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The Limits of International Environmental Law: Military Necessity v. Conservation

Alexander Gillespie

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I. INTRODUCTION

This paper analyzes the environmental regulations imposed on the military during preparation for possible conflicts, but does not focus on the tension between military and environmental interests during conflict itself.[1] Within this context, this paper is about the conflict between the interests of the military and the interests of conservation. The focus of this study is the impact of submarine detection techniques on the marine environment, particularly on cetaceans. The question that this paper seeks to answer is, what are the rules that apply, especially when looking at this problem in an international—as opposed to a domestic—context? While this question has been largely explored in domestic legal settings, it has not been examined in an international context. The unfortunate conclusion from this analysis is that although the military can be made to comply with the goals of international environmental law, either specifically or as part of a national effort, this is not the case when dealing with considerations of conservation on the high seas. For such rules on conservation, the exceptions for the military are clearer than in any other part of international environmental law, and it is only recently that some regional initiatives have attempted to challenge the presumption that military interests will always supersede conservation ones on the high seas.

II. DETECTING SUBMARINES AND PROTECTING CETACEANS

Some five hundred years ago, Leonardo da Vinci (1452–1519) noted, "if you cause your ship to stop and place the head of a long tube in the water and the other extremity to your ear, you will hear ships at a great distance from you."[2] Despite such long-standing recognitions, the study of noise in the ocean was largely a neglected subject until the rapid success of German U-Boats in the First World War. The astounding military success of these weapons demanded quick and effective responses. The first modern scientific work with regards to acoustics was in the development of portable directional hydrophones, which were fitted to warships. These hydrophones sought to detect submarines passively by hearing the sounds that the submarines emitted, such as the sounds of machinery, propeller rotation, and the use of compressed air in

1. For a full discussion of the rules and considerations pertaining to environmental protection in times of war, *see* ALEXANDER GILLESPIE, THE CUSTOMS AND LAWS OF WAR WITH REGARDS TO CIVILIANS IN TIMES OF CONFLICT, VOLUME II (Hart, Oxford 2011).

2. GOV'T DATA PUBL'NS, ANTI-SUBMARINE WARFARE 3 (1963).

ballast tanks. This work was supplemented by the development of hydrophones that were placed in tubes and towed behind warships. However, no sooner were these developed than the Germans embarked on programs to make their submarines quieter and therefore less detectable. The Anti-Submarine Division of the British Naval Staff responded by developing a technology known as ASDIC (Anti-Submarine Division supersonICs) which actively used a transmitter-receiver to send out a highly directional sound wave through the water. The sound wave was typically heard as a "ping" when it struck a submerged object, and then was echoed back as a "beep," which was then picked up by the receiver. However, the early models had a variety of problems: (1) they could not work on boats going faster than 15 knots; (2) they responded to reflective noise from all sources; and (3) they could not gauge depth, pick up the echo of a submarine on the surface, or be used within 100 yards of a submarine. As a result, this new technology was never deployed in force and only seven ships were fitted with ASDIC by the end of the First World War.[3]

During the 1920s and 1930s, engineers in the United States developed their own underwater sound detection technology. After technical information was exchanged between Britain and the United States during the Second World War, the United States began to use the term SONAR (originally an acronym for SOund Navigation And Ranging) for their systems, as an equivalent to RADAR. By the time of the Second World War, sonar was just one of the tools that had been utilized in the fight against enemy submarines. The sonar of the Second World War eventually progressed to a maximum range of 4,000 yards. Nevertheless, sonar of this epoch was a relatively unrefined technology that was subject to multiple errors. Echoes would bounce back from many things besides enemy submarines, such as whales, schools of fish, vertical sea currents, and ships' wakes. Water conditions, in terms of turbidity and temperature, could also reduce the effectiveness of the technology, as could the inexperience of its operators. Moreover, sonar was one of the lesser tools utilized in the defeat of enemy submarines, being overshadowed by the intelligence gathered through the breaking of the enigma code and the development of high-frequency direction finding technologies that could locate radio signals and radar (for detecting submarines on the ocean's surface). These latter technologies provided the ability to find submarines within a twenty-five mile radius, which was considerably more than the sonar operative at this point. Additionally, it was truly the supplemental air power, via both long-

3. DAVID OWEN, ANTI-SUBMARINE WARFARE: AN ILLUSTRATED HISTORY 39–42 (2007); BRAYTON HARRIS, THE NAVY TIMES BOOK OF SUBMARINES: A POLITICAL, SOCIAL, AND MILITARY HISTORY 50, 58–62 (2001).

range and carrier-based aircraft, that ultimately tipped the balance against enemy submarines. Thus, in the Second World War, sonar was not the primary instrument in antisubmarine warfare.[4]

After the end of the Second World War and with the beginning of the Cold War, the context of the concerns over enemy submarines began to change for four reasons. First, the magnitude of the submarine force was rapidly expanding. For example, by the mid-1950s the Soviets had produced about 500 submarines. Second, nuclear powered submarines began to appear, which radically altered the capacity of these vessels. By the turn of the twenty-first century, 245 nuclear submarines were being utilized by Russia, now the Soviet Union. These were matched by nuclear submarines possessed by the United States, France, the United Kingdom, China, and India. Argentina and Brazil are believed to also have intentions in this area. [5] Third, in addition to nuclear-powered submarines, diesel or diesel-electric submarines became increasingly popular. The importance of these submarines is that they are often more silent than their nuclear counterparts. The majority of modern submarines are believed to be possessed by China and Russia. In addition, more than twenty developing countries currently possess over 150 diesel attack submarines. Of note, it is estimated that North Korea has twenty-five, Iran has eleven, Libya has six and Pakistan has six.[6] According to the U.S. Navy's testimony before the Supreme Court, "[m]odern diesel-electric submarines pose a significant threat to Navy vessels because they can operate almost silently, making them extremely difficult to detect and track. Potential adversaries of the United States possess at least 300 of these submarines."[7]

Finally, and most importantly, submarines with nuclear weapons came to be recognized as perhaps the ultimate weapon. The focus, tracking, and pursuit of these submarines, capable of carrying nuclear warheads, has become the first priority for most navies of significance. For the U.S. Navy, this was especially true with the "boomers," which were Soviet submarines longer than a football field and carrying twenty ballistic missiles, with each missile possessing up to ten nuclear warheads. Thus, a single submarine was able to create a firestorm greater

4. OWEN, *supra* note 3, at 53, 56–57, 71–72.

5. *Id.* at 83, 87, 105, 192.

6. JOHN PARKER, MODERN SUBMARINES: AN ILLUSTRATED REFERENCE GUIDE TO UNDERWATER VESSELS OF THE WORLD 17–19, 56–71 (2009).

7. Winter v. NRDC, 555 U.S. 7, 12–13 (2008). For commentary on this case, see Joel R. Reynolds, Taryn G. Kiekow, & Steven Zak Smith, *No Whale of a Tale: Legal Implications of Winter v. NRDC,* 36 ECOLOGY L.Q. 753 (2009); Robin Kundis Craig, *Beyond Winter v. NRDC: A Decade of Litigating the Navy's Active Sonar Around the Environmental Exemptions,* 36 B.C. ENVTL. AFF. L. REV. 353 (2009).

than the combined power of all of the bombs dropped in the Second World War. In response, one United States Poseidon submarine could destroy every large and medium sized city in the Soviet Union. As such, learning about and tracking these weapons became the single biggest priority for all navies.[8]

After the Second World War, the tracking of enemy submarines has been an increasingly difficult goal to achieve because these vessels have continually evolved to avoid detection. In particular, submarines have been designed to stay beneath the surface for long periods, not utilize radio traffic, and be generally stealthy. While the United States and the United Kingdom were believed to have led the way in this area, in decades to come, potential adversaries were believed to have followed suit.[9]

Ever ingenious methods have been devised to help detect these increasingly invisible submarines. Whilst submariners have developed excellence in trying to avoid detection through the utilization of different ocean temperatures, salinity and seascape, those seeking these craft have developed a number of methods of detection. Within the technologies that are known (remembering that it is possible that other technologies exist which are not known in the public realm), the following are particularly notable: (1) the utilization of extreme low-frequency electric fields; (2) the search for magnetic anomalies when a vessel passes through an area; and (3) thermal scarring fields, which is caused by the unwelling of deeper cooler water pushed up to the surface by submarine hydrodynamic displacement effects. The examination of disruptions to biological luminance and residue contaminants, such as the leeching of antifouling paint or the leaking of lubricants, are also utilized in the search for submarines. Despite the ingenuity of each such method, they have all been found to be limited in one respect or another, and have remained second best to the only form of energy that can penetrate water masses at great distances—noise.[10]

Physically, there is no distinction between sound and noise. Sound is a sensory perception, and complex patterns of sound waves are found in music, speech, or noise. While sounds may be desirable, noise is often considered a nuisance as it has a negative connotation that can bring with

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8. SHERRY SONTAG & CHRISTOPHER DREW WITH ANNETTE LAWRENCE DREW, BLIND MAN'S BLUFF: THE UNTOLD STORY OF AMERICAN SUBMARINE ESPIONAGE xv–xvi (1998); DONALD C. DANIEL, ANTI-SUBMARINE WARFARE AND SUPERPOWER STRATEGIC STABILITY 4–7 (1986).

9. OWEN, *supra* note 3, at 199, 201; SONTAG, *supra* note 8, at 44.

10. DANIEL, *supra* note 8, at 40–50; W. CRAIG REED, RED NOVEMBER: INSIDE THE SECRET U.S-SOVIET SUBMARINE WAR, 142–144, 271–275 (2010).

it the view that it is the wrong sound, in the wrong place, or at the wrong time.[11] This identification of displeasure may be because the word "noise" is derived from the Latin word "nausea," meaning sea sickness. The link to sea sickness may have developed because of the importance of the ear to both sea sickness and noise.[12]

The hearing of sound depends both on the sound frequency, which is measured in Hertz (Hz) and the sound pressure on the eardrum, which is measured in decibels ("dB"). The unit, A-weighted "dB(A)", is used to indicate how humans hear a particular sound. A soft whisper at one meter away is about 30 dB(A). Noise levels below 30 dB(A), although often audible, are typically recognized as "low-frequency." For a good night's sleep, sound levels should not exceed 30 dB(A).[13] Although there are some forms of low-frequency noises that may need to be lower, individual noise events exceeding 45 dB(A) should be avoided. The sound pressure level of normal speech is about 50 dB(A), but for it to be intelligible, surrounding sound levels should be less than 35 dB(A). In a busy restaurant the level is roughly equivalent to 55 dB(A), while a busy intersection can generate noise levels of 75 dB(A).[14] Densely traveled motorways may generate noise levels in the range of 75 to 80 dB(A) and heavy industries, such as shipyards, average around 94 dB (A).[15] Portable music devices plugged directly into the ear and some music festivals can both exceed 100 dB(A). A chainsaw can reach 110 dB(A).[16] "Boom cars" equipped with powerful stereo systems can hit 140 to 150 dB(A) (the equivalent to standing next to a Boeing 747 with its engines at full throttle).[17] To avoid acute damage to the inner ear, adults should never be

11. BART KOSKO, NOISE 6–12 (2006).

12. CHARLTON T. LEWIS, A LATIN DICTIONARY 1191 (1966).

13. *See generally* GEOFF LEVENTHALL, A REVIEW OF PUBLISHED RESEARCH ON LOW FREQUENCY NOISE AND ITS EFFECTS (2003) (explaining the physics and affects of low frequency noise).

14. *See* Andy Coghlan, *Dying for Some Peace and Quiet*, NEW SCIENTIST, Aug. 2007, at 6–9 (discussing link between noise pollution and physical illness).

15. *See* WORLD HEALTH ORG., GUIDELINES FOR COMMUNITY NOISE (1999) (explaining adverse health effects of noise and sleep disturbance that is caused).

16. *See* Vlasta Mercier & Beat Hohmann, *Is Electronically Amplified Music Too Loud?: What Do Young People Think?*, NOISE AND HEALTH, July–Sept. 2002, at 48 (noting high sound level exposure from electronic devices); *see also* Vlasta Mercier & Beat Hohmann, *Sound Exposure of the Audience at a Music Festival*, NOISE AND HEALTH, Apr.–June 2003, at 51 (noting high sound level exposure from concerts and music festivals).

17. Ron Chepisuik, Decibel Hell, 113 ENVIRONMENTAL HEALTH PERSPECTIVES A34, A35, A37 (2005) (listing decibel levels of sounds).

exposed to more than 140 dB(A) of noise, even for very short periods. For children, the maximum noise level is 120 dB(A).[18]

Noise behaves differently in the ocean. Although the ocean is relatively opaque to light, it is relatively transparent to sound. Depending on the conditions of depth, temperature, salinity, and surface and bottom conditions, sound can travel four times faster in water than in air. Thus, depending on the variability of conditions, sound velocity can reach speeds of up to 1,600 meters per second in seawater, as compared to 350 meters per second in air. Moreover, transmission loss in water is much lower, and as a result, noises can be heard at great distances. It is expected that as the oceans' acidity changes in some areas due to climate change, existing noise absorption of sound below 1 kiloHertz ("kHz") could be decreased by up to forty percent.[19]

Integrated Underwater Surveillance Systems are comprised of fixed, mobile and deployable acoustic arrays that provide tactical information to anti-Submarine forces. The utilization of noise, either passively (just listening) or actively (propagating and waiting for a reply), is the core of most Integrated Underwater Surveillance Systems, In the United States, passive utilization is primarily found in the chains of sonar arrays which were, from the 1950s, mounted on the seabed to keep constant alert for passing submarines. These trip wire systems are modern day equivalents of the hydrophone arrays carried on ships used in the First World War. The differences are found in the scope and effectiveness of the modern systems. In ideal situations, noise signatures of submarines now can be picked up as far as 600 miles away. In terms of scope, these systems, which were originally placed down the East and West coasts of the United States, evolved into the Sound Surveillance System, which was deployed further out into international waters and at natural choke points, like the Greenland-Iceland-UK gap. By 1981, these systems also operated in the waters of the United Kingdom, Canada, Norway, Iceland, Denmark, and Italy, as well as off the shores of Turkey, Japan, the Aleutian island chain, Hawaii, Puerto Rico, Bermuda, Barbados, the Azores, Gibraltar, Panama, the Philippines, and Guam.

Military sonar can be conveniently categorized as mid-frequency or low-frequency. Mid-Frequency Active Sonar ("MFAS") has been used by Navies all over the world since the Second World War. Over 300 ships in the U.S. Navy alone are equipped with MFAS. MFAS employs frequencies of one to ten kHz and typically can detect objects one to ten nautical miles away. According to testimony from the U.S. Navy, MFAS

18. *See* WORLD HEALTH ORG., GUIDELINES FOR COMMUNITY NOISE (1999).

19. C. Brahic, *Hearing the Carbon Jolt Loud and Clear,* NEW SCIENTIST, Sept. 2008, at 10.

is "mission-critical" and "essential to national security," because it is the only proven method of identifying submerged diesel-electric submarines operating on battery power.[20] Low Frequency Active Sonar ("LFAS") uses sound frequencies of less than 1 kHz. This lower frequency suffers less attenuation in seawater and therefore can detect objects up to 100 nautical miles away. LFAS is currently operational on two ships in the U.S. Navy and one ship in the British Navy. A variation on LFAS is LFAS Surveillance Towed Array Sensor System ("SURTASS-LFAS"), which "sends out intense sonar pulses at low frequencies that travel hundreds of miles in order to timely detect increasingly quiet enemy submarines."[21] SURTASS utilizes a vertical line array of up to eighteen source projectors suspended below a vessel. The sonar beam is omni-directional (i.e. a full 360 degrees), at a nominal depth of 122 meters (400 feet). A complete sequence of transmissions is known as a 'ping' and lasts from six to one hundred seconds. The time between pings is usually between six to fifteen minutes. The source level of an individual projector is approximately 215 dB(A).[22] although they are believed to have "an effective sound level" of 230 to 240 dB. This would equate to about 180 dB(A) level one kilometer from the source, 173 dB(A) two kilometers away, 165 dB(A) forty nautical miles away, 150 dB(A) one hundred miles away, and 140 dB(A) up to four hundred miles from the source vessel.[23]

III. THE IMPACTS OF MILITARY SONAR UPON OCEANIC SPECIES

During the early years after the Second World War, experimentation with different levels of sonar produced unexpected results. For example, in the arctic, the sonar pings were found to be so similar to the mating call of the area's ring-necked seals that upon hearing the pings, the seals would start calling back to the submarine.

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20. *Winter,* 555 U.S. 7, at 14, 18.

21. NRDC v. Evans, *279 F. Supp. 2d 1129, 1137 (N.D. Cal. 2003)*. For commentary on the Evans case, see Carolyn M. Chopko Mongeon, *NRDC v. Evans: Northern District of California Delivers "Sound" Judgment in Protection of Marine Wildlife,* 15 VILL. ENVTL. L. J. 394 (2004).

22. CHIEF OF NAVAL OPERATIONS, DEP'T OF THE NAVY, FINAL COMPREHENSIVE REPORT FOR THE OPERATION OF THE SURVEILLANCE TOWED ARRAY SENSOR SYSTEM LOW FREQUENCY ACTIVE SONAR UNDER THE NATIONAL MARINE FISHERIES SERVICE REGULATIONS 1–2 (2007) [hereinafter SURTASS LFA REPORT] (In particular, see sections 3.1 and 4.11).

23. *See generally,* Jon M. Van Dyke, *Active Sonar & Shipments of Radioactive Materials,* 14 COLO. J. INT'L ENVTL L. & POL'Y 1, 1–8 (2003).

These calls would quickly multiply, with walruses joining in as well. In the early trials, the din went on for hours with seals answering the vessel and other seals, and walruses answering one another. Unsurprisingly, this wavelength and sound structure was abandoned, and new practices were adopted that did not promote courtship with the local mammals.[24]

The vast majority of the impacts of different anthropogenic noises upon the animal kingdom are not as benign as the above example would suggest. Since the 1950s, there have been many scientific studies on the effect of noise pollution on animals. This work began and continues largely in regard to endangered terrestrial species and birds.[25] The first study of the impact of ocean noise on marine biodiversity was conducted in 1971.[26] In the four decades since, scientists have conducted a large collection of ad hoc studies of the impacts on marine biodiversity. This is particularly so with regards to studies from the impacts of noise generated from seismic exploration, commercial shipping and military sonar.

The impact of military sonar upon cetaceans is the source of a large amount of scholarship, because, unlike the other two sources, noise pollution from military sonar has a strong linkage to whale strandings. However, this is not an easy thesis to prove, as whale strandings have been recorded throughout thousands of years of history. Many of these strandings may be attributed to natural and environmental factors, such as rough weather, weakness due to old age or infection, difficulty giving birth, hunting too close to shore, and navigation errors.[27] Against this background of natural incidents, it is difficult to determine whether noise pollution, and that caused by military sonar in particular, has increased the rate of strandings. However, the evidence showing the link between whale strandings and military sonar has been developing since the early 1990s.[28] Although the evidence in this area is far from conclusive, with regards to mid-frequency sonar, even the U.S. Navy agrees that in certain circumstances, mid-frequency (but *not* low-frequency)[29] sonar can be directly linked to the strandings of marine mammals.

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24. SONTAG, *supra* note 8, at 236.

25. Adam Anthony et al., *Noise Stress in Laboratory Rodents* 31 J. ACOUSTICAL SOC'Y AM. 1430, 1437 (1959); Carl Hopkins, *How Noise Effects Wildlife,* 29 BIOSCIENCE 547 (1979) (reviewing JOHN L. FLETCHER & R. G. BUSNEL, EFFECTS OF NOISE ON WILDLIFE (1978).

26. *See* Roger Payne & Douglas Webb, *Orientation by Means of Long Range Acoustic Signaling in Baleen Whales,* 188 ANN. N.Y. ACAD. OF SCI. 110, 110 (1971).

27. FRAN HODGKINS, SOLVING THE MYSTERY OF WHALE STRANDINGS 7–16 (2007).

28. M. P. Simmonds et al., *Whales and the Military,* 351 NATURE 448, 448 (1991).

29. SURTASS REPORT, *supra* note 22, at 48–49; CHIEF OF NAVAL OPERATIONS, DEP'T. OF THE NAVY, FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR

The Navy has conducted extensive research on this issue, including testing the effects of certain active sonar systems on some marine species. Research concerning active sonar's potential effects has demonstrated that, under certain circumstances and conditions, use of active sonar has an effect upon particular marine species. [30]

This is especially so with the relatively unknown, deep diving, beaked whales in certain geographical locations.[31] This concession is consistent with the occurrence of beached whales during mid-frequency sonar training exercises in the Canary Islands (2004, 2002, 1989, 1986, 1985);[32] Madeira (2000); Spain (2006); the U.S. Virgin Islands (1999, 1998); Greece (1996);[33] and around Britain and Ireland (2008).[34] Of this collection, one of the best-documented incidents occurred in the Bahamas in 2000, when sixteen beaked whales were stranded along fifteen miles of shoreline during a U.S. Navy exercise. Following this stranding in 2000, the National Oceanic and Atmospheric Administration and the National Marine Fisheries Service issued a joint interim report. This report concluded that the U.S. Navy's use of tactical mid-range frequency sonar, was in this instance, the "most plausible source of this acoustic or impulse trauma."[35] Further strandings that overlapped with military exercises using mid-frequency sonar off Hawaii in 2004 and North Carolina in 2005 were considered by the Navy to be "a plausible,

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SURVEILLANCE TOWED ARRAY SENSOR SYSTEM LOW FREQUENCY SONAR ES-10–ES-15 (2007) [hereinafter SURTASS LFA SUPPLEMENTAL REPORT].

30. SURTASS LFA SUPPLEMENTAL REPORT, *supra* note 29, at ES-18–*ES*-19.

31. T. M. Cox Hildebrand et al., *Understanding the Impacts of Anthropogenic Sound on Beaked Whales,* 7 J. CETACEAN RES. & MGMT. 177, 177–187 (2006); S. A. Rommel et al., *Elements of Beaked Whale Anatomy and Diving Physiology and Some Hypothetical Causes of Sonar-Related Stranding*, 7 J. CETACEAN RES. & MGMT. 189, 189–209 (2006); Colin D. MacLeod et al., *A Review of Beaked Whale Behavior and Ecology in Relation to Assessing and Mitigating Impacts of Anthropogenic Noise,* 7 J. CETACEAN RES. & MGMT. 211, 211–221 (2006); R. Edwards, *Sonar Kills Whales*, NEW SCIENTIST, Oct. 2003, at 10.

32. Angela D'Amico et al., *Beaked Whale Strandings and Naval Exercises,* 35 AQUATIC MAMMALS 452, 456, 458, 462; Simmonds, *supra* note 28, at 448; Vidal Martín et al., *Mass Strandings of Beaked Whales in the Canary Islands,* 42 EUR. CETACEAN SOC'Y NEWSL. 33, 33 (2004).

33. D'Amico, supra note 33; A. Frantzis, *Does Acoustic Testing Strand Whales?*, 392 NATURE 29, 29 (1998).

34. Sarah J. Dolman, et al., *A Note on the Unprecedented Strandings of 56 Deep Diving Whales Along the UK and Irish Coast,* 3 MARINE BIODIVERSITY RECS. 1, 1–8 (2010).

35. NAT'L MARINE FISHERIES SERVICE, U.S. DEP'T OF COMMERCE, JOINT INTERIM REPORT BAHAMAS MARINE MAMMAL STRANDING EVENT OF 15–16 MARCH 2000 ii (2001); Jeff Hecht, *Navy Accepts Blame For Whale Deaths,* NEW SCIENTIST, Jan. 2002, at 12, 15; James Hrynyshyn, *Going Round the Bend,* NEW SCIENTIST, Dec. 2001, at 17.

if not likely, contributing factor in what may have been a confluence of events"[36] (in the case of Hawaii) or a possible, but inconclusive, overlap (in the case of North Carolina).[37]

The whales that appear most vulnerable to military sonar are beaked whales. Beaked whales include twenty-one species of toothed whales, which are members of the family *Ziphiidae* and notable for their elongated snouts. Beaked whales are one of the least known groups of sea mammals. Several species have yet to be formally described or named; other species are known only from remains and have never been sighted alive. Only three to four of the twenty species are reasonably well-known. What is known is that beaked whales are the world's most extreme divers. They can dive for up to one hour and reach depths of nearly 1,900 meters. To avoid getting decompression sickness—the potentially fatal build-up of nitrogen bubbles in body tissues—they must surface slowly. Research suggests that their complex dive patterns and communication could be changed in response to sonar signals, either by surfacing more quickly than usual, disrupting a series of near-surface dives between deep dives, or triggering an extended fleeing response. In some unusual circumstances, such as certain confluences of particular bathymetric conditions or deep near-shore canyons, with shorelines limiting escape routes, modifications of behavior may lead to strandings or death.[38] Evidence suggests that the most serious effect of this process is the evolution of gas bubbles in their tissues, driven by behaviorally altered dive profiles (such as extended surface intervals). It has been predicted that the tissues of beaked whales are supersaturated with nitrogen gas on ascent due to the characteristics of their deep-diving behavior. The lesions observed in beaked whales that strand after interacting with sonar are consistent with, but not diagnostic of, decompression sickness. This is similar to what is commonly known as

36. BRANDON L. SOUTHALL ET AL., U.S. DEP'T OF COMMERCE, HAWAIIAN MELON-HEADED WHALE (*PEPONACEPHALA ELECTRA*) MASS STRANDING EVENT OF JULY 3–4, 2004, 2 (2006).

37. ALETA A. HOHN ET AL., U.S. DEP'T OF COMMERCE, REPORT ON MARINE MAMMAL UNUSUAL MORTALITY EVENT UMESE0501SP: MULTISPECIES MASS STRANDING OF PILOT WHALES (GLOBICEPHALA MACRORHYNCHUS), MINKE WHALE (BALAENOPTERA ACUTOROSTRATA), AND DWARF SPERM WHALES (KOGIA SIMA) IN NORTH CAROLINA ON 15–16 JANUARY 2005, 2–3 (2006).

38. J. Hildebrand et al., *Understanding the Impacts of Anthropogenic Sound on Beaked Whales,* 7 J. CETACEAN RES. & MGMT. 177–187 (2006); S.A. Rommel et al., *Elements of Beaked Whale Anatomy and Diving Physiology and Some Hypothetical Causes of Sonar-related Stranding*, 7(3) J. CETACEAN RES. & MGMT. 189–209 (2006); Colin D. MacLeod & Angela D'Amico, *A Review of Beaked Whale Behavior and Ecology in Relation to Assessing and Mitigating Impacts of Anthropogenic Noise*, J. CETACEAN RES. & MGMT. 211–221 (2006).

"the bends" in humans, and these injuries are known as "gas and fat embolic syndrome."[39]

To help build certainty in this area, a number of scholars have attempted to establish databases that show an overlap between military exercises using mid-frequency (*not* low-frequency) sonar and mass strandings of cetaceans. From such databases, a correlation was shown along the Japanese coast near Yokosuka, one of the primary bases for United States naval activity in the western Pacific, with ten mass strandings reported since the early 1950s and sixty-four beaked whales stranded individually. By comparison, only two other possible mass strandings of beaked whales are known to have occurred over the rest of the entire Pacific coast of Japan.[40] Similarly, a correlation appears evident with the historic strandings of beaked whales and naval operations in both the Mediterranean and the Caribbean from the early 1990s. However, in other parts of the world, such as with southern California between 1982 and 2007, there was no such overlap.[41] This last example, supplemented by the omission of "a single documented sonar-related injury to any marine mammal" of any cetacean deaths during 40 years of training exercises off Southern California was influential in the U.S. Supreme Court's decision to downgrade the risks of this technology.[42]

Although methodologies for the assessment of the environmental burdens and their impact are difficult in all fields, noise pollution is an especially challenging area. These difficulties are due to the multiple pathways that noise pollution can take, its cumulative impact, its failure

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39. *See* A. Fernández et al., *Gas and Fat Embolic Syndrome: Involving a Mass Stranding of Beaked Whales Exposed to Anthropogenic Sonar Signals,* 42 VETERINARY PATHOLOGY 446, 446–457 (2005); P. D. Jepson et al., *Gas Bubble Lesions in Stranded Cetaceans,* 425 NATURE 575, 575 (2003); Four major research priorities, needed to address information gaps on the impacts of sound on beaked whales have been identified as: (1) controlled exposure experiments to assess beaked whale responses to known sound stimuli; (2) investigation of physiology, anatomy, pathobiology and behavior of beaked whales; (3) assessment of baseline diving behavior and physiology of beaked whales; and (4) a retrospective review of beaked whale strandings.

40. R. Brownell, T. Yamada, J. G. Mead, & A. L. Helden, *Mass Stranding of Cuvier's Beaked Whales in Japan: U.S. Naval Acoustic Link?* (2004), (unpublished paper SC/56/E37 presented to the IWC Scientific Committee), (on file with the Office of the Journal of Cetacean Research and Management and reported out of the IWC Scientific Committee).

41. Ronald Filadelfo et al., *Correlating Military Sonar Use with Beaked Whale Mass Strandings: What Do the Historical Data Show?,* 35 AQUATIC MAMMALS 435, 435; Michela Podesta et al., *A Review of Cuvier's Beaked Whale Strandings in the Mediterranean Sea,* 7 J. CETACEAN RES. MGMT. 251, 251–261 (2006).

42. *Winter*, 555 U.S. at 14.

to leave a residue, and the vast differences between and within species' responses to noise.[43] Thus, it often becomes difficult, as has been pointed out in the courts of the United States, to find exactly where a level of noise is "biologically significant" to a species.[44] That is, when exactly does noise induce long-term abandonment of an area important for feeding, breeding, or rearing the young, leading to a reduction in fecundity, carrying capacity, or both? Such impacts may not become immediately apparent and could be modified by habituation, sensitization, hearing loss, physiological damage, and stress. It may be that such "indirect" stresses more seriously affect many marine species over the long term, as their efficiencies in foraging, navigation, or communication may be compromised. This may be especially so if the populations are already endangered and anthropogenic noise affects long-term reproductive success.[45] Accordingly, as the 2005 Report of the U.S. National Research Council explained, when trying to ascertain the biologically significant impacts upon marine mammals from ocean noise, "there was a consensus that we are a decade away or more from having the data and understanding of the transfer functions needed to turn such a conceptual model into a functional, implementable tool."[46]

The multitude of scientific gaps in this area have been noted by the International Council for the Exploration of the Sea[47] and the 1994,[48]

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43. COMM. ON POTENTIAL IMPACTS OF AMBIENT NOISE IN THE OCEAN ON MARINE MAMMALS, NAT'L RESEARCH COUNCIL, OCEAN NOISE AND MARINE MAMMALS 6–7 (2003) [hereinafter NRC 2003]; INT'L COUNCIL FOR THE EXPLORATION OF THE SEA ADVISORY COMM. ON ECOSYSTEMS, INT'L COUNCIL FOR THE EXPLORATION OF THE SEA, REPORT OF THE AD-HOC GROUP ON THE IMPACTS OF SONAR ON CETACEANS AND FISH 2, 3, 13–15, 39. (2nd ed. 2005) [hereinafter ICES REPORT].

44. NRDC v. Evans, 279 F. Supp. 2d 1129, at 1155*; see also*, NRDC v. United States Dep't of the Navy, 2002 WL 32095131, at *12.

45. STATE HEALTH AGENCY OF BADEN-WÜRTTEMBERG, WORLD HEALTH ORG., EXPERTS CONSULTATION ON METHODS OF QUANTIFYING BURDEN OF DISEASE RELATED TO ENVIRONMENTAL NOISE (2007); DAVID KAY, ANNETTE PRÜSS & CARLOS CORVALÁN,. WORLD HEALTH ORG., METHODOLOGY FOR ASSESSMENT OF THE ENVIRONMENTAL BURDEN OF DISEASE (2000); ICES Report, *supra* note 44, at 13, 15–17, 36–37; COMM. ON CHARACTERIZING BIOLOGICALLY SIGNIFICANT MARINE MAMMAL BEHAVIOR, NAT'L RESEARCH COUNCIL, MARINE MAMMAL POPULATIONS AND OCEAN NOISE: DETERMINING WHEN NOISE CAUSES BIOLOGICALLY SIGNIFICANT EFFECTS 3 (2005) [hereinafter NRC 2005]; NRC 2003, *supra* note 44, at 4–6; COMM. TO REVIEW RESULTS OF ATOC'S MARINE MAMMAL RESEARCH PROGRAM, NAT'L RESEARCH COUNCIL, MARINE MAMMALS AND LOW-FREQUENCY SOUND: PROGRESS SINCE 1994 3 (2000) [hereinafter NRC 2000].

46. ICES REPORT, *supra* note 44, at 2, 10–13, 15–17, 36–38; NRC 2005, *supra* note 46, at 4, 34; NRC 2000, *supra* note 46, at 3, 59; NRC 2003, *supra* note 44, at 4–6.

47. M. L. TASKER ET AL., THE MARINE STRATEGY FRAMEWORK DIRECTIVE: TASK GROUP 11, UNDERWATER NOISE AND OTHER FORMS OF ENERGY 33–35, 36 (2010); ICES REPORT, *supra* note 44, at 12–23, 47–49.

2000,[49] 2003,[50] and 2005[51] reports of the National Research Council. Similar calls highlighting the scientific gaps in this area have been made by the specialist cetacean organizations that operate within international law, namely the International Whaling Commission,[52] the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area[53] and the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas.[54] In addition, a number of scientific studies[55] along with the European Parliament,[56] the United States,[57] and the United Nations General Assembly[58] have called for collaborative international scientific investigations into the topic of anthropogenic noise pollution in the oceans. Following through, in 2010, the Secretariat of the Convention on Biological Diversity was

48. COMM. ON LOW-FREQUENCY SOUND AND MARINE MAMMALS OCEAN STUDIES BD., NAT'L RESEARCH COUNCIL, LOW-FREQUENCY SOUND AND MARINE MAMMALS: CURRENT KNOWLEDGE AND RESEARCH NEEDS (1994).

49. NRC 2000, *supra* note 46.

50. NRC 2003, supra *note* 44.

51. NAT'L RES. COUNCIL, MARINE MAMMAL POPULATIONS AND OCEAN NOISE: DETERMINING WHEN NOISE CAUSES BIOLOGICALLY SIGNIFICANT EFFECTS (2005).

52. *See generally* INT'L WHALING COMM'N, REPORT OF THE SCIENTIFIC COMMITTEE OF THE IWC, IWC/61/Section 12.4, *available at* http://swfsc.noaa.gov/uploadedFiles/Divisions/PRD/Programs/Photogrammetry/SC%20Report%20%20A-C.pdf?n=9220.

53. *See* AGREEMENT ON THE CONSERVATION OF CETACEANS OF THE BLACK SEA, MEDITERRANEAN SEA, AND CONTIGUOUS ATLANTIC AREA, ASSESSMENT AND IMPACT ASSESSMENT OF MAN-MADE NOISE, ACCOBAMS Res. 2.16 (2004) [hereinafter ACCOBAMS Res. 2.16].

54. *See* 4th Meeting of the Parties to ASCOBANS, Esbjerg, Den., Aug. 19–22, 2003, *Effects of Noise and of Vessels*, Res. 5, § 3.

55. *See generally*, INT'L WHALING COMM'N, REPORT OF THE SCIENTIFIC COMMITTEE § 12.2.5. (2004); NRC 2000, *supra* note 46, at 4, 7; NRC 2003, *supra* note 44, at 7, 11; Note also ACCOBAMS Res. 2.16, *supra* note 54.

56. Resolution on the Environmental Effects of High-Intensity Active Naval Sonars, EUR. PARL. DOC. (B6-0089) 5 (2004).

57. *See* International Union for the Conservation of Nature and Natural Resources, World Conservation Congress, Bangkok, Thail., Nov. 17–25, 2004, Resolutions and Recommendations 3.068 (2005); The Statement, attached to the end of the resolution. *See also* U.S. MARINE MAMMAL COMM'N, MARINE MAMMALS AND NOISE: A SOUND APPROACH TO RESEARCH AND MANAGEMENT, iii–iv (2007); U.S. COMM'N ON OCEAN POLICY, OCEAN BLUEPRINT FOR THE 21ST CENTURY 315–316 (2004).

58. *See* G.A. Res. 65/37A, ¶ 186, U.N. Doc. A/RES/65/37A (Dec. 7, 2010); For the earlier recognition of the same point, see G.A. Res. 64/71, ¶ 162, U.N. Doc A/RES/64/71 (Dec. 4, 2009); G.A. Res. 63/111, ¶ 141, U.N. Doc A/RES/63/111 (Dec. 5, 2008); G.A. Res. 62/215, ¶ 120, U.N. Doc A/RES/62/215 (Dec. 22, 2007); G.A. Res. 61/222, ¶ 107, U.N. Doc; A/RES/61/222 (Dec. 20, 2006); and G.A. Res. 60/30, ¶ 84, U.N. Doc A/RES/60/30 (Nov. 29, 2005).

instructed to compile and synthesize available scientific information on anthropogenic underwater noise and its impacts on marine and coastal biodiversity and habitats, for consideration at a future meeting prior to the eleventh meeting of the Conference of the Parties.[59]

IV. THE MILITARY AND CONSERVATION IN A DOMESTIC CONTEXT

Not surprisingly, against these growing concerns, a number of conservation groups have attempted to force the naval exercises utilizing sonar to be either abandoned or modified. All of the legal work on this topic has, to date, been conducted within domestic settings, and that of the United States in particular.

The domestic laws at issue over this topic in the United States are the Endangered Species Act,[60] the Marine Mammals Protection Act,[61] the

59. Tenth Meeting of Parties to the Convention on Biological Diversity, Nagoya, Japan, Oct. 18–20, 2010, *Decision X/13, New and Emerging Issues,* ¶ 2(b); *see also id. at Decision X/29, Marine and Coastal Biodiversity*, ¶ 12.

60. The Endangered Species Act of the United States was enacted in 1973 in order to, "provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] . . . to provide a program for the conservation of such endangered species and threatened species." *16 U.S.C. § 1531(b) (2011)*. This Act requires each federal agency to "insure that any action authorized, funded, or carried out by [federal] agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary [of the Interior or of Commerce] . . . to be critical." *16 U.S.C. § 1536(a)(2) (2011)*. To satisfy this mandate, an agency must inquire of the Fish and Wildlife Service whether any threatened or endangered species may be present in the area of proposed action. If the answer is in the affirmative, they must prepare a biological assessment, normally as part of environmental impact assessment, to see if the species is "likely to be effected." If the answer is positive, the agency must consult with the Fish and Wildlife Service, and the latter must produce a "biological opinion." If this shows the actions will jeopardize the species or destroy or adversely modify critical habitat, then the action may not go forward unless an alternative that avoids such destruction of adverse modification is found. For a good discussion of this Act in this setting, see STEPHEN DYCUS, NATIONAL DEFENSE AND THE ENVIRONMENT 30–35 (1996). For this Act when in conflict with the military in court, see *Sierra Club v. Glickman*, 156 F.3d 606 (5th Cir. 1998).

61. 16 U.S.C. § 1361 (1988). This Act is aimed primarily at the prevention of commercial whaling, as well as fishing that incidentally kills or injures ocean mammals. However, the act makes any hunting, capture, killing, harassment, or trade of a marine mammal unlawful without a permit from the Secretary of Commerce. Thus, the Act applies to national defense activities that might threaten cetaceans. The Navy had experience with this Act during the 1980s because of their taking and utilization of dolphins for military purposes. *See* Citizens to End Animal Suffering and Exploitation v. The New England Aquarium, 836 F. Supp. 45 (D. Mass. 1993).

Coastal Zone Management Act,[62] and the National Environment Policy Act.[63] While all of these laws have a strong conservation focus, they also have exemptions built into them allowing for necessary military objectives to trump conservation concerns. These exceptions were either built in originally at the time of drafting, or subsequently. However, before these subsequent amendments, which gave giving greater leeway to military needs, there was clearly a different trend in the decade between the end of the Cold War in 1991 and the attacks on the United States in 2001. This trend began, following some high profile noncompliance by the military, with environmental statutes.[64] Following the high profile noncompliance the then Secretary of Defense, Dick Cheney, issued a memorandum to the Secretaries of the Army, Navy, and Air Force declaring that:

> The Department of Defense will be the Federal Leader in agency compliance and protection. We must demonstrate commitment with accountability for responding to the Nations environmental agenda . . . defense and the environment is not an either/or proposition. To choose between them is impossible in this real world of serious defense threats and genuine environmental concerns.[65]

Following through, the Department of Defense and the associated wings of the military began to integrate environmental considerations into their work to a much greater extent. For example, in 1996, the Department of Defense issued a directive announcing its policy to "display environmental security leadership within DoD activities worldwide . . . [by] ensuring that environmental factors are integrated into DoD decision making processes . . . [and] protecting, preserving, and, when required, restoring and enhancing the quality of the environment."[66] The high tide of these efforts, which were reflected in

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62. 16 U.S.C. §§ 1451–1464 (1988). The Coastal Zone Management Act requires planning for activities that affect the nation's coastal waters and adjacent shore-lands. Each coastal state is encouraged through federal financial assistance to develop a management program approved by the Secretary of Commerce. And federal agency activity affecting the coastal zone of a state with an approved program must be "consistent with" that program "to the maximum extent practicable."

63. The National Environmental Policy Act, *42 USCA § 4321.*

64. United States v. Dee, 912 F.2d 741 (4th Cir. 1990).

65. Julie J. Yap, *Just Keep Swimming: Guiding Environmental Stewardship Out of the Riptide of National Security*, 73 FORDHAM Law L. REV. 1289, 1291 (quoting Dick Cheney's address to the Defense and Environmental Initiative Forum, September 3rd, 1990). Note also Nancy Bethurem, *Environmental Destruction in the Name of National Security,* 8 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 109, 115.

66. DEP'T OF DEF. Directive No. 4715 (Feb. 24, 1996). This Directive was cancelled in 2005, and replaced with a new one which omitted all of the language quoted above, and commits the government only to compliance with "applicable laws and DoD

numerous countries, was found in early 2001, when the Military Environmental Responsibility Act was introduced to the House of Representatives.[67] This revolutionary piece of legislation sought to make all of the military departments comply with all Federal and State laws designed to protect the environment or the health and safety of the public to the same extent as all other entities subject to those laws.[68]

Although the environmental progress between 1991 and 2001 was slow, at least it was slow progress, opposed to the regression post September 11, 2001, when environmental laws within the United States were quickly restricted.[69] This occurred because Congress granted a series of new exemptions or widening of rights within the existing laws because the military argued that it was unable to train correctly because its training areas (which have been expanded greatly since the middle of the twentieth century)[70] were being increasingly encroached upon,[71] thus causing it to lose its military edge. Following an overt push back authorizing the Secretary of Defense "to address training constraints caused by limitation on the use of military lands, marine areas and airspace that are available in the United States and overseas for training of the Armed Forces,"[72] the Readiness and Range Preservation Initiative emerged as a tool to counter what was perceived as environmental laws that were preventing the military from being fully prepared.[73] Although

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policies." DEP'T OF DEF. Directive No. 4715, *Environmental Safety and Occupational Health* § 4.6 (Mar. 9, 2005).

67. For similar approaches to this question in Europe, *see* RACHEL WOODWARD, MILITARY GEOGRAPHIES 85–90, (2004).

68. *See* Military Environmental Responsibility Act, H.R. 2154, 107th Congress (2001).

69. F.R. DURANT, THE GREENING OF THE U.S. MILITARY 155–175, (2007); Richard Lazarus, *A Different Kind of Republican Movement in Environmental Law,* 87 MINN. L. REV. 999 (2003).

70. SUSAN S. LANIER-GRAHAM, THE ECOLOGY OF WAR 88 (1993).

71. The Department of Defense uses the term "encroachment" to describe "the cumulative result of any and all outside influences that inhibit normal military training and testing." The eight encroachment issues of concern are urban growth around military installations and training ranges, radio frequency interference, air pollution, noise pollution, airspace interference, unexploded munitions, and endangered species habitat and protected marine reserves. Urban sprawl is recognized as the foremost concern in this area. *See* Ryan Santicola, *Encroachment: Where National Security, Land Use, and the Environment Collide*,10 ALB. L. ENVTL. OUTLOOK J. 329; *see also*, United States Army Legal Servs. Agency, *USALSA Report: Environmental Law Division Notes: Encroachment: Putting the Squeeze on the Department of Defense,* ARMY LAWYER, Dec. 2001, at 33.

72. National Defense Authorization Act, Pub. L. No. 107–314, § 366, 116 Stat. 2458, 2522 (2002).

73. National Defense Authorization Act, Pub. L. No. 108–136, § 319, 117 Stat.

remaining committed to "environmental stewardship," a number of exemptions were subsequently created for the laws pertaining to endangered species,[74] coastal zone management[75] and marine

1392, 1434 (2004). For commentary, see Marcilynn Burke, *Green Peace? Preserving Our National Treasures While Providing for Our National Security*, 32 WM. & MARY ENVTL. L. & POL'Y REV., 803, 804–806 (2008) and Stephen Dycus, *Osama's Submarine: National Security and Environmental Protection After 9/11*, 30 WM. & MARY ENVTL. L. & POL'Y REV., 1, 2–3 (2005).

74. The ESA already contained a broad exemption for national security reasons. Specifically, "[n]otwithstanding any other provision of this Act, the Committee shall grant an exemption for any agency action if the Secretary of Defense finds that such exemption is necessary for reasons of national security." This exemption is not subject to the discretion of the Committee, but is dependent only upon certification by the Secretary of Defense. The military has traditionally viewed the exemption as an extraordinary remedy, to be invoked as a measure of last resort in wartime. It has never been used, and during recent decades it appeared that this was likely to remain the practice. However, National Defense Authorization Act for Fiscal Year 2004, Pub. L. No. 108–136, §318, 117 Stat. 1433 (2003), took this further, with limiting the designation of critical habitat under the Endangered Species Act—if a military site was already in accordance with the 1960 (and subsequently updated) Sykes Act. This Act has consistently tried to promote effectual planning, development, maintenance, and coordination of wildlife, fish, and game conservation and rehabilitation in military reservations. However, this Act has always been clear that this had to be "consistent with the use of military installations to ensure the preparedness of the Armed Forces." For a useful background to this push, *see* Major David N. Diner, *The Army and the Endangered Species Act: Who's Endangering Whom?*, 143 MIL. L. REV. 161, 200–233 (1994).

75. Federal lands (of which the military has a strong stake) were specifically excluded from the Act's definition of coastal zone. Nevertheless, considerable uncertainty existed over the extent of the military obligations in this area. *See* Friends of the Earth v. United States Navy, 841 F.2d 927 (9th Cir. 1988); Richard Lee Kuersteiner et al., *Protecting our Coastal Interests: A Policy Proposal for Coordinating Coastal Zone Management, National Defense, and the Federal Supremacy Doctrine*, 8 B.C. ENVTL. AFF. L. REV 705 (1979). As was further explained in the Supreme Court, the President, pursuant to 16 U.S.C. § 1456(c)(1)(B) (2011), granted the Navy an exemption from the CZMA. Section 1456(c)(1)(B) permitted such exemptions if the activity in question is "in the paramount interest of the United States." The President determined that continuation of the exercises as limited by the Navy was "essential to national security." Thus, the President concluded that compliance with the District Court's injunction in this area would "undermine the Navy's ability to conduct realistic training exercises that are necessary to ensure the combat effectiveness of . . . strike groups." *Winter v. NRDC,* 555 U.S. 7, 17 (2008). In 2008, the Secretary of Commerce requested further, that the that the President exempt the Navy from section 307(c)(a)(a) of the CZMA, certifying that mediation under § 1456(h) was not likely to result in compliance with 1456(c)(1)(a). President Bush determined that, "compliance would undermine the Navy's ability to conduct realistic training exercises that are necessary to ensure the combat effectiveness of carrier and expeditionary strike groups. This exemption will enable the Navy to train effectively and to certify carrier and expeditionary strike groups for deployment of worldwide operational and combat activities, which are essential to national security." Marcilynn A. Burke, *Green Peace? Protecting our National Treasures While Providing*

mammals.[76] Moreover, the courts have consistently taken a hard line in limiting the application of the National Environmental Policy Act when conservation priorities have conflicted with military priorities. In particular, the underlying theme that the National Environmental Policy Act ("NEPA") "is a procedural statute . . . [that] does not force an agency to reach substantive, environment-friendly outcomes" is never far from the surface.[77] Courts have also been clear that they will not "flyspeck" an agency's environmental analysis, looking for any deficiency, no matter how minor,[78] and therefore, transgressions must be substantive for them to get involved.[79] Finally, and most substantively, when dealing with certain issues of high military importance, the courts will not demand that the military reveal its secrets in order to show compliance with the requirements of environmental impact assessments. In such instances, "ultimately, whether or not the navy has complied with the NEPA to the fullest extent possible is beyond judicial scrutiny."[80]

The cumulative results of the existing practices, and all of the changes noted above, is that it is very rare for any American court to absolutely prohibit the military from carrying out those activities that the military (or more specifically, the President and Congress) considers to

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for Our National Security, 32 WM. & MARY ENVTL. L. & POL'Y REV. 803, 831 (2007–2008).

76. In 2003, Congress, through the National Defense Authorization Act for Fiscal Year 2004, Pub. L. No. 108–136, §319, 117 Stat. 1434 (2003*)* amendments to the MMPA (section 319 of the 2004 Act, dealing with "exemptions of actions necessary for national defense" gave the Navy greater leeway to use LFAS if necessary for national defense. This was done by narrowing the definition of "harassment" in the MMPA for "military readiness activities" to cover (1) acts that actually injure or have a significant potential to injure marine mammals – mere potential is not enough and (2) acts that actually disturb or are likely to disturb to such a degree that behavioral patterns are abandoned or significantly altered . . . earlier requirements of advance publicity in local newspapers, opportunity for public comment, eliminated . . . finally the amendment allows the Secretary of Defense to exempt any action or category of actions from compliance with the MMPA for up to two years if they determine that it is "necessary for national defense" —this brings the Act into line with most other similar acts. For a discussion of this, *see* Stephen Dycus, *Osama's Submarine: National Security and Environmental Protection After 9/11*, 30 WM. & MARY ENVTL. AFF. L. & POL'Y REV. 1, 35–37 (2005–2006).

77. Nat'l Audubon Soc'y v. Navy, 422 F.3d 174, 184 (4th Cir. 2005).

78. *Id.* at 186.

79. Australians for Animals v. Evans, 301 F. Supp. 2d 1114, 1120 (N.D. Cal., 2004).

80. Weinberger v. Catholic Action of Hawaii, 45 U.S. 139, 146 (1981). For an overview of this area, see Randall Abate, *NEPA, National Security and Ocean Noise: The Past, Present and Future of Regulating the Impact of Navy Sonar on Marine Mammals,* 13 J. INT'L WILDLIFE L. & POL'Y 326, 349–355 (2010).

be necessary. These issues are, ultimately, not open to judicial inquiry.[81] In this regard, the Supreme Court has acknowledged that with regards to military matters: "[J]udges are not given the task of running the Army . . . . Orderly government requires that the judiciary be as scrupulous not to interfere with legitimate Army matters as the Army must be scrupulous not to interfere in judicial matters."[82]

Accordingly, when dealing with environmental matters, if some act is deemed "essential" for military purposes, courts will usually permit the activity to proceed, even if it is in breach of various environmental statutes.[83] This was most evident in the Supreme Court case *Winter v. NDRC*, where although it was agreed that "military interests do not always trump other considerations,"[84] if the interests are essential. In *Winter* MFA sonar was deemed "mission-critical [and] essential to

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81. United States v. 243.22 Acres of Land in Babylon, NY, 129 F.2d 678, 683 (2d Cir. 1942); Gilligan v. Morgan, 413 U.S. 1, 10 (1973); Schlesinger v. Ballard, 419 U.S. 498, 510 (1975).

82. Orloff v.Willoughby, 345 U.S. 83, 93–94 (1953).

83. *See* Barcelo v. Brown, 478 F. Supp. 646 (D.P.R. 1979). In this case, the defendants (the United States Navy) was charged with violating 17 different environmental laws during their military exercises on Vieques Island, Puerto Rico. Although many of these were not upheld, a number were. Accordingly, the court ordered the United States Navy to promptly comply with the technical requirements of three federal environmental and historic preservation statutes that it had violated. However, the Court refused to place a permanent injunction on the continued use of the island for military purposes, allowing the exercises to continue on the proviso that the Navy comply with the identified areas. The United States District Court for Puerto Rico held, "under the present circumstances the continued use of Vieques by Defendant Navy for naval training activities is essential to the defense of the Nation and that the enjoining of said activities is not an appropriate relief for the correction of the cited statutory violations." This was very similar to the earlier 1977 case of *Aluli v. Brown,* 437 F. Supp. 602, (D. Haw. 1977), where the District Court for the District of Hawaii, refused to order the navy to stop conducting bombing activities on an uninhabited Hawaiian island, although they were ordered to comply with the environmental and cultural laws and regulations that they had avoided. After prolonged legal debate, the Navy finally stopped utilizing the island in 2003. For a contemporary example of this, see *Nat'l Audobon Soc'y v. Gordon*, 422 F.3d 174 (4th Cir. 2005). In this case, the Navy had to comply with the NEPA, so they could not start building a new airfield, but they could still proceed with certain specific steps prefatory to possible construction. In addition, the Court was clear they would not second guess the navy in matters of military readiness, and as such, would not grant broad injunctions in this case. *See* Barcelo v. Brown, 478 F. Supp. at 694.

84. Winter v. NRDC, 555 U.S. 7, 9 (2008). For commentary on this case, *see* Joel Reynolds, *Submarines, Sonar and the Death of Whales: Enforcing the Delicate Balance of Environmental Compliance and National Security in Military Training,* 32 WM. & MARY ENVTL. L & POL'Y REV. 759 (2008); Benjamin Narodick, *Winter v. National Resources Defense Council: Going Into the Belly of the Whale*, 15 B.U. J. SCI. & TECH. L. 332 (2009); Alicia Schaffner, *National Security v. Whales: the Navy and Natural Defense Counsel Battle Their Way to the Supreme Court,* 1 SEA GRANT L. & POL'Y J. 82 (2008).

national security,"[85] and therefore the Court concluded that the environmental injury was "outweighed by the public interest and the Navy's interest in effective, realistic training of its sailors."[86] However, although matters deemed essential to the military may trump environmental considerations, the latter are rarely completely discarded. Rather, the courts typically try to find a balance between the interests of the military and the interests of environmental protection (as expressed by statutory obligations), whereby, in the language of *NDRC v. Evans*, "both can be safeguarded." Thus, in the case of *Evans*, "the public interest in both military preparedness and protection of marine life can be reconciled through a carefully tailored injunction that allows the Navy to meet its needs for peacetime training and testing, while also providing reasonable safeguards for marine mammals and other sea animals."[87]

The exact balance in such safeguarding will be influenced by considerations, such as the degree of the endangerment of the species at hand (with critically endangered species given higher standards),[88] the base standard is one whereby mitigation measures are imposed on the proposed military activity.[89] The question is, what are the appropriate mitigation measures to be imposed? The most common mitigation measure to be adopted is a "least-harm" rule, whereby military exercises may be continued, provided they attempt to do the least possible harm. The foremost method to achieve this is by ensuring that the testing site is the best possible location in terms of minimal environmental impact. The test for this is usually via an evaluation of alternative sites.

The examination of alternatives is a key consideration with impact assessments in general. In the cases pertaining to sonar, the adoption of alternative sites where there would be the least impact, has become standard. This practice first arose in the 1994 case of *NRDC v. the United States Department of the Navy*, which turned on the Navy's failure to examine meaningfully the possibility of alternative sites for the planned ship-shock trial, which would have resulted in taking fewer marine mammals and other animals. This was juxtaposed against evidence that suggested the planned site was a "uniquely populous nature of the Southern California Bight."[90] Similar considerations, whereby the importance of looking at all suitable alternative sites—and choosing the one which would result in the least impact on cetaceans—available to

85. Winter, 555 U.S. at 18, 25, 26.

86. *Id.* at 8.

87. NRDC v. Evans, 364 F.Supp.2d 1083, 1090 (N. D. Cal. 2003).

88. NRDC v. Evans, 316 F.3d 904, 907 (9th Cir. 2003).

89. NRDC v. Navy, 857 F. Supp. 734, 742 (C.D. Cal. 1994).

90. *Id.* at 740, 741.

test the new technologies, were reiterated in the cases of *NDRC v. United States Navy*[91] and *NRDC v. Evans*.[92]

In *Evans*, after reviewing the Navy's SURTASS LFAS Program, the Northern District of California imposed an injunction that permitted the Navy to train and test LFAS in a wide range of oceanic conditions as needed, "while restricting it from operating in certain sensitive areas when marine mammals are particularly abundant there."[93] Particular areas, identified as "Offshore Biologically Important Areas," were later added to this list.[94] Following this case, the Navy and the Natural Resources Defense Council ("NRDC") settled their lawsuit over global deployment of LFAS by the Navy agreeing to limit ongoing training missions to a region of the West Pacific, which is of great strategic importance to the Navy, yet relatively free of cetacean populations. In 2008, as attempts were made for a further roll-out of this technology, the Navy and NRDC agreed to a settlement in which both training and operational use of LFAS would continue to be limited to defined areas of the Pacific Ocean (although there were broad exemptions to these limits when Naval commanders deemed LFAS necessary in the search for potentially hostile submarines).[95]

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91. *See generally,* NRDC v. Navy, No CV-01-07781 (C.D. Cal. Sept 19, 2002); *Richard Heisler, A Whale of a Tale: NDRC v. U.S. Navy and the Attempt to Exempt the Exclusive Economic Zone from the National Environmental Policy Act,* 10 *SW. J. L. & TRADE AM.*, 125 (2008).

92. NRDC v. Evans, 316 F.3d 904 (9th Cir. 2003).

93. *Id.* at 1090. In particular, the injunction extended the coastal buffer zone beyond the existing twelve miles to include more of the continental shelf. The injunction also required the Navy to avoid certain areas of the deep ocean during seasons when data on marine mammals and other endangered species such as sea turtles shows that they are migrating, breeding, feeding, or otherwise clustering there.

94. CHIEF OF NAVAL OPERATIONS, DEP'T OF THE NAVY, FINAL COMPREHENSIVE REPORT FOR THE OPERATION OF THE SURVEILLANCE TOWED ARRAY SENSOR SYSTEM LOW FREQUENCY ACTIVE (SURTASS LFA) SONAR ONBOARD THE R/V CORY CHOUEST AND USNS IMPECCABLE (T-AGOS 23) UNDER THE NATIONAL MARINE FISHERIES SERVICE REGULATIONS 50 CFR 216 SUBPART Q 10–11, 15–17 (2007), *available at* http://www.nmfs.noaa.gov/pr/pdfs/permits/surtass_lfa_final_report.pdf. [hereinafter SURTASS LFA REPORT ONBOARD CHOUEST]. Outside the coastal areas, the areas identified were the 200 meter isobath of the North American Eastern Coast, year round; the Costa Rico Dome, year round; and the Atlantic Convergence Zone, October through March. It was also agreed that LFAS would not be deployed in the Arctic or the Antarctic. The court in late 2003 and again in 2005 added a further nine areas off Japan, the Philippines and China where the Navy was not to operate.

95. *See* Press Release, Natural Resources Defense Council, Agreement Limits Navy's Use of Low-Frequency Active Sonar (Aug. 18, 2008), available at http://www.nrdc.org/media/2008/080812.asp.

Once the question of alternative sites has been dealt with, additional mitigation methods tend to come into play. For example, in *NRDC v. Evans*,[96] when dealing with mitigation measures for testing SURTASS-LFAS, in addition to the rule of seeking out alternative sites that would lessen environmental impacts, two additional measures were added. These measures were to be adopted "whenever feasible." Specifically, in seeking to minimize the exposure of marine mammals (and sea turtles) to SURTASS levels below 180 dB(A), they mandated a two kilometer safety zone, whereby if one of these animals (to be actively monitored via visual and sonar sources) is located, within one kilometer (the safety zone) of the sonar source, transmissions are to be suspended. Secondly, coastal waters within 22 kilometers of the shore should not be exposed to SURTASS-LFAS signals at levels above 180 dB(A).[97]

Similar additional mitigation measures were accepted by the Supreme Court when dealing with MFA sonar. These measures, originally promulgated by the District Court, included: (1) the imposition of a 12-mile "exclusion zone" from the coastline; (2) utilizing lookouts to conduct additional monitoring for marine mammals; (3) restricting the use of "helicopter-dipping" sonar; and (4) limiting the use of MFA sonar in geographic "choke points." The Supreme Court differed from the District Court over two additional measures of "shutting down MFA sonar when a marine mammal is spotted within 2,200 yards of a vessel," and "powering down MFA sonar by 6 dB(A) during significant surface ducting conditions."[98] With respect to these two additional measures, the Supreme Court, in deferring to the opinion of the Navy, ordered that the Navy need not comply with the additional measures as they were overly restrictive and were likely to affect necessary Navy operations. Specifically, each additional shutdown could result in the loss of several days' worth of training. This could cause operational commanders to "lose awareness of the tactical situation through the constant stopping and starting of MFA [sonar]."[99]

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96. NRDC v Evans. No. C-02-3805-EDL. 316 F.3d 904 (9th Cir. 2003).

97. *Id.* at 1130; *see* SURTASS LFA REPORT ONBOARD CHOUEST, *supra* note 96 at 8–12.

98. Winter v. NRDC, 555 U.S. 7, 18 (2008).

99. *Id.* at 28. The Supreme Court also disagreed with the sixth condition, that the Navy power down MFA sonar by 6 dB during significant surface ducting conditions. Surface ducting is a phenomenon in which relatively little sound energy penetrates beyond a narrow layer near the surface of the water. When surface ducting occurs, active sonar becomes more useful near the surface but less useful at greater depths. The Supreme Court held that restrictions in this area placed upon the navy understated the burden this would impose on the Navy's ability to conduct realistic training exercises.

V. THE MILITARY AND THE ENVIRONMENT IN AN INTERNATIONAL CONTEXT

The question that arises following the consideration of the military and conservation in the domestic context is, how would such matters be considered in an international context? As it stands, it is assumed that military forces will carry some of their domestic laws with them when they leave their national territory. Thus, in the case of the United States, lawmakers initially presumed that certain laws, like their NEPA, had a global application outside of the borders of America.[100] This was especially so when dealing with Trust territories where the United States had exclusive control,[101] but when the United States. had unique foreign policy considerations those considerations trumped the possible application of domestic environmental laws.[102] Similarly, as the courts have held, NEPA does not apply to bilateral contexts with friendly countries, such as those countries which may hold American military bases (because foreign policy interests outweigh the benefits of preparing environmental impact statements).[103]

Indeed, "given that surface ducting is both rare and unpredictable, it is especially important for the Navy to be able to train under these conditions when they occur."

100. The National Environmental Policy Act of 1969, 42 U.S.C.S § 4332 (2011) (requires all federal agencies to recognize the worldwide and long-range character of environmental problems); *see* NRDC v. Nuclear Regulatory Comm'n, 647 F.2d 1345, 1366 (D.C. Cir. 1981) (a discussion of how this recognition must be consistent with the foreign policy of the United States).

101. *See* People of Enewetak v. Laird, 353 F. Supp. 811, 818 (D. Haw. 1973); *see also* People of Saipan by Guerrero v. United States Dep't of Interior, 356 F. Supp. 645, 650 (D. Haw. 1973).

102. For example, in *NRDC v. NRC*, the Court of Appeals for the District of Columbia Circuit held that NEPA did not apply to the Nuclear Regulatory Commission's approval of the export of a nuclear reactor and complementary nuclear materials to the Philippines. The Court of Appeals for the District of Columbia Circuit found NEPA inapplicable because of the unique foreign policy interests arising in the nuclear energy and nonproliferation contexts, the potential cultural and legal problems inherent in engaging in an analysis of environmental effects in another country, and the United States' limited oversight of the project once the export permit was issued. 647 F.2d 1345 (D.C. Cir. 1981).

103. *See, e.g.,* NEPA Coal. of Japan v. Aspin, 837 F. Supp. 466, 467 (D.C. Cir. 1993); *see also* Greenpeace USA v. Stone, 748 F. Supp. 749, 760 (D. Haw. 1990) In *Stone* the court found that NEPA's EIS requirement did not apply to certain portions of the United States Army's transport of obsolete chemical munitions from the Federal Republic of Germany to Johnston Atoll, a United States trust territory in the Pacific, so that they could be destroyed. NEPA did not apply because the disposal policy for the munitions was the result of a cooperative agreement between the United States and the FRG and "an extraterritorial application of NEPA to the Army's action in the FRG with

As a way to move past the ambiguities in this area, in 1979 President Carter issued Executive Order No. 12,114 which pertained to the "Environmental Effects Abroad of Major Federal Actions."[104] The purpose of this order was to enable those responsible officials from Federal agencies, who have ultimate responsibility to authorize and approve actions that have "significant effects on the environment outside of the geographical borders of the United States,"[105] to be informed of pertinent environmental considerations and to "take such considerations into account,"[106] as well as other pertinent considerations of national policy. Although independent from other legislation, the Executive Order was seen as furthering "the purpose of the National Environmental Policy Act and the Marine Protection Research and Sanctuaries Act . . . [by keeping them] consistent with the foreign policy and national security policy of the United States."[107] This Order exempted a number of instances,[108] including many of the United States national security activities abroad, from the depth of scrutiny applied to domestic actions. Similarly, most environmental impacts within a "participating" nation escape review entirely. Thus, a joint military exercise within a NATO country would not require the United States to consider its environmental effects (as such countries are assumed to have worked out, and reconciled with the visitors, such questions for themselves).[109]

Despite these limits, procedures were established in a number of other areas, such as for bilateral or multilateral environmental studies or reviews (when impacting the environment of a foreign nation not

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the approval and cooperation of the FRG would result in a lack of respect for the FRG's sovereignty, authority and control over actions taken within its borders."

104. Exec. Order No. 12,114, 44 Fed. Reg. 1,957 (Jan. 4, 1979).

105. *Id.* § 2-1.

106. Exec. Order No. 12, 114 § *1-1*.

107. *Id.* § 1-1.

108. *Id.* § 2-5. Exemptions from the order include, actions not having a significant effect on the environment outside the United States as determined by the agency; actions taken by the President; actions taken by or pursuant to the direction of the President or Cabinet officer when the national security or interest is involved or when the action occurs in the course of an armed conflict; intelligence activities and arms transfers; export licenses or permits or export approvals, and actions relating to nuclear activities except actions providing to a foreign nation a nuclear production or utilization facility as defined in the Atomic Energy Act of 1954, or a nuclear waste management facility; votes and other actions in international conferences and organizations; or disaster and emergency relief action.

109. STEPHEN DYCUS, NATIONAL DEFENSE AND THE ENVIRONMENT 26–28 (1996); Karen V. Fair, *Environmental Compliance in Contingency Operations: In Search of a Standard?*, 157 MIL. L. REV. 112, 120 (1998) (discussing the "participating nation" exception).

participating with the United States and not otherwise involved in the action).[110] Environmental impact statements, when dealing with the global commons outside the jurisdiction of any nation (e.g., the oceans or Antarctica), were also required. However, in some of these cases, such as with Antarctica, the American courts have not needed Executive Order No. 12,114 because they have held that the NEPA does apply to Federal actions in Antarctica because it was not subject to foreign sovereignty. Rather, it was part of a global commons over which the United States had "some real measure of legislative control."[111] By the same logic, it is possible—but uncertain[112]—that the same situation exists for the high seas, although the United States has a much lesser degree of control in this context, unlike the regulatory regime of the Antarctic Treaty System, of which the United States is a consultative party with full standing. The fact that the United States is a party to a specific treaty, which imposes particular obligations, is a defining consideration with regard to environmental responsibilities of an international significance.

A. The Military and Pollution of International Significance

Where international treaties responding to environmental problems exist, the obligations of the military depend on the treaty and whether it deals with pollution or conservation.

When dealing with international treaties that aim to control pollution, the degree of military involvement is largely dictated by the degree of environmental damage directly caused by the military. That is, if the damage is clearly excessive relative to the advantages gained by the military action, then the activity may be prohibited.

The foremost example where international law has come to favor conservation concerns over military preparation involves nuclear weapons testing in the atmosphere. The first nuclear weapons test was conducted in Alamogordo, New Mexico, on July 16, 1945 as part of the Manhattan Project. By 2010, a further 2,402 nuclear tests had been recorded. Five-hundred and forty-one of these tests have occurred in the atmosphere. Cumulatively, the nuclear tests have left a worldwide legacy in both environmental and human terms. It has been suggested that

110. Exec. Order No. 12, 114 § E.2.4.

111. Envt'l. Def. Fund v. Massey, 986 F.2d. 528, 534 (D.C. Cir. 1993).

112. *See generally* NRDC v. United States Dep't. of the Navy, No. CV-01-07781, 2002 U.S. Dist. LEXIS 26360, at 1 (C.D. Cal. Sept. 17, 2002).

atmospheric nuclear testing may have had a direct link to the deaths of up to 65 million people worldwide. [113]

The United States Department of Health and Human Services suggested that at least 11,000 Americans alone have died from cancers caused by the radioactivity released from the 390 nuclear bombs exploded in the atmosphere between 1951 and 1963.[114] Service personnel of all countries who were forced to witness some of the blasts have met with serious health problems. However, the differences in the way nuclear test veterans and civilians from the United States,[115] France, the United Kingdom, and the Commonwealth (especially Australia and New Zealand)[116] experienced blasts suggest that the extent of the impact from watching such tests, despite their frequent exposure to dangerous levels of radiation, is scientifically uncertain because of difficulties in trying to disentangle background rates of cancer and other possible sources of cause.[117]

Aside from the instability that nuclear testing caused during the Cold War, the world superpowers were also aware of the environmental damage that was being created by their atmospheric testing. The first formal proposals for a limited test ban treaty were advanced by the Soviet Union in 1955, followed by the United States and the United Kingdom in 1959. The General Assembly of the United Nations also advocated for an international agreement that would stop the testing of nuclear weapons.[118] The following year, the Security Council noted that the ongoing failure of meetings between the world superpowers "may

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113. *See* ALEXANDER GILLESPIE, 3 A HISTORY OF THE LAWS OF WAR: THE CUSTOMS AND LAWS OF WAR WITH REGARDS TO ARMS CONTROL 123 (2011).

114. *Id.* at 122.

115. *See generally* PHILLIP FRADKIN, FALLOUT: AN AMERICAN NUCLEAR TRAGEDY, (2004); F. Lincoln Grahlfs, VOICES FROM GROUND ZERO: RECOLLECTIONS AND FEELINGS OF NUCLEAR TEST VETERANS (1996). *Also,* Vincent Kiernan, *US Takes A Closer Look At Nuclear Test Veterans*, NEW SCIENTIST, July 1993, at 8; Rob Edwards, *Radiation Payout*, NEW SCIENTIST, May 1999, at 12; Anonymous, *Radiation Damages*, NEW SCIENTIST, Nov. 1996, at 12.

116. *See generally* RODGER CROSS, BEYOND BELIEF: THE BRITISH BOMB TESTS (2006). *See also*

France to Compensate for Victims of Nuclear Testing, N.Z. HERALD, Mar. 25, 2009, at A3, *available at* http://uk.reuters.com/article/2009/03/24/us-france-nuclear-idUKTRE52N4W720090324; *UK Comes Clean on Radiation, N.Z. HERALD,* Aug. 4 2008, at A3.

117. A. ROBBINGS ET AL., RADIOACTIVE HEAVEN AND EARTH: THE HEALTH AND ENVIRONMENTAL EFFECTS OF NUCLEAR WEAPONS TESTING IN, ON AND ABOVE THE EARTH 72–82 (1991).

118. Suspension of Nuclear and Thermonuclear Tests, G.A. Res. 1402 (XIV) ¶ 1–2, U.N. Doc. A/4290 (Nov. 21, 1959).

lead to an increase of international tensions likely to endanger peace and security."[119] It was particularly aware "of the mounting danger of the continuation of the arms race."[120] In particular, the Security Council requested "negotiations on measures to prevent surprise attack, including technical measures."[121] It also requested that all governments act to discontinue all nuclear weapons tests.[122] However, this appeal was against rising international tensions, and soon thereafter, the General Assembly solemnly appealed directly to the Soviet Union "to refrain from carrying out its intention to explode in the atmosphere a 50 megaton bomb."[123] The Soviets declined the request and carried out the largest nuclear test ever commenced on the planet. Nevertheless, this action was a stepping stone towards a comprehensive test ban treaty, which the United States, the United Kingdom, and the Soviet Union all pledged to support in early 1963. However, a comprehensive treaty proved elusive because there were difficulties over ensuring compliance due to a lack of established verification procedures, such as seismic mechanisms and on-site inspections.[124] Due to such concerns, the best the three superpowers could achieve was the 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, Outer Space and Under Water. This Treaty was positioned as a stepping stone toward "the discontinuance of all test explosions of nuclear weapons for all time," and "the speediest possible achievement of an agreement on general and complete disarmament under strict international control."[125]

The parties to the agreement also "desir[ed] to put an end to the contamination of man's environment by radioactive substances."[126] Accordingly, they agreed to:

> [P]rohibit, to prevent, and not to carry out any nuclear weapon test explosion, or any other nuclear explosion, at any place under its jurisdiction or control . . . in the atmosphere; beyond its limits,

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119. S.C. Res. 135, U.N. Doc. S/RES/135 (May 27, 1960).

120. *Id.*

121. *Id.* at ¶ 3.

122. *Id.*

123. G.A. Res. 1632 (XVI), U.N. Doc. A/4942 (Oct. 27, 1961).

124. US–USSR Exchange Views on Nuclear Test Ban, Feb. 11, 1963, 2 I.L.M. 298, at 298–300, 198–207; Verification and Response in Disarmament Treaties, 2 Agreements, June 20, 1963, 2 I.L.M. 320, at 321–331; US Report On Nuclear Test Ban Treaty Safeguards, May 11, 1964, 3 I.L.M., at 664, 664. *See also* Question of Compliance with Nuclear Test Ban Treaty, Jan. 19, 1965, 4 I.L.M. 393.

125. Treaty Banning Nuclear Weapon Tests in the Atmosphere Preamble, in Outer Space and Under Water, Aug. 5, 1963, 480 U.N.T.S. 43 [hereinafter Treaty Banning Nuclear Tests].

126. *Id.*

> including outer space; or underwater, including territorial waters or high seas.[127]

The treaty also prohibited carrying out any nuclear tests "in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted."[128] This prohibition did not cover underground explosions, although the parties did record their intention to reach "a treaty resulting in the permanent banning of all nuclear test explosions."[129] The Atmospheric Test Ban Treaty was signed by the United States, the Soviet Union and the United Kingdom. It was not signed by other superpowers, such as France and China. France stopped the atmospheric testing of its nuclear weapons in 1974 following cases brought against it by Australia[130] and New Zealand[131] in the International Court of Justice.[132]

Atmospheric testing is somewhat unique relative to other environmental problems because only the military is responsible for it. This is very unlike most other areas of internationally significant pollution, where the military is only one contributor among many, as seen with the creation of toxic waste, climate change, ozone depletion, chemicals, and some persistent organic pollutants. In these situations, the military's obligation to control its polluting activities is contained within the general obligations for parties to control all sources of pollution. Thus, unlike the atmospheric testing of nuclear weapons, when other types of pollution are involved the military is often just one sector of society contributing to the overall problem. When these problems are not international, the responsibilities of the military become invisible as the solutions are found only in domestic contexts. However, in some instances, where the pollution is international in impact, militaries have been drawn into the necessary solutions.

The best example of militaries having no direct international legal responsibilities with regard to their pollution is with their creation of toxic waste, which damages former (or contemporary) military bases. While in some instances the damage is done through deliberate violations

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127. *Id.* art. I.

128. *Id.* § (1)(b).

129. *Id.*

130. Nuclear Tests (Austl. v Fr.), 1974 I.C.J. 253, 269 (Dec. 20).

131. Nuclear Tests (N.Z. v Fr.), 1974 I.C.J. 457, 474–75 (Dec. 20).

132. *See* Request for an Examination of the Situation in Accordance With Paragraph 63 of the Court's Judgment of 20 December 1974 in *Nuclear Tests (New Zealand v. France)*, 1995 I.C.J. 288 (Sept. 22).

of existing laws,[133] more often than not the damage is done in accordance with the national exceptions that were added to laws such as those in the United States, covering toxic substances,[134] clean air,[135] and clean water.[136] Globally, within the estimated tens of millions of acres of territory in the possession of all of the militaries of the world, tens of thousands of sites contain buried waste, poisoned ecosystems, and/or damaged landscapes.[137] The only exception is where the disposal of some wastes have created impacts that have spread beyond national boundaries, such as with the reckless disposal of some nuclear submarines. In this situation, a number of nations have come together to cooperate in cleaning up a problem caused by previous administrations, when the environmental standards were considerably lower.[138] With a problem like climatic change, the contribution of the military can only be estimated. Estimates suggest that in some countries, such as the United States, the military was responsible for 76,267 gigatons (measures in carbon dioxide equivalent) of greenhouse gases emissions per year by the end of the twentieth century.[139] Some scholars have suggested that such an amount may equate to about one third of the nation's total energy consumption each year.[140] This percentage may be accurate based onto the sheer scale of military hardware in existence, coupled with the fact that considerations of energy efficiency and the like tend to play a very distant second to considerations of military efficiency.

Any attempts to determine numbers in this area are based purely on conjecture, and are likely not precise. The primary reason for this is that most nations do not report specifically on greenhouse gas emissions from their military, but rather, military totals are reported within aggregate national totals. Although this is creating a number of anomalies in the

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133. *See* United States v. Dee, 912 F.2d 741, 745 (4th Cir. 1990).

134. Toxic Substances Control Act, 15 U.S.C. § 2621 (2011)

135. Clean Air Act, 42 U.S.C. § 7418(b) (2011).

136. Clean Water Act, 33 U.S.C. § USC. 1323 (2011).

137. B. SANDERS, THE GREEN ZONE: THE ENVIRONMENTAL COSTS OF MILITARISM 36–37 (2009); S. LANIER-GRAHAM, THE ECOLOGY OF WAR 81, 85 (1993); W. THOMAS, SCORCHED EARTH 16–32 (1995).

138. C. KRUPNICK, DECOMMISSIONED RUSSIAN NUCLEAR SUBMARINES AND INTERNATIONAL COOPERATION (2001); *A Global Nightmare*, NEW SCIENTIST, Dec 6, 1997, at 2; R. Edwards, *Russia's Toxic Shock*, NEW SCIENTIST, Dec 6, 1997, at 15.

139. U.N. Framework on Climate Change Convention, *Report of the Individual Review of the Greenhouse Gas Inventory of the United States Submitted in the Year 2000*, ¶ 68, (July 11, 2002); Anon, *Armies Brought to Book for Dirty Deeds*, NEW SCIENTIST, June 27, 1992, at 6.

140. SANDERS, *supra* note 130, at 39; R. WOODWARD, MILITARY GEOGRAPHIES 73, 76 (2004).

attempts to create a robust greenhouse accounting regime, it is unlikely to change in the near term.[141] In exactly the same manner, because reductions in greenhouse gases are called for by country—not be specific sector—it is for each country to manage its own greenhouse budget. Accordingly, they may decide to pursue reductions and efficiencies in greenhouse gases in their nonmilitary sector, as reductions targeted toward this sector do not exist in international law.

This approach, whereby the military is but one sector that has to be considered akin to all other sectors within a society, requires a country to manage its collective reductions and is found to be more pronounced in other regimes, such as the Montreal Protocol. As it was, few of the parties who signed the Montreal Protocol had a fully informed idea of how important ozone depleting substances ("ODSs") were to the military. Only after they did national audits, from which they could make their promised reductions, did they discover the presence of ODSs in many weapons systems. That is, ODSs were actually required in standards, specifications, and codes governing operations ranging from design, engineering, manufacturing, and purchasing, to operations and maintenance activities. Their use for aerosols, electronics, solvents, and refrigeration were particularly notable. Moreover, in the 1980s, once the less damaging, but still impactful halons were created as an alternative to chlorofluorocarbons ("CFCs"), they quickly became the preferred firefighting agents aboard aircrafts and ships, in armored combat vehicles, and for ground/shore facility fire protection.

Despite the importance of the contribution of the military to the damage of the ozone layer, the Montreal Protocol contained no explicit provision to exempt military consumption of ozone depleting substances. The immediate response of the military to this situation was to find alternatives and plan for the phase out of the stipulated chemicals by the agreed dates. However, in many instances, alternatives were not possible within the given time frame. Accordingly, rather than create overt difficulties for the military, it was agreed that armed forces could collect and recycle their existing ozone depleting substances (as all sectors in society could). In addition, the Protocol allowed exceptions to the elimination of ODS obligations "to the extent that the Parties decide to permit the level of production or consumption that is necessary to satisfy uses agreed by them to be essential."[142] Although this "essential uses"

141. U.N. Framework on Climate Change Convention, *Preliminary Options for Methodologies to Apply Adjustments Under Article 5.2 of the Kyoto Protocol*, § 2, (Feb. 20, 2000).

142. Montreal Protocol on Substances that Deplete the Ozone Layer, Sept. 16, 1987, 26 I.L.M. 1550, arts. 2(a)(4), 2(b)(3), 2(c)(e), 2(d)(2), 2(e)(3) 2(g), *available at* http://www.unep.org/ozone (covering CFCs, halons, other fully halogenated CFCs,

exception exists, the important point to note is that to date, the parties have rarely utilized it for military exceptions.[143] Whether this situation will change in the future, and the use of this exception for military purposes will become more widespread, as some ozone depleting substances appear (especially some halon types for certain types of fire fighting) irreplaceable, is a matter of debate.[144]

The other international regime of note in this area is the Stockholm Convention on Persistent Organic Pollutants. The parties to this Convention have also banned singular chemicals that were of direct interest to the military, such as technical pentabromopidhenyl ethers. These chemicals are a class of additive flame retardants used to suppress or delay combustion. Within military application, they are widely valued for their flame retardant properties, for both safety clothing and electronics. They are also a persistent, multi-generational, organic pollutant. Accordingly, the international community agreed to prohibit the further production and use of this chemical, as well as its import or export.[145] This prohibition, like all others under this Convention, can be exempted by individual parties for exceptional reasons.[146] Despite this possibility, to date, no national governments have sought an exemption to the prohibition of technical pentabromopidhenyl ethers.

B. The Military and Conservation of International Significance

Exceptions for the military to take endangered species are rarely spelled out within international wildlife law. Rather, exceptions are assumed within some of the broader exceptions that exist in most treaties. Thus, the basic principle in this area, as recorded in Article 3 of the Convention on Biological Diversity, is that although "States have . . . the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of

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carbon tetrachloride, trichloroethane (Methyl chloroform) and hydrobromofluorocarbons)).

143. 10th Meeting of the Parties to the Montreal Protocol, Cairo, Egypt, Nov. 23–24, 1998, *Decision X/6:/ Essential Use Nominations for Controlled Substances for 1999 & 2000* (Dec. 3, 1998); 13th Meeting of the Parties to the Montreal Protocol, Colombo, Sri Lanka, Oct. 16–19, 2001, *Decision XIII/8: Essential Use Nominations for Non-Article 5 Parties For Controlled Substances for the Year 2002 and Beyond* (Oct. 26, 2001).

144. U.N. Environment Programme, Assessment Report of the Technology and Economic Assessment Panel, § 1.8 (2010), *available at* http://www.unep.org/zone.

145. *See* Stockholm Convention on Persistent Organic Pollutants amendment: *Listing of Tetrabromodiphenyl Ether and Pentabromodiphenyl Ether*, SC-4/18 (2009).

146. Stockholm Convention on Persistent Organic Pollutants, arts. 3(6), 4.

areas beyond the limits of national jurisdiction," this obligation is tempered by general caveats, that they are expected, "in accordance with its particular conditions and capabilities" and "as appropriate" to develop national strategies, plans, or programs for the conservation of biological diversity.[147]

The important point to note here is that the general principle and its application is clearly limited by the words "as appropriate." In practice, this means that conservation measures do not always supersede other considerations. This type of exception is common within many types of wildlife agreements. For example, Article VII of the 1916 Convention for the Protection of Migratory Birds between the United States and Great Britain (Canada) stipulated,

> Permits to kill any of the above named birds, which, under extraordinary conditions, may become seriously injurious to the . . . other interests in any particular community, may be issued by the proper authorities of the High Contracting Powers under suitable regulations prescribed therefore by them respectively, but such permits shall lapse, or may be cancelled, at any time when, in the opinion of said authorities, the particular exigency has passed, and no birds killed under this article shall be shipped, sold or offered for sale.[148]

Under this exception, national military activities have been permitted to trump regionally agreed conservation obligations.[149]

This type of exception reappeared in three other wildlife related treaties. In the first example, the Ramsar Convention on Wetlands of

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147. Convention on Biological Diversity, Dec. 29, 1993, art. 6.

148. Convention Between the United Kingdom and the United States for the Protection of Migratory Birds in Canada and the United States, Aug. 16, 1916, 2478 U.N.T.S. 33.

149. In 2002, the Congress of the United States was persuaded to alter its internal operation in terms of compliance with the 1916 Migratory Birds Treaty, of which the United States is a signatory. This followed the successful legal action against the Secretary of Defense, for the (incidental) killing of migratory birds located on, or near, a firing range on an island in *Marianas Ctr. for Biological Diversity v. Pirie*, 191 F. Supp. 2d 161, 166 (D.C. Cir. 2002). Although the United States could have dealt with this matter by correctly and fully complying with the exceptions in the Treaty, the American Congress passed and the president signed into law the Fiscal Year 2003 Defense Authorization Act, which substantially amended their domestic implantation of the Migratory Birds Treaty. In particular, the new law directed the Secretary of the Interior, with the concurrence of the Secretary of Defense, to prescribe new regulations that allow the 'incidental taking' of migratory birds during 'training and operations by the Armed Forces that relate to combat' and during the testing of military equipment and weapons. Bob Stump National Defense Authorization Act for Fiscal Year 2003, Pub. L. No. 107-314, §§315-16, 116 Stat. 2458, 2509 (2002).

International Importance provided parties with the ability to take actions required by "urgent national interest."[150] Similarly, a second example appeared in the Convention on Migratory Species, under which the parties can excuse themselves from the strong obligations to protect Appendix I listed animals if "extraordinary circumstances so require; provided that such exceptions are precise as to content and limited in space and time. Such taking should not operate to the disadvantage of the species."[151] Finally, the Convention on the Conservation of European Wildlife and Natural Habitats reiterated this type of exception in certain situations. Under Article 9, a party may avoid their regionally agreed conservation objectives if "there is no other satisfactory solution and that the exception will not be detrimental to the survival of the population concerned," and the action was "in the interests of public health . . . or other overriding public interests," then, under "strictly supervised conditions, on a selective basis and to a limited extent," protected species could be taken.[152] Although the examples noted above do not display how the military benefits from these exceptions, in the case of the oceans, it is different. In this area, international law is very clear with regards to controls pertaining to pollution (including noise from sonar) from warships—there is no international law in this area. Within the multitude of treaties covering the ocean, the exceptions for the military in meeting regional and/or international environmental goals are remarkably clear. These exceptions can be found in all matters related to the oceans and oil pollution (in terms of liability[153] and outside intervention to stop the spreading of oil pollution),[154] other forms of marine pollution,[155] the dumping of waste into the ocean,[156] and even salvage.[157] However, it is expected that on the High Seas, all flag States will attempt to adhere to the spirit of the various regimes. The overall

150. Ramsar Convention on Wetlands of International Importance, *amended*, July, 13 1994, art. 4.

151. Convention on Migratory Species, *revised*, Jan. 1, 2002, art. III (5)(d).

152. Convention on the Conservation of European Wildlife and Natural Habitats. Sept. 19, 1979, art. 9.

153. *See* International Convention on Civil Liability for Oil Pollution Damage, Nov. 29, 1969, art. XI.

154. International Convention Related to Intervention on the High Seas in Cases of Oil Pollution Damage, Nov. 11, 1969, art. 1(2).

155. *See* International Convention for the Prevention of Pollution from Ships, art. 3, 11(2) (1973).

156. *Id.* art. 3, 7, 11(2). The 1996 Protocol to this regime, which substantially re-oriented the original 1972 Convention, did not contain the original exception, although Article 8(2) did allow exceptions for dumping in emergencies.

157. International Convention on Salvage, art. 4, (1989).

situation was best summed up by Article 236 of the United Nations Convention on the Law of the Sea ("UNCLOS"). Namely, under the principle of sovereign immunity:

> The provisions of this Convention regarding the protection and preservation of the marine environment do not apply to any warship, naval auxiliary, other vessels, or aircrafts owned or operated by a state and used, for the time being, only on government non-commercial service. However, each state shall ensure, by the adoption of appropriate measures not impairing operations or operational capabilities of such vessels or aircrafts owned or operated by it, that such vessels or aircrafts act in a manner consistent, so far as is reasonable and practicable, with this Convention.[158]

The exceptions for the military from having to comply with conservation objectives are doubly reinforced in certain areas. For example, when examining the problem of military caused marine pollution which impacts upon cetaceans, the UNCLOS is clear that any conservation controls have to be undertaken by "appropriate international organizations." In this context, the universally recognized body in charge of the conservation of cetaceans is the International Whaling Commission. However, although the International Whaling Commission ("IWC") is aware of the problem of noise pollution of the oceans, it has never passed a specific resolution on this topic nor, more pertinently, on military generated noise.[159] Accordingly, aside from the general and specific exceptions granted to the military in the area of conservation concerns with the international law of the sea, standards to which they are expected to act, in a manner consistent with the international level, simply do not exist.

Although there are no international standards in this area, some standards are appearing at the regional level. The best examples of this are found within the Regional Agreement of the Convention on Migratory Species, the Agreement on the Conservation of Cetaceans in

158. U.N. Convention on the Law of the Sea, Dec. 10, 1982, 21 I.L.M. 1261, 1315, art. 237; *see also id.* at 1325, art. 298(1)(b) (disputes concerning military activities, including military activities by government vessels and aircraft engaged in non-commercial service, and disputes concerning law enforcement activities in regard to the exercise of sovereign rights or jurisdiction excluded from the jurisdiction of a court or tribunal under article 297 of the Convention).

159. The Parties to the IWCICRC could address (but not regulate) this topic under Article VI of the Convention. Specifically, "the Commission may from time to time make recommendations to any or all Contracting Governments on any matters which relate to whales or whaling and to the objectives and purposes of this Convention." INT'L WHALING COMM'N, INTERNATIONAL CONVENTION FOR THE REGULATION OF WHALING, art. VI (1946), *available at* http://iwcoffice.org/_documents/commission/convention.pdf.

the Black Sea Mediterranean Sea and Contiguous Atlantic Area ("ACCOBAMS")[160] and the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas ("ASCOBANS").[161] These are particularly interesting examples, as a large number of the members of both Agreements within the European Community have actively avoided obligations in this area. Thus, while the European Community created strong obligations relating to the assessment and management of (large-scale) environmental noise, they added the following exceptions:

> This Directive shall not apply to noise that is caused by the exposed person himself, noise from domestic activities, noise created by neighbors, noise at work places or noise inside means of transport or due to military activities in military areas.[162]

Despite such concerns, in the case of the ASCOBANS in 2003, the parties treated the call for further cooperation with military authorities in the area of noise pollution.[163] Taking one step further, the parties of ACCOBAMS, although being fully aware of Article 236 of the UNCLOS, still issued recommended Guidelines for all parties to combat underwater noise.[164] With particular regard to military sonar, the guidelines recommended principles that largely follow the United States (even though the United States is not a party to ACCOBAMS). Namely, the avoidance of military sonar activities in key habitat areas. The ACCOBAMS guidelines differed from the United States' position in the specification of the details of the monitoring requirements (so as to ensure that cetaceans are not in the area) and prohibiting the use of high-power sources at night (because detection is difficult). The guidelines were also more prescriptive in terms of ramp up times (a slow build-up to maximum noise emissions), and power down requirements (when a

160. Agreement on the Conservation of Cetaceans of the Black Seas, Mediterranean Sea and Contiguous Atlantic Area, Nov. 24, 1996, 36 I.L.M. 777.

161. Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, (1995). U.K.T.S. No 52; Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, April 14, 1992, *available at* http://ascobans.org/pdf/Ch_XXVII_09_Certified True CopiesAgreement.pdf.

162. European Council, Directive 2002/49: Relating to the Assessment and Management of Environmental Noise, art. 2, L/189 OFFICIAL J. OF THE EUROPEAN CMTYS. 12, 13 (2002).

163. Fourth Meeting of Parties to ASCOBANS, Esbjerg, Den., Aug. 19–22, 2003, Res. No. 5: Effects of Noise and of Vessels, at Annex 13 (Aug. 22, 2003), *available at* http://www.ascobans.org/pdf/mops/docs/MOP4FinalReport.pdf.

164. Agreement on the Conservation of Cetaceans in the Black Sea Mediterranean Sea and Contiguous Atlantic Area, Guidelines to Address the Impact of Anthropogenic Noise on Cetaceans in the ACCOBAMS Area, Resolution 4.17 (2010).

specimen was found in the zone), of which the United States Supreme Court specifically excluded for some types of sonar training.

VI. CONCLUSION

This paper was about the conflict between the interests of the military and the interests of conservation, in times of peace. The basis of this study was the particular problem of the techniques related to submarine detection and their impact upon the marine environment, and cetaceans in particular. The question at play was what are the rules that apply, especially when looking at this problem in an international—as opposed to a domestic—context? These issues have only been thoroughly examined in the domestic context of the United States. Thus, a technology that will have international implications is being examined by only one country, with regard to its own laws. Due to this shortfall, the question arises, how are the international considerations of militaries and conservation to be reconciled in times of peace?

Generally, the answer is that the military can be made to comply with laws that seek to resolve internationally significant environmental problems. In some instances, such as where they are main culprits in the causation of the problem, they can be the subject of particular treaties. This was the case with the testing of nuclear weapons in the atmosphere. In other instances, obligations can be placed upon them to control their pollutants, just as all other sectors within a country may be obligated to comply with agreed international rules. This is true with climate change, ozone depletion, and some persistent organic pollutants. Nonetheless, in some instances, the ability for the military to be granted exceptions exists, although they are rarely used. Rather, militaries have learned to adapt and comply with international standards.

However, this is not the case when dealing with issues of conservation. In the conservation treaties, exceptions from compliance of international obligations are very clear, although it is rare these attach directly to the military. The situation is different with respect to conservation concerns upon the high seas. In this last instance, the exceptions for the military are clearer than in any other part of international environmental law, specifically, the military is not expected to comply with such concerns. As such, in a manner unlike any other part of international environmental law, the military is granted a clear exception from compliance.

The conclusion this presents for the case study at hand is that while some success may be obtained by balancing the interests of conservation and the military—but only in some domestic settings—it is unlikely that

any such robust success will be found in international settings in the short term. This is especially so when all of the applicable laws in this area explicitly exempt the military and the only international body that could provide assistance has failed to contribute any guidance or comment. The only exception to this trend is two regional agreements, ACCOBAMS and ASCOBANS, where the parties have tentatively issued guidelines for each party to consider in controlling the emissions of underwater noise from their military. Although these guidelines include provisions that allow parties to circumvent the guidelines if deemed necessary, they are a clear, if tentative, step away from the absolute immunity of the military in this area. However, the extent of placing the interests of militaries over those of conservation when dealing with the high seas remains a matter of debate.

Mobilizing the Public Trust Doctrine in Support of Publicly Owned Forests as Carbon Dioxide Sinks in India and the United States

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I. INTRODUCTION

The ecological value of forests as carbon dioxide ("CO_2") sinks has been thrown into sharp relief by the emergence of anthropogenic climate change as a serious threat to the stability of ecosystems and the human societies that depend on them worldwide.[1] Anthropogenic climate change is related to the "greenhouse effect," the physics of which are relatively simple and well understood. Gases in the Earth's atmosphere, including but not limited to CO_2, trap energy from the Sun that the Earth otherwise would radiate into space, thus both warming the planet sufficiently to support life and creating the long-term patterns of meteorological phenomena that we know as climate.[2] In 1896, Swedish scientist Svante Arrhenius predicted that anthropogenic emissions of CO_2—at the time mostly from the burning of coal—would cause global temperatures to rise over time by magnifying this effect.[3] Few scientists were interested in his prediction then, or for many decades thereafter.[4]

The modern era of climate change research began in the 1960s, after American scientist Charles David Keeling detected a steady annual increase in average atmospheric CO_2 concentrations using advanced instrumentation unavailable to previous generations of scientists.[5] By the 1980s, studies of the CO_2 content of prehistoric air bubbles trapped in Antarctic and Greenland ice cores made clear that global temperatures rise and fall with atmospheric concentrations of CO_2,[6] and that the CO_2 concentrations in the air above the ice from which the Antarctic cores were drilled were far above prehistoric levels.[7] Since then, hundreds, if

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1. A CO2 sink is any process, activity, or mechanism that removes CO2 from the atmosphere. *See* Annex II: Glossary (Alfons P. M. Baede, Paul van der Linden & Aviel Verbruggen, eds.) to INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT. CONTRIBUTIONS OF WORKING GROUPS I, II AND III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 76, 86 (Core Writing Team, R. K. Pachauri & A. Reisinger, eds., 2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_appendix.pdf (defining "sink" in the context of greenhouse gases and aerosols).

2. *See* SPENCER R. WEART, THE DISCOVERY OF GLOBAL WARMING 2–4 (rev. ed., 2008).

3. *Id.* at 5–7.

4. *Cf. id.* at 7–19 (recounting the response of scientists to Arrhenius's prediction and the history of climatology from the late nineteenth through the mid-twentieth centuries).

5. *See id.* at 20–21, 25, 35–38.

6. *Id.* at 130–31, 138–39.

7. SPENCER WEART, *The Carbon Dioxide Greenhouse Effect*, in THE DISCOVERY OF GLOBAL WARMING, at text accompanying note 53 (2009), http://www.aip.org/history/climate/co2.htm (supplementing in hypertext SPENCER R. WEART, THE DISCOVERY OF GLOBAL WARMING (rev. ed., 2008)). Atmospheric CO2

not thousands, of peer-reviewed scientific studies have confirmed the speed and scope of the global warming that is disrupting the Earth's climate,[8] and the role of human activities, especially the combustion of fossil fuels, in causing it.[9] The Intergovernmental Panel on Climate Change ("IPCC") has concluded based on its synthesis of these studies that an increase in global annual average temperatures of more than two degrees Celsius (3.6 degrees Fahrenheit) above pre-industrial levels would cause many climate impacts that an IPCC chair has described as "devastating," and that limiting the increase to two degrees Celsius would require a reduction in global CO_2 emissions of fifty percent below 1990 levels by 2050.[10] In 2007, the IPCC won a Nobel Prize for its work.[11]

The United States was the world's largest emitter of CO_2 until 2006, when the People's Republic of China ("P.R.C.") surpassed it.[12] Together, the European Union, the United States, and the P.R.C. currently account for almost sixty percent of annual global CO_2 emissions,[13] with the

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concentrations are far higher now than they have been at any time in the past 650,000 years. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT. CONTRIBUTIONS OF WORKING GROUPS I, II AND III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 37 (Core Writing Team, R. K. Pachauri & A. Reisinger, eds., 2007), http://www.ipcc.ch/publications_and_data/ar4/syr/en/contents.html [hereinafter IPCC 2007 SYNTHESIS REPORT].

8. More than 900 climate change studies were published in peer-reviewed scientific journals between 1993 and 2003 alone. Naomi Oreskes, *The Scientific Consensus on Climate Change*, 306 SCIENCE 1686 (2004). For their implications, see *infra* note 10 and accompanying text.

9. The combustion of fossil fuels accounts for more than half of the global warming potential of global annual anthropogenic GHG emissions. See IPCC 2007 SYNTHESIS REPORT, *supra* note 7, at 36 fig.2.1.

10. Eric J. Lyman, *Climate* Change: Next IPCC Report to Add 'Astonishing Level' of Detail on Climate Issues, Panel Chair Says, 32 INT'L ENV'T REP. 670 (2009). The IPCC was established by the World Meteorological Organization and the United Nations Environmental Programme in 1988 to "assess scientific information related to climate change, to evaluate the environmental and socio-economic consequences of climate change, and to formulate realistic response strategies." Michel Jarraud & Achim Steiner, Foreword to IPCC 2007 SYNTHESIS REPORT iii, supra note 7. More than 500 lead authors and 2000 expert reviewers participated in the preparation of the IPCC's most recent assessment, which was released in 2007. *Id.*

11. Mike Ferullo, *Climate Change: Gore, U.N. Share Nobel Peace Prize for Raising Awareness of Global Warming*, 30 INT'L ENV'T REP. 822 (2007).

12. Press Release, Netherlands Environmental Assessment Agency, Chinese CO2 Emissions in Perspective (June 22, 2007), http://www.pbl.nl/en/news/pressreleases/2007/20070622ChineseCO2emissionsinperspective.html.

13. WORLD BANK, WORLD DEVELOPMENT REPORT 2010: DEVELOPMENT AND CLIMATE CHANGE, at 202 box 4.4 (2009), *available at*

United States' share standing at about twenty percent.[14] Although India currently accounts for only four percent of annual global CO_2 emissions, its projected contribution would grow to twelve percent by 2050 without any mitigation policy in place.[15]

The world's forests, which function as CO_2 sinks, mitigate the adverse environmental impacts of these emissions. These forests store 289 gigatons ("Gt") of carbon in their biomass alone,[16] which is nearly twenty-eight times the amount of carbon in the 38 Gt of anthropogenic CO_2 emitted globally in 2004, the last year included in the IPCC's most recent synthesis report.[17] Since 2005, however, the carbon stored in forest biomass worldwide has decreased by about 0.5 Gt per year, mostly because of deforestation.[18] Moreover, total anthropogenic greenhouse gas ("GHG") emissions from the forestry sector, including CO_2 emissions from deforestation, account for more than seventeen percent of the global warming potential of annual GHG emissions worldwide.[19] The IPCC considers the reduction of GHG emissions from deforestation through

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http://siteresources.worldbank.org/INTWDR2010/Resources/5287678-1226014527953/WDR10-Full-Text.pdf.

14. *Cf.* U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, REP. NO.DOE/EIA-0573(2008), EMISSIONS OF GREENHOUSE GASES IN THE UNITED STATES 2008, at 7 (2009), *available at* http://www.eia.doe.gov/oiaf/1605/ggrpt/pdf/0573%282008%29.pdf (reporting in relevant part on energy-related CO2 emissions only).

15. WORLD BANK, *supra* note 13, at 202 box 4.4. For an analysis of GHG emissions trends in India, see Subodh Sharma, Sumana Bhattacharya & Amit Garg, *Greenhouse Gas Emissions from India: A Perspective,* 90 CURRENT SCI. 326 (2006). For the most recent United Nations comparison of total CO2 emissions from more than 200 countries and related political units, see U.N. Statistics Division, Millennium Development Goals Indicators -- Carbon Dioxide Emissions (CO2), Thousand Metric Tons of CO2 (CDIAC), http://mdgs.un.org/unsd/mdg/SeriesDetail.aspx?srid=749&crid (last visited Oct. 2, 2011) [hereinafter U.N. Millennium Development Goals Indicators].

16. Food and Agriculture Organization of the United Nations ("FAO"), GLOBAL FOREST RESOURCES ASSESSMENT 2010: KEY FINDINGS, at 4 (2010), available at http://foris.fao.org/static/data/fra2010/KeyFindings-en.pdf [hereinafter FAO FOREST ASSESSMENT KEY FINDINGS]. Internationally, CO2 emissions are measured in metric tons, not Anglo-American tons. Mt CO2e - Metric Tonne Carbon Dioxide Equivalent, http://mtco2e.com/ (last visited Oct. 2, 2011). One metric ton of carbon is equivalent to approximately 3.67 metric tons of CO2. See id. Forests also store carbon in their soil. See, e.g., FAO FORESTRY DEPARTMENT, GLOBAL FOREST RESOURCES COUNTRY REPORT: UNITED STATES OF AMERICA, at 42 § 8.2.2, 43 § 8.4, FAO Doc. FRA2010/223, (2010), *available at* http://www.fao.org/forestry/20472-07ef217be8cc051b2772b2d01fd5a3535.pdf [hereinafter FAO U.S. FOREST RESOURCES REPORT].

17. *Cf.* IPCC 2007 SYNTHESIS REPORT, *supra* note 7, at 36 (reporting total global CO2 emissions in 2004 in Gt).

18. FAO FOREST ASSESSMENT KEY FINDINGS, *supra* note 16, at 4.

19. *See* IPCC 2007 SYNTHESIS REPORT, *supra* note 7, at 36 fig.2.1.

forest conservation and sustainable management practices to be an important part of any global climate change mitigation strategy.[20] The Thirteenth Conference of the Parties to the United Nations Framework Convention on Climate Change, which met in Bali in December 2007,[21] underscored this importance by establishing a program to encourage both developed and developing country parties to work together to reduce GHG emissions from deforestation and forest degradation in developing countries.[22]

At 304 million hectares ("ha") (1.17 million square miles ("mi^2")), U.S. forests are the fourth largest in the world.[23] India's forests, at 68 million ha (263,000 mi^2), are the tenth largest.[24] U.S. forests currently store more than 19.3 Gt of carbon in their living biomass alone,[25] which

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20. *See, e.g., id*. at 62 tbl.4.3.

21. For the official account of the Thirteenth Conference of the Parties, see United Nations Framework Convention on Climate Change, The United Nations Climate Change Conference in Bali, http://unfccc.int/meetings/cop_13/items/4049.php (last visited Oct. 18, 2011).

22. *See Reducing Emissions from Deforestation in Developing Countries: Approaches to Stimulate Action*, Decision 2/CP.13, in *U.N. Framework Convention on Climate Change Conference of the Parties,* Dec. 3–15, 2007, *Report of the Conference of the Parties on Its Thirteenth Session*, *Held in Bali from 3 to 15 December 2007 Addendum Part Two: Action Taken by the Conference of the Parties at Its Thirteenth Session*, at 8, FCCC/CP/2007/6/Add.1* (2008), *available at* http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=8. This program is known as REDD. For the official account of REDD's status, *see* United Nations Framework Convention on Climate Change, REDD Web Platform, http://unfccc.int/methods_science/redd/items/4531.php (last visited Jan. 25, 2011).

23. *See* FAO, GLOBAL FOREST RESOURCES ASSESSMENT 2010: MAIN REPORT, at 13 fig.2.2 (2010), *available at* http://foris.fao.org/static/data/fra2010/FRA2010_Report_en_WEB.pdf [hereinafter FAO 2010 FOREST ASSESSMENT MAIN REPORT]. Only the Russian Federation (809 million ha or 3 million mi2), Brazil (520 million ha or 2 million mi2), and Canada (310 million ha or 1.2 million mi2) have more forested land than the United States does. *See id*.; *see also* FAO, GLOBAL FOREST RESOURCES ASSESSMENT 2010: GLOBAL TABLES, at tab 2 (2010)(listing the extent of forest and other wooded land in 2010 for 252 countries and other areas), *available at* http://www.fao.org/forestry/fra/fra2010/en/ [hereinafter FAO 2010 FOREST ASSESSMENT GLOBAL TABLES].

24. *See* FAO 2010 FOREST ASSESSMENT MAIN REPORT, *supra* note 23, at 13 fig.2.2. In addition to the Russian Federation, Brazil, Canada, and the United States, only the P.R.C. (207 million ha or 799,000 mi2), the Democratic Republic of the Congo (154 million ha or 595,000 mi2), Australia (149 million ha or 575,000 mi2), Indonesia (94 million ha or 363,000 mi2), and Sudan (70 million ha or 270,000 mi2) have more forested land than India does. *See id*.; see also FAO 2010 FOREST ASSESSMENT GLOBAL TABLES, supra note 23, at tab 2 (listing the extent of forest and other wooded land in 2010 for 252 countries and other areas).

25. *See* FAO U.S. FOREST RESOURCES REPORT, *supra* note 16, at 42 § 8.2.2, 43 § 8.4. Forests also store carbon in their dead woody biomass (e.g., standing dead trees),

is more than twelve times the amount of carbon in the 5.8 Gt of CO_2 emitted annually by the United States in recent years.[26] India's forests currently store more than 2.8 Gt of carbon in their living biomass,[27] which is more than six times the amount of carbon in the 1.6 Gt of CO_2 emitted annually by India.[28] In the United States, only forty-three percent of forested land is publicly owned (131 million ha or 500,000 mi^2),[29] whereas in India the total stands at eight-six percent (58 million ha or 226,000 mi^2).[30] All publicly owned forests in the United States are managed by federal, state, county, or municipal governments.[31] The 76,292,000 ha (292,000 mi^2) National Forest System, managed by the U.S. Forest Service within the U.S. Department of Agriculture, comprises nearly sixty percent of the total.[32] In India, State Governments manage almost two-thirds of publicly owned forests,[33] with the rest being

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their "litter" (e.g., fallen leaves) and other small non-living biomass lying on the ground, and their soil. See, e.g., id.

26. *Cf.* U.N. Millennium Development Goals Indicators, *supra* note 15 (reporting U.S. CO2 emissions in 2007 in thousands of metric tons for purposes of assessing progress toward achieving the United Nations Millennium Development Goal of ensuring environmental sustainability).

27. *See* FAO FORESTRY DEP'T, GLOBAL FOREST RESOURCES COUNTRY REPORT: INDIA, at 35 §§ 8.4-.5 (FAO Doc. FRA2010/094) (2010), *available at* http://www.fao.org/forestry/20349-0d6aad0b1848bf82895842fe7bad58b4b.pdf [hereinafter FAO INDIA FOREST RESOURCES REPORT].

28. *Cf.* U.N. Millennium Development Goals Indicators, *supra* note 15 (reporting India's CO2 emissions in 2007 in thousands of metric tons for purposes of assessing progress toward achieving the United Nations Millennium Development Goal of ensuring environmental sustainability).

29. *See* FAO U.S. FOREST RESOURCES REPORT, *supra* note 16, at 15 § 2.4 tbl.2a. The percentage of U.S. forests in public ownership varies widely by region. Two-thirds of forested land in the Western continental United States is publicly owned, managed mostly by federal agencies such as the U.S. Forest Service (Department of Agriculture), the Bureau of Land Management (Department of the Interior ("DOI")), and the National Park Service (DOI), whereas less than twenty percent of Eastern forests are. See Mark D. Nelson & Greg C. Liknes, Forest Service, U.S. Dep't of Agric. *Forest Land Ownership in the Coterminous United States*, in 22 ESRI MAP BOOK 76 (M. Law, ed., 2007), *available at* http://www.nrs.fs.fed.us/pubs/maps/map497_pg76.pdf.

30. FAO INDIA FOREST RESOURCES REPORT, *supra* note 27, at 13 § 2.3.2. Eighty percent of forests are publicly owned worldwide. FAO 2010 FOREST ASSESSMENT KEY FINDINGS, *supra* note 16, at 10.

31. FAO INDIA FOREST RESOURCES REPORT, *supra* note 16, at 15 §§ 2.4 tbl.2b, 2.5.

32. *Compare* CONG. RESEARCH SERV., CRS REPORT 95-599 ENR, MAJOR FEDERAL LAND MANAGEMENT AGENCIES: MANAGEMENT OF OUR NATION'S LANDS AND RESOURCES, at text accompanying note 10 (1995), available at http://www.cnie.org/nle/crsreports/natural/nrgen-3.cfm (specifying the size of the National Forest System), with FAO INDIA FOREST RESOURCES REPORT, supra note 16, at 15 § 2.4 tbl.2a (tabulating the forest area in public ownership in the United States).

33. *See* FAO INDIA FOREST RESOURCES REPORT, supra note 27, at 11 § 2.1, 14 § 2.4

managed jointly by the State Governments and local communities.[34] The Union Government imposes numerous statutory and regulatory constraints on the management of all publicly owned forests.[35]

As publicly owned natural resources, the 189,000,000 ha (726,000 mi^2) of publicly owned forests in India and the United States are potentially subject to the public trust doctrine. This article explores the public trust doctrine as a strategy for supporting the role of these forests as CO_2 sinks in both jurisdictions.[36] Part I briefly recounts the origin and theory of the public trust doctrine. Part II summarizes the content and sources of its American variants. Part III does the same with respect to the Indian version. Part IV examines the status of publicly owned forests as public trust resources in both jurisdictions. Part V does the same with respect to the status of CO_2 sequestration as a protected public use. This article concludes by arguing that precedents exist in both India and the United States for many of the essential elements of a public trust cause of action in support of publicly owned forests as CO_2 sinks, although India probably offers a more fertile field for realizing their full potential, at least in the near term.

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tbl.2b.

34. *See id.* at 14 §§ 2.4 tbl.2b, 2.5. For a comprehensive exploration of the evolution and impact of joint forest management in six Indian States, see N. H. RAVINDRANATH & P. SUDHA, JOINT FOREST MANAGEMENT IN INDIA: SPREAD, PERFORMANCE AND IMPACT (2004).

35. *See generally* Forest (Conservation) Act, 1980 with Amendments Made in 1988, *available at* http://envfor.nic.in/legis/forest/forest2.html; The Indian Forest Act, 1927, *available at* http://envfor.nic.in/legis/forest/forest4.html; Forest (Conservation) Rules, 2003, Gazette of India, Part II — Section 3 — Sub-section (i), Jan. 10, 2003, *available at* http://www.envfor.nic.in/legis/forest/gsr23%28e%29.htm; Ministry Env't & Forests, Gov't of India, MEF Guideline No. 5-5/86-FC, Guidelines for Diversion of Forest Lands for Non-Forest Purpose Under the Forest (Conservation) Act, 1980 (Nov. 25, 1994), *available at* http://www.envfor.nic.in/legis/forest/forguide.html. Although the management of forests by the State Governments preceded Indian independence, see generally The Indian Forest Act, 1927, supra, the Indian Constitution gives both Parliament and the state legislatures the power to legislate with respect to forests, INDIA CONST. art. 246, § 1, List III-17A. Parliamentary legislation prevails over that of the States when the two conflict, except in very narrowly defined circumstances. *See id.* art. 254.

36. Narrower questions, such as the potential use of the public trust doctrine by the state or anyone else to recover natural resource damages from private parties for impairing the ability of privately owned forests to function as CO2 sinks, are beyond the scope of this article, except insofar as judicial decisions on those questions have established that the public trust doctrine applies to forests. Cf. Puerto Rico v. SS Zoe Colocotroni, 456 F. Supp. 1327 (D.P.R. 1978), *aff'd in part and vacated in part on other grounds*, 628 F.2d 652 (1980) (holding that the public trust doctrine applies to mangroves in an action by governmental authorities to recover the value of damage to those forests by an intentional release of crude oil from a grounded oil tanker in coastal waters).

II. ORIGIN AND THEORY OF THE PUBLIC TRUST DOCTRINE

The public trust doctrine is an invention of the English common law, but with roots in the Roman civil law's concept of *res communis*.[37] In the sixth century C.E., the *Institutes of Justinian* restated the Roman rule as follows: "By the law of nature these things are common to mankind—the air, running water, the sea, and consequently the shores of the sea."[38] The public acquired certain usufructuary rights in these resources by virtue of its common property interest in them. For example, all rivers and ports were public such that everyone had a right to fish in them.[39] Everyone also had the right to approach the seashore provided that habitations, monuments, and buildings were respected;[40] to build a cottage on the seashore; to haul nets to the shore from the sea; and to dry them there.[41] Finally, everyone had a right to navigate rivers, to bring vessels to their banks and to tie them to trees growing there, and to deposit the vessels' cargo on the banks, even though the banks and trees were the property of the riparian landowners.[42] The state apparently protected the uses to which the *res communis* concept applied, although there is no evidence that the Roman public could enforce its right against the state to these uses.[43]

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37. *See* Joseph L. Sax, *Liberating the Public Trust Doctrine from Its Historical Shackles,* 14 U.C. DAVIS L. REV. 185, 185 (1980) [hereinafter Sax 1980]; cf. Carl Bruch, Wole Coker & Chris Van Arsdale, *Constitutional Environmental Law: Giving Force to Fundamental Principles in Africa,* 26 COLUM. J. ENVTL. L. 131, 159–60 (2001) ("The [public trust] doctrine dates back to the Institutes of Justinian (530 A.D.), which restated Roman Law . . . . In the centuries since then, both civil law and common law countries have incorporated these principles . . . .").

38. J. INST. 2.1.1 (Thomas Collett Sandars trans., 1876).

39. *Id.* 2.1.2. Strictly speaking, this rule illustrates the Roman concept of res publicum—or public property—which overlapped and reinforced the concept of res communis—or common property. See Donna Jalbert Patalano, *Police Power and the Public Trust: Prescriptive Zoning Through the Conflation of Two Ancient Doctrines*, 28 B.C. ENVTL. AFF. L. REV. 683, 703–04 (2001) (exploring the distinctions among *res publicum, res communis*, other categories of Roman property (*res*), and related rights (*jus*)).

40. *See* J. INST. 2.1.1 (Thomas Collett Sandars trans., 1876).

41. *Id.* 2.1.5. According to the Roman law, the seashore extended to the high-water mark, as measured by the highest winter flood. *Id.* 2.1.3.

42. *Id.* 2.1.4.

43. Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471, 475 (1970) [hereinafter Sax 1970]; cf. Richard Perruso, *The Development of the Doctrine of Res Communes in Medieval and Early Modern Europe*, 70 LEGAL HIST. REV. 69, 70 (2002) (noting the right to seek redress against a private party for interference with the public right of access to *res*

By the thirteenth century, the English common law had absorbed the Roman concept, but added to it the idea that the Crown owned the property in question, at least insofar as it was comprised of the beds of navigable waters.[44] Bracton restated the English rule as follows:

> By natural law, these are common to all: running water, air, the sea, and the shores of the sea, as though accessories of the sea. No one therefore is forbidden access to the seashore, provided he keeps away from houses and buildings [built there] . . . .
>
> All rivers and ports are public, so that the right to fish therein is common to all persons. The use of river banks, as of the river itself, is also public . . . [and] consequently everyone is free to moor ships to them, to fasten ropes to the trees growing there and to land cargoes upon them, just as he is free to navigate the river itself.[45]

Moreover, the common law prohibited the Crown from alienating these lands. As Bracton restated the rule, "A thing belonging to the fisc is . . . *quasi*-sacred and cannot be given or sold or transferred to another by the prince or reigning king; such things constitute the [C]rown itself and concern the common welfare."[46] The common law thus transformed the Roman concept of common property to which the public had certain usufructuary rights into an English concept of a public trust that prohibited the Crown from alienating royal lands so as to impair certain types of public uses of them.[47]

Despite the later spread of the English common law tradition throughout the British Empire,[48] few former British colonies have embraced the common law public trust doctrine with much enthusiasm,[49]

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communis).

44. Jan S. Stevens, *The Public Trust: A Sovereign's Ancient Prerogative Becomes the Public's Environmental Right*, 14 U.C. DAVIS L. REV. 195, 197–98 (1980).

45. 2 HENRY DE BRACTON, ON THE LAWS AND CUSTOMS OF ENGLAND 39–40 (Samuel E. Thorne trans., Belknap Press 1968) (1922) (including bracketed material in original).

46. *Id.* at 58 (including bracketed material in original); see also LOUIS HOUCK, A TREATISE ON THE LAW OF NAVIGABLE RIVERS 16–17 § 28 (1868) (offering an alternative translation of and commentary on this passage, from Bracton, lib. 1, cap. 12, § 6, which Houck translates as "all things which relate peculiarly to the public good cannot be given over or transferred by the king to another person, or separated from the Crown"); cf. Stevens, supra note 44, at 198 (mis-citing to Bracton himself for Houck's translation and commentary).

47. *See* Stevens, supra note 44, at 197–98. The Crown's fiduciary duty did not prevent Parliament from expanding or contracting the public rights in royal lands in order to serve a legitimate public purpose. Sax 1970, *supra* note 43, at 476.

48. *See* JOHN HENRY MERRYMAN & ROGELIO PÉREZ-PERDOMO, THE CIVIL LAW TRADITION 4 (3d ed. 2007).

49. *See, e.g.*, Kenneth M. Murchison, *Environmental Law in Australia and the*

although some have adopted constitutional or statutory provisions that impose on the state trust or other obligations with respect to natural resources, the environment generally, or other matters.[50] India and the

United States: A Comparative Overview — Part 2, 11 ENVTL. & PLAN. L.J. 289, 297–99 (1994) (surveying the few Australian public trust doctrine cases, and describing the doctrine as "submerged rather than on the surface of Australian law," and as "a 'sleeping' doctrine, that is, a principle in need of specific articulation and recognition by the courts"); Tim Bonyhady, A Usable Past: The Public Trust in Australia, 12 ENVTL. & PLAN. L.J. 329, 330, 331–37 (1995) (observing that "[t]he public trust has . . . had little influence on environmental law in Australia," but offering two nineteenth-century cases as reasons for concluding that the public trust doctrine is more deeply rooted in Australian law than the conventional wisdom suggests); see also Brian J. Preston, Chief Judge, Land and Envtl. Court of N.S.W., Keynote Address to the Legal Aid New South Wales Civil Law Conference: The Environment and Its Influence on the Law 5, 6 n.38 (Sept. 26, 2007) (transcript *available a*t http://www.lawlink.nsw.gov.au/lawlink/lec/ll_lec.nsf/pages/LEC_whats_new7) (click on the link in the news story announcement of the paper presentation dated Oct. 12, 2007) (last visited Oct. 7, 2011) (citing only two public trust cases, both cited by Murchison, supra, or Bonyhady, supra, with the most recent from 1992); Paul L. Stein, Justice, Land and Envtl. Court of N.S.W., Address at the Queensland Planning and Environment Court Annual Conference: Use of Expert Assessors in the Hearing of Environmental Cases (March 26, 2002) (transcript *available at* http://www.courtwise.nsw.gov.au/lawlink/supreme_court/ll_sc.nsf/pages/SCO_speech_stein_260302) (last visited Feb. 11, 2011) (citing only four public trust cases, all cited by Murchison, *supra*, or Bonyhady, supra, with the most recent from 1993).

50. Some observers have mischaracterized cases in which courts apply or interpret these constitutional or statutory provisions as "public trust doctrine" cases. *Compare* Bruch et al., *supra* note 37, at 160–61 (citing as illustrations of the "public trust doctrine" cases in Pakistan and Kenya in which courts applied constitutional or statutory provisions), *with* Comm'r of Lands v. Coastal Aquaculture Ltd., Civil Appeal No. 252 of 1996 (Court of Appeal at Nairobi, June 27, 1997), *available at* http://www.unep.org/padelia/publications/Jud.Dec.Nat.pre.pdf, at 296 (concerning the statutory duty of a land commissioner to specify certain information in a notice to take privately owned land for allegedly public purposes), and Niaz Mohamed Jan Mohamed v. Comm'r of Lands, Civil Suit No. 423 of 1996 (High Court of Kenya at Mombasa, Oct. 9, 1996), *available at* http://www.unep.org/padelia/publications/Jud.Dec.Nat.pre.pdf, at 290 (concerning the statutory trust obligations of a municipal council regarding alienation of privately owned land taken for public road-building purposes), and Gen. Sec'y, W. Pak. Salt Miners Labour Union (CBA) Khewral, Jhelum v. Dir., Indus. & Mineral Dev., Punjab, Lahore, 1994 S.C.M.R. 2061 (1994), *available at* http://www.unep.org/padelia/publications/Jud.Dec.Nat.pre.pdf, at 282 (concerning the constitutional rights to life and to the dignity of man), and In re: Human Rights Case (Env't. Pollution in Balochistan), Human Rights Case No. 31-K/92(Q), P.L.D. 1994 SUPREME CT. 102 (1992), *available at* http://www.unep.org/padelia/publications/Jud.Dec.Nat.pre.pdf, at 280 (concerning the constitutional right to life). Although many States within the United States have adopted constitutional or statutory natural resource or environmental provisions of this type, *see, e.g.*, Stevens, supra note 44, at 226–30, they have had little impact to date, *cf., e.g.,* Janelle P. Eurick, *The Constitutional Right to a Healthy Environment: Enforcing Environmental Protection Through State and Federal Constitutions,* 11 INT'L LEGAL

United States are notable exceptions to this pattern. Both have developed robust bodies of case law interpreting and elaborating on the public trust doctrine.[51]

PERSP. 185, 201–10 (1999–2001) (surveying the jurisprudence under state constitutional provisions in the United States, with an emphasis on the challenges posed by standing requirements and the question of whether the provisions are self-executing).

51. Certain States within the United States were derived from former French or Spanish colonies. In the thirteenth century, Spain codified much of the res communis concept as restated by Justinian. *Compare* LAS SIETE PARTIDAS 3.28.6 (Samuel Parsons Scott trans. & Robert I. Burns ed., 2001) ("Rivers, harbors, and public highways belong to all persons in common, so that parties from foreign countries can make use of them, just as those who live or dwell in the country where they are situated. And although the banks of rivers are, so far as their ownership is concerned, the property of those whose lands include them, nevertheless, every man has a right to use them, by mooring his vessels to the trees, by repairing his ships and his sails upon them, and by landing his merchandise there; and fishermen have the right to deposit their fish and sell them, and dry their nets there, and to use said banks for every other purpose like these which appertain to the calling and the trade by which they live."), *with supra* notes 38–40 and 41–42 and accompanying text. In the nineteenth century, Napoleonic France did substantially the same thing. Compare CODE NAPOLEON 2.2.538 (Bryant Barrett trans., 1811) ("Roads, ways and streets maintained by the State, rivers and navigable, or floatable streams, shores, land between high and low water mark, ports, havens, moorings, and generally all parts of the French territory which are not susceptible of private ownership, are considered as dependancies [sic] of the public domain."), *with supra* notes 38–41 and accompanying text, although the French codification blended the Roman concepts of res communis (common property), *res publicum* (public property), and *jus publicum* (the right of the sovereign to manage *res communis* and *res publicum* for the benefit of the public), *and cf.* Patalano, supra note 39, at 703–04 (exploring the distinctions among res publicum, res communis, other categories of Roman property (*res*), and related rights (*jus*)).

The States within the United States that were derived from former French or Spanish colonies have incorporated the Roman *res communis* concept into their legal systems. *See, e.g.*, Gulf Oil Corp. v. State Mineral Bd., 317 So. 2d 576, 581–82 (1975) (discussing the origin of Arts. 449, 450, 453, 481, and 482 of the *Louisiana Civil Code* in effect at the time, and reproducing their language as follows: "Art. 449. Things are either common or public. . . . Art. 450. Things, which are common, are those the ownership of which belongs to nobody in particular, and which all men may freely use, conformably with the use for which nature has intended them; such as air, running water, the sea and its shores. . . . Art. 453. Public things are those, the property of which is vested in a whole nation, and the use of which is allowed to all the members of the nation; of this kind are navigable rivers, seaports, roadsteads and harbors, highways and the beds of rivers, as long as the same are covered with water. Hence it follows that every man has a right freely to fish in the rivers, ports, roadsteads, and harbors. . . . Art. 481. Things, in their relation to those who possess or enjoy them, are divided into two classes; those which are not susceptible of ownership and those which are. . . . Art. 482. Among those which are not susceptible of ownership, there are some which can never become the object of it; as things in common, of which all men have the enjoyment and use."); Dion G. Dyer, *California Beach Access: The Mexican Law and the Public Trust*, 2 ECOLOGY L.Q. 571, 601–07 (1972) (discussing the meaning and origin of the concept of *bienes* (apparently, a

According to Professor Joseph Sax, the most influential American student of the public trust doctrine, its essence is the same as the essence of property law and of the legal system generally—that is, the protection of reasonable expectations in the relative stability of relationships from destabilizing changes.[52] Therefore, there is no theoretical reason why the public trust doctrine should be limited to disputes over the disposition and use of the public waterways or lands to which it has been applied traditionally.[53] It could be applied just as appropriately and just as easily to disputes about air pollution, among other things.[54] In the 1980s, as if anticipating latter day concerns about the climatic disruption caused by anthropogenic global warming, Sax observed:

> The focus of environmental problems is *not*, as is sometimes suggested, the mere *fact* of change, which it is said environmental zealots cannot accommodate, but rather a rate of change so destabilizing as to provoke crises—social, biological and (as we see in the context of energy prices) economic. The disappearance of various species from the earth in the natural, evolutionary process is totally different from the disappearance of species over a short time. The key difference is not the *fact* of change, but the *rate* of change. The essence of the problem raised by public trust litigation is the imposition of destabilizing forces that prevent effective adaptation.[55]

Thus, he reasoned, the "central idea of the public trust is preventing the destabilizing disappointment of expectations held in common but without formal recognition" via legal mechanisms such as title.[56]

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mixture of *res communis* and *res publicum*) in the Mexican Civil Code of 1871); *cf.* LA. CIV. CODE ANN. arts. 449, 449 cmts.a–c, 450, 450 cmt. a (1980) (consisting of amended versions of most of the Louisiana code provisions reproduced in *Gulf Oil Corp., supra,* with comments illuminating the relationship between the two versions); Patalano, supra note 39, at 703–04 (exploring the distinctions among *res publicum, res communis*, other categories of Roman property (*res*), and related rights (*jus*)). The implications of the *res communis* concept per se on the trust-like duties of these States is beyond the scope of this article.

52. *See* Sax 1980, *supra* note 37, at 186–88.

53. *Cf.* Sax 1970, *supra* note 43, at 556 (arguing that the techniques used by judges in public trust cases need not be limited to the public's interest in waterways or parklands or to issues arising out of the disposition of public property).

54. *Id.* at 556–57.

55. Sax 1980, *supra* note 37, at 188.

56. *Id.*

III. THE AMERICAN PUBLIC TRUST DOCTRINE

A. The Traditional Public Trust Doctrine

The principal touchstone for the traditional American public trust doctrine, notwithstanding its ancient roots in the English common law, is *Illinois Central Railroad v. Illinois*.[57] In that case, the Illinois legislature granted to the Illinois Central Railroad Company a mile long section of the bed of Lake Michigan, which underlay almost all of Chicago's harbor, then tried to revoke the grant a few years later.[58] The Illinois Attorney General sued for a judicial determination to quiet title to the land.[59] In holding the original grant to be revocable,[60] the U.S. Supreme Court explained the implications of the traditional public trust as follows:

> [T]he State holds the title to the lands under the navigable waters of Lake Michigan, within its limits, in the same manner that the State holds title to soils under tide water, by the common law . . . . It is a title held in trust for the people of the State that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein freed from the obstruction or interference of private parties. . . .The State can no more abdicate its trust over property in which the whole people are interested, like navigable waters and soils under them, so as to leave them entirely under the use and control of private parties, except in the instance of parcels mentioned for the improvement of the navigation and use of the waters, or when parcels can be disposed of without impairment of the public interest in what remains, than it can abdicate its police powers in the administration of government and the preservation of the peace.[61]

Although *Illinois Central Railroad* applied the traditional public trust doctrine to the conveyance of trust lands from the State to private parties, American courts have recognized that it also applies to conveyances of trust lands from state to local governments, and to changes in the use of trust lands authorized by state governments.[62]

Historically, American courts applied the traditional public trust doctrine primarily to submerged lands on the shores of the ocean or the Great Lakes, as in *Illinois Central Railroad*, to the waters above them, to

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57. 146 U.S. 387 (1892).

58. *Id.* at 433–34, 448–49.

59. *Id.* at 433.

60. *See id.*. at 455.

61. *Id.* at 452–53.

62. For the seminal synthesis of the case law, *see* Sax 1970, *supra* note 43, at 489–556. For a more historical survey, *see* Stevens, *supra* note 44, at 199–225.

the waters of substantial rivers and streams, and to public parklands.[63] Over time, American courts have recognized that it protects not just the public's right to engage in navigation, commerce, and fishing in these areas, but also its right to engage in recreation or scientific study, and to enjoy the benefits of the ecological and aesthetic functions of public trust waters and lands, among other things.[64] American courts also have expanded the scope of the traditional doctrine beyond its historic application to navigable waters, submerged lands, and parklands per se, recognizing that it also applies to public resources such as the living and nonliving resources in and on the bed of navigable waters, as well as in the boundary zone between sea and land;[65] to upland wildlife and "archaeological remains";[66] to migratory waterfowl;[67] and to dry sand beach immediately landward of the high water mark.[68]

The traditional American public trust doctrine, although rooted historically in the English common law, appears to be a creature of both state common law and federal constitutional law.[69] According to the U.S. Supreme Court, when the American colonies secured their independence from Great Britain, the people of each of the original thirteen States took title to their own navigable waters and the beds underlying them.[70] Their

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63. Sax 1970, *supra* note 43, at 556.

64. *E.g.*, Stevens, supra note 44, at 221–23; *see also*, e.g., Mont. Coal. for Stream Access v. Hildreth, 684 P.2d 1088, 1090–91, 1093, 1094 (Mont. 1984) (holding under both the public trust doctrine and the Constitution of the State of Montana that the public had a right of access to waters navigable for recreational purposes and to use their beds and banks up to the ordinary high-water mark without interference from a riparian landowner, as well as to portage around barriers "in the least intrusive manner possible, avoiding damage to the adjacent owner's property and his rights").

65. Puerto Rico v. SS Zoe Colocotroni, 456 F. Supp. 1327, 1336–37, 1344 n.42 (D.P.R. 1978), *aff'd in part and vacated in part on other grounds*, 628 F.2d 652 (1980).

66. *See* Wade v. Kramer, 459 N.E.2d 1025, 1027–28 (Ill. App. Ct. 1984). These resources were located in a local conservation area. *Id.* at 1026. Although the Illinois state appellate court recognized that the public trust doctrine applied to the wildlife and "archaeological remains," it nevertheless held that the doctrine permitted the state legislature to reallocate part of the conservation area to construction of a new highway despite the potential damage to the wildlife and "archaeological remains" in it. *See id.*. at 1028.

67. *In re* Steuart Transp. Co., 495 F. Supp. 38 (E.D. Va. 1980).

68. *E.g.*, Matthews v. Bay Head Improvement Ass'n, 471 A.2d 355, 363–66 (N.J. 1984).

69. *See* Charles F. Wilkinson, *The Headwaters of the Public Trust: Some Thoughts on the Source and Scope of the Traditional Doctrine*, 19 ENVTL. L. 425 (1988–89); *but cf.* Crystal S. Chase, *The Illinois Central Public Trust Doctrine and Federal Common Law: An Unconventional View*, 16 HASTINGS W.-NW. J. ENVT'L L. & POL'Y 113 (2010) (misconstruing federal case law as federal common law in arguing that the latter is the source of the traditional public trust doctrine).

70. Martin v. Waddell, 41 U.S. (16 Pet.) 367, 410 (1842); *see also Wilkinson, supra*

right to use these resources for common purposes was limited only by the rights that the States later gave up to the Federal Government when they ratified the Constitution.[71] Under the constitutional equal footing doctrine developed by the Court, the same rule applies to the new States subsequently admitted to the Union.[72]

One of the federal limits on State sovereignty over these resources is the traditional public trust doctrine as articulated in *Illinois Central Railroad*.[73] Both the Court's opinion and the briefs filed by the parties in that case make clear that the doctrine exists as a matter of federal law, not the law of the individual States,[74] although the Court has never been more specific about its latter day source.[75] As Professor Charles Wilkinson argues in his seminal article on the subject, however, the most likely source of the traditional public trust doctrine is the Constitution's Commerce Clause, which is also the source of the federal navigation servitude that applies to the same waterways.[76] Moreover, the substantive requirements of the trust most likely are derived from both the Commerce Clause itself, which establishes minimum requirements, and state common law, which fleshes out the details.[77] At a minimum, federal

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note 69, at 439 (noting that, historically, the question of ownership of lands under navigable waters was answered easily with respect to the original thirteen States because these lands never passed from them to the United States after independence).

71. *Martin*, 41 U.S. (16 Pet.) at 410. For the classic account of the drafting and ratification of the Constitution, see CATHERINE DRINKER BOWEN, MIRACLE AT PHILADELPHIA (2d ed. 1986).

72. Pollard's Lessee v. Hagan, 44 U.S. (3 How.) 212, 228–30 (1845); see also Wilkinson, supra note 69, at 439–45 (tracing the development of the constitutional equal footing doctrine in the nineteenth century with respect to the lands under navigable waters). For a critique of the case law, see id. at 445–47. The Court also gradually developed a concept of navigable waters more expansive than the English common law conception. E.g., *id*. at 447–48.

73. *See Wilkinson*, *supra* note 69, at 450–53.

74. *Id.* at 453–55.

75. *Id.* at 455.

76. *Id.* at 458–59; see also U.S. CONST. art. I, § 8, cl. 3 ("The Congress shall have Power . . . To regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes."). For analyses of the most likely alternatives to the Interstate Commerce Clause as the source of the traditional public trust doctrine in federal law, see Wilkinson, supra note 69, at 455–58. The argument that the traditional public trust doctrine is rooted in federal common law is especially unpersuasive. *Cf.* Erie R.R. v. Tompkins, 304 U.S. 64, 78 (1938) (holding that the lower federal court was not free to disregard the common law of the Commonwealth of Pennsylvania in resolving the parties' dispute because "[t]here is no federal general common law"); *see generally* Chase, supra note 69 (misconstruing federal case law as federal common law in arguing that the latter is the source of the traditional public trust doctrine).

77. Wilkinson, *supra* note 69, at 460–64. For the alternatives to this federal-state conception, see id. at 459–60.

constitutional law prohibits the States from abandoning their trust obligations entirely, although it permits them to exercise so much discretion in fulfilling those obligations that this minimum standard is of little practical importance.[78]

B. The Federal Public Trust Doctrine

A federal public trust doctrine distinct from the traditional doctrine exists in the United States, notwithstanding the tendency of some legal scholars to conflate the two in some contexts.[79] The federal public trust doctrine is a pale shadow of its traditional counterpart, however.[80] The principal touchstone for the federal doctrine is *United States v. Beebe*.[81] In that case, the United States sought to cancel certain land patents issued to a private citizen by the United States decades earlier that purported to give him title to property on which part of a city had been built since.[82] In holding that the Attorney General had the authority to bring suit on behalf of the United States to cancel these patents,[83] the Supreme Court recognized that "[t]he public domain is held by the [Federal] Government as part of its trust[,] . . . the title [to] which [is] . . . common to all the people as the beneficiaries of the trust."[84] The Court has made clear that Congress has plenary authority to determine by statute how the federal trust in public lands shall be administered, however,[85] and thus

78. *See id.* at 464.

79. *Cf.* ZYGMUNT J. B. PLATER, ROBERT H. ABRAMS, WILLIAM GOLDFARB, ROBERT L. GRAHAM, LISA HEINZERLING & DAVID A. WIRTH, ENVIRONMENTAL LAW AND POLICY: NATURE, LAW, AND SOCIETY 1101 (3d ed., 2004) (including in a list of cases in which "the trust doctrine" has been applied both traditional public trust doctrine cases and federal public trust doctrine cases).

80. *See* Eric Pearson, The Public Trust Doctrine in Federal Law, 24 J. LAND RESOURCES & ENVTL. L. 173 (2004).

81. 127 U.S. 338 (1888).

82. *Id.* at 338.

83. *See id.* at 342–43.

84. *Id.* at 342. A few years later, the Court invoked the Federal Government's public trust obligations again in resolving another land title dispute. *See* Knight v. U.S. Land Ass'n, 142 U.S. 161, 183 (1891). In that case, the Court also distinguished between the federal trust as it applies to uplands, of which all Americans are the beneficiaries, and the federal trust as it applies to tidelands in newly acquired territories, of which the beneficiaries are the future States that might be formed out of those territories. *See id.* at 183, 185–86.

85. *See* Light v. United States, 220 U.S. 523, 537 (1911); *cf.* Sierra Club v. Block, 622 F. Supp. 842, 865–66 (D. Colo. 1985), vacated on other grounds *sub nom*. Sierra Club v. Yeutter, 911 F.2d 1405 (10th Cir. 1990) (holding that the public trust obligations of federal land management agencies are limited to the duties prescribed by statute). One U.S. district court at least arguably has asserted that the federal public trust doctrine

that the federal public trust doctrine does not constrain the Federal Government in the way that the traditional doctrine constrains the States.

IV. THE INDIAN PUBLIC TRUST DOCTRINE

Whereas the traditional American public trust doctrine has developed primarily by accretion, the Indian variant is mostly the product of adoption and expansion. In 1996, the Indian Supreme Court essentially imported the American variant of the traditional public trust doctrine, declaring it to be part of Indian law—although even in that case the Court began to stretch the public trust doctrine beyond its traditional bounds. In *Mehta v. Nath*,[86] a company with ties to the family of a Minister for Environment and Forests had built a riverside motel resort

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prohibits the Federal Government from conveying submerged lands below the low-water mark to private parties free of the public trust. *See* United States v. 1.58 Acres of Land, 523 F. Supp. 120, 124 (D. Mass. 1981). The court referred to the public trust at issue as one "administered jointly by the state and federal governments," however, *see id.* at 124; *see also id*. at 122, 124 (referring to the trust as "administered by both the federal and state sovereigns" and as "administered by the state and federal governments"), and cited to *Illinois Central Railroad*, the principal touchstone of the traditional public trust doctrine, *see supra* notes 57–61 and accompanying text, in describing the nature and status of that trust, see id. at 123, 124. In explaining the Federal Government's role in administering the trust described in *Illinois Central Railroad*, however, the district court in 1.58 Acres of Land cited to part of Justice Reed's concurring opinion in Alabama v. Texas, 347 U.S. 272, 277 (1954) (Reed, J., concurring), although the district court misidentified that part of Justice Reed's concurrence as part of Justice Black's dissent, *see* 1.58 Acres of Land, supra, at 123 n.3. In his concurring opinion in *Alabama v. Texas*, Reed essentially restated the federal public trust doctrine rule articulated in Light, according to which Congress has plenary power to determine by statute how the federal trust in public lands shall be administered. Compare 347 U.S. at 277, with 220 U.S. at 537. (In making a similar point, the per curiam majority in *Alabama v. Texas* quoted a passage from *United States v. Midwest Oil Co.,* 236 U.S. 459, 474 (1915), which also cited to *Light,* see 347 U.S. at 273.) The genealogy of the district court's arguable assertion in 1.58 Acres of Land that the federal public trust doctrine prohibits the Federal Government from conveying submerged lands below the low water mark to private parties free of the public trust, which starts with *Light* and proceeds through *Illinois Central Railroad by* way of Justice Reed's concurring opinion in *Alabama v. Texas*, strongly suggests that the federal trust obligation to which the district court referred was not the federal public trust per se, but rather the federal navigation servitude, which the Supreme Court in *Illinois Central Railroad* identified as an important constraint on the States' sovereignty over tidelands and other waters that are navigable in fact. *See* 146 U.S. at 435–37.

86. (1997) 1 S.C.C. 388. The opinion is reprinted in UNEP/UNDP/DUTCH GOVERNMENT JOINT PROJECT ON ENVIRONMENTAL LAW AND INSTITUTIONS IN AFRICA, 1 COMPENDIUM OF JUDICIAL DECISIONS ON MATTERS RELATED TO ENVIRONMENT: NATIONAL DECISIONS 259 (1998), *available at* http://www.unep.org/padelia/publications/Jud.Dec.Nat.pre.pdf.

that encroached on protected forest land, which the State of Himachal Pradesh later leased to the company during the minister's term in office.[87] After suffering flood damage to the property, the company used heavy earth moving equipment to divert the river flow into a newly dredged part of the channel, and otherwise to protect the resort from floods.[88] The Indian Supreme Court invalidated the leases as a breach of the public trust, and, in accordance with the polluter pays principle, ordered the company to pay for the ecological restoration of the leased land, and of the adjacent lands adversely affected by the company's efforts to protect the leased land from floods.[89] In doing so, the Court acknowledged the roots of the doctrine in the Roman *res communis* concept and the English common law,[90] engaged in a lengthy analysis of American public trust jurisprudence and scholarship,[91] and ultimately declared:

> Our legal system—based on English common law—includes the public trust doctrine as part of its jurisprudence. The State is the trustee of all natural resources which are by nature meant for public use and enjoyment. Public at large is the beneficiary of the sea-shore, running waters, airs, forests and ecologically fragile lands. The State as a trustee is under a legal duty to protect the natural resources. These resources meant for public use cannot be converted into private ownership.[92]

In reaching this conclusion, the Court observed, "We see no reason why the public trust doctrine should not be expanded to include all ecosystems operating in our natural resources."[93]

Since then, the Indian Supreme Court has invoked the public trust doctrine in two other cases. In *M.I. Builders v. Sahu*,[94] a municipal corporation authorized a private company to construct and operate an underground shopping center and parking lot in a public park of historical importance and environmental value on terms that benefitted only the company.[95] The Court held the transaction to be invalid,[96] declaring it to be an "outrageous" example of bad governance,[97] and

87. Mehta v. Nath, (1997) 1 S.C.C. 388, at para. 1–¶ 13.
88. *Id.* ¶ 19.
89. *Id.* ¶¶ 36–39.
90. *See id*. ¶ 24.
91. *See id*. ¶¶ 24–33.
92. *Id.* ¶ 34.
93. *Id.* ¶ 33.
94. A.I.R. 1999 SC 2468, available at http://judis.nic.in/supremecourt/chejudis.asp.
95. M. I. Builders, A.I.R. 1999 SC 2468, at para. 1, ¶¶ 11, 50, 56–57, 69.
96. *Id*. ¶ 58.
97. *See id.*

ordered the municipal corporation both to dismantle most of the construction and to restore the park to as close to its original condition as was practicable given the irreversible changes that had been made to it.[98] In doing so, the Court concluded that the agreement between the municipal corporation and the developer had violated the public trust doctrine,[99] which it emphasized "is part of Indian law."[100] The Court cited *Mehta v. Nath* as the case in which the doctrine was "expounded,"[101] and to a leading American environmental law casebook for analyses of the history and theory of the doctrine and of *Illinois Central Railroad*,[102] but ultimately remarked that "[t]his public trust doctrine in our country, it would appear, has grown from Article 21 of the Constitution."[103] Article 21 declares that "[n]o person shall be deprived of his life or personal liberty except according to procedure established by law,"[104] but the Court has interpreted it to be a source of a substantive environmental civil right.[105] The Court's rationale for identifying this constitutional provision as the likely source of the Indian public trust doctrine is not clear.[106] What is clear is that the Court

98. *Id.* ¶ 76; *see also id*. ¶¶ 50, 72 (noting that the construction had caused irreversible changes to the park, and recognizing that it might not be possible to restore the park to its original condition because trees planted to replace the ones chopped down will take years to grow).

99. *Id.* ¶ 51.

100. *See id.* ¶ 50.

101. *See id.* ¶ 50.

102. *See id.* ¶ 51.

103. *Id*.

104. INDIA CONST. art. 21.

105. *See* Jona Razzaque, Human Rights and the Environment: The National Experience in South Asia and Africa § 2.1.1, in JOINT UNEP-OHCHR EXPERT SEMINAR ON HUMAN RIGHTS AND THE ENVIRONMENT (Background Paper No. 4) (Office of the United Nations High Comm'r for Human Rights ed., 2002), http://www2.ohchr.org/english/issues/environment/environ/index.htm.

106. It is possible that the Supreme Court was influenced by the opaque decision rendered almost a year earlier by the High Court of Jammu and Kashmir in *Th. Majra Singh v. Indian Oil Corp.*, A.I.R. 1999 J. & K. 81, *available at* http://www.indiankanoon.org/doc/201603, which seems to be the only case reported to date in which a court subordinate to the Indian Supreme Court has applied the public trust doctrine, *cf.* Jona Razzaque, *Application of Public Trust Doctrine in Indian Environmental Cases*, 13 J. ENVTL. L. 221 (2001) (briefly analyzing the three Indian public trust doctrine cases reported through *M.I. Builders v. Sahu*). The petitioners in Indian Oil Corp. challenged the siting of a facility for filling cylinders with liquefied natural gas. A.I.R. 1999 J. & K. 81, at ¶ 1. In holding that the governmental authorities must take the precautionary principle into account in reviewing the siting request, *see id.* ¶ 7, the High Court lifted almost all of the language of its description of the history and content of the public trust doctrine from *Mehta v. Nath*, albeit without quotation marks, and declared that "[t]hese concepts have now become part of Indian legal thought

considered the municipal corporation to have abandoned its trust obligations completely by entering into such a one-sided agreement with the developer.[107]

Most recently, in *Reliance Natural Resources Ltd. v. Reliance Industries*,[108] the Indian Supreme Court recognized in the context of resolving a complex, intra-family business dispute that the public trust doctrine applies to natural gas deposits located in Indian waters.[109] In that case, the Government of India had leased rights to certain offshore lands to a private consortium for natural gas development and production pursuant to a production sharing contract.[110] The Court held in part that a clause of the public agreement through which the family members had implemented their private agreement to divide up their business interests must be interpreted so as to require consideration of both the

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process," *id*. ¶ 5. In listing the sources of this description of the public trust doctrine, however, the High Court cited not only to *Mehta v. Nath*, but also to seven other judicial opinions that do not appear to be public trust doctrine cases. *See id.; see also, e.g.,* Jagannath v. Union of India, A.I.R. 1997 S.C. 811, available at http://indiankanoon.org/doc/507684/ (deciding the case on precautionary principle, polluter pays principle, and other grounds); Vellore Citizens' Welfare Forum v. Union of India, A.I.R. 1996 S.C. 2715, *available at* http://judis.nic.in/supremecourt/chejudis.asp (deciding the case on precautionary principle and polluter pays principle grounds); Indian Council of Enviro-Legal Action v. Union of India, A.I.R. 1995 S.C. 2252, available at http://indiankanoon.org/doc/1315992/ (modifying an earlier order in Action Comm. v. Union of India, 1994 5 S.C.C. 244, *available at* http://indiankanoon.org/doc/1774631/, which was decided on constitutional grounds). The High Court then asserted:

> As a matter of fact, this is now considered as part and parcel of Article 21 of the Constitution of India. . . . These "precautionary principles" were recognised by the Supreme Court of India in Vellore Citizens Welfare Forum v. Union of India [citation omitted].

Indian Oil Corp., A.I.R. 1999 J. & K. 81, at ¶ 6. The Supreme Court's decision in *Vellore Citizens Welfare Forum v. Union of India*, A.I.R. 1996 S.C. 2715, *available at* http://judis.nic.in/supremecourt/chejudis.asp, rested on the precautionary and polluter pays principles, both of which the Supreme Court seemed to conclude were manifest in Article 21 and certain other constitutional and statutory provisions. As one would expect in a case decided before *Mehta v. Nath*, however, the Supreme Court in *Vellore Citizens* did not mention the public trust doctrine at all. Thus, the line of reasoning that led the High Court of Jammu and Kashmir to conclude in *Indian Oil Corp*. that the Indian public trust doctrine is rooted in Article 21 of the Indian Constitution is opaque at best. To the extent that the High Court's decision in *Indian Oil Corp*. influenced the Supreme Court in *M. I. Builders* to identify Article 21 as the likely source of the Indian public trust doctrine, then the Supreme Court's reasoning in *M. I. Builders* is equally obscure.

107. *See* M. I. Builders v. Sahu, A.I.R. 1999 SC 2468, at ¶¶ 56–57, *available at* http://judis.nic.in/supremecourt/chejudis.asp.

108. SCC Civ. App. No. 4273 (May 7, 2010), *available at* http://judis.nic.in/supremecourt/chejudis.asp.

109. *See, e.g*., Reliance Industries, SCC Civ. App. No. 4273, at ¶¶ 84–86.

110. *See id*. ¶ 6(a), (c), (e).

Government's natural gas policy and the broader national and public interest.[111] In doing so, the Court reasoned that "gas is an essential natural resource" owned by neither of the private disputants, which "[t]he Government holds . . . as a trust for the people of the country."[112] Similarly, in concluding that the production sharing contract trumped any other contract entered into by the contractor to supply the gas,[113] the Court reasoned that the contractor could not transfer any rights to the gas beyond those conferred by the production sharing contract itself because the Government holds the gas in trust for the people, and therefore continues to own it until it reaches the consumer.[114] Moreover, in further construing the terms of this contract,[115] the Court invoked the mandate established by Article 297 of the Indian Constitution.[116] Article 297 declares in relevant part that "[a]ll lands, minerals and other things of value underlying the ocean within the territorial waters, or the continental shelf, or the exclusive economic zone, of India shall vest in the Union and be held for the purposes of the Union."[117] The Court observed that the word "vest" must be interpreted in the light of the public trust doctrine, which although previously applied in environmental cases "has its broader application."[118] In addition, the Court quoted extensively from *Mehta v. Nath*, including its reference to the English common law as the basis of the Indian legal system,[119] emphasized that the doctrine described in that case "is part of Indian law,"[120] and asserted that the doctrine required the Government "to provide complete protection to the natural resources as a trustee of the people at large."[121] The Court then reiterated the essence of its earlier

111. *See id*. ¶ 45–47; *see also id*. ¶¶ 6(k)–(m), (12)(2), 27(e), (i), 92(C) (describing the public and private agreements, the legal issue raised by the clause in question as framed by the lower court, and related legal issues raised by the appeal as framed by the Supreme Court itself, and summarizing the Supreme Court's conclusion with respect to the need to consider the "broader national and public interest" in interpreting the clause).

112. *Id.* ¶ 46.

113. *See id*. ¶ 64; cf. id.¶ 27(g) (identifying whether the court must interpret the provisions of the production sharing contract as an issue raised by the appeal).

114. *Id.* ¶ 64.

115. *Cf. id*. ¶ 77 (asserting the usefulness of recapitulating certain facts and deciding the issue of the Government's role in the arrangement created by the production sharing contract).

116. *See id*. ¶ 84; *see also id*.¶ 17 (reproducing Article 297).

117. INDIA CONST. art.297, § 1.

118. Reliance Natural Res. Ltd. v. Reliance Indus., SCC Civ. App. No. 4273, at ¶ 84 (May 7, 2010), available at http://judis.nic.in/supremecourt/chejudis.asp.

119. *See id*. ¶ 85.

120. *See id*.

121. *Id.*

conclusion about the limited nature of the rights to the gas acquired by the contractor under the production sharing contract.[122] In doing so, it asserted that "the very basis of [the contractor's] mandate is the *constitutional concepts* [discussed earlier in the opinion], including Article 297 . . . and the Public Trust Doctrine."[123]

Four features of these cases stand out. First, they evince the Indian Supreme Court's ongoing desire to ground its public trust jurisprudence in India's English common law heritage. After prefacing its lengthy exploration of the American public trust doctrine in *Mehta v. Nath* with an acknowledgement of the historical contribution made by the English common law,[124] the Court declared that "[o]ur legal system—based on English common law—includes the public trust doctrine as part of its jurisprudence."[125] More than ten years later, in *Reliance Industries*, the Court quoted this same declaration before asserting again that the public trust doctrine is part of Indian law.[126] Thus, whatever other sources of law the Indian courts might consult to flesh out the content of the public trust doctrine, its existence as an enforceable legal doctrine is clearly a function of the Indian common law.

Second, these cases manifest an ongoing shift away from the Court's initial reliance on American law as the touchstone for the trust's content toward a uniquely Indian conception that the Court deems to spring from some set of Indian constitutional principles. In *Mehta v. Nath*, the court clearly looked to American jurisprudence and scholarship for its conception of the trust's purposes, content, and scope.[127] A few years later, in *M.I. Builders*, the Court continued to do so, relying on a leading American environmental law casebook, including its analysis of *Illinois Central Railroad*, for the Court's own explanation of the history,

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122. *See id*. ¶ 86.

123. *See also id.* ¶ 91(1), (3) (including among the "broad sustainable conclusions" derived from the Government's role in the production sharing arrangement that "[t]he natural resources are vested with the Government as a matter of trust in the name of the people of India," and that "[t]he broader constitutional principles, [among other things,] . . . mandate[] the Government to determine the price of the gas before it is supplied by the contractor").

124. *See* Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶ 24; *cf. id.* ¶ 33 (emphasizing that American courts have expanded the scope of the uses protected by the public trust doctrine beyond its historic focus on navigation, commerce, and fishing under the English common law).

125. *Id.* ¶ 34.

126. *See* Reliance Natural Res. Ltd. v. Reliance Indus., SCC Civ. App. No. 4273 (May 7, 2010), at ¶ 85, *available at* http://judis.nic.in/supremecourt/chejudis.asp (quoting Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶ 34, but misidentifying the paragraph quoted as ¶ 27).

127. *See* Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶¶ 24–34.

purposes, and content of the doctrine.[128] The Court ultimately concluded, however, albeit without explanation, that "[t]his public trust doctrine in our country, it would appear, has grown from Article 21 of the constitution."[129] Article 21 purports merely to protect the lives and personal liberty of individuals,[130] but the Court has interpreted it to be a source of a substantive environmental civil right.[131] A decade after *M.I. Builders*, in *Reliance Industries*, the Court dispensed with any reference to American law or scholarship,[132] merely quoting two paragraphs from *Mehta v. Nath* that omitted any mention of either,[133] and identified the public trust doctrine as one of the "constitutional concepts" implicated in the case.[134] Although the Court concluded that Article 297, which declares that certain offshore resources "shall vest in the Union and be held for the purposes of the Union,"[135] must be interpreted in the light of the public trust doctrine,[136] it clearly did not identify Article 297 as the doctrine's source. Thus, although the Court has moved away from a reliance on American law as the touchstone for the trust's content, the only clue to the indigenous constitutional source of that content—at least as the Court currently understands it—is the Court's cryptic reference in *M.I. Builders* to Article 21.[137]

Third, *Reliance Industries* demonstrates the Court's willingness, in defining the universe of resources to which the doctrine applies, to go far beyond its dictum in *Mehta v. Nath* regarding the applicability of the public trust doctrine to "all ecosystems operating in our natural resources."[138] Not only has the court applied the public trust doctrine to an environmentally and historically significant public park,[139] which the

128. *See* M. I. Builders v. Sahu, A.I.R. 1999 SC 2468, at ¶ 51, *available at* http://judis.nic.in/supremecourt/chejudis.asp.

129. *Id*.

130. *See* INDIA CONST. art. 21.

131. *See* Razzaque, supra note 105.

132. *See* Reliance Natural Res. Ltd. v. Reliance Indus., SCC Civ. App. No. 4273 (May 7, 2010), at ¶¶ 84–86, *available at* http://judis.nic.in/supremecourt/chejudis.asp.

133. *See id*. ¶ 85 (quoting Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶¶ 25, 34, but misidentifying the paragraphs quoted as ¶¶ 17 and 27).

134. *Id.* ¶ 86.

135. INDIA CONST. art. 297, § 1.

136. Reliance Natural Res. Ltd. v. Reliance Indus., SCC Civ. App. No. 4273 (May 7, 2010), at ¶ 84, available at http://judis.nic.in/supremecourt/chejudis.asp.

137. *Cf.* M. I. Builders v. Sahu, A.I.R. 1999 S.C. 2468, at ¶ 51, *available at* http://judis.nic.in/supremecourt/chejudis.asp ("This public trust doctrine in our country, it would appear, has grown from Article 21 of the Constitution.").

138. Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶ 33.

139. *Supra* notes 94–107 and accompanying text.

traditional American variant recognizes as a public trust resource,[140] but also to natural gas,[141] which the American variant clearly does not recognize. Although the production and use of natural gas has obvious ecological implications, including for global climate change,[142] the *Reliance Industries* Court focused only on its public value as an economic resource.[143]

Finally, these cases make clear that the Indian public trust doctrine is solely a creature of Indian federal law, and is not, like its American cousin, dependent on state law for any of its content. Since declaring in *Mehta v. Nath* that the public trust doctrine is "part of [Indian] jurisprudence,"[144] the Indian Supreme Court has emphasized and reemphasized that the doctrine is part of "Indian law" per se,[145] without reference to any role that the States otherwise might play in fleshing out its content.[146] The disparity between the Indian and traditional American variants of the public trust doctrine in this regard is a function of how the Indian and American central governments acquired their sovereignty in the context of their respective federations. In the United States, the Federal Government acquired its sovereignty from the individual States, with the residuum remaining in the States that created that Federal Government.[147] In India, the Union Government acquired its sovereignty directly from the people, with the residuum residing in the Union Government itself.[148]

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140. *See supra* note 63 and accompanying text.

141. *Supra* notes 108–23 and accompanying text.

142. The components of natural gas are more powerful GHGs than CO2 when released into the atmosphere, although natural gas also produces CO2 when burned. *Cf.* WEART, *supra note* 2, at 2, 26–30, 114, 126–29 (comparing the current and potential future contributions to global warming of anthropogenic CO2 and other anthropogenic GHGs that have a much greater warming potential per molecule but are emitted in much smaller amounts).

143. *See, e.g.,* Reliance Natural Res. Ltd. v. Reliance Indus., SCC Civ. App. No. 4273, at ¶¶ 16–21 (May 7, 2010), *available at* http://judis.nic.in/supremecourt/chejudis.asp.

144. *See* Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶ 34.

145. *See* Reliance Natural Res. Ltd. v. Reliance Indus., SCC Civ. App. No. 4273, at ¶ 85; M. I. Builders v. Sahu, A.I.R. 1999 SC 2468, at ¶ 50, *available at* http://judis.nic.in/supremecourt/chejudis.asp.

146. If the States were to play a role in fleshing out the content of the public trust doctrine in the Indian context, then it would be through legislation. A distinction between state common law and federal common law would not be relevant because the Indian judiciary is unitary. See INDIA CONST. art. 141.

147. *See* BOWEN, supra note 71, at 3–15, 32–33; see also U.S. CONST. amend X ("The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.")

148. *See, e.g.*, GRANVILLE AUSTIN, THE INDIAN CONSTITUTION: CORNERSTONE OF A

V. PUBLICLY OWNED FORESTS AS RESOURCES SUBJECT TO THE PUBLIC TRUST

A. U.S. Forests

1. Publicly Owned Forests as Resources Subject to the Traditional Public Trust Doctrine

Only two American courts—in the context of the same federal case—seem to have recognized either explicitly or implicitly that the traditional public trust applies to publicly owned forests.[149] In *Puerto Rico v. SS Zoe Colocotroni*,[150] the Commonwealth of Puerto Rico and its Environmental Quality Board sued the owner of an oil tanker in admiralty to recover damages for impairment of the ecological value of mangrove forests, among other things, as the result of the intentional release of 1.5 million gallons of crude oil into waters a few miles off the Puerto Rican coast by the oil tanker in an effort to free itself from where it had run aground.[151] The oil slick came ashore and infiltrated various "mangrove areas" in and around a bay.[152] In holding that the plaintiffs had standing to sue for damages, the U.S. District Court for the District of Puerto Rico emphasized that the Commonwealth has title to all beaches and the "maritime terrestrial zone" abutting its navigable waters, and "in particular to the mangrove areas which are a part of the same," and therefore holds them in trust for the benefit of its people.[153] On appeal, the U.S. Court of Appeals for the First Circuit affirmed in part

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NATION 192–94 (1966).

149. Although a Michigan state trial court also held trees along a scenic roadway to be subject to a public trust, it did so under a state statute that declared certain natural resources to be imbued with such a trust. See Irish v. Green, 4 Env't Rep. Cas. (BNA) 1402, 1404–05 (Mich. Cir. 1972); *but cf*. PLATER, *supra note* 79, at 1101 (characterizing both the Michigan case and a case in which a federal court held mangroves to be subject to the state common law public trust as "trust cases").

150. 456 F. Supp. 1327 (D.P.R. 1978), *aff'd in part and vacated in part on other grounds*, 628 F.2d 652 (1980).

151. *SS Zoe Colocotroni,* 456 F. Supp. at 1330–31, 1333; *see also id*. at 1339–42, 1344–45 (describing how the oil came ashore, spread throughout the affected ecosystems, and was cleaned up, as well as the details of the damage caused to the mangroves). Although Puerto Rico is not a State per se within the United States, it has many of the attributes of a State, including the duty to protect the public trust in "the public property and domain" to which it holds title. *Id.* at 1336.

152. *Id.* at 1337–41.

153. *See id.* at 1336–37; see also id. at 1344 n. 42 (noting that "[a]s explained previously, the affected flora and fauna were part of a trust held for the people by the Commonwealth of Puerto Rico").

and vacated and remanded in part.[154] The court recognized that the oil damaged some of the "mangrove forests," which performed ecologically valuable functions.[155] In holding that the plaintiffs had stated a cognizable cause of action, however, the court declined to reach the issue of whether the traditional public trust doctrine applied to the "mangrove trees" and other natural resources in question because a Commonwealth statute otherwise authorized the Environmental Quality Board to recover damages for the impairment of natural resources or the environment generally in certain circumstances.[156] Thus, the First Circuit apparently left undisturbed the district court's general conclusion that the traditional public trust doctrine applies to "mangrove areas."[157]

Two features of these cases stand out. First, notwithstanding the First Circuit's characterization of the district court's holding with respect to standing as applying to recovery for damages to mere "mangrove trees,"[158] among other resources, the district court clearly concluded that the public trust applied to the ecological communities of organisms of which mangroves apparently were the keystone species.[159] In describing the setting for the environmental damage caused by the oil spill, the district court distinguished between the "mangrove components" of the larger bay ecosystem, which served as breeding, feeding, and nursery grounds for various species, and "the mangroves themselves," which served as the basis of the aquatic food chain.[160] In detailing the damages caused by the spill, the district court focused on both "mangrove

154. Commonwealth of Puerto Rico v. SS Zoe Colocotroni, 628 F.2d 652, 678 (1st Cir. 1980).

155. *See id*. at 657–59.

156. *Id*. at 670–72. The court of appeals reframed as a question of whether plaintiffs had stated a cognizable cause of action what the district court and the parties had framed as a question of "standing." *See id*. at 670.

157. The First Circuit characterized the district court's holding regarding standing as one that applied to recovery for damages to "mangrove trees," however, among other natural resources. *Id.* at 670. The First Circuit also asserted that the Commonwealth of Puerto Rico had sought to recover for "the loss of living natural resources on the land such as trees." *Id.* at 670–71.

158. *Cf., e.g*., Commonwealth of Puerto Rico v. SS Zoe Colocotroni, 628 F.2d 652, 670 (1st Cir. 1980).

159. *See* Commonwealth of Puerto Rico v. SS Zoe Colocotroni, 456 F. Supp. 1327, 1339 (D.P.R. 1978). A "community" in the ecological sense is "any grouping of populations of different organisms found living together in a particular environment; essentially, the biotic component of an ecosystem." OXFORD UNIV. PRESS, THE CONCISE OXFORD DICTIONARY OF ECOLOGY 100 (3d ed. 2005). A "keystone species" is "[a] species that has a disproportionately strong influence within a particular ecosystem, such that its removal results in severe destabilization of the ecosystem and can lead to further species losses." *Id.* at 245.

160. *See* SS Zoe Colocotroni, 456 F. Supp. at 1339.

mortality"—apparently, the mortality of individual mangrove trees—and the reduction in macrobiotic diversity in the "mangrove community" in which that mortality took place.[161] Thus, to the extent that the First Circuit's decision left undisturbed the district court's conclusion that the traditional public trust doctrine applies to mangroves,[162] the latter clearly applies to the mangrove dominated ecosystems that the district court called mangrove "areas,"[163] and which the First Circuit called mangrove "forests."[164]

The second noteworthy feature of these cases is a constraint on the precedential value of the first noteworthy feature. Even to the extent that the district court's conclusion that the public trust doctrine applies to mangrove forest ecosystems remains good law,[165] it did not expand the scope of the public trust doctrine beyond the submerged settings to which the doctrine was applied historically. The species of mangroves affected by the oil in *SS Zoe Colocotroni* grow either in submerged soil or on land that is flooded regularly by the tide.[166]

2. Publicly Owned Forests as Resources Subject to the Federal Public Trust Doctrine

The federal public trust clearly applies to federally owned forests. In *Light v. United States*,[167] the U.S. Supreme Court made clear that Congress has plenary authority to determine by statute how the federal trust in public lands shall be administered.[168] The setting for the dispute was a federal forest reserve,[169] a predecessor of today's national

161. *See id*. at 1344.

162. *Cf. supra* notes 155–57 and accompanying text (analyzing the relevant parts of the First Circuit's opinion in the case).

163. *See* Commonwealth of Puerto Rico v. SS Zoe Colocotroni, 456 F. Supp. 1327, 1338, 1344 (D.P.R. 1978). The district court also referred to one of these "mangrove areas" as a "mangrove stand." See id. at 1338. A "stand" in the ecological sense is "[t]he standing growth of plants (e.g. trees)" or, more formally, "[i]n vegetation classification, a distinctive plant association that may be recognized elsewhere." OXFORD UNIV. PRESS, supra note 159, at 412.

164. *See* Commonwealth of Puerto Rico v. SS Zoe Colocotroni, 628 F.2d 652, 658 (1st Cir. 1980). The First Circuit referred to one group of mangroves as a "stand." *See id*. For the ecological meaning of "stand," *see supra* note 163.

165. *Cf. supra* notes 155–57 and accompanying text (analyzing the relevant parts of the First Circuit's opinion in the case).

166. Commonwealth of Puerto Rico v. SS Zoe Colocotroni, 456 F. Supp. 1327, 1338 (D.P.R. 1978).

167. 220 U.S. 523 (1911).

168. *See* Light v. United States, 220 U.S. at 537.

169. *See id*. at 524–25.

forests.[170] American courts also have applied the federal public trust doctrine to privately owned timberland located upstream and upslope of a national park under federal statutes that apply either to national parks generally or to the specific national park at issue.[171] The most important federal statute regarding the application of the federal public trust doctrine to forests, however, is the Multiple-Use and Sustained-Yield Act ("MUSYA"),[172] which specifies the management goals for the national forests that comprise sixty percent of all publicly owned forests in the United States.[173] In preambular language the MUSYA declares that Congress's policy is for the national forests to be administered for "outdoor recreation, range, timber, watershed, and wildlife and fish purposes," which supplement the timber supply, water flow, and general forest improvement and protection purposes for which they were established.[174] The heart of the MUSYA, however, is the requirement that the Secretary of Agriculture "develop and administer the renewable surface resources of the national forests for multiple use and sustainable yield of the several products and services obtained therefrom."[175] In relevant part, the statute defines "multiple use" as "[t]he management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people."[176] It defines "sustained yield of the several products and services" as "the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable

170. *See generally* CONG. RESEARCH SERV., supra note 32, at text accompanying notes 8–9 (summarizing the history of what is now the National Forest System since the late nineteenth century).

171. *See* Sierra Club v. Dep't of Interior, 398 F. Supp. 284, 285, 287 (N.D. Cal. 1975); Sierra Club v. Dep't of Interior, 376 F. Supp. 90, 92–93, 95–96 (N.D. Cal. 1974).

172. 16 U.S.C. §§ 528–31 (2006).

173. *See id*. § 528; see also supra note 32 and accompanying text (establishing the proportion of publicly owned forests in the United States comprised by the National Forest System); but cf. 16 U.S.C. § 475 (2006) (establishing narrower goals for the establishment, administration, and control of national forests established pursuant to a nineteenth-century statutory provision repealed in 1976).

174. 16 U.S.C. § 528 (2006); see also id. § 475 (establishing narrower goals for the establishment, administration, and control of national forests established pursuant to a nineteenth-century statutory provision repealed in 1976). The MUSYA specifies that the establishment and maintenance of wilderness areas is consistent with these purposes. *Id.* § 529. For an influential insider's account of the establishment and challenges faced in the early expansion and administration of what is now the National Forest System, see GIFFORD PINCHOT, BREAKING NEW GROUND 79–132 (1947); *cf.* National Forest Management Act, 16 U.S.C. § 1609(a) (2006) (defining the scope of the National Forest System).

175. 16 U.S.C. § 529 (2006).

176. *Id.* § 531(a).

resources of the national forests without impairment of the productivity of the land."[177] Thus, the MUSYA makes clear that the Federal Government has a fiduciary duty to manage the national forests as resources for the public's benefit.

B. Indian Forests

The Indian public trust doctrine clearly applies to publicly owned forests. The setting for *Mehta v. Nath*,[178] in which the Indian Supreme Court recognized the public trust doctrine as part of Indian law,[179] was State-owned forested land that had been converted to a private use.[180] In that case, the court clearly recognized that the corpus of the public trust includes forest ecosystems, not merely the land on which forests happen to be growing. The court invoked *National Audubon Society v. Superior Court of Alpine County*,[181] in which the Supreme Court of California recognized that the purposes of the public trust include the protection of ecological values,[182] to suggest that ecological values should be used to determine which resources are subject to the public trust doctrine.[183] The court went on to invoke *Phillips Petroleum Co. v. Mississippi*[184] as a purported illustration of this approach.[185] In *Phillips Petroleum*, the U.S. Supreme Court held that the State of Mississippi's title to tidelands extended to all lands subject to the ebb and flow of the tide, whether or not the waters that flowed over them were navigable in fact.[186] According to the Indian Supreme Court, *Phillips Petroleum* "assumes importance because the [U.S.] Supreme Court expanded the public trust doctrine to identify the tide lands not on commercial considerations but on ecological concepts."[187] On the basis of this analysis of American case

177. *Id.* § 531(b).

178. (1997) 1 S.C.C. 388.

179. *Id.* ¶ 34.

180. *See id*. ¶ 19. This forested land happened to be "protected," *id*. ¶¶ 19(1), 36, and thus subject to a level of state protection under the Indian Forest Act, 1927, less stringent than that applied to certain other forests. *Compare* The Indian Forest Act, 1927, §§ 3–27, *available at* http://envfor.nic.in/legis/forest/forest4.html, *with id*. §§ 29–34 (regulating activities in reserved forests and protected forests, respectively).

181. 658 P.2d 709 (Cal. 1983).

182. *Id.* at 719.

183. *See* Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶ 33.

184. 484 U.S. 469 (1988).

185. *See* Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶ 33.

186. 484 U.S. at 472–81.

187. Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶ 33. In this and related respects, the Indian Supreme Court misread *Phillips Petroleum*. The issue in that case was whether,

law the Indian Supreme Court concluded, "[w]e see no reason why the public trust doctrine should not be expanded to include all ecosystems operating in our natural resources,"[188] including "forests."[189]

upon its admission to the United States, the State of Mississippi acquired title to certain lands within its jurisdiction that were subject to the ebb and flow of the tide but not navigable in fact. 484 U.S. at 472. In holding that Mississippi had acquired title to these tidelands, the U.S. Supreme Court merely reaffirmed its long-standing rule that the constitutional equal footing doctrine, according to which new States acquire title to the submerged lands within their jurisdiction to the same degree as the original thirteen States did upon their independence from Great Britain, applies to all waters subject to the ebb and flow of the tide. *Id.* at 473–74, 476, 484–85; see also Pollard's Lessee v. Hagan, 44 U.S. (3 How.) 212, 228–30 (1845) (establishing the equal footing doctrine with respect to title to lands under navigable waters). These tidelands also happen to be subject to the traditional public trust doctrine. *See Phillips Petroleum*, 484 U.S. at 475–76, 476–80, 481, 484–85.

188. Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶ 33.

189. *Id.* ¶ 34. The Indian Supreme Court's historical analyses of both the Roman law and the English common law were flawed as well. In identifying as an historical analog of modern environmental concerns the Roman law's *res communis* concept, which the court characterized inaccurately as "the 'Doctrine of the Public Trust'," *see id*. ¶ 24, the court asserted that the Roman concept was founded on the idea that "certain common properties such as . . . *forests*"—as well as rivers, the seashore, and the air—were "held by Government in trusteeship for the free and unimpeded use of the general public," id. (emphasis added). Similarly, after recounting the contributions of both the Roman civil law and the English common law to the development of the modern public trust doctrine, the Court asserted that "[t]he Public Trust Doctrine primarily rests on the principle that certain resources like air, sea, waters and the *forests* have such great importance to the people as a whole that it would be wholly unjustified to make them a subject of private ownership." *Id.* ¶ 25 (emphasis added). In fact, with respect to forests, the Roman concept merely protected the public's right to tie their vessels to trees growing on riverbanks that otherwise were protected as *res communis* lands. J. Inst. 2.1.4 (Thomas Collett Sandars trans., 1876). The English common law doctrine was of similarly limited scope. See BRACTON, supra note 45, at 40. As if realizing the weakness of its analysis on these points, the court went on to argue that American courts have expanded the scope of the public trust doctrine beyond both traditional trust resources and traditional public uses of those resources, *see* Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶ 33, albeit partly in reliance on a misreading of the case law, *see supra* note 187 and accompanying text, and ultimately concluded that the Indian variant of the public trust doctrine applies to "the sea-shore, running waters, airs, forests and ecologically fragile land," at a minimum, Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶ 34; *see also id*. ¶ 33 ("We see no reason why the public trust doctrine should not be expanded to include all ecosystems operating in our natural resources.").

VI. CO_2 SEQUESTRATION AS A PROTECTED PUBLIC USE

A. CO_2 Sequestration in the United States

1. CO_2 Sequestration as a Public Use Protected by the Traditional Public Trust Doctrine

Although no American court has addressed the issue of whether CO_2 sequestration by vegetated lands per se is a public use protected by the traditional public trust doctrine, one court has recognized that protecting certain trust lands for their favorable impacts on climate is a protected public use. In *Marks v. Whitney*,[190] the plaintiff sought to quiet title to tidelands that he had acquired through a patent issued by the State of California.[191] The defendant was an adjoining, upland landowner whose access to the ocean would be cut off if the plaintiff filled and developed those tidelands as a marina.[192] In holding that the tidelands were burdened with a public easement imposed by the public trust,[193] the Supreme Court of California recognized that "[t]here is a growing public recognition that one of the most important public uses of the tidelands—a use encompassed within the tidelands trust—is preservation of these lands in their natural state, so that they may serve as ecological units for scientific study, . . . and as environments which . . . favorably affect the . . . climate of the area."[194] Although the court referred to the effect of these tidelands on the climate "of the area," there is nothing in its opinion to suggest that the court intended this modifier to exclude effects on climate generally. Of course, neither anthropogenic global climate change nor the ecological value of vegetated tidelands as CO_2 sinks were on anyone's mind in 1971 when the Supreme Court of California decided *Marks v. Whitney*.[195]

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190. 491 P.2d 374 (Cal. 1971).

191. *Id.* at 377.

192. *Id.*; *see also id*. at 381 (noting the plaintiff's plans to develop the tidelands as a marina).

193. *See id.* at 378–81.

194. *Id.* at 380.

195. *Cf.* ROSS W. GORTE, CONG. RESEARCH SERV., CRS Report RL31432, CARBON SEQUESTRATION IN FORESTS 5 tbl.1 (2009) (comparing the tons per acre of carbon sequestered in various biomes, including wetlands). Ironically, when both plants and soil are considered together, "wetlands" sequester much more CO2 than forests. *See id*.

2. CO_2 Sequestration as a Public Use Protected by the Federal Public Trust Doctrine

With respect to the national forests that comprise sixty percent of all publicly owned forests in the United States,[196] the MUSYA requires the Secretary of Agriculture to "develop and administer the renewable surface resources of the national forests for multiple use and sustainable yield of the several products and services obtained therefrom."[197] In relevant part, the statute defines "multiple use" as "[t]he management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people," and contemplates "that some land will be used for less than all of the resources[,] . . . with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output."[198] The United States Supreme Court has made clear, however, that in the event of a conflict between any of the uses identified by the MUSYA and the timber supply, water flow, or general forest and improvement purposes for which the national forests were established, the former must be subordinated to the latter.[199]

Significantly, the U.S. Forest Service has proposed a new planning rule under the National Forest Management Act to guide land management planning for all national forests in accordance with the principles of the MUSYA.[200] In relevant part, the intent of the planning

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196. *Cf. supra* note 32 and accompanying text (establishing the proportion of publicly owned forests in the United States comprised by the National Forest System).

197. 16 U.S.C. § 529 (2006).

198. *Id.* § 531(a).

199. *See* United States v. New Mexico, 438 U.S. 696 (1978).

200. National Forest System Land Management Planning, 76 Fed. Reg. 8480 (proposed Feb. 14, 2011) (to be codified at 36 C.F.R. pt. 219). In relevant part, the National Forest Management Act requires the Secretary of Agriculture to "promulgate regulations, under the principles of the Multiple-Use Sustained-Yield Act of 1960 that set out the process for development and revision of the land management plans" for national forests that the National Forest Management Act otherwise requires the Secretary to prepare. National Forest Management Act, 16 U.S.C. § 1604(g) (2006); *see also id*. § 1604(a) (requiring the Secretary of Agriculture to "develop, maintain, and, as appropriate, revise land and resource management plans for units of the National Forest System"). All current Forest Service land management plans are based on a rule promulgated in 1982. National Forest System Land Management Planning, 76 Fed. Reg. at 8481. Although the 1982 rule was replaced in 2000 with a new rule, which in turn was reinstated as amended in 2009 after a federal district court had invalidated two even newer rules on procedural grounds, the 2000 rule does not refer to climate change or carbon storage. See 36 C.F.R. pt. 219 (2011); see also National Forest System Land and Resource Management Planning, 74 Fed. Reg. 67,059, 67,059–67,060 (Dec. 18, 2009) (recounting the procedural history of the reinstated 2000 rule). Moreover, the transition

framework embodied in the rule would be "to create a responsive and agile planning process that informs integrated resource management and allows the Forest Service to adapt to changing conditions, including climate change."[201] The proposed rule would require each plan to provide for ecological sustainability, among other things, while taking into account "[p]otential system drivers, stressors, and disturbance regimes, including climate change."[202] It also would require each plan to provide for multiple uses, including "ecosystem services,"[203] which the proposed rule would define to include both "long term storage of carbon" and "climate regulation."[204] With respect to the development of plan components for integrated resource management, the proposed rule would require the responsible official to consider "[p]otential impacts of climate and other system drivers, stressors and disturbance regimes."[205] The proposed rule also would require the monitoring program for each unit of the National Forest System to include "one or more monitoring questions or indicators addressing . . . [m]easurable changes on the unit related to climate change and other stressors on the unit."[206]

Thus, the Forest Service clearly considers whatever public trust obligations have been imposed on it by statute to permit, if not necessarily to require, the management of national forests in a manner that takes climate change into account. The proposed rule seems to be much less concerned with managing forests for the purpose of mitigating climate change through CO_2 sequestration, however, than with managing

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provisions in the 2000 rule permit Forest Service personnel to continue to follow the 1982 rule until another rule is promulgated to supersede the 2000 rule. 36 C.F.R. § 219.35(b) (2011). The Forest Service anticipates that the units of the National Forest System will continue to follow the 1982 rule until the newly proposed land management planning rule is promulgated in final form. National Forest System Land Management Planning, 76 Fed. Reg. at 8482.

201. National Forest System Land Management Planning, 76 Fed. Reg. 8480, 8516 (proposed Feb. 14, 2011) (to be codified at 36 C.F.R. § 219.5(a)). Thus, the proposed rule would require a more holistic approach than the 1982 rule on which all current Forest Service land management plans are based, which instead of promoting integrated resource management focused on managing each type of resource individually. *Id.* at 8481, 8495.

202. *Id.* at 8518 (to be codified at 36 C.F.R. § 219.8(a)(1)(ii)). In relevant part, the proposed rule would define "system drivers" as "[n]atural or human-induced factors that directly or indirectly cause a change in an ecosystem, such as climate change." *Id.* at 8525 (to be codified at 36 C.F.R. § 219.19).

203. *Id.* at 8519 (to be codified at 36 C.F.R. § 219.10).

204. *Id.* at 8523 (to be codified at 36 C.F.R. § 219.19).

205. *Id.* at 8519 (to be codified at 36 C.F.R. § 219.10(a)(9)).

206. *Id.* at 8520 (to be codified at 36 C.F.R. § 219.12(a)(5)(v)); *see also* National Forest Management Act, 16 U.S.C. § 1609(a) (2006) (defining the scope of the National Forest System in terms of its constituent "units").

them for other purposes even in the face of climate change. The agency's views on these points are especially significant for federal public trust doctrine purposes given that the Supreme Court has made clear both that Congress has plenary authority to determine by statute how the federal trust in public lands shall be administered,[207] and that the courts must defer to federal agencies' own interpretations of the statutes that Congress has authorized them to implement as long as those interpretations are "reasonable."[208]

B. CO_2 Sequestration in India

No Indian court has considered whether the protection of public trust resources for their favorable impacts on climate is a protected public use. What the Indian Supreme Court has done, however, is manifest a clear concern for the ecological value of public trust resources, including forests, as well as a general willingness to expand the universe of protected public uses far beyond its traditional bounds. In holding in *Mehta v. Nath* that the State of Himachal Pradesh had violated the public trust doctrine by leasing protected forest land to a private company, the court repeatedly emphasized the forest's ecological fragility,[209] and in dicta clearly contemplated that the Indian public trust doctrine would apply to all "ecologically fragile lands."[210] In doing so, the court argued that ecological factors—apparently including ecologically defined public uses—should be used to identify which public resources are subject to the public trust doctrine in the first place.[211] Moreover, in declaring in *Reliance Industries* that the public trust doctrine applies to natural gas, the Court defined the public use value of the gas solely in economic and development terms,[212] which is well outside the universe of public uses traditionally protected by the doctrine.[213] If the Indian Supreme Court is willing to recognize mere economic or development value as a protected public use of a public trust resource, then there is little reason to believe that it would refuse to do

207. *See* Light v. United States, 220 U.S. 523, 537 (1911).

208. *See* Chevron U.S.A., Inc. v. NRDC, 467 U.S. 837, 842–45 (1984).

209. *See* Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶¶ 22, 36.

210. *See id*. ¶ 34.

211. *See id*. ¶ 33.

212. *See, e.g.*, Reliance Natural Res. Ltd. v. Reliance Indus., SCC Civ. App. No. 4273, at ¶¶ 16–21 (May 7, 2010), *available at* http://judis.nic.in/supremecourt/chejudis.asp.

213. *Cf., e.g.*, *supra* note 64 and accompanying text (listing public uses that American courts have come to recognize as protected by the traditional public trust doctrine).

the same with respect to CO_2 sequestration by forests as a means of mitigating climate change in appropriate circumstances.

VII. CONCLUSION

Notwithstanding the challenging factual issues that any court would need to resolve in order to determine whether a publicly owned forest had been diverted to a use incompatible with its role as a CO_2 sink,[214] precedents exist for many essential elements of a public trust cause of action in support of that role in both India and the United States. American courts have applied the traditional public trust doctrine to publicly owned forests, albeit not in upland contexts,[215] and have recognized the protection of certain trust lands for their favorable impacts on climate as a protected public use.[216] They also have applied the federal public trust doctrine to federally owned forested lands in appropriate statutory contexts.[217] The U.S. Forest Service, which manages sixty percent of all publicly owned forested lands in the United States, has proposed to consider their value in mitigating climate change in its land management planning for national forests, thus making clear that the agency considers any public trust obligations imposed on it by statute to permit, if not necessarily to require, the management of those forests for CO_2 sequestration purposes.[218]

Although fewer precedents exist in India than in the United States for essential elements of a public trust cause of action in support of publicly owned forests as CO_2 sinks, India probably offers a more fertile field for realizing their full potential, at least in the near term. Although the Indian Supreme Court has not considered whether CO_2 sequestration is a protected public use of trust resources, it has applied the public trust doctrine to publicly owned forests,[219] has recognized the protection of ecological values as a purpose of the public trust,[220] and has demonstrated a willingness to define the universe of protected public

214. *See generally* GORTE, *supra* note 195 (analyzing what is known and not known about carbon cycling in forests and about how land use changes, forestry management practices, and other factors affect their role as CO2 sinks).

215. *Supra* notes 149–66 and accompanying text.

216. *Supra* notes 190–95 and accompanying text.

217. *Supra* notes 167–71 and accompanying text; *cf. supra* notes 172–77 and accompanying text (arguing that the most important statute with respect to the application of the federal public trust doctrine to forests makes clear that the Federal Government has a fiduciary duty to manage the national forests for the public's benefit).

218. *Supra* notes 200–08 and accompanying text.

219. *Supra* notes 178–89 and accompanying text.

220. *See supra* notes 209–11 and accompanying text.

uses in ways that go far beyond traditional bounds.[221] It also has demonstrated a willingness to adapt American precedents to its own purposes,[222] if sometimes interpreting their implications more liberally than the precedents themselves warrant,[223] thus making cases like *Marks v. Whitney*, in which the Supreme Court of California recognized the protection of certain trust lands for their favorable impacts on climate to be a protected public use,[224] to be freely available for use in filling the gaps in Indian jurisprudence. Given sufficient interest on the part of Indian courts, their freewheeling style of jurisprudence[225]—especially when combined with their constitutional authority to assert jurisdiction, on their own initiative, over nearly any matter that interests them[226]—would enable them to mobilize the public trust doctrine in support of publicly owned forests as CO_2 sinks without much further ado.

221. *See supra* notes 212–13 and accompanying text.

222. *See, e.g.*, Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶¶ 26–29, 32–33; but cf. supra notes 127–37 and accompanying text (arguing that Mehta v. Nath, (1997) 1 S.C.C. 388, and its progeny manifest an ongoing shift away from the Indian Supreme Court's initial reliance on American law as the touchstone for the content of the public trust).

223. *See supra* notes 184–87 and accompanying text.

224. *Supra* notes 190–95 and accompanying text.

225. *Cf. supra* notes 106, 181–89 and accompanying text (analyzing a decision by the High Court of Jammu and Kashmir and its possible impact on the Indian Supreme Court's understanding of the source of the Indian public trust doctrine, and analyzing the Indian Supreme Court's reasoning in Mehta v. Nath, (1997) 1 S.C.C. 388, at ¶¶ 24–25, 33–34, with respect to the scope of the doctrine).

226. *See* INDIA CONST. arts. 142, 226; *see also* Razzaque, *supra* note 106, at 230 n.23 (pointing out that actions initiated on Indian courts' own initiative are known as *suo motu* actions). For example, the Indian Supreme Court initiated Mehta v. Nath itself in response to a newspaper story about the construction project at issue. *See Mehta v. Nath*, (1997) 1 S.C.C. 388, at pr. para. 2.

Climate Change, Sea Level Rise, and Artificial Islands: Saving the Maldives' Statehood and Maritime Claims Through the 'Constitution of the Oceans'

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I. INTRODUCTION

On October 17, 2009, President of the Republic of the Maldives, Mohamed Nasheed, held a meeting with other government officials in which a declaration making a demand for global carbon emissions reductions was signed.[1] This was not a surprising decision by the Maldivian president, who has become a critical advocate in mitigating climate change since his election in 2008.[2] However, this was no ordinary meeting between President Nasheed and his Cabinet.[3] The meeting took place thirteen feet underwater.[4] Wearing scuba gear, the President and his eleven ministers sat around a submerged table, complete with name plates and an array of tropical fish swimming around them, as they each signed a declaration that stated: "We must unite in a global effort to halt further temperature rises."[5]

Commentators of President Nasheed's underwater meeting called it a media stunt, but the meeting nonetheless highlights the fact that the Maldives may become uninhabitable by the end of the twenty-first century due to the effects of climate change.[6] The Intergovernmental Panel on Climate Change ("IPCC") concluded in 2007 that average air and sea temperatures are on the rise worldwide, and that ice and snow is melting at a rapid pace.[7] Even more alarming are the consequences of this: sea levels are rising worldwide.[8]

Sea level rise will have a severe impact on small island states, particularly the Maldives, which has an average elevation of only 1.5 meters above sea level.[9] Many small island states worldwide may

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1. *From Underwater, Maldives Sends Warning on Climate Change*, CNNWORLD, Oct. 17, 2009, http://articles.cnn.com/2009-10-17/world/maldives.underwater.meeting_1_maldives-climate-change-sea-levels?_s=PM:WORLD (last visited Oct. 4, 2011).

2. Emily Wax, *Maldives' Unconventional President Takes on Dominant Role in Climate Battle*, WASH. POST, Dec. 10, 2009, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2009/12/09/AR2009120904229.html.

3. CNN, *supra* note 1.

4. Olivia Lang, *Maldives Leader in Climate Change Stunt*, BBC NEWS, Oct. 17, 2009, http://news.bbc.co.uk/2/hi/8312320.stm (last visited Oct. 5, 2011).

5. *Id.*

6. Wax, *supra* note 2.

7. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE [IPCC], CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 5 (Susan Solomon et al. eds., 2007).

8. *Id.*

9. John H. Knox, *Linking Human Rights and Climate Change at the United Nations*, 33 HARV. ENVTL. L. REV. 477, 480 (2009).

become completely submerged as sea levels continue to rise.[10] For the Maldives, a 0.49 meter rise in sea level would mean that significant portions of the archipelagic state would be severely inundated by 2100.[11] Moreover, at such a rate of sea level rise, fifteen percent of the Maldives' capital island of Malé would be submerged by 2025, with fifty percent submerged by 2100.[12] One third of the Maldives' 300,000 nationals live on the congested capital island.[13]

Although the complete submergence of a small island state due to rising sea levels has not yet occurred,[14] the possibility of such an event raises complex questions under international law.[15] One issue is whether, in the event of complete submersion, an island state ceases to exist, given that the notion of statehood arguably encompasses the requirement of a defined territory.[16] A related issue is whether a submerged island state

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10. WORLD METEOROLOGICAL ORGANIZATION, SAVING PARADISE: ENSURING SUSTAINABLE DEVELOPMENT 3 (2005), *available at* http://www.wmo.int/pages/publications/showcase/documents/WMO973.pdf; James G. Titus, *Rising Sea Levels: The Impact They Pose*, 12 EPA J. 17, 18 (1986).

11. Submission of the Maldives to the Office of the U.N. High Commissioner for Human Rights under Human Rights Council Res. 7/23 (Sept. 25, 2008), http://www2.ohchr.org/english/issues/climatechange/docs/submissions/Maldives_Submission.pdf [hereinafter *Maldives OHCHR Submission*]. An archipelagic state is "a State constituted wholly by one or more archipelagos and may include other islands." U.N. Convention on the Law of the Sea art. 46(a), Dec. 10, 1982, 1833 U.N.T.S. 396 [hereinafter LOSC].

12. Maldives OHCHR Submission, *supra* note 11.

13. Frank McDonald, *Paradise in a Perilous State*, IRISH TIMES, Dec. 5, 2009, at 1.

14. *Id.*

15. *See, e.g.*, Shaina Stahl, *Unprotected Ground: The Plight of Vanishing Island Nations*, 23 N.Y. INT'L L. REV. 1, 29-30 (2010) (discussing whether a submerged state maintains its statehood).

16. Montevideo Convention on the Rights and Duties of States art. 1, Dec. 26, 1933, 165 L.N.T.S. 19 [hereinafter *Montevideo Convention*]; Lilian Yamamoto & Miguel Esteban, *Vanishing Island States and Sovereignty*, 53 OCEAN & COASTAL MGMT. 1, 4 (2010). There is some consensus among the international community that the permanent submergence of an island state means that it ceases to exist as a state. *See, e.g.*, U.N. HIGH COMMISSIONER FOR REFUGEES, CLIMATE CHANGE AND STATELESSNESS: AN OVERVIEW 1-2 (May 15, 2009), *available at* http://www.unhcr.org/refworld/docid/4a2d189d3.html [hereinafter *UNHCR Report*]; G.A. Res. 63/213, U.N. Doc. A/RES/63/213 (Feb. 10, 2009), *available at* http://www.sidsnet.org/msi_5/docs/res/res_63_213E.pdf (discussing how climate change and rises in sea level poses risks to the continued viability of some small island developing states); PERMANENT MISSION OF THE REPUBLIC OF NAURU TO THE U.N.,VIEWS ON THE POSSIBLE SECURITY IMPLICATIONS OF CLIMATE CHANGE TO BE INCLUDED IN THE REPORT OF THE SECRETARY-GENERAL TO THE 64TH SESSION OF THE UNITED NATIONS GENERAL ASSEMBLY 10 (2009), *available at* http://www.un.org/esa/dsd/resources/res_pdfs/ga-64/cc-inputs/PSIDS_CCIS.pdf [hereinafter Nauru Report] (discussing how states will be wiped off the face of the earth

loses its maritime claims,[17] which are of critical economic importance to small island states.[18]

Arguably, the answers to these two questions would be in the affirmative, meaning that small island states have a strong interest in adjusting to the potential impacts of climate change, particularly through large-scale engineering strategies.[19] The Maldives has emerged as a leader in complex engineering projects to battle sea level rise.[20] One of

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rising sea levels).

17. *See* Rosemary Rayfuse, *W(h)ither Tuvalu? International Law and Disappearing States* 2-4 (Univ. of N.S.W. Faculty of Law Research Series, Working Paper No. 9, 2009), *available at* http://law.bepress.com/cgi/viewcontent.cgi?article=1151&context=unswwps. The 1982 United Nations Convention on the Law of the Sea (LOSC) dictates that maritime zones are generally calculated by relation to a state's land mass, and scholars have interpreted the Convention to encompass the idea that as a state's coastline fluctuates due to sea level rise, the outer limits of its maritime zones are affected. *See, e.g.*, LOSC, *supra* note 11, art. 5 (discussing calculation of the territorial sea using a baseline which reflects the coast's low-water line); UNITED NATIONS CONVENTION ON THE LAW OF THE SEA 1982: A COMMENTARY Vol. III (Myron H. Nordquist et al., eds. 1993) [hereinafter LOSC COMMENTARY III]; *see* CHRIS WOLD & DAVID HUNTER, CLIMATE CHANGE AND THE LAW 417-18 (2009); Achim Maas & Alexander Carius, Territorial Integrity and Sovereignty: Climate Change and Security in the Pacific and Beyond 6 (2010) (unpublished manuscript) (on file with the Royal Norwegian Soc'y of Sci. and Letters), *available at* http://climsec.prio.no/papers/Paper_Trondheim_PSIDS_CCIS_Maas_Carius_final_revised.pdf ("[I]nstead of opening up new resources, sea-level rise is likely leading to shrinking maritime territories and thus international disputes over extent of current boundaries"); *see also* David D. Caron, *When Law Makes Climate Change Worse: Rethinking the Law of Baselines in Light of a Rising Sea Level*, 17 ECOLOGY L.Q. 621, 634 (1990) [hereinafter *Caron 1990*] (discussing how the existence of maritime zones in the LOSC depends on the baseline's continued presence).

18. *See, e.g.*, EUR, REGIONAL SURVEYS OF THE WORLD: THE FAR EAST AND AUSTRALASIA 2003 822 (34th ed. 2002) (discussing how fishing is a critical aspect of the Maldivian economy and how foreign fishing licenses to fish in the Maldives' exclusive economic zone contributes extensively to its economy); MICHAEL WITTER ET AL., MEASURING AND MANAGING THE ECONOMIC VULNERABILITY OF SMALL ISLAND STATES (2002), *available at* http://www.sidsnet.org/docshare/other/Jamaica_rt_Economic_Vulnerability-Paper.doc; A.H.A. Soons, *The Effects of a Rising Sea Level on Maritime Limits and Boundaries*, 37(2) NETH. INT'L L. REV. 207, 210 (1990); *see, e.g.*, LOSC, *supra* note 11, at art. 56(1)(a) (discussing how a coastal state has sovereignty over the living and non-living natural resources in its exclusive economic zone).

19. Edward Cameron, *The Human Dimension of Global Climate Change*, 15 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 1, 8 (2009).

20. *Sea Wall 'Saves Maldives Capital*, BBC NEWS, Jan. 10, 2005, http://news.bbc.co.uk/2/hi/south_asia/4161491.stm (last visited Oct. 4, 2011); KOJI FUJIMA ET AL., PRELIMINARY REPORT ON THE SURVEY RESULTS OF 26/12/2004 INDIAN OCEAN TSUNAMI IN THE MALDIVES 82, 88 (2005), *available at* http://www.nda.ac.jp/~fujima/maldives-pdf/.

the Maldives' most significant recent projects was the completion of an artificial island called Hulhumalé within waters under its sovereign control.[21] Hulhumalé is intended to serve as the Maldives' "modern Noah's Ark" in the event its 202 populated atolls should be lost to the rising waters.[22]

The artificial island of Hulhumalé may be the Maldives' best attempt at maintaining both its statehood and its maritime zones.[23] Unfortunately, the United Nations Convention on the Law of the Sea ("LOSC"), which regulates the legal status of artificial islands, is currently at odds with at least the latter proposition. Under the LOSC, islands may generate maritime zones,[24] but the Convention's rules governing islands effectively exclude artificial islands from the definition of an island, which requires that the land be "naturally formed."[25] Considering that the LOSC was intended from its inception to be a "constitution of the oceans,"[26] the Maldives should advocate for a new rule to give effect to artificial islands statehood, and effect to them under the Convention in light of the impacts of sea level rise on maritime zones.[27]

This article proposes and frames a potential amendment to the LOSC to allow small island states, such as the Maldives, to endorse

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21. *See generally* FUJIMA ET AL., *supra* note 20, at 69 (discussing how Hulhumalé is located atop a shallow reef between the North Malé Atoll and South Malé Atoll).

22. Uli Schmetzer, *The Rising Ocean Threatens to Sink Low-Lying Maldives*, SEATTLE TIMES, Feb. 27, 2000, at A12. Measuring 465 acres, Hulhumalé can accommodate around 150,000 people. Matthew Rosenberg, *Dreams for Island Swept out to Sea: Few Willing to Live in 'Ugly' Maldives Spot*, CHI. TRIB., Feb. 10, 2008, at 16.

23. *See* Patrick Barta, *Apathy Sinks Maldives Island*, AUSTRALIAN, Jan. 12, 2008, at 33 (discussing how Hulhumalé is intended to be a solution to global warming); Benjamin Joffe-Walt, *Future of the Maldives Emerges From the Waves As Rising Waters Threaten the Tourist Archipelago Beloved by Britons, a Man-Made Island is Rising From a Reef*, SUNDAY TELEGRAPH (LONDON), Aug. 22, 2004 (mentioning that Hulhumalé is intended to act as a long-term solution to sea level rise in the Maldives).

24. LOSC, *supra* note 11, art. 121(1)-(2).

25. Francesca Galea, Artificial Islands in the Law of the Sea 19 (May 2009) (unpublished Doctor of Laws dissertation, University of Malta) (on file with the Seasteading Institute), *available at* http://www.seasteading.org/files/research/law/ARTIFICIAL_ISLANDS_-_01.09.09_mod.doc.pdf.

26. Jon M. Van Dyke, *A Constitution for the Oceans: A Closer Look at the United Nations Law of the Sea Convention*, 6 INSIGHTS ON LAW & SOC'Y 1, 1 (2006), *available at* http://www.abanet.org/publiced/insights/vol6_3/nosearch/constitution_Insightsspring06.pdf.

27. *See* Tsaltas Grigoris et al., Artificial Islands and Structures as a Means of Safeguarding State Sovereignty Against Sea Level Rise: A Law of the Sea Perspective 15-17 (unpublished manuscript) (on file with the University of New South Wales), *available at* http://www.gmat.unsw.edu.au/ablos/ABLOS10Folder/S2P3-P.pdf (advocating that the legal regime of artificial islands be expanded).

artificial islands as "defined territory" in order to save their statehood and maritime zones. This Article introduces the problem of sea level rise in the Maldives in Part II. It then closely analyzes, in Parts III and IV respectively, the ability of a small island state to legally maintain its statehood and maritime zones in the event of inundation by sea level rise. In Part V, the Article examines the current legal regime governing islands in the LOSC to determine whether the construction of an artificial island, such as Hulhumalé, may be used to overcome the potential loss of statehood and maritime zones. Analyzing the relevant provisions of the LOSC, the Article opines in this section that the current legal regime of islands is insufficient to address this contemporary use of artificial islands. Therefore, the latter half of Part V proposes and frames a potential amendment to the LOSC to explicitly allow the construction of artificial islands to maintain the statehood and maritime zones of disappearing island states.[28] The Article concludes with a brief discussion of the practical impediments to constructing artificial islands for these purposes. Prior to examining these legal issues and potential solutions under international law, however, a discussion of global warming's impacts on the Maldives, and why this small island state would even consider tackling such a financially costly project like Hulhumalé, is warranted.

II. THE MALDIVES AND CLIMATE CHANGE

The Republic of the Maldives is comprised of twenty-six major atolls and 1,190 very small islands southwest of Sri Lanka in the Indian Ocean.[29] The largest island is no larger than 2.5 square kilometers, and the islands themselves are generally comprised of coral or sandbanks.[30]

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28. *See* Cleo Paskal, *Strange Case of the Disappearing Islands*, N.Z. HERALD, Apr. 3, 2010, *available at* http://www.nzherald.co.nz/world/news/article.cfm?c_id=2&objectid=10635956 (discussing how the starting point to resolving the issues surrounding submerging island states is the LOSC, and discussing how artificial islands might be used to resolve the issues of statehood being lost and the rights that attach to that status).

29. *Maldives: An Overview*, S. ASIA REG'L INITIATIVE FOR ENERGY, http://www.sari-energy.org/PageFiles/Countries/maldives_Energy_detail.asp (last visited Oct. 4, 2011); *Introduction*, PERMANENT MISSION OF THE REPUBLIC OF THE MALDIVES TO THE UNITED NATIONS OFFICE AT GENEVA http://www.maldivesmission.ch/index.php?id=9 (last visited Oct. 4, 2011). An atoll is "a ring-shaped reef with or without an island situated on it surrounded by the open sea, that encloses or nearly encloses a lagoon." U.N. OFFICE FOR OCEAN AFFAIRS & THE LAW OF THE SEA, THE LAW OF THE SEA: BASELINES, at 50, U.N. Sales No. E.88.V.5 (1989).

30. MOHAMED MUNAVVAR, OCEAN STATES: ARCHIPELAGIC REGIMES IN THE LAW OF THE SEA 21 (1995).

The highest elevation of any of these islands is only 1.5 meters above sea level.[31] This average elevation has earned the Maldives a reputation as the world's flattest state.[32]

Unfortunately, this status does not present any long-term benefits for the Maldives. For example, in late December 2004, the underwater eruption of the strongest earthquake in four decades off the coast of Sumatra, Indonesia, triggered a forty-foot high tsunami, which ravaged much of southern Asia, killing more than 13,000 people across twelve states.[33] The tsunami had a profound impact on the Maldives, where the large wave temporarily submerged an estimated forty percent of the Maldives' land mass, killed eighty-two people, and destroyed the homes of some 15,000 Maldivians.[34] The tsunami virtually eliminated the basic infrastructure of many inhabited islands.[35]

Moreover, scientists believe that climate change is occurring.[36] In 2007, the IPCC concluded with "very high confidence" that "[s]mall islands, whether located in the tropics or higher latitudes, have characteristics which make them especially vulnerable to the effects of climate change, sea-level rise, and extreme events."[37] One effect of climate change is that as the Earth warms up, more intense weather patterns are expected, including stronger cyclones.[38] However, another by-product of climate change is a rise in sea levels worldwide.[39] The main processes contributing to sea level rise include the expansion of ocean water as temperatures increase, ice caps and glaciers melting, and

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31. *Id.*

32. Lucy Siebert, *The Maldives Going Flat Out on Tourism*, MSNBC, Mar. 3, 2008, http://www.msnbc.msn.com/id/23450642/ (last visited Oct. 4, 2011).

33. Amy Waldman, *Asia's Deadly Waves: Disaster;, Thousands Die as Quake-Spawned Waves Crash Onto Coastlines Across Southern Asia*, N.Y. TIMES, Dec. 27, 2004, at A1.

34. Scott Lamb, *Paradise (Soon to be) Lost*, SPIEGEL ONLINE, Feb. 15, 2005, http://www.spiegel.de/international/0,1518,341669,00.html (last visited Oct. 4, 2011).

35. Clare Masters, *Australia Will Clean Maldives*, SUNDAY TELEGRAPH (Austl.), May 29, 2005, at 44.

36. *See Climate Change*, CLIMATE INSTITUTE, http://www.climate.org/topics/climate-change/index.html (last visited Oct. 4, 2011).

37. Nobou Mimura et al., *Small Islands*, *in* CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 687, 689 (M.L. Parry et al. eds., 2007) [hereinafter *IPCC Working Group II Report*].

38. *Id.* at 695.

39. Gerald A. Meehl, et. al.,*Global Climate Projections*, *in* CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 812 (S. Solomon et al. eds., 2007) (discussing how as temperatures of sea water increase, the water expands, which contributes to an increase in volume of the world's oceans and a thermosteric sea level rise).

Greenland and Antarctica losing their ice masses.[40] With regard to small islands, the IPCC has indicated with "very high confidence" that "[s]ea-level rise is expected to exacerbate inundation, storm surge, erosion, and other coastal hazards, thus threatening vital infrastructure, settlements, and facilities that support the livelihood of island communities."[41] Even more alarming, the land-masses of islands could dwindle due to elevated sea levels.[42]

For the Maldives specifically, the IPCC is convinced that a dependable estimate of sea level rise is 50 centimeters by 2100.[43] However, a one-meter rise in sea levels in the coming centuries would mean the Maldives, as a state, will totally vanish.[44] The Maldives is already plagued by significant island erosion.[45] Some nationals have been moved to more protected islands in the face of these continued threats.[46]

In 1987, former Maldives President Abdul Gayoom spoke in the UN General Assembly and stated that sea level rise would lead to "the death of a nation."[47] Two years later, the Maldives held a meeting of small island states to highlight their shared fears of climate change, and ultimately called for industrialized states to reduce greenhouse gas emissions.[48] These small island state attendees later formed the Association of Small Island States to consolidate their individual

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40. *Climate Change & Sea Level Rise: Consequences of Climate Change on the Oceans*, CLIMATE INSTITUTE, http://www.climate.org/topics/sea-level/index.html (last visited Oct. 4, 2011).

41. IPCC Working Group II Report, *supra* note 37, at 689.

42. *Id.*

43. *Id.* at 694.

44. SECRETARIAT OF THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, VULNERABILITY AND ADAPTATION TO CLIMATE CHANGE IN SMALL ISLAND DEVELOPING STATES 16 (2007), *available at* http://unfccc.int/files/adaptation/adverse_effects_and_response_measures_art_48/application/pdf/200702_sids_adaptation_bg.pdf.

45. His Excellency Mr. Maumoon Abdul Gayoom, President, Republic of the Maldives, Address at the Opening of the Joint High-level Segment of the 13th Session of the Conference of Parties of the UNFCCC and the 3rd Session of the Meeting of the Parties to the Kyoto Protocol (Dec. 12, 2007), *available at* http://www.maldivesmission.ch/fileadmin/Pdf/Environment/President_at_Bali_Conference_2012122007_final_.pdf.

46. *Id.*; Joffe-Walt, *supra* note 23 (discussing how three islands have been evacuated).

47. R.K. Pachauri, Chairman, Intergovernmental Panel on Climate Change, Acceptance Speech for the Nobel Peace Prize Awarded to the Intergovernmental Panel on Climate Change, 11 (Dec. 10, 2007), *available at* http://www.ipcc.ch/graphics/speeches/nobel-peace-prize-oslo-10-december-2007.pdf.

48. Knox, *supra* note 9, at 481 (citing James Lewis, *Small States Conference on Sea Level Rise*, 10(2) ENVIRONMENTALIST 141, 141-2 (1990)).

demands for lower greenhouse gas emissions.[49]

More significantly, the Maldives has planned adaptation measures in a long-term effort to save itself from extinction.[50] Short-term plans include potentially moving all occupants onto a few large islands as part of the "Safe Islands" project, and building up some existing islands to a higher elevation.[51] The "Great Wall of Malé," a concrete sea wall surrounding the one-square mile capital island of Malé, which stands six feet tall, was also constructed to mitigate the effects of flooding.[52] Long-term plans include establishing an investment fund for the purchase of new land, perhaps in nearby India or Sri Lanka, for the possible future relocation of the Maldivian people.[53]

However, current President Nasheed may not have to move his people at all because one of the most significant projects the Maldives has undertaken is the construction of an artificial island called Hulhumalé, through a massive land-reclamation undertaking.[54] The resulting artificial island is roughly the size of Malé, but stands one meter higher than that island.[55] The immediate goals for Hulhumalé include remedying the intense population congestion in nearby Malé, while, at the same time, helping the Maldives' fisheries and tourism industries grow.[56] In the long term, it is hoped that "the island will be transformed into a progressive world class city where 60,000 people will live, work and raise their families."[57]

These are certainly valid priorities for the Maldives with regard to Hulhumalé. However, a greater priority for the Maldives should be to advocate for Hulhumalé as the ideal long-term solution to maintaining that state's maritime zones and statehood status.[58] The Maldives already

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49. Knox, *supra* note 9, at 481; ASSOCIATION OF SMALL ISLAND STATES, http://aosis/info (last visited Oct. 4, 2011).

50. Cameron, *supra* note 19, at 7.

51. Lamb, *supra* note 34.

52. Schmetzer, *supra* note 22, at A12; Andrew C. Revkin, *Maldives Considers Buying Dry Land if Seas Rise*, N.Y. TIMES, Nov. 11, 2008, at A10.

53. Revkin, *supra* note 52, at A10.

54. *Introduction to Hulhumalé, Maldives*, HOUSING DEVELOPMENT CORPORATION, http://www.hdc.com.mv/development/introduction.php (last visited Oct. 4, 2011) [hereinafter *Hulhumalé Background*].

55. *Maldives – Hulhumalé*, DEME: DREDGING, ENVIRONMENTAL & MARINE ENGINEERING, http://www.deme.be/Projects/maldive_hulhumale.html (last visited Feb. 8, 2011) [hereinafter *DEME Report*].

56. Hulhumalé Background, *supra* note 54.

57. MALDIVES HOUSING DEVELOPMENT CORPORATION, INVITATION FOR EXPRESSIONS OF INTEREST FOR THE LEASE AND DEVELOPMENT OF A MARINA INCLUSIVE OF HOTEL IN HULHUMALÉ LAGOON (2009), *available at* http://www.investmaldives.org/mediacenter/documents/EOI.HDC.Marina.pdf.

58. *See generally* Tsaltas et al., *supra* note 27, at 4, 6 (calling for a more robust

appears well aware of the artificial island's potential use as a safe haven against climate change. In fact, many nationals from other islands affected by the 2004 tsunami were relocated to the island.[59] However, whether the artificial island of Hulhumalé may satisfy the elements of statehood, and bear maritime zones—in the event that the rest of the Maldives' territory is lost to sea level rise—first requires an analysis of the relevant legal rules regarding statehood and the attribution of maritime zones.

III. CLIMATE CHANGE, TERRITORY, AND STATEHOOD

A. Statehood, Defined

In order to properly discuss how a sea level rise may extinguish the statehood of small island states, it is important to first understand how states are created and what their legal status entails. The principal legal entity subject to international law is the state.[60] International law itself is traditionally described as a body of mutual obligations created through state consent.[61] The concept of statehood is of paramount importance under international law because being a state gives rise to a bundle of rights and duties at the global level.[62] If the state borders a coast, a very significant right is the ability to declare maritime zones.[63]

However, what constitutes 'statehood' is a difficult question to answer because there is no agreed-upon legal characterization of statehood under international law.[64] Defining statehood may be difficult

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legal framework with regard to artificial islands that takes into consideration climate change).

59. *See Resettling Displaced Vilufushi Islanders in Vilufushi Begins*, MIADHU NEWS, May 17, 2009, http://www.miadhu.com/2009/05/local-news/resettling-displaced-vilufushi-islanders-in-begins-10150/ (last visited Oct. 4, 2011).

60. Samantha Besson, *The Authority of International Law – Lifting the State Veil*, 31 SYDNEY L. REV. 343, 360 (2009); Y.A. KOROVIN ET AL., INTERNATIONAL LAW 133 (1951).

61. John Cerone, *Much Ado About Non-State Actors: The Vanishing Relevance of State Affiliation in International Criminal Law*, 10 SAN DIEGO INT'L L.J. 335, 337 (2009).

62. Martti Koskenniemi, *The Future of Statehood*, 32 HARV. INT'L L.J. 397, 408 (1991).

63. *See generally* Geoffrey Marston, *The Stability of Land and Sea Boundary Delimitations in International Law*, *in* MARITIME BOUNDARIES 144, 152 (Gerald H. Blake, ed., 1994) (discussing how "the maritime area is not jurisdictionally homogenous and contains areas under coastal state sovereignty").

64. MICHAEL SCHOISWOHL, STATUS AND (HUMAN RIGHTS) OBLIGATIONS OF NON-RECOGNIZED *DE FACTO* REGIMES IN INTERNATIONAL LAW: THE CASE OF 'SOMALILAND' 11 (2004).

because the elements of statehood have not only evolved throughout history, but are also affected by the circumstances of the entity claiming to be a state.[65] In international law, two competing theories of what constitutes a state have emerged: the constitutive and declaratory theories.[66]

The constitutive theory of statehood encompasses the idea that the emergence of a new state is dependent on its recognition by other states.[67] That is, existing states have a certain level of discretion in allowing a state to come into being.[68] The constitutive theory has been criticized as "lead[ing] to extreme subjectivity in the notion of the state, effectively destroying that which it seeks to define."[69] Conversely, under the declaratory theory, statehood is imputed automatically once the entity meets the elements of statehood, and recognition is not truly necessary as it "merely declares the existence of that fact."[70] However, the declaratory theory presupposes that there are concrete characteristics of statehood, which in practice has proven to be a difficult and highly politicized exercise.[71]

The declaratory theory appears to be the dominant view regarding statehood.[72] In fact, the declaratory theory is enshrined in the Montevideo Convention on the Rights and Duties of States ("Montevideo Convention"),[73] which contains "the most widely accepted formulation of the criteria of statehood in international law."[74] Meanwhile, the constitutive theory of statehood is discarded through

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65. Thomas D. Grant, *Defining Statehood: The Montevideo Convention and its Discontents*, 37 COLUM. J. TRANSNAT'L L. 403, 408 (1999).

66. Johan D. Van Der Vyver, *Self-Determination of the Peoples of Quebec Under International Law*, 10 J. TRANSNAT'L L. & POL'Y 1, 2 (2000).

67. Robert J. Delahunty & John Yoo, *Statehood and the Third Geneva Convention*, 46 VA. J. INT'L L. 131, 142 (2005).

68. William Thomas Worster, *Law, Politics, and the Conception of the State in State Recognition Theory*, 27 B.U. INT'L L.J. 115, 120 (2009).

69. James Crawford, *Israel (1948-1949) and Palestine (1998-1999): Two Studies in the Creation of States*, *in* THE REALITY OF INTERNATIONAL LAW: ESSAYS IN HONOUR OF IAN BROWNLIE 95, 114 (Guy S. Goodwin-Gill & Stefan Tallman eds., 1999).

70. H. LAUTERPACHT, RECOGNITION IN INTERNATIONAL LAW 41 (1947); *see also* THOMAS D. GRANT, THE RECOGNITION OF STATES: LAW AND PRACTICE IN DEBATE AND EVOLUTION 5 (1999).

71. GRANT, *supra* note 70, at 5.

72. Van Der Vyver, *supra* note 66, at 29; Worster, *supra* note 68, at 125 (arguing that the International Court of Justice has upheld the declaratory theory of statehood).

73. Robert D. Sloane, *The Changing Face of Recognition in International Law: A Case Study of Tibet*, 16 EMORY INT'L L. REV. 107, 115 (2002).

74. MALCOLM N. SHAW, INTERNATIONAL LAW 178 (5th ed. 2003); Montevideo Convention, *supra* note 16, at art. 1 (giving four criteria for the definition of statehood).

Article 3 of the Montevideo Convention.[75] It is worth mentioning that the Montevideo Convention is a regional agreement among the International Conference of American States but to date has merely nineteen signatories and sixteen states parties.[76] Nonetheless, the Montevideo criteria for statehood over time developed into a legal benchmark for determining whether an entity is considered a state, at least objectively,[77] and therefore may have the status of customary international law.[78] The definition of a state in Article 1 of the Montevideo Convention consists of four criteria: "a) a permanent population; b) a defined territory; c) government; and d) capacity to enter into relations with other states."[79]

Other legal commentators have effectively dealt with the population, government, and international relations requirements.[80]

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75. Montevideo Convention, *supra* note 16, art. 3 ("The political existence of the state is independent of recognition by the other states"); Delahunty & Yoo, *supra* note 67, at 142.

76. Organization of American States, Convention on Rights and Duties of States, Dec. 26, 1934, O.A.S.T.S. No. 37 *available at* http://www.oas.org/juridico/english/sigs/a-40.html (last visited Feb. 8, 2011).

77. Grant, *supra* note 65, at 416; *see also* JAMES CRAWFORD, THE CREATION OF STATES IN INTERNATIONAL LAW 36 (1979) ("the best known formulation of the basic criteria for statehood is that laid down in Article 1 of the Montevideo Convention, 1933").

78. SCHOISWOHL, *supra* note 64, at 12; *see, e.g.*, RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW § 201 cmt. a (1987) [hereinafter *Third Restatement of Foreign Relations Law*] (§ 201 indicates that "[u]nder international law, a state is an entity that has a defined territory and a permanent population, under the control of its own government, and that engages in, or has the capacity to engage in, formal relations with other such entities" of which the enumeration of these elements is "well-established in international law; it is nearly identical to that in Article 1 of the Montevideo Convention on the Rights and Duties of States").

79. Montevideo Convention, *supra* note 16, art. 1.

80. *See, e.g.*, MICHAEL ROSS FOWLER & JULIE MARIE BUNCK, LAW, POWER, AND THE SOVEREIGN STATE: THE EVOLUTION AND APPLICATION OF THE CONCEPT OF SOVEREIGNTY 35 (1995) (discussing how the population requirement need not satisfy a particular size and how the government requirement does not require a particular type of government); Third Restatement of Foreign Relations Law, *supra* note 78, at § 201 cmt. d (in the context of the government requirement, "[a] state need not have any particular form of government, but there must be some authority exercising governmental functions and able to represent the entity in international relations"); CRAWFORD, *supra* note 77, at 47-48 (discussing how the capacity to enter into relations with other states requirement is closely intertwined with the government requirement, because the government must have the competence to act on the international plane); Milena Sterio, *On the Right to External Self-Determination: "Selfistans," Secession, and the Great Powers' Rule*, 19 MINN. J. INT'L L. 137, 150 (2010) (citing JEFFREY L. DUNOFF ET AL., INTERNATIONAL LAW: NORMS, ACTORS, PROCESSES 138 (2d ed. 2006)) (discussing how the constitutive theory of statehood may still be relevant to the foreign relations element "because an entity claiming to be a state cannot conduct international relations with other states unless those states are willing to enter into such relations").

While these criteria are certainly still relevant to the question of statehood,[81] this article is primarily concerned with the construction of artificial islands to replace lost territory, for which the "defined territory" element deserves the greatest attention.

The territory element has been construed broadly under international law.[82] Preliminarily, a state requires a territorial foundation from which it can assert itself, given that a state is in essence a "territorial entit[y]."[83] However, there is considerable flexibility in the size requirement for a territory to be considered a state.[84] For example, Canada has a land- mass of 9,984,670 square kilometers,[85] while the Maldives land mass is a mere 298 square kilometers.[86]

Unfixed borders, and even boundary disputes, will not defeat the defined territory requirement.[87] As early as 1929, a German-Polish Mixed Arbitral Tribunal stated that, "[i]n order to say that a State exists . . . it is enough that this territory has a sufficient consistency, even though its boundaries have not yet been accurately delimited."[88] The International Court of Justice reiterated this point in the *North Sea Continental Shelf Cases* in 1969, stating that there is "no rule that the land frontiers of a State must be fully delimited and defined, and often in various places and for long periods they are not."[89] Nonetheless, a territory must be adequately recognized and controlled regularly by an entity to qualify for statehood.[90]

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81. Montevideo Convention, *supra* note 16, at art. 1; *see* MIKULAS FABRY, RECOGNIZING STATES: INTERNATIONAL SOCIETY AND THE ESTABLISHMENT OF NEW STATES SINCE 1776 2 (2010) (mentioning that an entity becomes a state so long as it meets each element, at least under the declaratory theory).

82. Omar M. Dajani, *Stalled Between Seasons: The International Legal Status of Palestine During the Interim Period*, 26 DENV. J. INT'L L. & POL'Y 27, 82 (1997).

83. Justus Reid Weiner & Diane Morrison, *Legal Implications of 'Safe Passage' Reconciling a Viable Palestinian State with Israel's Security Requirements*, 22 CONN. J. INT'L L. 233, 246 (2007).

84. *Id.*

85. *Canada, World Factbook*, CENTRAL INTELLIGENCE AGENCY, https://www.cia.gov/library/publications/the-world-factbook/geos/ca.html (last visited Feb. 8, 2011).

86. *Maldives, World Factbook*, CENTRAL INTELLIGENCE AGENCY, https://www.cia.gov/library/publications/the-world-factbook/geos/mv.html (last visited Feb. 8, 2011).

87. North Sea Continental Shelf (Ger. v. Den.; Ger. v. Neth.), 1969 I.C.J. 3, 33 (Feb. 20); CRAWFORD, *supra* note 77, at 38.

88. CRAWFORD, *supra* note 77, at 38 (quoting *Duetsche Continental Gas-Gessellschaft v. Polish State*, 5 A.D. No. 5, 14-15 (1929)).

89. North Sea Continental Shelf, *supra* note 87, at 32.

90. PETER MALANCZUK, AKEHURST'S MODERN INTRODUCTION TO INTERNATIONAL LAW 76 (1997).

It has been argued that the four Montevideo criteria are not the only relevant considerations for statehood, and that additional requirements must be met.[91] Nonetheless, the notion of territory remains a vital element, regardless of what other elements may be necessary.[92] While it is at least arguable that a defined territory is absolutely necessary to create a state, the status of an existing state that has lost its territory, particularly to rising sea levels, is less clear.[93]

B. Potential Loss of Statehood Through Submergence of a State

An open question under international law is whether the loss of a state's entire land mass due to rising sea levels means that the entity ceases to be a state.[94] As discussed above, to become a state, an entity must possess a defined territory.[95] However, the Montevideo Convention's definition of a state does not discuss the requirements for a state to continue to exist once it comes into being.[96] Moreover, it has been argued that "a state is not necessarily extinguished by substantial changes in territory, population, government, or even, in some cases, by a combination of all three."[97]

Nonetheless, it appears that many in the international community believe that the permanent submergence of an island state means that it ceases to exist as a state.[98] The UN High Commissioner for Refugees

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91. *See, e.g.*, Angeline G. Chen, *Taiwan's International Personality: Crossing the River by Feeling the Stones*, 20 LOY. L.A. INT'L & COMP. L.J. 223, 237-40 (1998) (sovereignty of the government, state responsibility, membership in various international organizations, and even power in trade and economics); *see also* KOROVIN ET AL., *supra* note 60, at 118 (recognition of the state by other states); Nii Lante Wallace-Bruce, *Taiwan and Somalia: International Legal Curiosities*, 22 QUEEN'S L.J. 453, 466 (1997) (independence).

92. SHAW, *supra* note 74, at 178; UNHCR Report, *supra* note 16, at 1.

93. Yamamoto & Esteban, *supra* note 16, at 1 (discussing how not much attention has been paid to whether a submerged island state may continue to exercise sovereignty over its submerged lands).

94. *See* Stahl, *supra* note 15, at 29-30 (discussing the lack of clarity on the statehood of submerged island states due to sea level rise).

95. Montevideo Convention, *supra* note 16, at 25 art. I; LAUTERPACHT, *supra* note 70, at 30 ("The possession of territory is . . . a regular requirement of statehood"); Duke E.E. Pollard, *International Law and Protection of Small Caricom States*, CARICOM PERSP., 1966, at 4, *available at* http://www.caribbeancourtofjustice.org/speeches/pollard/03Intl%20Law%20%20the%20Protection%20of%20Small%20States.pdf.

96. CHIARA GIORGETTI, A PRINCIPLED APPROACH TO STATE FAILURE: INTERNATIONAL COMMUNITY ACTIONS IN EMERGENCY SITUATIONS 65-66 (2010).

97. CRAWFORD, *supra* note 77, at 417.

98. *See, e.g.*, UNHCR Report, *supra* note 16, at 1-2; G.A. Res. 63/213, *supra* note

presumes that a state would not cease to exist if its entire territory is temporarily disappeared or if for a limited period of time its government is exiled, but if "the entire territory of a State [is] permanently submerged, inevitably there could be no permanent population attached to it or a government in control of it."[99] The UN General Assembly has similarly expressed concerns about the threat of sea level rise to the status of small island states.[100] Specially affected island states themselves share these views circulating among the UN.[101]

It is important to note that to date no state has been completely swallowed up by the sea, and, therefore, the true answer to whether an entity retains statehood status in such a situation has yet to be confirmed.[102] Additionally, some entities lacking a territory continue to enjoy sovereign recognition by other states, such as the Royal Order of Malta, which lost sovereignty over the Maltese islands in 1798, and today merely occupies a few structures in Rome.[103] However, the Royal

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16; Nauru Report, *supra* note 16, at 10 (discussing how states will be wiped off the face of the earth by rising sea levels).

99. UNHCR Report, *supra* note 16, at 1-2.

100. *See, e.g.*, G.A. Res. 63/213, *supra* note 16 ("[T]he adverse effects of climate change and sea-level rise present significant risks to the sustainable development of small island developing States, that the effects of climate change may threaten the very existence of some of them and that adaptation to the adverse effects of climate change and sea-level rise therefore remains a major priority for small island developing States"); *see also* G.A. Res. 63/281, U.N. Doc. A/RES/63/281 (Jun. 11, 2009) ("[D]eeply concerned that the adverse impacts of climate change, including sea level rise, could have possible security implications").

101. Nauru Report, *supra* note 16, at 10 (mentioning how sea level rise will "eliminate whole islands and even nations"); TUVALU'S VIEWS ON THE POSSIBLE SECURITY IMPLICATIONS OF CLIMATE CHANGE TO BE INCLUDED IN THE REPORT OF THE UN SECRETARY GENERAL TO THE UN GENERAL ASSEMBLY 64TH SESSION 3 (2009), *available at* http://www.un.org/esa/dsd/resources/res_pdfs/ga-64/cc-inputs/Tuvalu_CCIS.pdf (Tuvalu fears its sovereignty will be submerged when its land mass is submerged); *see also* FEDERATED STATES OF MICRONESIA, VIEWS ON THE POSSIBLE SECURITY IMPLICATIONS OF CLIMATE CHANGE TO BE INCLUDED IN THE REPORT OF THE SECRETARY-GENERAL TO THE 64TH SESSION OF THE UNITED NATIONS GENERAL ASSEMBLY 7 (2009), *available at* http://www.un.org/esa/dsd/resources/res_pdfs/ga-64/cc-inputs/Micronesia_CCIS.pdf (pointing out that once Micronesia's land mass is submerged, its nationals will be forever prevented from going home to their state).

102. UNHCR Report, *supra* note 16, at 1-2; Lisa Friedman, *If a Country Sinks Beneath the Sea, is it Still a Country?*, SCI. AM., (Aug. 23, 2010), http://www.scientificamerican.com/article.cfm?id=if-a-country-sinks-beneath-the-sea-is-it-still-a-country ("[U]ntil recently, the notion of a country's extinction has been largely theoretical.").

103. John Alan Cohan, *Sovereignty in a Postsovereign World*, 18 FLA. J. INT'L L. 907, 928-29 (2006); David Freestone & John Pethick, *Sea Level Rise and Maritime Boundaries: International Implications of Impacts and Responses*, *in* WORLD BOUNDARIES VOL. 5: MARITIME BOUNDARIES 73, 80 (Gerald H. Blake ed. 1994).

Order still enjoys continued recognition by some sixty states and has embassies in fifty-nine of them.[104] This indicates that a state submerged by sea level rise may assume the role of a *sui generis* international entity and continue its existence so long as other states choose to continue recognizing it.[105]

In light of these considerations, this article may only presume for the sake of later arguments, but not definitively conclude, that the permanent loss of a state's entire land territory to rising sea levels means that it ceases to meet the criteria for statehood.[106] In such an event, loss of statehood may have drastic consequences.[107] One of the most significant consequences for small island states specifically under the LOSC, which is a large focus of this article, is the loss of maritime zones.[108]

IV. CLIMATE CHANGE, TERRITORY, AND MARITIME ZONES

In addition to the potential loss of statehood, the potential loss of maritime zones poses another significant legal issue relating to the submersion of a small island state.[109] After all, a state has the right under international law to not only exercise sovereignty within its borders,[110] but also to exercise varying forms of jurisdiction over the waters seaward of its shores.[111] The principal international convention regulating these waters is the LOSC.[112] The Maldives became a state party to the LOSC

104. Cohan, *supra* note 103, at 928-29.

105. Freestone & Pethick, *supra* note 103, at 80.

106. *See* Yamamoto & Esteban, *supra* note 16, at 4 (pondering "[W]hether a State can continue to exist if the second element that constitutes it (i.e. its territory) disappears"); *see* Caron 1990, *supra* note 17, at 650 (postulating that a state's continued existence may be questioned if sea levels rise sufficiently enough to inundate its territory); DAVID ANDERSON, MODERN LAW OF THE SEA: SELECTED ESSAYS 383 (2008); Freestone & Pethick, *supra* note 103, at 79-80.

107. Maas & Carius, *supra* note 17, at 8.

108. Rayfuse, *supra* note 17, at 6 ("[O]nly states are entitled to declare maritime zones. Thus, the existence of maritime zones depends on the existence of a state.").

109. *Id.*; *see also* Jonathan Lusthaus, *Shifting Sands: Sea Level Rise, Maritime Boundaries and Inter-State Conflict*, 30 POLITICS 113, 114 (2010), *available at* http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9256.2010.01374.x/pdf.

110. Cohan, *supra* note 103, at 916.

111. *See* LOSC, *supra* note 11, at art. 2, 33, 57, 76; *see also* Dr. Barry Hart Dubner, *The Spratly "Rocks" Dispute—A "Rockapelago" Defies Norms of International Law*, 9 TEMP. INT'L & COMP. L.J. 291, 296 (1995) (discussing how the scope of maritime jurisdiction decreases further out to sea).

112. *See, e.g.*, LOSC, *supra* note 11, at art. 3; Chronological List of Ratifications of,

on September 7, 2000.[113] The LOSC divides seaward waters into four maritime zones: the continental shelf, the exclusive economic zone (EEZ), the contiguous zone, and the territorial sea.[114] The right to claim a territorial sea, contiguous zone, EEZ, and continental shelf also extends to islands.[115]

Maritime zones are very important economically to coastal states, because they enjoy various sovereign rights over the natural resources found in those areas.[116] Small island states tend to have limited land-based resources, and thus their maritime zones are economically indispensible, especially considering fisheries comprise one of their only genuinely sustainable resources.[117] For the Maldives, seventy percent of its Gross Domestic Product is attributable to its bustling tourism businesses; but the second largest industry, accounting for another ten percent, is fisheries.[118]

However, the method through which these maritime zones are determined uses the state's coastline as a critical part of the calculation, meaning that the rightful claims of states over maritime zones measured from these points will be challengeable if the coastal baseline changes due to erosion from sea level rise.[119] By consequence, if an island becomes completely submerged, it loses its privileges over its former

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Accessions and Successions to the Law of the Sea Convention and the Related Agreements, U.N., http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#The%20United%20Nations%20Convention%20on%20the%20Law%20of%20the%20Sea (last visited Feb. 8, 2011) [hereinafter *Chronological List of Ratifications*] (the Maldives became a state party to the LOSC on September 7, 2000).

113. Chronological List of Ratifications, *supra* note 112.

114. LOSC, *supra* note 11, at art. 2, 33, 57, 76; Yamamoto & Esteban, *supra* note 16, at 4.

115. LOSC, *supra* note 11, at art. 121(2).

116. *See, e.g.*, *id.* art. 56(1)(a) ("In the exclusive economic zone, the coastal State has . . . sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or nonliving"); Yamamoto & Esteban, *supra* note 16, at 4.

117. *See* Tuiloma Neroni Slade, *The Making of International Law: The Role of Small Island States*, 17 TEMP. INT'L & COMP. L.J. 531, 535 (2003).

118. S. ASIA REG'L INITIATIVE FOR ENERGY, *supra* note 29,; *see also Background Paper from the Maldives Ministry of Housing*, TRANSPORT AND ENVIRONMENT TO THE MALDIVES PARTNERSHIP FORUM 1 (Mar. 23-24, 2009), *available at* http://www.maldivespartnershipforum.gov.mv/pdf/Adaptation%20to%20Climate%20Change.pdf (discussing fisheries and tourism as the greatest contributors to the Maldivian economy).

119. Freestone & Pethick, *supra* note 103, at 74; *see also* W. MICHAEL REISMAN & GAYL S. WESTERMAN, STRAIGHT BASELINES IN MARITIME BOUNDARY DELIMITATION 4 (1992) (discussing how baselines need constant revision due to natural forces which can erode and build up a coast).

maritime zones.[120] In order to effectively discuss this phenomenon, it is first critical to understand how maritime zones are calculated under the LOSC.

A. Calculation of Maritime Zones Under the LOSC

Under the LOSC, state parties are obliged to calculate the geographic breadth of each maritime zone through a sometimes elaborate measuring process contained in the Convention, which generally uses the state's coast as a baseline for the measurements.[121] Regarding the calculation of baselines, the LOSC's default rule is found in Article 5, which states that "the normal baseline for measuring the breadth of the territorial sea is the low-water line along the coast as marked on large-scale charts officially recognized by the coastal State."[122] The LOSC provides a variety of alternate rules for constructing baselines in certain circumstances, some of which are relevant to small island states.[123] For example, Article 6 allows a reef's "seaward low-water line" to be used as the baseline in the specific instance where the land mass happens to be a coral island or has a fringing reef.[124] In general, the waters on the landward side of the baseline are characterized as internal waters, in which the state exercises absolute sovereignty,[125] akin to sovereignty over its land mass.[126]

Additionally, Article 47 enumerates an elaborate procedure for archipelagic states to draw their baselines.[127] In essence, this provision allows maritime zones to be measured from an archipelagic state's outermost points, which are connected by straight lines.[128] The Maldives uses this method to determine its maritime zones.[129] In the case of

120. *See* Rayfuse, *supra* note 17, at 4.

121. J. Ashley Roach, *The Maritime Claims Reference Manual and the Law of Baselines*, 72 INT'L STUD. SER. US NAVAL WAR COL. 181, 182 (1998); *see, e.g.*, LOSC, *supra* note 11, at art. 5 (discussing calculation of the territorial sea using a baseline).

122. LOSC, *supra* note 11, at art. 5; *see also* SHAW, *supra* note 74, at 495 (This rule has the status of customary international law).

123. *See, e.g.*, LOSC, *supra* note 11, at art. 6, 7, 9, 10, 13, 14, 47; UNITED NATIONS CONVENTION ON THE LAW OF THE SEA 1982: A COMMENTARY VOL. II 88 (Myron H. Nordquist etl al., eds. 1995); Rayfuse, *supra* note 17, at 3.

124. LOSC, *supra* note 11, at art. 6.

125. *Id.* at art. 2(1).

126. George K. Walker & John E. Noyes, *Definitions for the 1982 Law of the Sea Convention—Part II*, 33 CAL. W. INT'L L.J. 191, 264 (2003).

127. LOSC, *supra* note 11, at art. 47.

128. R. R. CHURCHILL & A. V. LOWE, THE LAW OF THE SEA 50 (3d ed. 1999).

129. Maritime Zones of Maldives Act No. 6/96, U.N. FOOD & AGRICULTURE ORGANIZATION, http://faolex.fao.org/docs/pdf/mdv21767E.pdf (last visited Feb. 8, 2011)

archipelagic states, if the state chooses to use this method for its baseline construction, then the waters landward of these baselines are called archipelagic waters and while the state has sovereignty over these waters, ships also have the right of innocent passage and sea-lane passage through them.[130]

Regardless of the ultimate method employed, each maritime zone's geographic scope is calculated by measuring seaward from the same baseline.[131] For instance, the territorial sea, in which the state may exercise sovereignty subject to the right of innocent passage of ships, cannot extend beyond twelve nautical miles from the baseline.[132] The contiguous zone, where the state may exercise jurisdiction both to prevent and to penalize violations of its sanitary, immigration, customs, or fiscal laws, cannot extend beyond twenty-four nautical miles from the baseline.[133] The EEZ may not protract from the baseline more than 200 nautical miles.[134] States enjoy limited rights in their EEZs, including the ability to exploit living and non-living natural resources to the exclusion of other states.[135] Finally, the continental shelf "extend[s] beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance."[136] The coastal state may explore and exploit the natural resources found in the continental shelf to the exclusion of other states.[137]

The Maldives currently claims twelve nautical miles of territorial sea, a twelve nautical mile contiguous zone, and a 200 nautical mile EEZ.[138] In July 2010, a continental shelf exceeding 200 nautical miles

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[hereinafter *Maldives Maritime Zones Act*]; OFF. OF OCEANS AFF., BUREAU OF OCEANS AND INT'L ENVTL. AND SCI. AFF., DEPT. OF STATE, NO. 126, LIMITS IN THE SEAS: MALDIVES: MARITIME CLAIMS AND BOUNDARIES 2 (2005).

130. *See* LOSC, *supra* note 11, at art. 2(1), 49(1), 52(1), 53(2); Donald R. Rothwell, *Navigational Rights and Freedoms in the Asia Pacific Following Entry Into Force of the Law of the Sea Convention*, 35 VA. J. INT'L L. 587, 597 (1995).

131. LOSC, *supra* note 11, at art. 3, 33(2), 57, 76(1); *History of the Maritime Zones under International Law, Office of Coast Survey*, NATIONAL OCEANIC AND ATMOSPHERIC ADMIN., http://www.nauticalcharts.noaa.gov/staff/law_of_sea.html (last visited Feb. 8, 2011); Rayfuse, *supra* note 17, at 3.

132. LOSC, *supra* note 11, at art. 2-3, 17.

133. *Id.* at art. 33.

134. *Id.* at art. 57.

135. *Id.* at art. 56(1)(a).

136. *Id.* at art. 76(1).

137. *Id.* at art. 77(1).

138. Maldives Maritime Zones Act, *supra* note 128.

from the Maldives' archipelagic baselines was declared.[139] However, because the Maldives' expansive maritime zones are calculated by reference to its land territory,[140] those vast areas of ocean are currently at risk as sea levels continue to rise.[141]

B. Loss of Maritime Zones due to Sea Level Rise

As discussed above, the calculation of baselines and the very entitlement to maritime zones is premised on a state having sovereignty over a land mass bordering the seashore.[142] Although the LOSC does not explicitly state whether baselines and maritime zones fluctuate due to coastal erosion, such as through sea level rise, legal scholars have interpreted the Convention to mean that baselines are ambulatory.[143] This means that as baselines change location as a result of human or natural forces, the outer limits of maritime zones fluctuate inward or outward, as the case may be.[144] This rule also might apply to drawing archipelagic baselines, which is the method the Maldives appears to use to calculate its zones[145] because when the former points used to form straight baselines are submerged, the coastal state has an obligation to update

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139. *Maldives Submission to Extend the Continental Shelf*, MIADHU NEWS, Oct. 10, 2010, http://www.miadhu.com/2010/10/local-news/maldives-submission-to-extend-the-continental-shelf/.

140. *See* CHURCHILL & LOWE, *supra* note 128, at 50 (discussing how maritime zones of archipelagic states are measured from their outermost land points, which are connected by straight lines).

141. *See* David D. Caron, *Climate Change, Sea Level Rise and the Coming Uncertainty in Oceanic Boundaries: A Proposal to Avoid Conflict*, *in* MARITIME BOUNDARY DISPUTES, SETTLEMENT PROCESSES, AND THE LAW OF THE SEA 1, 9 (Seoung-Yong Hong & Jon M. Van Dyke eds., 2009) [hereinafter *Caron 2009*] (discussing how coastal baselines are ambulatory in the face of sea level rise).

142. PÅL JAKOB AASEN, THE LAW OF MARITIME DELIMITATION AND THE RUSSIAN-NORWEGIAN MARITIME BOUNDARY DISPUTE 4 (Fridtjov Nansen Institute 2010).

143. Caron 2009, *supra* note 141, at 9; Michael Barry, Inna Elema & Paul van der Molen, *Governing the North Sea in the Netherlands*, *in* ADMINISTERING MARINE SPACES: INTERNATIONAL ISSUES 64, 67 (International Federation of Surveyors 2006), *available at* http://www.fig.net/pub/figpub/pub36/pub36.pdf; Jonathan I. Charney, *Rocks that Cannot Sustain Human Habitation*, 93 AM. J. INT'L L. 863, 867-68 (1999); *see also* Hugo Ignacio Llanos, *Low-Tide Elevations: Reassessing their Impact on Maritime Delimitation*, 14 PACE INT'L L. REV. 255, 264 (2002) (discussing how climate change and resulting sea level rise may affect current low-tide elevation configurations, which will have impacts on maritime delimitation).

144. Caron 2009, *supra* note 141, at 9; Barry, Elema & van der Molen, *supra* note 143, at 67; Rayfuse, *supra* note 17, at 3-4.

145. Maldives Mar. Zones Act, *supra* note 128; OFF. OF OCEANS AFF., *supra* note 129, at 2.

these points.[146]

Therefore, with regard to small island states, rising sea levels may transform a land mass that used to be an island into a mere rock,[147] extensively impacting the land mass's ability to generate maritime zones.[148] Under the LOSC, in contrast to islands, mere "[r]ocks which cannot sustain human habitation or economic life of their own shall have no exclusive economic zone or continental shelf."[149] Therefore, if an island loses land mass to the point where it can no longer support human life, then it may not claim an EEZ or a continental shelf.[150] Thus, an island that becomes completely submerged cannot claim a territorial sea.[151]

Moreover, the LOSC only allows islands to claim maritime zones, such as a territorial sea, if they fit the definition of an island, which is "a naturally formed area of land, surrounded by water, which is *above water at high tide*."[152] If the island declines to a low-tide elevation,[153] meaning land that is above water at low tide but submerged at high tide, it may still serve as a baseline point, but only if it is otherwise located within a territorial sea as measured from the state's mainland or another island.[154] This nexus would probably be difficult to satisfy if an island state's islands become submerged,[155] especially considering "[t]he law of the

146. Soons, *supra* note 18, at 219-20.

147. *Id.* at 218; Rayfuse, *supra* note 17, at 4.

148. Clive Schofield, *The Trouble with Islands: The Definition and Role of Islands and Rocks in Maritime Boundary Delimitation*, *in* MARITIME BOUNDARY DISPUTES, SETTLEMENT PROCESSES, AND THE LAW OF THE SEA 19, 25 (Seoung-Yong Hong & Jon M. Van Dyke eds., 2009).

149. LOSC, *supra* note 11, at art. 121(3).

150. Rayfuse, *supra* note 17, at 4; *see generally* Freestone & Pethick, *supra* note 103, at 76 (discussing how if an island is transformed into a rock because of sea level rise, it would lose its entitlement to previously established maritime zones); LOSC, *supra* note 11, at art. 121(3) (under this provision, a rock cannot claim a continental shelf or exclusive economic zone).

151. Rayfuse, *supra* note 17, at 4 (citing Soons, *supra* note 18, at 216-17).

152. LOSC, *supra* note 11, at art. 121(1)-(2) (emphasis added); Schofield, *supra* note 147, at 24-25 (explaining how a critical element of an island is that it must at high tide be above water, which distinguishes an island from other insular features, particularly regarding the ability to generate maritime zones).

153. *See generally* Freestone & Pethick, *supra* note 103, at 75 (discussing how islets, rocks, and other entities could be maintained artificially to stop them from eroding into low-tide elevations).

154. LOSC, *supra* note 11, at art. 13(1)-(2); CHURCHILL & LOWE, *supra* note 128, at 48.

155. *See* Jonas Attenhofer, *Baselines and Base Points: How the Case Law Withstands Rising Sea Levels and Melting Ice*, 1 LOS REPORTS 1, 5 (2010), *available at* http://www.asil.org/losreports/LOSReportsVol12010w3Attenhofer.pdf; CHURCHILL & LOWE, *supra* note 128, ("[w]here, however, a low-tide elevation (or former island) lies at

sea does not in these circumstances allow application of the so-called 'leapfrogging' method" for low-tide elevations outside the territorial sea.[156] Therefore, in the end, these former maritime zones become by default either part of a neighboring state's maritime claims, or part of the high seas,[157] which are not subject to the sovereignty of any particular state and are subject to free use by all states with certain limitations.[158]

The only maritime zone that may not necessarily fluctuate with sea level rise is the continental shelf because Article 76 of the LOSC requires the coastal state to place charts and information that permanently describe the continental shelf's outer limits with the UN Secretary General.[159] One author points out that a coastal state would still maintain its continental shelf even if its island becomes completely inundated.[160] However, it is questionable whether an entity that no longer can be considered a state because it lacks a defined land territory can continue to claim any maritime zones at all, including a continental shelf.[161]

In sum, an island state will likely lose its maritime claims if its defined territory becomes completely submerged.[162] Notably, the impact of rising sea levels on baselines does not seem to have been considered from the time the notion of baselines was originally devised during the Hague Conference all the way up to the adoption of the LOSC.[163] The current President of the International Tribunal for the Law of the Sea (ITLOS), José Luiz Jesus,[164] writes that "[t]he prospect of sea-level rise and its effect on maritime space and borderlines was not specifically addressed by the 1982 Convention. Indeed, during the Conference this

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a distance exceeding the breadth of the territorial sea from the mainland or a 'real' island, it has no territorial sea of its own (internal citations omitted)"); *see also* Llanos, *supra* note 142, at 264 (pointing out that even low tide elevations are threatened by sea level rise, which will affect the structure of future maritime zones).

156. Maritime Delimitation and Territorial Questions Between Qatar and Bahrain (Qatar v. Bahr.), 2001 I.C.J. 40, 102 (March 16); Schofield, *supra* note 147, at 26-27.

157. Soons, *supra* note 18, at 230.

158. LOSC, *supra* note 11, at art. 86-87, 89.

159. *Id.* at art. 76(9); Soons, *supra* note 18, at 216-17.

160. Soons, *supra* note 18, at 219.

161. *See* Rayfuse, *supra* note 17, at 6-7 (discussing how maritime zones may only be claimed by states).

162. *Id.* at 4 (discussing how submerged islands will lose their territorial sea, exclusive economic zone, and continental shelf); *see generally* Maas & Carius, *supra* note 17, at 6 ("[i]nstead of opening up new resources, sea-level rise is likely leading to shrinking maritime territories and thus international disputes over extent of current boundaries"); *see also* Caron 1990, *supra* note 17, at 634 (discussing how the existence of maritime zones in the LOSC depends on a baseline's continued presence).

163. Caron 2009, *supra* note 141, at 5.

164. *General Information – Judges: The Presidency*, INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA, http://www.itlos.org/index.php?id=17 (last visited Feb. 8, 2011).

was not a major concern."[165]

Considering the fact that sea levels are on the rise, legal commentators have called for a renewed analysis of the rules on baselines.[166] In order to mitigate the uncertainty of ambulatory baselines and maritime zones, some scholars proposed that states should move toward permanently fixing ocean boundaries, which some states have done through bilateral treaties.[167] It remains unclear, however, whether such rights to fixed maritime zones could be maintained in the specific case of an island state completely submerging into the sea, and thus ceasing to exist.[168] It is also not enough that baselines are simply prospectively frozen because it does not resolve the issue of the maintenance of statehood[169] in the event of complete land loss by small island states.[170]

Overall, certain fundamental changes to the LOSC should be made in order to address this issue of losing maritime zones in a way that also addresses the statehood question.[171] The Maldives appears to have attempted to address these issues through the construction of the artificial island, Hulhumalé. Therefore, this article next examines the legal regime governing artificial islands to determine whether such man-made land-masses may be used to effectively address small island states' concerns about statehood and maritime zones in the face of a sea level rise.

V. THE CONSTRUCTION OF ARTIFICIAL ISLANDS AS A SOLUTION TO MAINTAINING MARITIME ZONES AND STATEHOOD

The Maldives' construction of the artificial island Hulhumalé may serve as a practical solution to mitigate the effects of climate change for small island states, and in particular, the loss of statehood and maritime

165. José Luiz Jesus, *Rocks, New-Born Islands, Sea Level Rise and Maritime Space*, *in* NEGOTIATING FOR PEACE 579, 601 (Jochen A. Frowein et al., eds., 2003).

166. Caron 1990, *supra* note 17, at 629.

167. Caron 2009, *supra* note 141, at 14, 16; Soons, *supra* note 18, at 225.

168. *Compare* Soons, *supra* note 18, at 228-29 (rejecting the ability of a state party to a delimitation agreement to invoke the doctrine of changed circumstances to terminate the agreement and concluding that maritime boundaries permanently fixed through an agreement between states are not affected by sea level rise), *with* Caron 2009, *supra* note 141, at 14, 16 (questioning whether a state may continue to exercise fixed boundaries if it becomes completely submerged).

169. Rayfuse, *supra* note 17, at 6.

170. Yamamoto & Esteban, *supra* note 16, at 7.

171. *See* Paskal, *supra* note 28 (discussing how the starting point to resolving the issues surrounding submerging island states is the LOSC).

zones.[172] At the current moment, whether such construction may serve as a legal solution to these two issues simultaneously remains unclear, especially considering the fact that the status of artificial islands remains limited under international law.[173] Therefore, small island states such as the Maldives should advocate for their status to be expanded, potentially through a new law.[174] In order to demonstrate the limited nature of artificial islands, and how any derogation from these limitations might operate, the relevant rules of international law regulating their status must first be analyzed.

A. Current Legal Status of Artificial Islands

1. In General

Many of the current international legal rules governing the status of artificial islands are found in the LOSC.[175] However, the LOSC does not explicitly define the term 'artificial island,' so the best way to define an artificial island may be by first determining what it is not.[176] Article 121(1) defines an island as "a naturally formed area of land, surrounded by water, which is above water at high tide."[177] This definition effectively eliminates some types of formations, including islands constructed artificially and land masses at low-tide elevations, from having the legal status of islands.[178] The LOSC itself further states in Article 60(8), at least in the context of the EEZ, and through Article 80 regardingthe continental shelf, that "[a]rtificial islands, installations and structures do not possess the status of islands."[179]

While an artificial island does not fit into the legal definition of an island, a coastal state has the explicit right to construct them within its maritime zones according to the LOSC.[180] A coastal or land-locked state

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172. Larry Luxner, *Raising the Maldives*, SAUDI ARAMCO WORLD, May/Jun. 2009, http://www.saudiaramcoworld.com/issue/200903/raising.the.maldives.htm (last visited Feb. 8, 2011).

173. *See, e.g.*, LOSC, *supra* note 11, art. 60(8) (discussing how artificial islands do not have the status of islands within the exclusive economic zone); Tsaltas et al., *supra* note 27, at 16-17.

174. *Id.*

175. *See, e.g.*, LOSC, *supra* note 11, art. 60, 121.

176. Samuel Pyeatt Menefee, *"Half Seas Over": The Impact of Sea Level Rise on International Law and Policy*, 9 UCLA J. ENVTL. L. & POL'Y 175, 209-10 (1991).

177. LOSC, *supra* note 11, art. 121(1).

178. Steven Wei Su, *The Tiayu Islands and their Possible Effect on the Maritime Boundary Delimitation Between China and Japan*, 3 CHINESE J. INT'L L. 385, 392 (2004).

179. LOSC, *supra* note 11, at art. 60(8), 80.

180. *Id.* at art. 2(1), 60(1), 60(8), 80; *see also* NIKOS PAPADAKIS, THE

may also construct artificial islands on the high seas.[181] For artificial islands constructed in the coastal state's internal waters and territorial sea, the state can exercise sovereignty.[182] In both the EEZ and continental shelf the coastal state has "exclusive jurisdiction over such artificial islands, installations and structures, including jurisdiction with regard to customs, fiscal, health, safety and immigration laws and regulations."[183] Even though the coastal state has jurisdiction over artificial islands constructed in these areas, this jurisdiction is not equivalent to sovereignty.[184] However, a state cannot exercise jurisdiction over artificial islands built on the high seas because a state's exercise of sovereignty over any part of the high seas would be contrary to the LOSC.[185]

The right to construct artificial islands also entails numerous legal responsibilities attributable to the state.[186] For example, regarding artificial islands constructed in the EEZ and continental shelf, the coastal state must give other states notification of their construction, as well as maintain a permanent warning system of their existence.[187] They cannot be constructed where their presence would undermine the use of internationally acknowledged sea-lanes.[188] The coastal state is obliged to pass laws to prevent marine environmental pollution from the construction of its artificial islands.[189] If an artificial island becomes partially or completely abandoned, the coastal state has a general

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INTERNATIONAL LEGAL REGIME OF ARTIFICIAL ISLANDS 51-55 (1977).

181. LOSC, *supra* note 11, art. 87(d).

182. PAPADAKIS, *supra* note 180, at 78, 151.

183. LOSC, *supra* note 11, art. 60(2), 80.

184. George V. Galdorisi & Alan G. Kaufman, *Military Activities in the Exclusive Economic Zone: Preventing Uncertainty and Defusing Conflict*, 32 CAL. W. INT'L L.J. 253, 278 (2002); Galea, *supra* note 25, at 86.

185. LOSC, *supra* note 11, art. 89; *see also* EUR. CONSULT. ASS. DEB. 23D SESS. 606 (Jan. 19, 1972) ("too much encouragement must not be given to those who imagine that by establishing an island on the high seas, they are, so to speak, creating sovereign rights; that is not admissible").

186. *See, e.g.*, LOSC, *supra* note 11, art. 60, 80, 208; *see also* Karen N. Scott, *Tilting at Offshore Windmills: Regulating Wind Farm Development within the Renewable Energy Zone*, 18 J. ENVTL. L. 89, 96 (2006) (mentioning that states have rights and obligations with regard to artificial islands constructed on the continental shelf or in the EEZ).

187. LOSC, *supra* note 11, art. 60(3), 80. Other obligations exist when an 'installation' is constructed in the International Seabed Area for the purpose of carrying exploration and exploitation activities there. *Id.* art. 147(2); UNITED NATIONS CONVENTION ON THE LAW OF THE SEA 1982: A COMMENTARY VOL. VI 208 (Myron H. Nordquist et al., eds. 1995).

188. LOSC, *supra* note 11, art. 60(7), 80.

189. *Id.* art. 208.

obligation to remove it, or with respect to an artificial island not completely deconstructed, the coastal state must give suitable notification to other states regarding the dimensions, location, and depth of the remains.[190]

2. Artificial Islands and the Generation of Maritime Zones

As previously mentioned, the LOSC governs the generation of maritime zones, and dictates that if a land mass satisfies the legal definition of an island under article 121(1) of the LOSC, it may claim all the maritime zones available to it under the Convention.[191] Nonetheless, artificial islands would not satisfy the "naturally formed" element of this definition because they do not materialize as a result of the forces of nature, but rather, are man-made.[192] Therefore, the most limiting factor of artificial islands is that they have no effect on the generation of maritime zones.[193]

The "naturally formed" requirement under the LOSC's island definition has had a peculiar existence, because it is a relatively recent addition to international law.[194] The Sub-Committee II of the Second Commission (Territorial Waters) of the 1930 Hague Conference implicitly allowed artificial islands to claim territorial seas, because they observed that "[t]he definition of the 'Island' does not exclude artificial islands, provided these are true portions of territory and not merely floating works, anchored buoys, etc."[195] The Hague Codification Conference failed to adopt a comprehensive convention, and therefore the status of artificial islands having the ability to generate maritime zones remained ambiguous for some time.[196]

Moreover, when the International Law Commission ("ILC") revisited the issue in 1956, it omitted any 'naturally formed' requirement in its definition in Article 10 of the draft articles concerning the law of

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190. *Id.* art. 60(3), 80; Walker & Noyes, *supra* note 125, at 228.

191. LOSC, *supra* note 11, art. 121(1)-(2); Charney, *supra* note 143, at 864; Freestone & Pethick, *supra* note 103, at 74.

192. MOM RAVIN, LAW OF THE SEA: MARITIME BOUNDARIES AND DISPUTE SETTLEMENT MECHANISMS 23 (United Nations-The Nippon Foundation 2005), *available at* http://www.un.org/Depts/los/nippon/unnff_programme_home/fellows_pages/fellows_papers/mom_0506_cambodia.pdf.

193. LOSC, *supra* note 11, art. 60(8), 121(1); RAVIN, *supra* note 192, at 23.

194. HIRAN W. JAYEWARDENE, THE REGIME OF ISLANDS IN INTERNATIONAL LAW 8 (1990).

195. League of Nations Doc. C.230M.117 1930 V (1930), *quoted in* JAYEWARDENE, *supra* note 194, at 8.

196. JAYEWARDENE, *supra* note 194, at 8; *see* Galea, *supra* note 25, at 23-26.

the sea.[197] Comment 2 to draft Article 10 excluded only two features from the proposed definition of island, neither of which encompassed artificial islands explicitly.[198] The first exclusion was formations at low tide elevations, including those with installations built on them that would render the installation itself above high tide waters.[199] The second excluded feature was "technical installations built on the sea-bed, such as installations used for the exploitation of the continental shelf," but the ILC advocated for maintaining a zone of safety around this type of feature because of their "extreme vulnerability."[200] This second excluded feature does not explicitly reference artificial 'islands;' it only discusses "technical installations," and draft Article 71 and its comments, which deals with technical installations on the continental shelf, does not further define the term.[201] In fact, nowhere in the entire 1956 draft articles is the term 'artificial island' even used, but perhaps this is a reflection of the fact that in its earlier sessions, "the Commission . . . left out subjects which, because of their technical nature, were not suitable for study by it."[202]

Ultimately, the exclusion of artificial islands from the ability to generate maritime zones stemmed from a 1958 United States proposal during the First Law of the Sea Conference to add the 'naturally formed' qualification to the islands definition, which essentially resolved this ambiguity existing in the draft articles.[203] Article 10(1) in the resulting 1958 Convention on the Territorial Sea and the Contiguous Zone requires that an island be "naturally formed."[204] This definition is

197. Int'l L. Comm'n, *Report of the International Law Commission to the General Assembly: Report of the International Law Commission Covering the Work of its Eighth Session*, U.N. Doc. A/3159 (Apr. 23-Jul. 4, 1956), *reprinted in* [1956] 2 Y.B. Int'l L. Comm'n 253, 257, U.N. Doc. A/CN.4/SER.A/1956/Add.1 [hereinafter Int'l L. Comm'n 1956 G.A. Report] ("[e]very island has its own territorial sea. An island is an area of land, surrounded by water, which in normal circumstances is above [the] high-water mark"); JAYEWARDENE, *supra* note 194, at 8.

198. Int'l L. Comm'n 1956 G.A. Report, *supra* note 197, at 270.

199. *Id.*

200. *Id.*

201. *Id.* at 270, 299-300.

202. *Id.* at 254; *see also* Galea, *supra* note 25, at 120 (discussing how the need to distinguish artificial from natural islands was not really considered at this time because the technology was not available to engage in such construction).

203. LOSC COMMENTARY III, *supra* note 17, at 327; JAYEWARDENE, *supra* note 194, at 8; Aristotelis B. Alexopoulos, *The Legal Regime of Uninhabited Islets and Rocks in International Law: The Case of the Greek Seas*, 56 REVUE DE DROIT INTERNATIONAL 131, 135 (2003).

204. Convention on the Territorial Sea and the Contiguous Zone art. 10(1), April 29, 1958, 516 U.N.T.S. 205 ("[a]n island is a naturally formed area of land, surrounded by water, which is above water at high tide").

mirrored in the LOSC under Article 121(1).[205]

As another result of the First Law of the Sea Conference, under Article 5 of the Convention on the Continental Shelf, artificial "installations and other devices" constructed on the continental shelf are not islands and do not bear their own territorial seas or affect maritime delimitation.[206] A similar provision exists in the more recent LOSC, which states that artificial islands "have no territorial sea of their own,"[207] at least in the context of the newly created EEZ, and extending states' rights to more expansive aspects of the continental shelf.[208] This provision also mentions that "their presence does not affect the delimitation of the territorial sea, the exclusive economic zone or the continental shelf."[209] Artificial islands also cannot be considered as part of the baseline for the measurement of maritime zones, because although Article 11 states that permanent harbor works forming a fundamental part of a harbor system can form part of the coast for the purpose of constructing baselines to calculate the territorial sea, artificial islands cannot be used in this way.[210] Ultimately, states' concerns in developing the law of the sea regarding artificial islands reflect a desire to limit claims to expansive areas of the sea through territorial manipulation by artificial island construction.[211]

As a result of these severe limitations, artificial islands are only allowed to generate one limited zone under the LOSC at the election of the coastal state, called a zone of safety, at least when one is constructed in the coastal state's EEZ or continental shelf.[212] In this safety zone, the coastal state may take the necessary steps to maintain the safety both of navigation and the artificial island itself.[213] All ships must respect and

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205. LOSC, *supra* note 11, art. 121(1); LOSC COMMENTARY III, *supra* note 17, at 338.

206. Convention on the Continental Shelf art. 5(4), Apr. 29, 1958, 499 U.N.T.S. 311.

207. *Id.* art. 60(8).

208. Galea, *supra* note 25, at 38.

209. LOSC, *supra* note 11, art. 60(8).

210. *Id.* at art. 11; Galea, *supra* note 25, at 40, 83; John E. Noyes, *New Land for Peace: An Overview of International Legal Aspects* 48 (Roger Williams University Center for Macro Projects and Diplomacy, Macro Center Working Papers, Paper No. 7, 2004), *available at* http://docs.rwu.edu/cgi/viewcontent.cgi?article=1005&context=cmpd_working_papers.

211. Galea, *supra* note 25, at 37.

212. LOSC, *supra* note 11, art. 60(4), 80; *see also* Convention on the Continental Shelf, *supra* note 206, art. 5(2)-(3)(discussing how coastal states may declare reasonable safety zones around its installations and devices constructed on the continental shelf); *see also* JAYEWARDENE, *supra* note 193, at 9.

213. LOSC, *supra* note 11, art. 60(4), 80; U.N. OFFICE FOR OCEAN AFFAIRS & THE LAW OF THE SEA, *supra* note 29, at 61.

comply with generally accepted international navigation standards in this zone.[214] The coastal state must design the safety zone so that it bears a reasonable relationship to the nature and function of the artificial island.[215] The coastal state may determine the breadth of this safety zone, which must take into account relevant international standards in the calculation, but the safety zone may not exceed 500 meters from the artificial island's outer edge.[216] The safety zone can be extended "as authorized by generally accepted international standards or as recommended by the competent international organization."[217]

In sum, although there is a general right under international law for a state to construct artificial islands, which also entails a number of obligations,[218] artificial islands are not islands and as a result cannot generate maritime zones.[219] This current limitation may have significant impacts on the maintenance of maritime zones of small island states such as the Maldives, which has already chosen to construct artificial islands as protective margins against climate change.[220] In light of the recognition that climate change is significantly impacting global sea levels,[221] it may be time to revisit the LOSC to give further legal effect to artificial islands.[222]

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214. LOSC, *supra* note 11, art. 60(6), 80.

215. *Id*. art. 60(5), 80.

216. *Id.*

217. *Id.*

218. *Id.* art. 2(1), 60, 80, 87(d), 208; *see also* Scott, *supra* note 186, at 96 (mentioning that states have rights and obligations with regard to artificial islands constructed on the continental shelf or in the EEZ).

219. COUNCIL FOR SECURITY COOPERATION IN THE ASIA-PACIFIC, MEMORANDUM 6: THE PRACTICE OF THE LAW OF THE SEA IN THE ASIA PACIFIC 3 (2002), *available at* http://www.cscap.org/uploads/docs/Memorandums/CSCAP%20Memorandum%20No%206%20--%20The%20Practice%20of%20the%20Law%20of%20the%20Sea%20in%20the%20AP.pdf.

220. *See* DR. TRISH BATCHELOR, MALDIVES 104 (Lonely Planet 2006) (discussing how Hulhumalé was constructed to combat sea level rise in the Maldives).

221. Robert L. Glicksman, *Global Climate Change and the Risks to Coastal Areas from Hurricanes and Rising Sea Levels: The Costs of Doing Nothing*, 52 LOY. L. REV. 1127, 1134-5 (2006).

222. *See* Tsaltas et al., *supra* note 27, at 2 (pointing out that a climate change adaptation solution might be artificial island construction projects).

B. Amending the LOSC to Expand the Legal Status of Artificial Islands for the Purpose of Maintaining Maritime Claims and Statehood

Some legal commentators have proposed expanding the LOSC to allow technological installations to replace the lost territory of an inundated island state, ultimately in the form of a legal framework to allow the nationals of that state to maintain the state's sovereign rights.[223] After all, the practical significance of artificial islands was recognized during the ILC's deliberations as early as the 1950s.[224] During those debates, Faris Bey el-Khouri of Syria opined that "artificial islands [c]ould no doubt be useful for various purposes and Governments should not be discouraged from undertaking their construction."[225] Certainly, artificial islands have become valuable resources in supporting urban expansion and tourism ventures in recent years.[226] Likewise, in the context of sea level rise, artificial islands may prove useful to facilitating the reclamation and preservation of land, to serve as habitats that can be populated by humans, and as symbols of sovereignty.[227]

Unfortunately, the LOSC seems to be at odds with these contemporary uses because that treaty dictates that artificial islands cannot bear maritime zones.[228] Therefore, the Maldives should advocate for the regime of artificial islands to be expanded to encompass attribution of maritime zones, and by implication statehood, through a new rule in the Convention.[229] The remainder of this discussion is

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223. *Id.* at 16-17; *see also* Yamamoto & Esteban, *supra* note 16, at 7 (discussing how one way to preserve sovereignty is to build sea defenses around small island states).

224. Summary Record of the 260th Meeting, [1954] 1Y.B. Int'l L. Comm'n 90, 94, U.N. Doc. A/CN.4/SR.260, *available at* http://untreaty.un.org/ilc/documentation/english/a_cn4_sr260.pdf [hereinafter Int'l L. Comm'n 1954 260th Meeting Summary Record].

225. *Id.*

226. McKinley Conway, *The Case for Micronations and Artificial Islands*, FUTURIST, May 1, 2009, *available at* http://www.allbusiness.com/environment-natural-resources/ecology/12329421-1.html.

227. Tsaltas et al., *supra* note 27, at 3-4; *see also* Ilan Kelman, *Island Security and Disaster Diplomacy in the Context of Climate Change*, 63 LES CAHIERS DE LA SÉCURITÉ 61, 69 (2006), *available at* http://www.disasterdiplomacy.org/kelman2006cce.pdf (discussing building artificial islands strong enough to withstand climate change).

228. *See*, *e.g.*, LOSC, *supra* note 11, art. 60(8), 121; Tsaltas et al., *supra* note 27, at 16-17 ("the drawback is the insufficiency of the legal framework").

229. Tsaltas et al., *supra* note 27, at 16 ("the introduction of new provisions for uses of AIS [artificial islands and structures] other than exploration and exploitation purposes is a step [i]n [the right] . . . direction. Such provisions could deal with a potential role of AIS as 'safeguards' or as human habitats"); *see generally* Paskal, *supra* note 28 (discussing how the starting point to resolving the issues surrounding submerging island

intended to explore some of the legal issues that might need to be addressed to give effect to such a rule, and how these issues might be resolved.[230]

1. Preliminary Considerations

Preliminarily, any rule extending the legal characterization of artificial islands would likely be at odds with the LOSC as it stands now, given that artificial islands have such a limited meaning within the Convention. Therefore any departure from the current regime might be considered an exceptional remedy.[231] Thus, to limit the pool of states entitled to use the possible new rule, a state might have to objectively demonstrate that it is imminently threatened by submergence or that its maritime zones are threatened, which could be a factual determination performed by a specialized scientific body such as the IPCC.[232] The practical effect of such a determination is that it would prevent much larger continental states, which are not as threatened by being wiped out by sea level rise as small island states, from potentially abusing the rule.[233]

Another preliminary issue is where artificial islands could be built to maintain sovereign rights such as statehood and maritime claims.[234] Commentators point out that coastal states enjoy sovereignty in their territorial sea and internal waters, including on artificial islands

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states is the LOSC, and discussing how artificial islands might be used to resolve the issues of statehood being lost and the rights that attach to that status); Caron 1990, *supra* note 17, at 634 (discussing how one way to fix baselines could be creating a new rule in the LOSC); *see also* Galea, *supra* note 25, at 127-28.

230. *See* PAPADAKIS, *supra* note 180, at 37 (opining that "a successful seaward advancement will undoubtedly require the solution of many technical, economic, energy, pollution and other problems, if industrial societies are not to commit in the oceans the errors they have committed on land").

231. *See* Tsaltas et al., *supra* note 27, at 1; *see, e.g.*, LOSC COMMENTARY III, *supra* note 17, at 327 (discussing how artificial islands are not islands).

232. The Intergovernmental Panel on Climate Change appears to already have the capability to determine rises in sea level regarding specific states. *See, e.g.*, IPCC Working Group II Report, *supra* note 37, at 694 (discussing that a fifty centimeter rise in sea level during the twenty-first century is a proper estimate regarding inundation of the Maldives).

233. *See generally* David Taylor, World Watch Inst., *Small Islands Threatened by Sea Level Rise*, *in* VITAL SIGNS 84 (2003), *available at* http://www.worldwatch.org/brain/media/pdf/pubs/vs/2003_sealevel.pdf (discussing how small islands are the most at risk regarding sea level rise).

234. *See generally* Tsaltas et al., *supra* note 27, at 8-10 (discussing varying scopes of jurisdiction within each maritime zone, and how where an artificial island is constructed might impact the scope of a state's jurisdiction over activities taking place there).

constructed in those areas.[235] Regarding archipelagic states, such as the Maldives,[236] those states may claim sovereignty over their archipelagic waters as well.[237] The Maldives specifically erected Hulhumalé within its archipelagic waters,[238] in particular Hulhumalé was erected in the waters south of North Malé Atoll.[239] Regardless, for future islands construction, the Maldives will still have to first consider the impact that the position of the island would have on the right of innocent passage of ships if the artificial island is constructed in the territorial sea or archipelagic waters, and second, choose a location for the island that would not infringe this right under the LOSC.[240]

Limiting where the state may build artificial islands, in order to maintain statehood and maritime zones, is critical because the farther out to sea coastal state jurisdiction stretches, the more weakened it becomes.[241] In the EEZ and continental shelf the coastal state only has "sovereign rights," which is not equivalent to absolute sovereignty, but only amounts to a certain extent of "functional jurisdiction."[242] Constructing artificial islands in the high seas with the ability to impute maritime zones and corresponding state sovereignty would undermine

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235. *Id.* at 9-10; *see also* LOSC, *supra* note 11, art. 2(1); PAPADAKIS, *supra* note 180, at 78, 151.

236. The Maldives is considered an archipelagic state. MUNAVVAR, *supra* note 30, at 126.

237. LOSC, *supra* note 11, art. 49; *see also* LORI FISLER DAMROSCH ET AL, INTERNATIONAL LAW 1399-1400 (4th ed. 2001).

238. *See generally* Maldives Maritime Zones Act, *supra* note 129 (illustrating a map of the Maldives' archipelagic waters, which would appear to include Hulhumalé within those waters).

239. *See generally* MALDIVES ENVTL. PROTECTION AGENCY, ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR HULHUMALÉ SWIMMING AREA AND LAND BASED FACILITIES DEVELOPMENT PROJECT, http://epa.gov.mv/index.php?option=com_content&view=article&id=165:eia-for-Hulhumalé-swimming-area-and-land-based-facilities-development-project&catid=2:eia-reports&Itemid=27/ (discussing how Hulhumalé is located within the south of the Maldives' North Malé Atoll); *see also* MALDIVES HOUS. DEV. CORP., CALL FOR EXPRESSION OF INTEREST FOR THE DEVELOPMENT OF THE HULHUMALÉ COMMERCIAL ZONE (2009), *available at* http://www.investmaldives.org/mediacenter/documents/EOI.HDC.Commercial.Zone.pdf / (discussing how Hulhumalé is located only three kilometers from Malé).

240. *See generally* Noyes, *supra* note 210, at 47-48 (discussing how in the proposition for an artificial island to be built in Egypt's territorial sea, the builder must be mindful of the right of innocent passage in the territorial sea); LOSC, *supra* note 11, art. 17-26, 52-53.

241. Dubner, *supra* note 111, at 296.

242. COUNCIL FOR SECURITY COOPERATION IN THE ASIA-PACIFIC, *supra* note 219, at 3; *see also* MARIA GAVOUNELI, FUNCTIONAL JURISDICTION IN THE LAW OF THE SEA 64-65 (2007) (discussing functional jurisdiction in the EEZ).

the principle that "no state may validly purport to subject any part of the high seas to its sovereignty."[243] Also, if the chosen location for the artificial island under such a rule were limited to waters in which the constructing state enjoys sovereignty,[244] it would implicitly limit the rule to existing states, because maritime zones may only be declared by existing states.[245]

Additionally, any rule regarding artificial islands would have to take into consideration marine environment preservation responsibilities under the LOSC.[246] This issue was highlighted in a 2003 case brought before the ITLOS by Malaysia against Singapore.[247] Malaysia contended that Singapore's land reclamation activities in the Straits of Johor were impacting Malaysia's rights to waters within its jurisdiction, including "the rights to the natural resources within its territorial sea and . . . its rights to the integrity of the marine environment in those areas."[248] Malaysia requested provisional measures to halt Singapore's irreversible land reclamation activities which were "causing and ha[d] the potential to cause serious and irreversible damage to the marine environment and serious prejudice to the rights of Malaysia" in violation of various LOSC articles.[249] The ITLOS ultimately ordered provisional measures against

243. LOSC, *supra* note 11, at art. 89; *see also* Int'l L. Comm'n 1954 260th Meeting Summary Record, *supra* note 224, at 94 (Member Georges Scelle discussing how artificial islands should have territorial seas of their own when erected in the territorial sea, but not when erected on the high seas); *Chierici and Rosa v. Ministry of the Merchant Navy and Harbour Office of Rimini*, 71 I.L.R. 259-61 (Council of State 1969) (It.) (discussing how an artificial island built by Italian citizens on the high seas "was in conflict with the principles which govern the freedom of the high seas because of its structure and position in that it permanently withdrew part of the high seas from common use").

244. Grigoris Tsaltas points out that a coastal state may build artificial islands in its internal waters and territorial sea, where it may regulate any activities on artificial islands. Tsaltas et al., *supra* note 27, at 9-10.

245. Rayfuse, *supra* note 17, at 6.

246. *See*, *e.g.*, LOSC, *supra* note 11, art. 192; Jean-Dominique Wahiche, *Artificial Structures and Traditional Uses of the Sea*, 7 MARINE POL'Y 37, 47 (1983); *see also* PAPADAKIS, *supra* note 180, at 111 (demanding for clearer rules on pollution from artificial islands); Tsaltas et al., *supra* note 27, at 5 (discussing how artificial islands construction has created environmental issues, particularly in the Persian Gulf).

247. *Land Reclamation Activities* (Malay. v. Sing.), Case No. 12, Order of Oct. 8, 2003, ITLOS Rep. 21, *available at* http://www.itlos.org/fileadmin/itlos/documents/cases/case_no_12/Order.08.10.03.E.pdf [hereinafter ITLOS Order].

248. *Id*. ¶ 93.

249. *Land Reclamation Activities* (Malay. v. Sing.), Case No. 12, Request by Malay., Sept. 4, 2003, ¶ 14-18, *available at* http://www.itlos.org/fileadmin/itlos/documents/cases/case_no_12/request_malaysia_eng.1.pdf.

Singapore, declaring it could not prejudice Malaysia's rights or cause serious harm to the environment through its land reclamation project.[250] The case illustrates the potential environmental impacts of land reclamation projects, such as artificial islands in the sea, which the Maldives would have to consider in tailoring a new rule to comply with the rest of the LOSC.[251]

2. Attributing Maritime Zones to Artificial Islands in the Amendment and Curtailing Potential Abuse

Another important issue to address would be how to undermine the potential abuse by states in using the rule to manipulate their maritime boundaries.[252] In the 1950s, during the ILC's deliberations over whether to incorporate a requirement of natural formation into the definition of islands, concerns arose about manipulating artificial island construction to expand maritime zones.[253] ILC member Hersch Lauterpacht feared that "if artificial islands erected within the territorial sea were to have a territorial sea of their own, then a State could erect a series of small artificial islands just within its territorial sea and a few miles apart," which "might in that way double the extent of its territorial sea."[254]

If the Maldives push for artificial islands to be able to bear maritime zones in any new rule,[255] it might try to curtail such abuse by requiring the constructing state to permanently fix its baselines prior to or following construction, which has been a solution proposed by others to negate the concept of ambulatory baselines in the face of rising sea levels.[256] Therefore, fixing baselines would serve not only to reinforce existing maritime claims as sea levels continue to rise,[257] but also serve as a check on potential later manipulation of maritime zones from artificial island construction.[258] Regardless of whether an artificial island

250. ITLOS Order, *supra* note 247, ¶ 106(2).

251. *See* Wahiche, *supra* note 246, at 47 (discussing how pollution of the marine environment from artificial islands will need to be regulated).

252. Tsaltas et al., *supra* note 27, at 14.

253. Int'l L. Comm'n 1954 260th Meeting Summary Record, *supra* note 224, at 94.

254. *Id.*; *see also* D.H.N. Johnson, *Artificial Islands*, 4 INT'L L.Q. 203, 213 (1951).

255. *See, e.g.*, PAPADAKIS, *supra* note 180, at 104, 108 (proposing that a type of artificial island called "'Sea-Cities' . . . should be entitled to a territorial sea belt, or to a similar jurisdictional zone with obvious sovereign implications").

256. Caron 2009, *supra* note 141, at 14.

257. *Id.* at 14, 16.

258. Schofield, *supra* note 148, at 24 ("island-building activities on the part of states, in an effort to *enhance* their claims to maritime space by creating new islands, is . . . contrary to the Convention") (emphasis added); *see also* Leticia Diaz et al., *When is a "Rock" an "Island?"—Another Unilateral Declaration Defies "Norms" of International Law*, 15 MICH. ST. J. INT'L L. 519, 555 (2007) (discussing how Japan's unilaterally

is granted the ability to generate maritime zones, its presence would at least lend greater legitimacy to freezing maritime zones in the absence of naturally formed land.[259]

Requiring any new rule to be subjected to compulsory dispute settlement procedures under Part XV of the LOSC, could provide another enforcement mechanism to curtail the potential for abuse that might occur if maritime zones were allowed to be attributed to artificial islands.[260] Part XV of the Convention calls for settling disputes concerning the LOSC's interpretation or application through peaceful means.[261] The LOSC gives primacy to settling disputes through informal means such as negotiation, but if the parties to the dispute fail to settle informally, then the parties may choose among a number of third-party adjudicatory tribunals having the power to render binding decisions.[262] Notably, state parties are explicitly exempt or may opt out from compulsory dispute settlement regarding certain types of disputes under the Convention.[263] However, to give credence to curtailing abuse under a rule attributing maritime zones to artificial islands, states should not be exempt from Part XV regarding such a provision under the LOSC.[264]

3. Attributing Statehood to Artificial Islands in the Amendment and Clarifying the Uncertainty

An additional issue is whether artificial islands could be characterized as defined territory for the purpose of maintaining statehood.[265] It is not clear whether a state may continue to exist if its territory is solely made up of artificial islands after losing its naturally

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proposed construction of artificial islands around small rocks located in the Pacific Ocean in order to generate an exclusive economic zone would undermine the purpose of the LOSC).

259. David D. Caron questions whether it is equitable for an island state to maintain its maritime zones if its land mass becomes completely submerged. Caron 2009, *supra* note 141, at 16; *see also* Tsaltas et al., *supra* note 27, at 6 (discussing how artificial islands could be used as "sovereignty markers").

260. LOSC, *supra* note 11, at art. 279-299.

261. *Id.* art. 279; Joanna Mossop, *The Future of Compulsory Dispute Settlement Under the Law of the Sea Convention*, 36 VICT. U. WELLINGTON L. REV. 683, 684 (2005).

262. John E. Noyes, *The International Tribunal for the Law of the Sea*, 32 CORNELL INT'L L.J. 109, 118-119 (1998).

263. LOSC, *supra* note 11, art. 297-298.

264. *Id.*

265. *See* Lawrence A. Horn, *To Be or not to Be: The Republic of Minerva – Nation Founding by Individuals*, 12 COLUM. J. TRANSNAT'L L. 520, 539 (1973) ("it is not clear whether such artificially created islands would fulfill the definition of territory under international law").

formed islands to sea level rise.[266] Although a few municipal court decisions[267] and legal commentators have discussed whether a new state may be borne out of an artificial island, many authorities seem to remain silent on whether an existing state may maintain statehood exclusively through artificial island construction.[268] Comprehensive research has only unraveled the thoughts of one scholar who claims that "artificial islands constructed by, or under the auspices of, a State, and occupied by it, shall be subject to its sovereignty and control as any other part of its territory."[269] This scholar also advocates for treating artificial islands just like natural islands, including for the purpose of generating a territorial sea.[270]

Another commentator argues that international law permits other types of artificial construction projects, such as conservation of the coastline or even islands.[271] For example, the Netherlands has taken the approach of building an elaborate system of dikes and dams to ward off sea level rise.[272] Similarly, the construction and occupation of Hulhumalé

266. Tsaltas et al., *supra* note 27, at 15-16; *see also* PAPADAKIS, *supra* note 180, at 112 (arguing that states have the right to construct artificial islands and treat them as territory for sovereignty purposes).

267. *See, e.g., United States v. Ray*, 423 F.2d 16, 17-23 (5th Cir. 1970) (regarding a dispute involving private individuals who sought to construct artificial islands on the Triumph and Long Reefs four and one half miles off Florida's coast through dredging seabed material and using it to fill the reefs to create newly planned state, the Grand Capri Republic); *Chierici and Rosa*, *supra* note 243, at 258-61 (disputing a small artificial island built by private individuals 300 meters outside Italy's territorial sea); *In Re Duchy of Sealand*, 80 I.L.R. 685 (Admin. Ct. of Cologne 1978) (Ger.) (holding that an anti-aircraft platform used to assert new statehood did not satisfy the territory element of statehood).

268. *See, e.g.*, Trevor A. Dennis, *The Principality of Sealand: Nation Building by Individuals*, 10 TULSA J. COMP. & INT'L L. 261, 296 (2002) ("international law does not provide any conclusive answers as to the status of The Principality of Sealand . . . the creation of new states by individuals is such a rare event it has simply not been adequately addressed by the international community"); Frank B. Arenas, *Cyberspace Jurisdiction and the Implications of Sealand*, 88 IOWA L. REV. 1165, 1178, 1181 (2003) (discussing how the artificial installation called Sealand likely fails to satisfy the requisite criteria of the Montevideo Convention including the defined territory element); Samuel Pyeatt Menefee, *"Republics of the Reefs:" Nation-Building on the Continental Shelf and in the World's Oceans*, 25 CAL. W. INT'L L.J. 81, 81, 111 (1994) (discussing how attempted creations of a number of new states, including by artificial island construction, on the continental shelf have failed).

269. PAPADAKIS, *supra* note 180, at 112.

270. *Id.* at 5.

271. Soons, *supra* note 18, at 222.

272. DELTAWERKEN, *Delta Works*, http://www.deltawerken.com/23 (last visited Feb. 8, 2011); Yamamoto & Esteban, *supra* note 16, at 3 (discussing how island states might use sea dykes to protect against inundation of their land masses, much like how the Dutch have done); Titus, *supra* note 10, at 19; Pier Vellinga, *The Netherlands, The Three*

was an act of an existing state.[273] Admittedly, the Netherlands' continued exercise of sovereignty over areas of land it has reclaimed does not appear to have been challenged by the international community.[274] However, just because there has not been any current or past objection to these practices does not mean there may not be objections in the future.[275]

In the absence of a concrete legal doctrine,[276] and to ensure that inundated states can continue to exist on artificial islands, the Maldives might advocate for enshrining in the LOSC a recognition-based theory by the international community to give effect to artificial island construction for this purpose,[277] akin to the constitutive theory of statehood.[278] After all, even if states establish a common practice toward the treatment of artificial structures, and under international law construction need not be approved at the international level, "it is not just advisable, but frequently simply mandatory to commence consultation."[279] This recognition could come from an international body such as the UN General Assembly, which may render resolutions that are not actually legally binding[280] but in some circumstances may be strong

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Foreign Perspectives, 15 EPA J. 28, 28 (1989).

273. *See generally* Hulhumalé Background, *supra* note 54 ("Hulhumalé is the most ambitious land reclamation and urban development project undertaken by the Government of [the] Maldives to date").

274. Yamamoto & Esteban, *supra* note 16, at 7.

275. *See* Tsaltas et al., *supra* note 27, at 16-17 (discussing how rights of artificial island construction will eventually develop in the face of climate change and proposing that the implications of such claims should be considered now).

276. *Id.* at 15.

277. *See* PAPADAKIS, *supra* note 180, at 37, 112-15 (citing GEORG SCHWARZENBERGER, A MANUAL OF INTERNATIONAL LAW 69 (5th ed. 1967)) (discussing how artificial islands could be used to create new states or expand existing states, and how new sovereign states built out of artificial islands "may be legitimized through general recognition by the existing state subjects of international law"); *see also* Yamamoto & Esteban, *supra* note 16, at 6 ("Island States such as Tuvalu and Maldives are facing the threat of losing their territories not because of a war or occupation, but as a result of rising sea levels caused by climate change, a situation that has never happened before. If they lose their territory they would depend on other States to recognize their international personality"); Rosemary Rayfuse, *International Law and Disappearing States: Utilising Maritime Entitlements to Overcome the Statehood Dilemma*, University of New South Wales Faculty of Law Research Series, Working Paper No. 52, 9, 12 (2010), *available at* http://law.bepress.com/cgi/viewcontent.cgi?article=1247&context=unswwps (calling for recognition of "deterritorialized state[s]").

278. LAUTERPACHT, *supra* note 70, at 38.

279. Galea, *supra* note 25, at 125 (citing Erik Jaap Molenarr, *Airports at Sea: International Legal Implications*, 14(3) INT'L J. MARINE & COASTAL L. 371, 386 (1999)).

280. U.N., *Functions and Powers of the General Assembly*,

evidence of an emerging norm of customary international law.[281] Another potential forum is the Security Council, which has the authority, under Chapter VII of the UN Charter, to issue legally binding resolutions necessary to uphold international peace and security.[282] Climate change and the submergence of an entire state to sea level rise may impact international peace and security, such as perpetuating maritime border disputes.[283]

Finally, it may be necessary to precisely define the type of artificial island that could take on these attributes,[284] due to the fact that the term 'artificial island' is not adequately defined in the LOSC.[285] A formulated working definition reflecting new and different uses of artificial islands[286] might take into consideration what physical characteristics the artificial island might need to be considered a defined territory for the purpose of maintaining statehood.[287] Artificial structures such as seawalls and even artificial islands have been used previously by governments for the preservation and reclamation of land, but it is not clear whether such structures could be considered a territory in the event that all of that state's naturally formed territory became submerged by rising sea levels.[288] One commentator answers this question in the negative, taking the view that the territory element of statehood is equal to "land territory, and not . . . artificial constructions built on the sea-bed."[289] However, the

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http://www.un.org/en/ga/about/background.shtml (last visited Feb. 8, 2011).

281. DAMROSCH ET AL., *supra* note 237, at 146.

282. U.N. Charter art. 39; Peter Hulsroj, *The Legal Function of the Security Council*, 1 CHINESE J. INT'L L. 59, 60 (2002).

283. Press Release, Security Council, Security Council Holds First-Ever Debate on Impact of Climate Change on Peace, Security, Hearing Over 50 Speakers, U.N. Doc. SC/9000 (Apr. 17, 2007), http://www.un.org/News/Press/docs/2007/sc9000.doc.htm/ (last visited Oct. 6, 2011) (Jeem Lippwe speaking on behalf of Federated States of Micronesia); Christopher K. Penny, Greening the Security Council: Climate Change as an Emerging 'Threat to International Peace and Security' 38-39 (Jun. 2005) (unpublished manuscript) (on file with International Human Dimensions Program), *available at* http://www.gechs.org/downloads/holmen/Penny.pdf.

284. *See* PAPADAKIS, *supra* note 180, at 105.

285. Menefee, *supra* note 176, at 209-10.

286. Galea, *supra* note 25, at 127-30.

287. *See* PAPADAKIS, *supra* note 180, at 105 (discussing how there should be a category of artificial islands called "Sea-Cities" that encompasses factors to make it "of the nature of territory" to make it "capabl[e] of being subjected to the sovereignty of a State as 'territory,' and [having] a degree of permanence similar to that possessed by a natural island").

288. *See* Tsaltas et al., *supra* note 27, at 4, 6 (pointing out that whether a state's territory may be made up of solely artificial islands in the event of sea level rise remains an unsettled legal question).

289. N.A. MARYAN GREEN, INTERNATIONAL LAW: LAW OF PEACE 34 (2nd ed. 1982); *see also* James Crawford, *Islands as Sovereign Nations*, 38 INT'L & COMP. L.Q. 277, 279

commentator only speaks of this qualification in the context of forming a new state, not the continuity of an existing state[290] such as the Maldives.[291]

Looking to existing jurisprudence and scholarship may help LOSC states parties tailor the definition of an artificial island under the LOSC in such a way as to encompass the defined territory element of statehood. For instance, the meaning of a defined territory in the context of artificial island construction was litigated in a 1978 German court case, *In Re Duchy of Sealand*.[292] It is worth mentioning that while this is a municipal court case, such cases may serve as a subsidiary means for determining new rules of international law.[293] In response to the attempt to declare nationality in a new state called 'Sealand,' comprising of a British World War II anti-aircraft platform located off the coast of Great Britain, the Administrative Court of Cologne ultimately held that Sealand failed the territory and population requirements of statehood.[294]

The court asserted that a military structure sitting sixty feet above water,[295] with two large concrete shafts driven into the seabed, did not satisfy the territory element of statehood.[296] To be a defined territory, the court reasoned that the area must be "situated on any fixed point on the surface of the earth," and furthermore, "only those parts on the surface of the earth which have come into existence in a natural way can be recognized as constituting State territory."[297] Although the concrete shafts were fastened to the seabed, the judges reasoned that this did not make the platform part of the earth's surface or "land territory" because under international law territory only encompasses structures comprising a defined area on the surface of the planet.[298] The court concluded that "[s]tate territory within the meaning of international law must be either

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(1989) ("artificial islands cannot form the basis for territorial States any more than can ships").

290. GREEN, *supra* note 289, at 34.

291. The Maldives achieved independence in 1965. JOHN S. BOWMAN, COLUMBIA CHRONOLOGIES OF ASIAN HISTORY AND CULTURE 391 (2000).

292. *Sealand*, 80 I.L.R., at 685-87.

293. Statute of the International Court of Justice art. 38(d), Jun. 26, 1945, 3 Bevans 1179; SHABTAI ROSENNE, THE PERPLEXITIES OF MODERN INTERNATIONAL LAW 46 (2004) ("[t]he term judicial decisions does not refer only to decisions of international courts or tribunals. It also envisages . . . relevant internal judicial decisions").

294. *Sealand*, 80 I.L.R., at 683-85.

295. Matt Rosenberg, *Where in the World?*, DALL. MORNING NEWS (Texas), Feb. 4, 2001, at 5G.

296. *Sealand*, 80 I.L.R., at 685.

297. *Id.*

298. *Id.*

'mother earth' or something standing directly thereon."[299]

Legal commentators may provide more guidance on what may constitute a territory for artificial island construction.[300] For example, one scholar distinguishes between an "installation," defined as human built structures made out of steel or concrete, and an "artificial island," which is constructed with natural materials such as soil and rocks.[301] This commentator considers the latter, but not the former, to be the "nature of territory."[302] Regarding the Maldives, the construction of Hulhumalé was a reclamation project, performed by dredging sand from the sea floor and depositing it in a shallow lagoon,[303] which seems to be in line with what this commentator would consider to be territory.[304] One scholar even goes so far as to argue that if an existing natural island is artificially conserved it would not lose its status as an "island."[305] Another commentator points out that because the definition of an island itself must constitute "an area of land," there are two factors within this requirement that should be met, which could be relevant to any new definition of artificial islands:

> Firstly, that a formation must have at least attachment to the seabed to have insular characteristics; and secondly, that the formation should . . . have an equivalent degree of permanence. These twin characteristics could, prima facie, appear to rule out as having insular status anchored ships, naturally-formed floating formulations (e.g. icebergs), technical insulations, and so-called "stilt villages[,]" as all lack them.[306]

Ultimately, articulating a precise definition of an artificial island to maintain statehood and maritime zones must be left to the delegations of a future LOSC review conference, but the above discussion may prove to be helpful to

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299. *Id.* at 685-86.

300. *See, e.g.*, PAPADAKIS, *supra* note 180, at 6.

301. *Id.*

302. *Id.*

303. Jon Hamilton, *Maldives Builds Barriers to Global Warming*, NAT'L PUB. RADIO, Jan. 28, 2008, http://www.npr.org/templates/story/story.php?storyId=18425626/ (last visited Feb. 8, 2011); *see also* DEME Report, *supra* note 55.

304. *See* PAPADAKIS, *supra* note 179, at 6 (discussing how artificial islands made by manipulating soil and rocks in the ocean takes on the status of the "nature of territory").

305. Soons, *supra* note 18, at 222 (citing PAPADAKIS, *supra* note 179, at 91-97). Additionally, one scholar wishes for the definition of natural island to be expanded to encompass "[i]slands which have lost the quality of being above water at high tide retain the status of islands even in those instances where they are aided by artificial works to the extent of re- establishing their natural status of islands." Galea, *supra* note 25, at 130.

306. CLIVE R. SYMMONS, THE MARITIME ZONES OF ISLANDS IN INTERNATIONAL LAW 21 (1979); *see also* Johnson, *supra* note 254, at 214 (mentioning that that an artificial island that is permanent in nature should be considered territory for statehood).

future drafters of a new provision.[307]

4. Summarizing Remarks

As a "comprehensive constitution of the oceans" the LOSC from its inception was intended to be evolutionary in the face of change, not static.[308] By incorporating new rules into the Convention to impute statehood and maritime zones to an artificial island and considering the discussed issues above,[309] the LOSC can continue to fulfill this mandate and respond to continued changes in the international legal order of the oceans well into the future.[310] Moreover, such rules could "promote the economic and social advancement" of the Maldivian people, in line with the LOSC's preamble, if a state is allowed to maintain its maritime zones and statehood through artificial island construction.[311] However, numerous issues would need to be dealt with in tailoring such a new rule, including how to appropriately attribute maritime zones and statehood to human-made areas of land that were never intended to have such wide-ranging significance under the LOSC. The discussion above regarding these issues may offer some guidance to state parties in creating an appropriate characterization of artificial islands in envisaging these new uses.

VI. CONCLUSION

The nationals of the Maldives have expressed disgust that Hulhumalé is "an ugly mis-fit among the picture perfect beaches of their Indian Ocean archipelago."[312] However, the construction of such an artificial island ought to be advocated by the Maldives and other small island states as a solution to otherwise potentially losing statehood and maritime claims as sea levels continue to rise.[313] Other states, including

307. *See generally* Johnson, *supra* note 254, at 215 (in the context of the First Law of the Sea Conference, discussing how international treaty drafting bodies will ultimately have the task of recommending the types of artificial islands that may bear territorial seas of their own).

308. Tommy T.B. Koh, President of the Third United Nations Conference on the Law of the Sea, Remarks at the Final Session of the Conference at Montego Bay 1 (Dec. 6-11, 1982), *available at* http://www.un.org/Depts/los/convention_agreements/texts/koh_english.pdf.

309. *See generally* Tsaltas et al., *supra* note 27, at 15-17 (advocating for an expansion of the legal regime of artificial islands to resolve climate change issues).

310. Koh, *supra* note 308, at 1; *see also* GAVOUNELI, *supra* note 242, at 59.

311. LOSC, *supra* note 11, at preamble.

312. Rosenberg, *supra* note 22, at 16.

313. *See generally* Paskal, *supra* note 28 (discussing how the LOSC does not take

Tuvalu, are also considering this option.[314] In order to implement this, the Maldives could advocate for an amendment to the LOSC to give further effect to artificial islands for these purposes.[315] Notably, some issues might arise in tailoring such a rule, particularly the method in which to attribute maritime zones and statehood to artificial islands, which would need to be dealt with effectively in a way that does not disrupt the remainder of the LOSC.[316]

Even if such an amendment were enshrined in the LOSC, the Maldives would still face practical challenges in the implementation of an artificial island construction program, including the financial costs involved.[317] Hulhumalé cost roughly US$63 million to build.[318] While the Maldives has considered buying a new homeland with its tourism revenue,[319] perhaps the money might be better spent investing in an artificial land reclamation program to keep its nationals in their existing territory.[320]

Constructing artificial islands also may affect the integrity of surrounding natural islands.[321] For example, when former President Gayoom decided to develop over thirty- six new artificial harbors nationwide between 2004 and 2007, the construction program fundamentally changed sea currents around the islands, which led to significant coastal erosion.[322] The presence of Hulhumalé has similarly

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into account sea level rise, and discussing how artificial islands could be used to resolve the issues of statehood being lost and the rights that attach to that status, although there are security risks inherent in allowing this); *see also* Gaia Vince, *Paradise Lost?: How the Maldives is Fighting the Rising Tide of Climate Change*, NEW SCIENTIST, May 9, 2009, at 37 (discussing how nongovernmental organization Bluepeace has advocated for an artificial island construction program to combat the effects of climate change).

314. Robert Matau, *Tuvalu, Kiribati Look at Options to Relocating*, PAC. ISLAND NEWS ASS'N, Jan. 19, 2010, http://www.pina.com.fj/?p=pacnews&m=read&o=7544228754b550cb34f172e1058050&PHPSESSID=f29620c841a39d6e003cb9df38bf4b8f (last visited Oct. 6, 2011).

315. *See* Tsaltas et al., *supra* note 27, at 15-17.

316. *See, e.g.*, Menefee, *supra* note 176, at 209-10 (discussing how the LOSC does not characterize a definition for an artificial island).

317. Vince, *supra* note 313, at 37; Yamamoto & Esteban, *supra* note 16, at 7.

318. Simon Gardner, *Nation Builds New Landmass*, MERCURY, Dec. 18, 2004, at 45.

319. Barun Roy, *40 Years to Doom?*, BUS. STANDARD, Apr. 9, 2009, at 8.

320. *See* Gardner, *supra* note 318, at 45 (pointing out some Maldivians' praise for Hulhumalé and how that island is going to be expanded in the future).

321. *See* Christine Toomey, *The Maldives: Trouble in Paradise*, TIMES OF LONDON, Feb. 1, 2009, *available at* http://www.timesonline.co.uk/tol/news/environment/article5604464.ece (discussing how constructing man-made harbors in the Maldives led to erosion of surrounding islands).

322. *Id.*

contributed to the increased erosion of nearby islands, so these concerns would have to be mitigated in any future artificial island development program.[323]

Perhaps the most significant challenge would be obtaining consensus among the international community to give further effect to artificial islands, because international law is formed through the choices and consent of states, as opposed to being dictated by a legislating entity. Thus, the Maldives must ultimately convince other states that it is in their best interests to collectively give effect to any proposition.[324] Simply obtaining global consensus on how to address the effects of climate change is already a challenge.[325] Ultimately, the problem of climate change will require a solution at the international level because it is an international legal crisis.[326] Giving small island states such as the Maldives, which are among the most susceptible to the impacts of climate change, the tools to survive would certainly be a worthwhile first step.[327]

323. Vince, *supra* note 313, at 37.

324. *See* Richard Shaffer et al., International Business Law and its Environment 47-48 (7th ed. 2009).

325. Eric Biber, *Climate Change and Backlash*, 17 N.Y.U. ENVTL. L.J. 1295, 1298-99 (2009) (discussing the backlash to climate change policies because the effects of climate change are "delayed harm").

326. H.R.C. Res. 7/23, U.N. Doc. A/HRC/RES/7/23 (Mar. 28, 2008), *available at* http://ap.ohchr.org/documents/E/HRC/resolutions/A_HRC_RES_7_23.pdf.

327. *See id.* (discussing how small island states are very threatened by climate change).

The North American Agreement on Environmental Cooperation: Has It Fulfilled Its Promises and Potential? An Empirical Study of Policy

Linda J. Allen

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I. INTRODUCTION

Twenty years ago, the United States ("U.S."), Canada, and Mexico embarked on a groundbreaking effort to link their economies more closely together under the North American Free Trade Agreement[1] ("NAFTA"). Although a controversial trade agreement, NAFTA has nonetheless served to strengthen economic ties between the U.S. and two of its largest trading partners and create one of the largest free trade blocs in the world. But this economic integration is only part of the legacy of NAFTA; it also was the first trade agreement to inextricably and explicitly link trade policy with environmental protection goals.

As part of the NAFTA negotiations, the U.S., Mexico, and Canada also negotiated the North American Agreement on Environmental Cooperation[2] ("NAAEC") to address the environmental impacts of trade liberalization in North America. Since the NAAEC entered into effect in 1994, the three countries have collectively invested over $140 million[3] into its implementation and the U.S. and Canada have continued to use its policy framework as the model for addressing the environmental effects of other free trade agreements.[4]

Despite the investment of considerable resources and the unquestioned precedence given to the NAAEC, there has not yet been a comprehensive assessment of its long-term effectiveness. Thus, it has been both difficult to gauge whether it has fulfilled its promises and potential, and difficult to substantiate its continued use as a model for other trade agreements. The empirical assessment of the implementation of the agreement documented herein will provide not only a benchmark for future assessments of the NAAEC, but also a basis for comparative analyses with similar agreements.

This article is organized as follows; first, general background on the environmental effects of trade liberalization is provided, followed by a discussion of the environmental effects associated with NAFTA and a synopsis of the negotiation of the NAAEC. Next, an overview of the NAAEC's mandates and institutional framework is provided, followed

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1. North American Free Trade Agreement, U.S.-Can.-Mex., Dec. 17, 1992, 32 I.L.M. 289 (1993) [hereinafter NAFTA].

2. North American Agreement on Environmental Cooperation, U.S.-Can.-Mex., Sept. 14, 1993, 32 I.L.M. 1480 (1993) [hereinafter NAAEC].

3. The NAAEC does not specify funding levels for implementation; however, each country contributes $3 million (U.S. dollars) annually to the budget of the Commission for Environmental Cooperation, established under NAAEC, *supra* note 2, art. 8 [hereinafter CEC]. Cumulative contributions through 2010 were $144 million.

4. *See, e.g.,* Gerda Van Roozendaal, *The Inclusion of Environmental Concerns in US Trade Agreements*, 18 ENVTL. POL. 431 (2009).

by a review of existing literature on the performance of the NAAEC to highlight key findings from previous research. The methodology and scope of the empirical assessment of the NAAEC are then described, followed by the results of the empirical assessment and conclusions.[5]

II. THE TRADE AND ENVIRONMENT NEXUS

Efforts to liberalize trade over the past sixty years at the global, regional, and bilateral levels have often been pursued without consideration to their potential environmental impacts. It was not until negotiation of the Canada – United States Free Trade Agreement[6] and Uruguay Round of the General Agreement on Tariffs and Trade[7] ("GATT") in the late 1980s and early 1990s that environmental concerns were first raised.[8] These concerns have persisted, resulting in on-going efforts to characterize the effects and identify policy prescriptions to mitigate them.

Although the trade and environment nexus is often presented in simple terms, free trade agreements do not cause direct and immediate environmental damage. Rather, damages most often arise when economic activities associated with freer trade exacerbate the unmitigated market or government failures.[9] Trade liberalization may

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5. The empirical assessment presented herein is documented in Linda Allen, The Politics of Structural Choice of the Commission for Environmental Cooperation: The Theoretical Foundations of the Design of International Environmental Institutions (Apr. 2005) (unpublished Ph.D. dissertation, Indiana University) (on file with author).

6. Canada – United State Free Trade Agreement, Oct. 4, 1988, 27 I.L.M. 281 (1988).

7. General Agreement on Tariffs and Trade, opened for signature on Jan. 1, 1948, T.I.A.S. No. 1700, 55 U.N.T.S. 194 [hereinafter GATT].

8. For CUSFTA, s*ee* STEVEN SHRYBMAN, ENVIRONMENTAL IMPACTS OF BILL C-130: THE CANADA - U.S. TRADE AGREEMENT AS ENVIRONMENTAL LAW (1988); STEVEN SHRYBMAN, SELLING CANADA'S ENVIRONMENTAL SHORT: THE ENVIRONMENTAL CASE AGAINST THE TRADE DEAL (1988); MICHELE SWENARCHUK, ENVIRONMENTAL IMPACTS OF THE CANADA – U.S. FREE TRADE AGREEMENT (1988). For GATT, *see* Mark Ritchie, *GATT, Agriculture, and the Environment: The US Double Zero Plan*, 20 ECOLOGIST 214 (1990); JANINE FERRETTI, ZEN MAKUCH, & KEN TRAYNOR, INTERNATIONAL TRADE AND THE ENVIRONMENT (1991); Charles Arden-Clarke , *The General Agreement on Tariffs and Trade, Environmental Protection, and Sustainable Development* (World Wildlife Federation International Discussion Paper 1991).

9. Arden-Clarke, *supra* note 8, at 3; ORGANISATION OF ECONOMIC CO-OPERATION AND DEVELOPMENT, THE ENVIRONMENTAL EFFECTS OF TRADE, 8-12 (1994) [hereinafter OECD]; Kym Anderson & Richard Blackhurst, *Trade, The Environment, and Public Policy, in* THE GREENING OF WORLD TRADE ISSUES 3, 4-7 (Kym Anderson & Richard Blackhurst eds., 1992); Matthew A. Cole, *Examining the Environmental Case*

give rise to both positive and negative effects; negative effects have historically been the primary concern.[10] In general, the negative environmental effects of free trade are categorized as: (1) *scale* effects, (2) *sectoral*, structural, or composition effects, (3) *product* or technological effects, and (4) *legal* or regulatory effects.[11]

Negative *scale* effects correspond to higher levels of pollution or faster depletion rates of natural resources due to expansion of production and consumption activities associated with increased trade.[12] *Sectoral* effects are associated with changes in the patterns of production and resource use within specific sectors, as liberalized trade alters the international location and intensity of production and consumption activities. These effects foster a relocation of pollution sources around the world.[13] *Sectoral* effects may be negative when production or consumption shifts to geographic areas that are unsuited to the nature or intensity of the new activity.[14] Negative *product* effects are associated with changes in trade flows of particular environmentally-damaging or harmful products, such as hazardous waste, endangered species, or toxic chemicals; for these effects, the characteristics of the product cause the adverse environmental impact.[15]

Legal effects generally refer to differing levels of domestic environmental safeguards or enforcement between trading partners, or a 'conflict of rules' between trade regime rules and domestic or international environmental laws.[16] Differing levels of safeguards or enforcement may give rise to a competitive advantage that results in a downward harmonization of regulations [race to the bottom hypothesis], or migration of dirty industries to countries with lower standards or

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Against Free Trade, 33 J. WORLD TRADE 183, 184 (1999).

10. Cole, *supra* note 9, at 185, 187, 193.

11. OECD, *supra* note 9, at 12-16; HÅKAN NORDSTRÖM & SCOTT VAUGHAN, SPECIAL STUDIES 4, TRADE AND ENVIRONMENT, 3, at 29-30 (1999); Per G. Fredriksson, *Trade, Global Policy, and the Environment; New evidence and issues*, in TRADE, GLOBAL POLICY AND THE ENVIRONMENT 1, at 1-3 (Per G. Fredriksson ed., 1999); Michael J. Ferrantino, *International Trade, Environmental Quality and Public Policy,* 20 WORLD ECON. 43, 48-50 (1997).

12. Fredriksson, *supra* note 11, at 1-3; OECD, *supra* note 9, at 13.

13. NORDSTRÖM & VAUGHAN, *supra* note 11, at 29; Anderson & Blackhurst, *supra* note 9, at 4-7; OECD, *supra* note 9, at 13-14; Fredriksson, *supra* note 11, at 1-3.

14. OECD, *supra* note 9, at 15-16; NORDSTRÖM & VAUGHAN, *supra* note 11, at 29.

15. OECD, *supra* note 9, at 12-13; Peter L. Lallas, *NAFTA and Evolving Approaches to Identify and Address "Indirect" Environmental Impacts of International Trade,* 5 GEO. INT'L ENVTL. L. REV. 519, 522, 526-527 (1998).

16. OECD, *supra* note 9, at 16-17; NORDSTRÖM & VAUGHAN, *supra* note 11, at 35-46; James Salzman, *Seattle's Legal Legacy and Environmental Reviews of Trade Agreements*, 31 ENVTL. L. 503, 529 (2001).

enforcement [pollution havens or industrial flight hypotheses].[17] A conflict between trade regime rules and environmental laws may occur when regime rules restrict the use of trade measures for enforcement of international environmental laws and treaties, or they restrict domestic environmental regulations if they are determined to be non-tariff barriers to trade.[18]

Taking into consideration the complexity of linkages between trade liberalization and environmental quality, and the existence of other non-policy factors, it is difficult to predict the specific environmental effects that may emerge as trade is liberalized between countries. In general, however, the emergence of negative scale, sectoral, and product effects will likely depend on the substantive focus or areas of liberalization of a particular free trade agreement, whereas the legal effects depend more generally on non-substantive trade regime rules or levels of environmental protection in each country. For NAFTA, the anticipated environmental effects of primary concern were the legal effects, followed by scale and sectoral effects, especially in Mexico.

III. NAFTA AND THE ENVIRONMENT: ORIGINS OF THE NAAEC

Environmental groups in the U.S. raised concerns over the potential environmental impacts of trade liberalization in North America shortly after the U.S. and Mexico announced their intent to negotiate a free trade agreement.[19] Initially, these groups had limited access to the trade policy negotiations and environmental concerns were barely on the radar at the onset of negotiations. As the negotiations progressed, however, the trickle of concerns turned into a torrent. Indeed, by the time NAFTA was submitted for legislative approval, the resolution of environmental concerns had become a political imperative required for ultimate passage

17. NORDSTRÖM & VAUGHAN, *supra* note 11, at 35-46; WILLIAM J. BAUMOL & WALLACE E. OATES, THE THEORY OF ENVIRONMENTAL POLICY (1988); Cole, *supra* note 9, at 190-191; Ferrantino, *supra* note 11, at 48-50.

18. NORDSTRÖM & VAUGHAN, *supra* note 11, at 35-46; Kerry Krutilla, *World Trade, the GATT, and the Environment*, in ENVIRONMENTAL POLICY TRANSNATIONAL ISSUES AND NATIONAL TRENDS, 87, 97-104 (Lynton K. Caldwell & Robert V. Bartlett eds., 1997) [hereinafter ENVIRONMENTAL POLICY]; Cole, *supra* note 9, at 191-192.

19. The U.S. and Mexico formally announced their intent to negotiate a free trade agreement in June 1990, Canada joined the negotiations in Jan. 1991, and the NAFTA was finalized in Aug. 1992. *See* BARBARA HOGENBOOM, MEXICO AND THE NAFTA ENVIRONMENT DEBATE, at 112-113 (1998).

of the trade agreement.[20]

The principal concern identified for NAFTA was the potential for liberalized trade to give rise to pollution havens in Mexico as industries relocated to take advantage of lax enforcement of environmental laws in that country, with possible pollution spillovers along the U.S. – Mexico border.[21] Other concerns were subsequently identified, including the use of trade regime rules to challenge legitimate domestic environmental regulations and standards as non-tariff barriers to trade, the downward harmonization of environmental laws and standards as trading partners strive for common standards, the accelerated exploitation of natural resources due to liberalization of certain sectors, and a general increase in levels of pollution due to economic growth.[22]

To address these concerns, the three NAFTA countries first sought, in 1991 and 1992, to incorporate a limited number of environmental provisions directly into NAFTA, as well as to develop supplemental environmental policies or programs in parallel with the trade agreement.[23] However, when these measures proved insufficient to

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20. For a comprehensive history of environmental issues within the context of the NAFTA negotiations, *see generally* PIERRE MARC JOHNSON & ANDRE BEAULIEU, THE ENVIRONMENT AND NAFTA: UNDERSTANDING AND IMPLEMENTING THE NEW CONTINENTAL LAW (1996); JOHN J. AUDLEY, GREEN POLITICS AND GLOBAL TRADE, NAFTA AND THE FUTURE OF ENVIRONMENTAL POLITICS (1997); FREDERICK MAYER, INTERPRETING NAFTA, THE SCIENCE AND ART OF POLITICAL ANALYSIS (1998); HOGENBOOM, *supra* note 19.

21. U.S. Trade Representative, *Review of U.S.-Mexico Environmental Issues, February 25, 1992*, *reprinted in* NAFTA AND THE ENVIRONMENT, SUBSTANCE AND PROCESS 205 (Daniel Magraw ed., 1992) [hereinafter NAFTA AND THE ENVIRONMENT]. The highly polluted Mexican border region served as a harbinger for what might occur elsewhere in Mexico as trade and investment were liberalized.

22. *See, e.g.,* National Wildlife Federation, ENVIRONMENTAL CONCERNS RELATED TO A UNITED STATES-MEXICO FREE TRADE AGREEMENT, *reprinted in* NAFTA AND THE ENVIRONMENT, *supra* note 21, at 681; *The North American Free Trade Agreement: Hearing before the H. Subcomm. on International Economic Policy and Trade and on Western Hemisphere Affairs of the Comm. on Foreign Relations*, 102nd Cong., 64 to 81 (1991) (Statement of Stewart Hudson); *Protecting the Environment in North American Free Trade Agreement Negotiations: Hearing before the H. Subcomm. on Regulation, Business Opportunities, and Energy of the Comm. on Small Business*, 102nd Cong. 31-34, 104-113 (1991) (Statement of Michael McCloskey); *North American Free Trade Agreement: Hearing before the H. Subcomm. on Commerce, Consumer Protection, and Competitiveness of the Comm. on Energy and Commerce,* 102nd Cong., 113 to 133 (1991) (Statement of Richard Kamp); *Proposed Negotiation of a Free Trade Agreement with Mexico: Hearing before the H. Subcomm. on Trade of the Comm. on Ways and Means*, 102nd Cong., 213 to 248 (1991) (Statement of David E. Ortman); *Trade and Environment: Hearing before the S. Subcomm. on International Trade of the Comm. on Finance,* 101st Cong., 66-69 (1991) (Statement of Lynn Greenwalt).

23. George Bush, *Response of the Administration of George Bush to Issues Raised*

obtain support of the environmentalists for NAFTA approval in 1992, the countries negotiated the NAAEC in 1993 and established a trilateral commission, the North American Commission for Environmental Cooperation ("CEC"), to address the remaining legal, sectoral, and scale effects associated with NAFTA.[24]

Overall, the CEC has a remit to promote environmental cooperation and improve enforcement of environmental laws in North America, as well as limited authority to conduct independent investigations and support the NAFTA Free Trade Commission ("FTC") to promote integration of trade and environment objectives under NAFTA.[25] The most controversial aspect of the NAAEC was the establishment of a state-to-state dispute resolution process. This process permitted assessing fines or levying sanctions to address lax enforcement of environmental laws, which remained the predominant concern for NAFTA.[26] In the end, the NAAEC addressed in principle the major environmental concerns for NAFTA and was sufficient to neutralize the environment as an issue during the ultimate approval of the agreement in 1993.

IV. INSTITUTIONAL MANDATES AND FRAMEWORK OF THE NAAEC

Given the multitude of environmental concerns identified for NAFTA, the CEC was endowed with several major substantive mandates, each one was intended to address one or more of the concerns. In general, the major mandates of the CEC are: (1) promoting environmental cooperation on programmatic and regulatory issues through voluntary initiatives, (2) preparing independent reports on environmental issues of regional significance, (3) improving enforcement of environmental laws through administration of the citizen submission process and state-to-state consultation and dispute resolution process, and (4) supporting the environmental goals and objectives of NAFTA through coordination with the NAFTA FTC.[27]

These mandates are reflected in the annual work program of the

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in Connection with the Negotiation of a North American Free Trade Agreement, *reprinted in* NAFTA AND THE ENVIRONMENT**,** *supra* note 21, at 163.

24. *See Hills Letter on NAFTA Environmental Commission*, INSIDE U.S. TRADE**,** Oct. 2, 1992, at 6.

25. The NAFTA Free Trade Commission is the tri-national body comprised of trade ministers from the U.S., Canada, and Mexico that oversees implementation of the NAFTA, NAFTA, *supra* note 1, art. 2001 [hereinafter FTC].

26. NAAEC, *supra* note 2, Part 5. *See* Mayer, *supra* note 20, at 197-203.

27. *See* JOHNSON & BEAULIEU, *supra* note 20, at 140-149.

CEC, which defines the major programmatic and procedural activities to be undertaken by the CEC each year. Since the CEC was established in 1994, its budget has remained constant[28] and on average, around fifty to sixty percent of the funding is allocated to implementing voluntary environmental cooperative initiatives, six to seven percent to administering the citizen submission process under Articles 14 and 15, two to three percent to preparing independent Secretariat reports under Article 13, and the remaining thirty to forty percent on logistical, administrative, management, or communication activities.[29]

Historically, the majority of the CEC's substantive work has been related to cooperative initiatives clustered under four core programmatic themes: Conservation of Biodiversity; Law and Policy; Environment, Economy, and Trade; Pollutants and Health.[30] Each of these core areas encompasses a number of different programs covering a very broad range of topics. Table 1 in Appendix A provides a summary of the CEC's cooperative initiatives from 1995 to 2010 with their respective years of implementation; Figure 1 provides a breakdown of the cumulative funding from 1995 to 2010 for the four core programmatic areas.[31]

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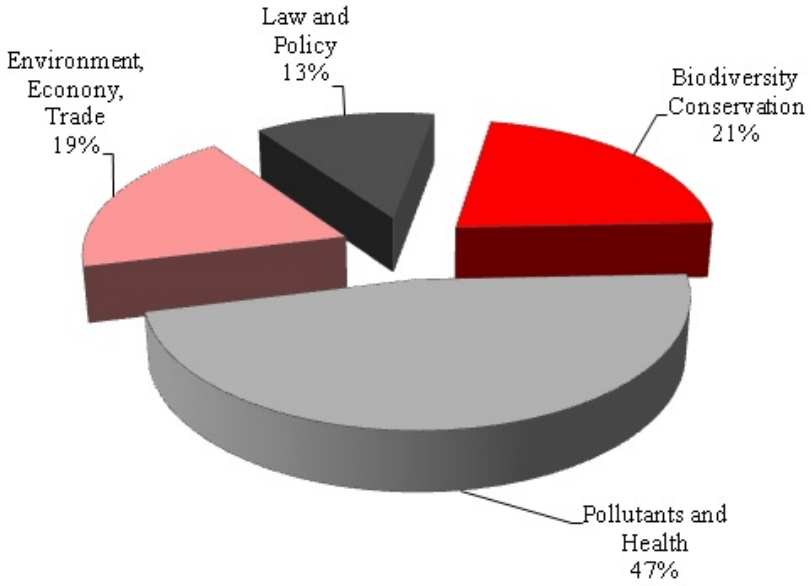
28. The CEC has an annual budget of $9 million (U.S. dollars), *see* CEC *supra* note 3.

29. Breakdown of funding is derived from published CEC annual budgets and operational reports, *infra* note 31.

30. The specific names of core areas have changed over time, but the general focus has remained essentially the same. Conservation and Biodiversity initiatives are focused on promoting conservation, sound management, and sustainable use of North American biodiversity; Law and Policy initiatives are focused on enhancing regional cooperation in the development and implementation of environment laws and regulations in each country; Economy, Trade, and Environment initiatives are focused on analyzing the relationship between the environment, economy, and trade in the North American; Pollutants and Health initiatives are focused on addressing adverse effects to human and ecosystem health from pollution that is regional (continent-wide) in scale.

31. Table 1 and Figure 1 were derived from CEC annual reports: 1995 ANNUAL REPORT (1995); 1995 PROGRAM REPORT (1996); 1996 ANNUAL REPORT (1997); 1997 ANNUAL REPORT (1997); 1998 ANNUAL PROGRAM AND BUDGET (1998); 1998 ANNUAL REPORT (1998); NORTH AMERICAN AGENDA FOR ACTION 1999-2001 (1999); 1999 ANNUAL REPORT (1999); NORTH AMERICAN AGENDA FOR ACTION 2000-2002 (2000); NORTH AMERICAN AGENDA FOR ACTION 2001-2003 (2001); NORTH AMERICAN AGENDA FOR ACTION 2002-2004 (2002); NORTH AMERICAN AGENDA FOR ACTION 2003-2005 (2003); NORTH AMERICAN AGENDA FOR ACTION 2004-2006 (2004); 2002 ANNUAL REPORT (2002); OPERATIONAL PLAN: 2004-2006 (2003); OPERATIONAL PLAN: 2006-2008 (2005); OPERATIONAL PLAN, 2007-2009 (2007); 2008 OPERATIONAL PLAN (2007); 2009 OPERATIONAL PLAN (2009); 2010 OPERATIONAL PLAN (2010). The CEC did not publish an annual operational plan for 2005.

Figure 1: Total Funding Allocation for Cooperative Initiatives, 1995 to 2010



Institutionally, the CEC has a tripartite bureaucratic structure comprised of a Council of Ministers ("Council"), a Secretariat, and a Joint Public Advisory Committee ("JPAC"). The Secretariat, a permanent bureaucratic organization located in Montreal, conducts the day-to-day operations of the CEC and prepares its annual work program and budget.[32] The Secretariat also prepares independent reports under Article 13 and administers the citizen submission process under Articles 14 and 15.[33] The Council, comprised of cabinet level officials[34] from the NAFTA countries, sets the priorities for the CEC, serves as a gatekeeper for the Secretariat's independent work under Articles 13, 14, and 15, cooperates with the NAFTA FTC, and administers the state-to-state

32. CEC, NAFTA'S INSTITUTIONS, THE ENVIRONMENTAL POTENTIAL AND PERFORMANCE OF THE NAFTA FREE TRADE COMMISSION AND RELATED BODIES (1997); *see also* J. Owen Saunders, *The NAFTA and the North American Agreement on Environmental Cooperation*, *in* ENVIRONMENTAL POLICY, *supra* note 18, at 289-291.

33. NAAEC, *supra* note 2, arts. 11, 12, 13, 14, 15, 16.

34. NAAEC, *supra* note 2, Part 3, art. 9 § 1. The Council is to be comprised of cabinet-level officials or equivalent representatives without reference to particular agencies. Since the NAAEC entered into effect, the Council has been comprised of the Administrator of the U.S. Environmental Protection Agency, the Secretary of the Mexican Ministry of Environment and Natural Resources, and Minister of Environment Canada.

dispute resolution process.[35] The JPAC, a standing committee comprised of five representatives from each country,[36] serves in a traditional advisory role to the Council and Secretariat.[37]

V. PREVIOUS RESEARCH ON THE NAAEC

There exists a fairly sizable body of literature that provides a mix of perspectives on the history and operation of the NAAEC and CEC, with a limited amount focused on assessing institutional effectiveness.[38] To date, there have been three modest assessments of the implementation and performance of the NAAEC and CEC, as well as more focused research on particular programs or aspects of the NAAEC, which, taken together, give a partial picture of the institutional performance and effectiveness of the NAAEC and CEC at different points in time.

A. Past Studies on Overall Institutional Performance

DiMento and Doughman[39] reviewed implementation of the NAAEC and functioning of the CEC during its first two years of operation, and concluded that, while some aspects of implementation of the NAAEC had been problematic, on the whole it appeared to be an impressive example of an innovative initiative in international environmental cooperation.[40] The study found that the CEC was most successful in promoting cooperation and least successful in seeking sanctions to mitigate violations of environmental laws.[41] Overall, about seventy-five

35. NAAEC, *supra* note 2, Part 3, arts. 9, 10, 11, 12, 13, 14, 15, 16. There are eighteen (18) specific areas for which the Council may develop recommendations, as well as any other areas that it may decide warrant attention, so essentially the CEC may work on practically any environmental issue in North America.

36. NAAEC, *supra* note 2, Part 3, art. 16. The composition of the JPAC is not specified within the NAAEC. Historically, it has been comprised of representatives from nongovernmental organizations, national and subnational governments, academia, indigenous communities, and the private sector.

37. NAAEC, *supra* note 2, Part 3, art. 16.

38. *See, e.g.,* LINDA ALLEN, LITERATURE REVIEW OF THE NORTH AMERICAN AGREEMENT ON ENVIRONMENTAL COOPERATION (2003), *available at* http://www.unisfera.org/IMG/pdf/Unisfera_-_NAAEC_Literature_Review.pdf.

39. Joseph F. DiMento & Pamela M. Doughman, *Soft Teeth in the Back of the Mouth: The NAFTA Environmental Side Agreement Implemented*, 10 GEO. INT'L ENVTL. L. REV. 651 (1998). Data for this study were obtained from a review of archival records, an opinion survey (n=57, 30% response rate) to individuals involved with the CEC, interviews with key stakeholders, and attendance at various CEC events.

40. *Id.* at 653, 740-742.

41. *Id.* at 692-695.

percent of the respondents felt that some but not all of the objectives of the NAAEC were being met.[42]

The Four-Year Review[43] was a self-evaluation required under the NAAEC[44] that examined the operation and effectiveness of the NAAEC during its first four years of implementation. Overall, the review found that while considerable progress had been made in implementing some of the provisions of the NAAEC, there were numerous implementation challenges.[45] Most significant were a lack of focus on the annual program activities and strategic vision for the CEC, and conflicting views and undue influence of the three national governments on the Secretariat work.[46] Despite these shortcomings, the Four-Year Review found some effective implementation efforts, in particular efforts related to fostering cooperation between the countries.

The Ten-Year Review and Assessment[47] was a non-mandated review commissioned by the Council at the ten-year anniversary of the NAAEC. Overall, the Ten Year Review found that the CEC had helped to advance trilateral cooperation on several key environmental issues and promote transparency and public participation. [48] The performance of the CEC, however, had been hampered by several factors.[49] The major factors hindering its performance included: a lack of focus and strategic direction in the CEC's work; a lack of clarity of the respective roles and responsibilities of the Council, Secretariat, and JPAC; disagreement between the Council and Secretariat over implementation of the citizen submission process; and lack of a broad based constituency.[50] As a result of these shortcomings, the CEC had not yet realized its full potential.[51]

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42. *Id.* at 691- 692, 694- 695.

43. FOUR-YEAR REVIEW OF THE NORTH AMERICAN AGREEMENT ON ENVIRONMENTAL COOPERATION, REPORT OF THE INDEPENDENT REVIEW COMMITTEE (1998) [hereinafter FOUR-YEAR REVIEW]. Data were obtained from a review of published literature and archival records and interviews with national governments and CEC officials.

44. NAAEC, *supra* note 2, Part Two, art. 10 § 1(b).

45. FOUR-YEAR REVIEW**,** *supra* note 43, at vii-xii.

46. *Id.* at 10, 12, 34-37

47. PIERRE MARC JOHNSON, ROBERT PAGE, JENNIFER A. HAVERKAMP, JOHN F. MIZROCH, DANIEL BASURTO, & BLAN CA TORRES, TEN YEARS OF NORTH AMERICAN ENVIRONMENTAL COOPERATION (2004). Data were obtained from a review of published literature and archival records, interviews with key stakeholders, publicly solicited input, and contracted research.

48. *Id.* at x-xi.

49. *Id.*

50. *Id.* at 11, 42-46, 50, 53, 55, 56.

51. *Id.* at x.

B. Past Studies on Specific Aspects of the NAAEC

In addition to the general assessments of the NAAEC, other research has examined specific aspects, programs, or functions of the agreement and the CEC over the past fifteen years. These, are summarized below under the following general categories that correspond to the major substantive mandates of the CEC: promoting environmental cooperation, coordinating with NAFTA FTC, preparing independent reports, administering citizen submission and factual record process, and administering the state-to-state dispute resolution process.

1. Promoting Environmental Cooperation

The majority of the CEC's work has historically consisted of voluntary environmental cooperative initiatives. Between 1995 and 2010, the CEC had undertaken over eighty different cooperative initiatives[52] under its four core programmatic areas.[53] The success of these initiatives has varied over time.[54] Overall, it appears that initiatives are most successful when they reflect the environmental priorities of all three countries, or they are consistent with obligations or efforts of the countries under other global environmental accords.[55] Examples of initiatives that have been effective at facilitating cooperation between the countries include the North American Biodiversity Information Network and North American Bird Conservation Initiative[56] ("NABCI"), which have fostered closer coordination on conservation of biodiversity in North America.[57] The Pollutant Release and Transfer Registry ("PRTR")

52. The number of initiatives is based on annual reports and budgets for the CEC from 1995 to 2010, *see* CEC reports, *supra* note 31.

53. *Supra* note 30.

54. Greg Block, *The CEC Cooperative Program of Work*, *in* GREENING NAFTA, THE NORTH AMERICAN COMMISSION FOR ENVIRONMENTAL COOPERATION 25, 28 (David L. Markell & John H. Knox eds., 2003) [hereinafter GREENING NAFTA].

55. JAN GILBREATH, THE ENVIRONMENT AND TRADE: PREDICTING A COURSE FOR THE WESTERN HEMISPHERE USING THE NORTH AMERICAN EXPERIENCE 27 (2001).

56. *See generally* North American Bird Conservation Initiative – International, *NABCI Bird Conservation Regions*, http://www.nabci.net/International/English/bcrmap.html (last visited Jan. 22, 2011); North American Bird Conservation Initiative – International, *Background, Vision, and Strategy*, (last visited Jan. 22, 2011).

57. Block, *supra* note 54, at 34; Jonathan M. Andrews & Brad A. Andres, *Towards Integrated Bird Conservation in North America: A Fish and Wildlife Service Perspective*, 25 (SUPPL. 2) WATERBIRDS 122, 125 (2002); CEC, ECOLOGICAL REGIONS OF NORTH AMERICA: TOWARD A COMMON PERSPECTIVE (1997); *see also* John R. Sauer, Jane E. Fallon & Rex Johnson, *Use of North American Breeding Bird Survey Data to Estimate Population Change for Bird Conservation Regions,* 67 J. WILDLIFE MGMT. 372, 372 (2003); Robert L. Glicksman, *The CEC's Biodiversity Conservation Agenda*, *in*

and Sound Management of Chemicals ("SMOC") have likewise helped foster more standardized and comparable regulatory approaches to toxic chemical usage between the three countries.[58] Despite the success of some initiatives, some researchers feel that the CEC is spread too thin with too many cooperative initiatives[59] and some initiatives a lack of clarity in program goals, methodologies, and implementing responsibilities respectively for the Secretariat, countries, and other stakeholders.[60]

2. Coordinating with the NAFTA Free Trade Commission

Up through 2010, there had been almost no meaningful coordination between the CEC Council and NAFTA FTC to ensure the environmental goals of NAFTA are being achieved. The Council had not been involved in any of NAFTA's environment-related trade disputes nor developed any concrete joint initiatives with the FTC, despite considerable pressure and numerous meetings between trade and environmental officials to identify specific areas for coordination.[61] The lack of coordination between the Council and the FTC may be due to a lack of political will

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GREENING NAFTA, *supra* note 54, at 57.

58. Mark S. Winfield, *North American Pollutant Release and Transfer Registries: A Case Study in Environmental Policy Convergence*, *in* GREENING NAFTA, *supra* note 54, at 38, 46-47, 5050; *see also* Block, *supra* note 54, at 28.

59. GARY HUFBAUER, REGINALD JONES, & DIANA OREJAS, INSTITUTE FOR INTERNATIONAL ECONOMICS, SPEECH DELIVERED AT THE INTERNATIONAL POLICY FORUM, NAFTA AND THE ENVIRONMENT AMERICAS: LESSONS FOR TRADE POLICY (Feb. 28, (2001), *available at,* http://ctrc.sice.oas.org/geograph/papers/iie/hufbauer0301-1.asp.

60. JOHNSON ET AL.**,** *supra* note 47, at x, xii, 11, 50-52; Glicksman, *supra* note 57, at 70.

61. See OPERATIONAL PLAN: 2004-2006, *supra* note 31, at 40, for proposal by CEC to identify areas for coordination with the FTC; *see also* GARY C. HUFBAUER, DANIEL C. ESTY, DIANA OREJAS, LUIS RUBIO & JEFFREY J. SCHOTT, NAFTA AND THE ENVIRONMENT: SEVEN YEARS LATER 36-37 (2000); Laura Carlsen & Hilda Salazar, *Limits to cooperation: A Mexican Perspective on the NAFTA's Environmental Side Agreement and Institutions, in* GREENING THE AMERICAS, NAFTA'S LESSONS FOR HEMISPHERIC TRADE, at 221 (Carolyn L. Deere & Daniel C. Esty eds., 2002) [hereinafter GREENING THE AMERICAS]; Mary Kelly & Cyrus Reed, *The CEC's Trade and Environment Program: Cutting Edge Analysis, but Untapped Potential*, *in* GREENING NAFTA, *supra* note 54, at 101; Andrea Abel, *NAFTA's North American Agreement for Environmental Cooperation: A Civil Society Perspective,* AM. PROGRAM POL'Y REP. (Mar. 1, 2003), available at, http://www.cipamericas.org/archives/1081 (last visited Mar. 12, 2011); Howard Mann, *NAFTA and the Environment: Lessons for the Future*, 13 TUL. ENVTL. L.J**.** 387, 399-400 (2000); Janine Ferretti, *Innovations in Managing Globalization: Lessons from the North American Experience*, 15 GEO**.** INT'L ENVTL. L. REV. 367, 377 (2003).

on the part of the Council, or the fact that the Council's authority is derived from the NAAEC and not NAFTA. Whatever the reason, it lacks a strong institutional and legal prerogative to pursue cooperation and trade officials may be reluctant to give a greater substantive role for the environment in trade policy implementation.[62]

3. Preparing Independent Reports

Six independent Secretariat reports had been prepared as of 2010, and overall these reports may have helped raised awareness on particular environmental issues. In some instances, they may have led to more concrete actions on these issues, or at least attitudinal changes amongst affected stakeholders.[63] For example, the Secretariat report on the Silva Reservoir bird die-off[64] in Mexico may have served as a basis for establishing an environmental council and action plan to address the causes of the die-off[65], while the *Continental Pollutant Pathways*[66] study has served as a technical basis for coordination of air pollution policies in North America.[67] The *Ribbon of Life* report[68] on the San Pedro River may have contributed to development of new institutions on the U.S. side to coordinate stakeholders in the management of the watershed.[69] While these reports may have had some impact, their effectiveness is limited because their recommendations are not binding on the countries or other

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62. Abel, *supra* note 61; Mann, *supra* note 61, at 399-402; Ferretti, *supra* note 61, at 377; Roberto Sanchez, *Governance, Trade, and the Environment in the Context of NAFTA*, 45 AM. BEHAV. SCI. 1369, 1374 (2002).

63. *See, e.g.,* Dan A. Tarlock & John E. Thorson, *Coordinating Land and Water Use in the San Pedro River Basin: What Role for the CEC?, in* GREENING NAFTA, *supra* note 54, at 229-230; Frona M. Powell, *The North American Commission for Environmental Cooperation's San Pedro Report: A Case Study and Analysis of the CEC Process*, 6 ENVTL. L. 809, 835-837 (2000).

64. CEC, CEC SECRETARIAT REPORT ON THE DEATH OF MIGRATORY BIRDS AT THE SILVA RESERVOIR (1995) [hereinafter CEC SILVA RESERVOIR REPORT].

65. Talli Nauman, *NAFTA's First Real Test,* AUDUBON**,** Sept.-Oct., 1995, at 96-99 (on file with author).

66. CEC, CONTINENTAL POLLUTANT PATHWAYS: AN AGENDA FOR COOPERATION TO ADDRESS LONG-RANGE TRANSPORT OF AIR POLLUTION IN NORTH AMERICA (1997) [hereinafter CEC CONTINENTAL POLLUTANT PATHWAYS REPORT].

67. HUFBAUER ET AL**.**, *supra* note 61, at 27.

68. CEC, RIBBON OF LIFE: AN AGENDA FOR PRESERVING TRANSBOUNDARY MIGRATORY BIRD HABITAT ON THE UPPER SAN PEDRO RIVER (1999) [hereinafter CEC RIBBON OF LIFE REPORT].

69. Robert G. Varaday, Margaret A. Moote, & Robert Merideth, *Water Management Options for the Upper San Pedro Basin: Assessing the Social and Institutional Landscape*, 40 NAT. RESOURCES J. 223, 234-235 (2000); UPPER SAN PEDRO RIVER BASIN, at 13-16, *available at* www.snre.umich.edu/emi/pubs/transboundary/San%20Pedro.pdf.

affected stakeholders[70] and because the CEC has no well-defined follow-up role once the report is released.[71]

4. Administering Citizen Submission and Factual Record Process

The citizen submission and factual record process[72] has received more attention than any other aspect of the CEC or NAAEC. Implementation of the process, however, has often been controversial.[73] Up through 2010, sixteen factual records had been completed by the Secretariat, but overall it appears that these records have had a very limited influence on enforcement actions in the countries. For example, the Cozumel factual record[74] may have contributed to improved management of marine resources near Cozumel,[75] while the Metales y Derivados factual record[76] may have prompted the U.S. and Mexican governments to initiate joint efforts to remediate and redevelop brownfield sites along their shared border.[77] The British Columbia Hydro and Power Authority ("BC Hydro") factual record[78] may have spurred Canada into instituting a water use planning process to improve enforcement under the Fisheries Act.[79]

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70. Mary Kelly, *Carbón I/II: An Unresolved Binational Challenge*, *in* ENVIRONMENTAL MANAGEMENT ON =NORTH AMERICA'S BORDERS 189, at 198 (Richard Kiy & John D. Wirth eds., 1998) [hereinafter ENVIRONMENTAL MANAGEMENT]; Powell, *supra* note 63, at 835.

71. Tarlock & Thorson, *supra* note 63, at 229.

72. NAAEC, *supra* note 2, arts. 14, 15.

73. The guidelines are outlined in CEC, BRINGING THE FACTS TO LIGHT, A GUIDE TO ARTICLES 14 AND 15 OF THE NORTH AMERICAN AGREEMENT ON ENVIRONMENTAL COOPERATION (2007) [hereinafter CEC BRINGING THE FACTS TO LIGHT].

74. CEC, FINAL FACTUAL RECORD THE CRUISE SHIP PIER PROJECT IN COZUMEL, QUINTANA ROO (1997) [hereinafter CEC COZUMEL PIER FACTUAL RECORD].

75. INSTITUTO NACIONAL DE ECOLOGÍA, PROGRAMA DE MANEJO PARQUE MARINO NACIONAL ARRECIFES DE COZUMEL (1998); Gustavo Alanis-Ortega, *Public Participation within NAFTA's Environmental Agreement: The Mexican Experience*, in LINKING TRADE, ENVIRONMENT, AND SOCIAL COHESION, NAFTA EXPERIENCES, GLOBAL CHALLENGES 183, 184-185 (John J. Kirton & Virginia W. Maclaren eds., 2002) [hereinafter LINKING TRADE].

76. CEC, METALES Y DERIVADOS FINAL FACTUAL RECORD (2002) [hereinafter CEC METALES FACTUAL RECORD].

77. George Kourous, *NAFTA Governments Flirt with Selling Out Environmental Side Accord*, UPDATER, June 14, 2000.

78. CEC, FINAL FACTUAL RECORD FOR SUBMISSION SEM-97-001(BC ABORIGINAL FISHERIES COMMISSION, ET AL.) (2000) [HEREINAFTER CEC BC HYDRO FACTUAL RECORD].

79. Jonathan Graubart, *Giving Meaning to New Trade-Linked "Soft Law" Agreements on Social Values: A Law-In-Action Analysis of NAFTA's Environmental Side*

Although these factual records may have had some limited impact on policy or enforcement, they did not come close to resolving fully the concerns of the submitters.[80] Rather, the submitters have found the main value of the process and the factual records to be the symbolic validation of their claims, the added information obtained from the records, and the fact that the governments are being required to give a formal justification for their behavior.[81]

5. Administering State-to-State Consultation and Dispute Resolution Process

The state-to-state consultation and dispute resolution process[82] was established to resolve claims, by one country against another, of a persistent pattern of failure to effectively enforce its domestic environmental laws, with ultimate recourse to fines or snap-back tariffs,[83] and was considered to be the "teeth" of the NAAEC. However, as of 2010, the process had not been used. As currently designed, the Part 5 process appears to be quite time-consuming and onerous. It has been recommended that Part 5 be renegotiated to make it more functional,[84] or that the punitive measures be eliminated altogether,[85] even though realistically the likelihood of these measures ever being invoked is quite remote.[86]

6. Summary of Research on the NAAEC and CEC

Overall, past research indicates that implementation of the NAAEC has produced some tangible results but there have also been some problematic aspects that have plagued the work of the CEC from the onset. The CEC has been most successful at promoting voluntary environmental cooperation through its efforts of convening the countries

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Agreement, 6 UCLA J. INT'L L. & FOREIGN AFF. 425, 442-443 (2002).

80. *Id.*, at 448-449.

81. *Id.*, at 448-450.

82. NAAEC, *supra* note 2, Part 5, arts. 22-36.

83. Kevin W. Patton, *Dispute Resolution Under the North American Commission on Environmental Cooperation,* 5 DUKE J. COMP. & INT'L L. 87, 87-90 (1994).

84. HUFBAUER, ET AL., *supra* note 61, at 57.

85. JOHN AUDLEY & SCOTT VAUGHAN, *TIME FOR THE NAFTA ENVIRONMENTAL WATCHDOG TO GET SOME TEETH, available at* http://carnegieendowment.org/publications/index.cfm?fa=view&id=1300 (last visited Oct. 16, 2011).

86. David Schorr, *NAFTA and the Environment* in FREE TRADE: RISKS AND REWARDS 226, at 231 (L.I. MacDonald ed., 2000) [hereinafter FREE TRADE].

and other stakeholders, and facilitating the exchange of information on regional environmental issues that reflect priorities for all three countries.[87] At the same time, the CEC has been hindered by a general lack of focus in its work, a lack of political support by the three countries, continuing controversy over the implementation of the citizen submission process, and weak public participation. While the past studies have provided important insights into the effectiveness of the NAAEC and CEC, they provide only a partial picture at different times. The empirical assessment discussed in the remaining sections serves to provide a more comprehensive assessment of the implementation of the NAAEC.

VI. EMPIRICAL ASSESSMENT OF INSTITUTIONAL EFFECTIVENESS

There are several approaches that can be used to assess the performance of an international institution, including problem-solving, legal, economic, normative, and political approaches.[88] Given the soft law nature of the NAAEC, with its limited number of specific obligations, the legal and political approaches were used in this assessment to examine institutional effectiveness. In general, the legal approach assesses the effectiveness of an institution by the degree to which contractual obligations, typically defined within an international agreement, are met.[89] The political approach gauges institutional effectiveness in terms of specific changes in the behavior of actors, in the interest of actors, or in the policies and performance of institutions that in turn contribute to the improved management of the targeted problem.[90]

A. Methodology

Overall, the institutional effectiveness of the CEC was ascertained by examining a representative number of activities and/or legal

87. *See, e.g.,* Winfield, *supra* note 58, at 51; Ferretti, *supra* note 61, at 371-72; Pierre Marc Johnson, *Trade Liberalization and the Environment, from NAFTA to FTAA,* ISUMA, Spring 2000, at 62, 66.

88. For a full description of the approaches, see Thomas Bernauer, *The Effect of International Environmental Institutions: How We Might Learn More*, 49 INT'L ORG. 351 (1995); Oran Young & Marc Levy, *The Effectiveness of International Environmental Regimes*, in THE EFFECTIVENESS OF INTERNATIONAL ENVIRONMENTAL REGIMES: CAUSAL CONNECTIONS AND BEHAVIORAL MECHANISMS 1, at 4-6 (Oran Young ed., 1999).

89. Young & Levy, *supra* note 88, at 4.

90. *Id.* at 5.

obligations associated with the principal mandates of the CEC, which were selected based on longevity in implementation[91]. Table 2 lists the foci of the empirical assessment. Data sources and collection methods for the assessment included a review of pertinent documentation and archival records,[92] interviews with key stakeholders,[93] a self-administered stakeholder opinion survey,[94] and direct observations at various CEC sponsored events or meetings.[95] A breakdown of the

91. The empirical assessment of the effectiveness of the CEC covered the years from 1994 to 2004. During this time period, the CEC implemented on a continuing basis Articles 10(6), 13, 14, and 15 of the NAAEC, as well sixty-four cooperative initiatives of varying durations. The empirical assessment examined activities under Articles 10(6), 13, 14, and 15, and three cooperative initiatives that spanned the entire time period covered by the assessment. The average duration of all cooperative initiatives implemented during the time period from 1994 to 2004 was 3.4 years. The three cooperative initiatives selected for the empirical assessment had duration of 10 years. *See* Allen, *supra* note 5.

92. Documents and archival records included popular press and non-academic publications, academic publications, governmental publications, CEC publications such as meeting minutes, correspondence, technical reports, annual reports, work plans, resolutions, letters, and unpublished reports, letters, and other documentation provided by interviewees and other stakeholders.

93. Key stakeholder interviews were conducted with individuals who had extensive experience with the work of the CEC. A focused snowball sampling technique was used to identify potential interviewees associated primarily with the mandates or activities listed in Table 1. Initial candidates were identified from published documentation and subsequent candidates were identified from contacts with initial interviewees. A total of 133 interviews were conducted in person or by telephone in either Spanish or English between 2000 and 2003. All interviews were confidential to obtain candid responses and protect the identity of the interviewees. Interviews, when cited herein, are identified using the organizational affiliation (government = "G", CEC = "C", private sector = "P", academia = "A", nongovernmental organization = "N") and nationality of interviewee (Mexican = "MX", United States = "US", Canadian = "CN", and other = "OT"), and a chronologically assigned number for the interview: ex. MX-G-25.

94. Survey: Effectiveness of the Commission for Environmental Cooperation [hereinafter CEC Effectiveness Survey] (on file with author). The CEC Effectiveness Survey was an eight page written self-administered opinion survey with 23 questions, distributed via regular postal service and email in 2003. Survey recipients were identified using a probability sample developed from a sample frame of published lists of individuals who participated in work or activities of the CEC. The initial probability sample size was 962; however 267 individuals were excluded from the sample due to lack of reliable contact information or non-availability. The final sample size was 697. Survey responses were anonymous to obtain candid responses and protect respondents' identities. Survey comments, when cited herein, are identified using the nationality of respondent, see *supra* note 93, and a chronologically assigned survey number: ex.: MX243.

95. A large portion of the CEC's work is elaborated or reviewed during CEC events, such as Council, JPAC, or Secretariat public meetings, which serve as a rich source of unpublished comments on the effectiveness of the CEC.

interviewees by organizational affiliation is provided in Table 3.[96] Table 4 summarizes the distribution of survey recipients by country of residence, and survey respondents (n = 277, response rate = 40 percent) by nationality. [97] Table 5 provides a summary of the CEC sponsored events attended for the assessment.

Table 2: Focus of Empirical Assessment of Institutional Effectiveness

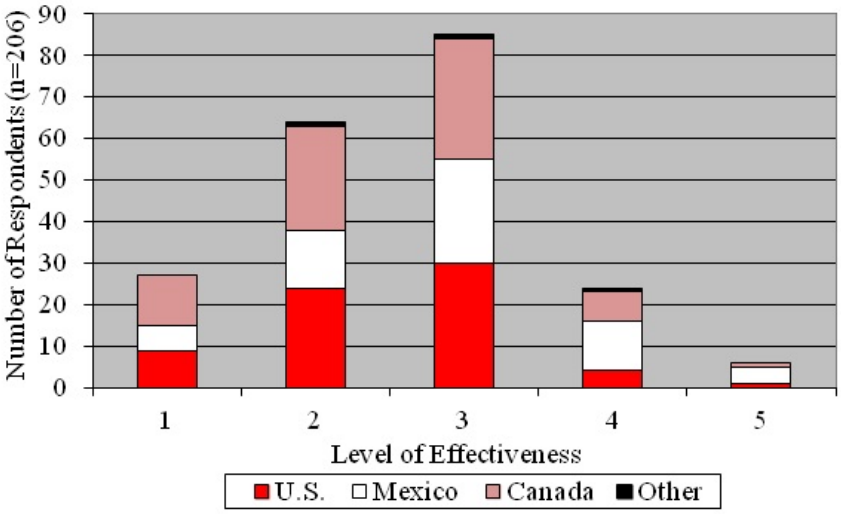

Table 3: Breakdown of Interviewees by Organizational Affiliation

Organizational Affiliation	Number of Interviewees
CEC Staff	22
JPAC, NAC, GAC Members	22
Council Members or Delegates	11
CEC Working Groups	30
Nongovernmental Organizations	19
Other Government Representatives	25
Others	4
Total	**133**

96. CEC Effectiveness Survey, *supra* note 94, Question 1.

97. CEC Effectiveness Survey, *supra* note 94, Question 2. The nationality of the survey recipient was not known at the time of mailing, only the country of residence. Nationality was self-reported on the survey and is provided only for respondents.

Table 4: Breakdown of Survey Sample by Country of Residence and Respondents by Nationality

Recipient Country of Residence	Number of Surveys by Country of Residence	Percent of Total	Number of Respondents by Nationality	Percent of Total
Mexico	190	27%	81	29.2%
USA	243	35%	95	34.3%
Canada	259	37%	97	35.0%
Switzerland, France, Belgium	5	1%	4	1.5%
Total	**697**	**100%**	**277**	**100%**

Table 5: CEC Sponsored Events Attended

Event	Location	Date
8th Regular Session of the CEC Council	Guadalajara, Jalisco, Mexico	June 2001
JPAC Regular Session and Public Workshop on Green Goods and Services	Guadalajara, Jalisco, Mexico	June 2001
9th Regular Session of the CEC Council	Ottawa, Ontario, Canada	June 2002
JPAC Regular Session	Ottawa, Ontario, Canada	June 2002
Canadian NAC Meeting	Hull, Quebec, Canada	June 2002
CEC Workshop on Transboundary Law Enforcement	Washington, DC, USA	January 2003
CEC Second North American Symposium on Assessing the Environmental Effects of Trade	Mexico City, DF, Mexico	March 2003
JPAC Regular Session and Public Workshop on Chapter 11 of the North American Free Trade Agreement	Mexico City, DF, Mexico	March 2003
SMOC Working Group Public Meeting	Windsor, Ontario, Canada	May 2003
10th Regular Session of CEC Council	Washington, DC, USA	June 2003
JPAC Regular Session and Joint Public Workshop of the Enforcement Working Group and JPAC on Enforcement Cooperation Issues	Washington, DC, USA	June 2003

VII. EMPIRICAL ASSESSMENT OF RESULTS

The empirical assessment focused on representative activities for each of the major substantive mandates of the CEC (see Table 2). The results of the assessment are organized and discussed in four sections, with each section covering one mandate. The four sections include, integrating trade and environment objectives under NAFTA and supporting the NAFTA FTC, promoting environmental cooperation, undertaking independent reporting, and improving enforcement of environmental laws. First, some background information is provided on the survey respondents and a summary of the survey results related to ranking of CEC principal objectives.

A. Background on Survey Respondents

The 277 individuals who responded to the survey had a variety of organizational affiliations. The largest single segment, comprising around twenty-five percent of the respondents, was affiliated with CEC working groups.[98] Meanwhile, twenty-one percent of respondents were affiliated with nongovernmental organizations, sixteen percent were affiliated with government, nine percent were affiliated with either the NAC or GAC, eight percent were affiliated with academia, six percent were affiliated with CEC staff, five percent were affiliated with JPAC, and two percent or less were affiliated each with consultants, the CEC Council, international organizations, industry, private citizens, media, and other.[99]

At the time of the survey, respondents (n = 272) had been involved with, or followed, the work of the CEC for approximately five years on average[100]. Respondents generally obtained information on the CEC from more than one source, with around seventy-three percent obtaining information during meetings, sixty-six percent from publications, and fifty-five percent from person to person contact.[101] Around fifty-nine percent of the respondents (n = 276) attended CEC meetings occasionally, while thirty-four percent attended meetings frequently; only seven percent of respondents had never attended CEC meetings.[102]

98. CEC Effectiveness Survey, *supra* note 94, Question 1.

99. *Id.*

100. CEC Effectiveness Survey, *supra* note 94, Question 3. Unpaired t-tests for difference of means indicate that there is no significant difference between the mean years of involvement for survey respondents with U.S., Mexican, and Canadian nationalities.

101. CEC Effectiveness Survey, *supra* note 94, Question 4.

102. CEC Effectiveness Survey, *supra* note 94, Question 5.

Around thirty-seven percent of the respondents (n = 271) were interested in all of the work programs of CEC, while fifty-five percent were interested in a few programs and only eight percent were interested in just one program.[103]

B. Overall Ranking of Principal Objectives

Survey respondents ranked in order of importance seven specific objectives of the CEC.[104] Around forty-four percent of the respondents (n = 273) indicated that the most important objective of the CEC was to facilitate voluntary environmental cooperation between the three countries, whereas eighteen percent of the respondents ranked improving effective enforcement of environmental laws and regulations as the most important objective.[105] Around nine percent of the respondents ranked evaluating trade and environment linkages and cooperating with the NAFTA FTC as the most important objectives for the CEC, while eight percent of the respondents ranked improving compatibility of environmental regulations and improving public involvement in development of environmental laws as the most important objective.[106] Only three percent of the respondents ranked the objective to develop a North American constituency and agenda as the most important, and one percent ranked other miscellaneous objectives as most important.[107]

C. Enforcement Mandate

Lax enforcement of environmental laws was the principal concern during negotiation of NAFTA, and under the NAAEC there are two institutional mechanisms available to improve the effective enforcement of laws in the three countries: a state-to-state consultation and dispute resolution process[108] and a citizen submission process.[109] Although enforcement of issues has remained a key concern for some stakeholders, the use of these mechanisms has been quite mixed. The citizen submission process has been used on a limited basis while the state-to-state dispute resolution process has never been used. The following is an assessment of the effectiveness of these processes for improving the enforcement of environmental laws.

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103. CEC Effectiveness Survey, *supra* note 94, Question 6.
104. CEC Effectiveness Survey, *supra* note 94, Question 7.
105. CEC Effectiveness Survey, *supra* note 94, Question 7.
106. *Id.*
107. *Id.*
108. NAEEC, *supra* note 2, arts. 22–36.
109. NAEEC, *supra* note 2, arts.14, 15.

1. State-to-State Consultation and Dispute Resolution Process

The state-to-state consultation and dispute resolution process was the most contentious aspect of the NAAEC, and symbolically it was intended to provide the "teeth" of the CEC to remedy the lax enforcement. Overall, the process allows one country to submit a claim against another for a persistent pattern of failure to effectively enforce its domestic environmental laws in a manner that affects trade between the countries, with ultimate recourse to fines or snap-back tariffs. The threat of sanctions was envisioned to be a powerful incentive for improving enforcement, but a measure that would only be used as a last resort.

To date, the consultation and dispute resolution process has never been initiated by any of the countries, which presents a challenge for evaluating its effectiveness. On the one hand, it is possible that the process has not been used because the countries have been effectively enforcing their environmental laws since NAFTA entered into effect, either as a matter of standard practice or due to the threat of potential sanctions under this process. On the other hand, it is possible that the countries have not been effectively enforcing their environmental laws, but have not used the process because they do not have the capacity to do so or because they do not want to criticize each other's domestic enforcement efforts through a formal dispute resolution process. While it is possible to formulate some conjectures for each of the above scenarios, there is strong anecdotal evidence that suggests the countries do not want to criticize each other's enforcement efforts, and have no intention of ever using the process regardless of levels of non-enforcement.

In general, there are a number of actions that should have been undertaken to ensure the process would be available if needed, since the potential always exists for it to be used one day. These actions include establishing a roster of panelists and developing "Model Rules of Procedure" for administration of the process.[110] When the CEC was established in 1993, the U.S. government committed to develop Model Rules of Procedure[111] and in 1995 the Secretariat commissioned the Bar Associations of the three countries to jointly draft a set of Model Rules.[112] The draft rules, however, were never adopted by the

110. NAAEC, *supra* note 2, arts. 25, 28.

111. *See, e.g., North American Free-Trade Agreement (NAFTA) and Supplemental Agreements to the NAFTA: Hearings Before the H.R. Comm. on Ways and Means,* 103rd Cong. 1 (1993) (statement of Carol M. Browner, Administrator, U.S. Environmental Protection Agency); This commitment was later formalized in Exec. Order No. 12,915, 59 Fed. Reg. 25775 (May 13, 1994).

112. Jay M. Vogelson, *Dispute Resolution Under the North American Agreement on Environmental Cooperation*, 30 INT'L LAW**.** 198, 200 (1996).

governments. The U.S. government attempted again in the late 1990s to develop Model Rules[113], but these efforts were not supported by either Mexico or Canada. At that time, very preliminary rules were drafted but still have never been finalized.[114]

In addition to Rules of Procedure, the governments are required to "establish and maintain" a roster of up to forty-five individuals to serve as panelists for an arbitral panel for the process.[115] To date, the three governments have never developed a roster of panelists.[116] In addition, the three governments may be subject to a monetary penalty for failure to enforce their laws.[117] In the U.S., federal agencies conducted preliminary discussions on how the fines under this article would be paid, but no agreement has ever been reached.[118] Overall, the U.S. has led efforts to operationalize the dispute resolution process, but these efforts have been minimal and appear to have been undertaken to maintain an aura of credibility for the process.[119]

According to officials inside and outside of the governments, the process has not been initiated because the countries do not want to publicly criticize each other's domestic enforcement activities. The lack of action by the governments to ensure the process is available for use fifteen years after the CEC was established indicates that they probably do not envision using the process anytime soon, regardless of the levels of non-enforcement in each country. As some observers note, it appears that the governments have entered into an implicit mutual non-aggression pact and they will never initiate the process under their own

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113. *See, e.g.,* CEC, SUMMARY RECORD, SESSION 98-07 OF THE COUNCIL (Sept. 3-4, 1998), *available at* http://cce.cec.org/Storage/26/1692_Council_Session_98-07.pdf; CEC, SUMMARY RECORD, SESSION 99-09 OF ALTERNATIVE REPRESENTATIVES (1999) (on file with author).

114. Freedom of Information Act Request HQ-RIN-00457-04 [hereinafter FOIA 00457-04] (on file with author); *see also* HUFBAUER, JONES, & OREJAS, *supra* note 59; Vogelson, *supra* note 112; John H. Knox, *A New Approach to Compliance with International Law: The Submissions Procedure of the NAFTA Environmental Commission*, 28 ECOLOGY L.Q. (2001).

115. NAAEC, *supra* note 2, art. 25.

116. FOIA 00457-04, s*upra* note 114.

117. NAAEC, *supra* note 2, art. 34.

118. U.S. GENERAL ACCOUNTING OFFICE, GAO-01-933, NORTH AMERICAN FREE TRADE AGREEMENT: U.S. EXPERIENCE WITH ENVIRONMENT, LABOR, AND INVESTMENT DISPUTE SETTLEMENT CASES 49 (2001).

119. Efforts by the U.S. Government to establish Model Rules of Procedure appear to be driven in part by the interest of particular individuals within the U.S. Environmental Protection Agency to maintain the credibility of the process, and in part by pressure from the environmental groups.

volition.[120] As such, it is unlikely that the process will ever have any effect on enforcement levels in the countries.

2. Citizen Submission Process

The citizen submission process is the other mechanism established to improve enforcement of environmental laws. This process is administered by the Secretariat and allows for private parties[121] to submit petitions alleging that one of the governments is failing to effectively enforce its laws. The Secretariat reviews the submissions, determines whether a factual record is warranted and prepares and releases a factual record with approval of the Council. The factual record presents only the facts associated with the enforcement issue and is intended to serve as a spotlight, or sunshine, remedy that focuses public scrutiny on particular enforcement activities by the governments and thereby generate pressure for remedial action. Within this process, the Secretariat exercises a modest amount of independent decision-making to examine and document domestic environmental enforcement practices in the three countries. Although the process is considered to be one of the most innovative features of the CEC, it has not been extensively used over the past fifteen years.[122]

a. Implementation of the Process

The implementation of the citizen submission process, from a budgetary standpoint, has not historically been a major component of the work of the CEC. Despite its limited use, however, the submission process has received more attention from the Council, JPAC, and other stakeholders than any other aspect of the CEC. The reason for this high level of attention has been the ongoing controversy associated with the implementation of the process, due in general, to differences in interpretation of the NAAEC provisions (Articles 14 and 15) that have arisen repeatedly during the past fifteen years.[123]

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120. Schorr, *supra* note 86, at 231; HUFBAUER ET AL.**,** *supra* note 61, at 20.

121. Private parties include any scientific, professional, business, non-profit, or public interest organization or association that is neither affiliated with nor under the direction of a government; NAAEC, *supra* note 2, art. 45 § 1.

122. Given the importance of lax enforcement during the NAFTA negotiations, some negotiators of the NAAEC anticipated that the CEC would receive hundreds, if not thousands, of citizen submissions annually. As of the end of 2010, the Secretariat had received 76 submissions on enforcement matters and had prepared 16 factual records.

123. *See generally* ENVTL. LAW INST., FINAL REPORT: ISSUES RELATED TO ARTICLES 14 AND 15 OF THE NORTH AMERICAN AGREEMENT ON ENVIRONMENTAL COOPERATION (2003); Christopher Tollefson, *Stormy Weather: The Recent History of the Citizen Submission North American Agreement on Environmental Cooperation*, *in*

When the three countries negotiated the citizen submission process provisions of the NAAEC in 1993, they could not agree on the respective decision-making authorities, responsibilities, and levels of discretion of the governments and the Secretariat[124] in the implementation of the process.[125] The result was ambiguous language that provided only a general outline, and differences in interpretation of these provisions emerged almost immediately upon implementation of the process in 1995.[126] To resolve these differences, the Secretariat and the three governments sought to develop more detailed guidelines for the process, even though guidelines were not required under the NAAEC.[127]

The Secretariat first developed draft guidelines in 1995, but these were never adopted by the governments. The governments then crafted the guidelines that are currently used to administer the process,[128] however these guidelines still left many aspects of the process open to interpretation because governments could not reach consensus amongst themselves. During the course of implementing the process since 1995, the Secretariat has taken the initiative to interpret aspects of Articles 14 and 15 left unclear by the guidelines, but some of the governments have strongly disagreed with these actions.

The governments, in turn, have sought several times to resolve some of the interpretative issues through modifications to the guidelines. These efforts have been perceived as attempts to undermine the independence of the Secretariat and the credibility of the process.[129] The

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LINKING TRADE, *supra* note 75, at 153; Serena Wilson, *Article 14-15 of the North American Agreement on Environmental Cooperation: Intent of the Founders*, in LINKING TRADE, *supra* note 75, at 187; Paul S. Kibel, *Awkward Evolution: Citizen Enforcement at the North American Environmental Commission*, 32 ENV'L. LAW REP. 10769 (2002); David J. Blair, *The CEC's Citizen Submission Process: Still a Model for Reconciling Trade and the Environment?*, 12 J. ENV'T & DEV. 295 (2003); Geoff Garver, *Tooth Decay*, 25 ENVT'L FORUM 34 (2008); Chris Wold et al., *The Inadequacy of the Citizen Submission Process of Articles 14 and 15 of the North American Agreement on Environmental Cooperation*, 26 LOY. L.A. INT'L & COMP. L. REV. 415 (2004).

124. The Parties are responsible for addressing questions and differences that may arise between the Parties regarding the interpretation and application of the NAAEC; NAAEC, *supra* note 2, art.10 § 1(d).

125. Wilson, *supra* note 123, at 188; *see also* Tollefson, *supra* note 123.

126. Wilson, *supra* note 123, at 188; Tollefson, *supra* note 123, at 162; *see also* MARC PAQUIN, ET AL., UNISFÉRA INTERNATIONAL CENTRE, THE ARTICLES 14 & 15 CITIZEN SUBMISSION PROCESS OF THE NORTH AMERICAN AGREEMENT ON ENVIRONMENTAL COOPERATION: DISCUSSION PAPER (2003), *available at* http://unisfera.org/IMG/pdf/Unisfera_-_NACEC_14-15_Process.pdf.

127. Wilson, *supra* note 123, at 188.

128. CEC BRINGING THE FACTS TO LIGHT, *supra* note 73.

129. *See, e.g.,* Abel, *supra* note 61; ENVTL. LAW INST.**,** *supra* note 123; Wilson, *supra* note 123; Tollefson, *supra* note 123; Kibel, *supra* note 123; David L. Markell, *The*

governments' proposed modifications to the guidelines in 1998, 1999, and 2000, were strongly opposed by environmental groups, and, as a result, only minor changes were adopted.[130] Overall, there have been numerous disagreements between the governments and the Secretariat over interpretation of the guidelines and Articles 14 and 15, and the implementation of the process.

Some of the specific interpretative issues that have arisen include, whether the Council has authority to narrow the scope of factual records or to determine what constitutes sufficient information to allow the Secretariat to review the submission, or whether the Secretariat has the authority to determine the process used to gather information for a factual record or to release information obtained during preparation of a factual records to the public without Council approval.[131] Closely related to the interpretative issues, have been controversies over the actual implementation of the process, including government actions, to delay release of information, selectively disclose information, and unduly exercise claims of confidentiality to prevent full disclosure as well as the Secretariat actions to provide comments that resemble recommendations or conclusions in the factual records.[132]

Notwithstanding the controversies surrounding implementation of the process, the Secretariat has been perceived as providing sound legal reasoning for accepting or rejecting a citizen submission.[133] At the same time, however, the process has been frequently criticized for being lethargic, extremely time consuming, lacking transparency, overly legalistic, and at odds with the cooperative mandates of the CEC.[134] The

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CEC Citizen Submission Process: Off Course?, *in* GREENING NAFTA, *supra* note 54, at 275; Wold et al., *supra* note 123.

130. ENVTL LAW INST.**,** *supra* note 123, at 29-33; PAQUIN, ET AL., *supra* note 126, at 6-8; Tollefson, *supra* note 123, at 153-154; Wilson, *supra* note 123, at 189-90.

131. *See generally* ENVTL LAW INST.**,** *supra* note 123; Tollefson, *supra* note 123.

132. *See generally* ENVTL. LAW INST.**,** *supra* note 123; CEC JOINT PUBLIC ADVISORY COMMITTEE, LESSONS LEARNED, CITIZEN SUBMISSIONS UNDER ARTICLES 14 AND 15 OF THE NORTH AMERICAN AGREEMENT ON ENVIRONMENTAL COOPERATION (2001) [hereinafter CEC ARTICLE 14 AND 15 LESSONS LEARNED]; Graubart, *supra* note 79; Tollefson, *supra* note 123.

133. *See generally* FOUR-YEAR REVIEW, *supra* note 43; JOHNSON ET AL.**,** *supra* note 47; Knox, *supra* note 114; Beatriz Bugeda, *Is NAFTA Up to Its Green Expectations? Effective Law Enforcement under the North American Agreement on Environmental Cooperation*, 32 U. RICH. L. REV. 1591, 1615 (1999); David L. Markell, *The Commission for Environmental Cooperation's Citizen Submission Process*, 12 GEO**.** INT'L ENVTL. L. REV. 545 (2000); Raymond MacCallum, *Evaluating the Citizen Submission Procedure Under the North American Agreement on Environmental Cooperation***,** 8 COLO. J. INT'L L. & POL'Y 395 (1997).

134. *See generally* Kibel, *supra* note 123; Wilson, *supra* note 123; Victor Lichtinger, *NAFTA and the Environment: Five Years Later*, in FREE TRADE**,** *supra* note

process is also perceived to be inaccessible to grassroots organizations, particularly in Mexico, which lack legal expertise and access to the Internet to benefit from information available on the CEC website. That process, to date, has been used most often by larger, relatively well-funded non-governmental organizations (NGOs) who have legal staffs to craft detailed submittals.[135]

b. Factual Records – Substance and Outcomes

As the end of 2010, sixteen citizen submissions[136] had wielded their way through the entire submission process and resulted in the completion of a publicly released factual record, but there has been practically no empirical research examining the impact that these factual records have had on enforcement practices in the three countries.[137] The empirical assessment is examined in some detail in two factual records, the Metales y Derivados[138] and BC Hydro,[139] and on a more limited basis, the Migratory Bird[140] factual record. Process tracing is used to assess the effectiveness of the citizen submission process to improve the enforcement of specific environmental laws cited in the citizen submissions. This is accomplished by evaluating whether or not the governments made any substantial modifications in their behavior as a result of the preparation and publication of a factual record by the CEC Secretariat.

i. BC Hydro Factual Record (Canada)

The BC Hydro submission pertained to the failure of Canada to enforce its *Fisheries Act*[141] against hydroelectric facilities owned and operated by BC Hydro.[142] This submission was filed jointly by several

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86, at 222-23; Margaret Wilder*, Border Farmers, Water Contamination, and the NAAEC Environmental Side Accord to NAFTA*, 40 NAT. RESOURCES J. 873 (2000).

135. Wilder, *supra* note 134, at 892.

136. Of the sixteen factual records, one record was for enforcement issues in the U.S., seven records were for issues in Mexico, and eight records were for issues in Canada. The length of time required to process these submissions has ranged from twenty-one months to eighty-two months, with an average time-period of fifty-three months or about four years and four months.

137. Tollefson, *supra* note 123, at 168; PAQUIN, ET AL., *supra* note 126, at 13.

138. CEC METALES FACTUAL RECORD, *supra* note 76.

139. CEC BC HYDRO FACTUAL RECORD, *supra* note 78.

140. CEC, FINAL FACTUAL RECORD FOR SUBMISSION SEM-99-002 (MIGRATORY BIRDS) (2003) [hereinafter CEC MIGRATORY BIRDS FACTUAL RECORD.

141. Fisheries Act, R.S.C. ch. F-14 (1985) [hereinafter Fisheries Act].

142. CEC BC HYDRO FACTUAL RECORD, *supra* note 78. The Secretariat was directed by the Council to focus the factual record on dams located on the Bridge River; CEC, C/C.01/98-00/RES/03/REV.3, BC HYDRO – COUNCIL RESOLUTION 98-07

nongovernmental organizations in the U.S. and Canada[143] in 1997. The submission alleged, in particular, that the Canadian Department of Fisheries and Oceans ("DFO") had failed to enforce Section 35(1) of the *Fisheries Act* that prohibits harmful alternation, disruption, or destruction of fish habitat.[144] According to the submission, fish habitat, or around, the hydroelectric facilities was adversely affected by the reduced water flows, rapid flow fluctuations, altered water quality, fish entrainment, and reservoir drawdown caused by operation of the facilities, yet the DFO had issued only two charges against BC Hydro since 1990.[145]

The BC Hydro factual record[146] examined non-compliance activities and related adverse impacts on fish habitat at six BC Hydro hydroelectric facilities, the enforcement measures undertaken by DFO to address the impacts, and the effectiveness of these measures to prevent or mitigate harm to fish habitat in compliance with the *Fisheries Act*. In its response to the submission, Canada acknowledged that the operation of BC Hydro facilities resulted in violations of the *Fisheries Act*, but it contended that the government was still effectively enforcing the law by using a range of enforcement and compliance strategies, including new projects, emergency operations, regional technical committees, a water use planning process ("WUPP"), water quality guidelines, and prosecutions to mitigate the impacts to fish habitat or to enhance the habitat.[147]

Overall, the factual record provided a general discussion of the actual and potential impacts of hydroelectric facility operation on fish habitat, as well as the enforcement and compliance strategies employed

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(1998).

143. British Columbia Aboriginal Fisheries Commission, British Columbia Wildlife Federation, Trail Wildlife Association, Steelhead Society, Trout Unlimited (Spokane Chapter), Sierra Club (US), Pacific Coast Federation of Fishermen's Association, and Institute of Fisheries Resources represented by Sierra Club Legal Defense Fund, Sierra Legal Defense Fund; CEC BC HYDRO FACTUAL RECORD, *supra* note 78.

144. Fisheries Act, *supra* note 141, §35(1): "No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat." The *Fisheries Act* is the principal federal law for regulating Canadian fisheries and it applies to fish habitat on all public, private, or aboriginal lands in Canada. Hydroelectric facilities, to the extent that they impact fish habitat, are subject to regulation under this law.

145. CEC BC HYDRO FACTUAL RECORD, *supra* note 78, at 6.

146. The Secretariat conducted a fairly elaborate process for gathering information for this factual record, which included establishing an Expert Group comprised of recognized experts on fish habitat issues, dam operations, and compliance and enforcement to independently analyze data for the factual record, and conducting public workshops with provincial authorities, the nongovernmental organizations that filed the submission, and the federal government. However, the latter refused to participate in the workshops; *see* CEC BC HYDRO FACTUAL RECORD, *supra* note 78, at 18-26.

147. CEC BC HYDRO FACTUAL RECORD, *supra* note 78, at 7-17.

by DFO for mitigating impacts to fish habitat. The factual record did not provide data on the actual impacts of these enforcement actions, which remediated impacts to fish habitat, primarily because these data did not exist.[148] Anecdotally, the factual record indicated that some enforcement actions, such as emergency response procedures, did positively impact fish habitat, but for other enforcement actions, such as the WUPP, there was insufficient information to ascertain their effectiveness.[149] The lack of data was cited as a major constraint in preparing the factual record and it was noted that Canada was not forthcoming in providing data as requested by the Secretariat and Expert Group.[150]

It took over three years for the CEC to review the BC Hydro submission and prepare and publicly release the BC Hydro factual record. During this time period, the media attention on the investigation waxed and waned. Overall, most of the government officials and representatives from the submitting organizations involved with this factual record, felt that there was relatively minimal press coverage of the investigation[151] and some of the coverage focused more on Canada's refusal to participate in public workshops organized by the Secretariat rather than the substantive outcome of the citizen submission process.[152] Following release of the factual record, two of the original eight submitting organizations continued to follow the fisheries enforcement issues, primarily through participation in the WUPP, but these groups made limited use of the factual record. The nongovernmental organizations from the U.S. ceased to participate and follow the CEC process altogether before the factual record was completed.

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148. *See generally* CEC BC HYDRO FACTUAL RECORD, *supra* note 78.

149. CEC BC HYDRO FACTUAL RECORD, *supra* note 78, at 28, 76.

150. CEC BC HYDRO FACTUAL RECORD, *supra* note 78, at 25, 53, 99.

151. Craig McInnes, *Protest Enrages BC Minister: Activists Seek NAFTA Censure of Power Agency for Harming Fish*, GLOBE & MAIL**,** (TORONTO)**,** Apr 3, 1997, at A4; Anne McIlroy, *Canada May Face NAFTA Probe: Fish Habitat Laws Under Microscope*, GLOBE & MAIL**,** (TORONTO), May 21, 1998, at A1; *BC Hydro Dams Probed by NAFTA Agency*, INT'L WATER POWER & DAM**,** CONSTR., August 10, 1998, *available at* http://www.waterpowermagazine.com/story.asp?storyCode=2000548; Andrew Duffy & Mark Brown, *Canada's Fish Habitat Protection Criticized: A NAFTA Environmental Panel Says the 'Ad-Hoc' Approach Doesn't Properly Oversee BC Hydro*, VANCOUVER SUN**,** June 13, 2000, at A6.

152. Paul Knox, *Canada Refuses Meeting Before NAFTA Panel: Activists Say the Federal Government is Consistent in Seeking to Hobble Public-Complaints Process*, GLOBE & MAIL**,** (TORONTO)**,** Apr. 28, 2000, at A11; *Sierra Fund Charges Canada Ignores NAFTA Hydroelectric Environmental Rule*s, UTIL. ENV'T REP., Mar. 12, 1999, at 13; Heather Scoffield, *Ottawa Stifling Hearings, Groups Say. Environmentalists Claim NAFTA Side Agreement Undermined by Secrecy in BC Hydro Case,* GLOBE & MAIL**,** (TORONTO), Mar. 8, 1999, at B3.

With respect to the impact of the factual record, most of the interviewees felt that the factual record did not have any significant impact on enforcement by DFO of the *Fisheries Act* vis-á-vis the hydroelectric facilities.[153] A representative from one of the submittal organizations contended that the factual record was a factor in spurring Canada to institute the WUPP,[154] but the process had been initiated a year or more before the submission was made to the CEC.[155] So, rather than serve as an impetus for establishing the WUPP, the factual record served to strengthen the provincial and federal governments' commitment to the WUPP and encourage them to take more ownership of it. The factual record, however, did not substantively change the WUPP.

While the factual record was being prepared by the CEC, the provincial government of British Columbia committed to provide funding for the WUPP. A total of $25 million was allocated to develop water use plans for the hydroelectric facilities and approximately $50 million per year was allocated to compensate BC Hydro for revenue losses associated with operational changes under the plans.[156] This funding commitment represented a considerable increase over the initial funding level proposed for the system operations fund of $3.5 million per year. Based on the information available from this assessment, however, it was not possible to determine what influence the factual record had on securing this level of funding. In addition, the Water Use Plan for the Bridge River[157] had not yet been implemented by the end of 2010, and it does not provide any information on funding.

Considering the broader context of fisheries issues in British Columbia, the preparation of the BC Hydro factual record coincided with already ongoing efforts of both the federal and provincial governments to address many long-standing non-power impacts associated with hydroelectric facilities in British Columbia, such as impacts to fisheries. Historically, the hydroelectric facilities had operated with little regard for their social or environmental impacts. However, in the 1980s and early

153. Interview Numbers CN-P-140 (May 27, 2003); CN-N-130 (May 16, 2003); CN-G-147 (May 13, 2003); CN-G-133 (May 20, 2003); CN-G-149 (Jun. 16, 2003); CN-N-88 (Mar. 8, 2003); CN-G-137 (May 22, 2003); CN-G-138 (May 26, 2003); CN-G-134 (May 22, 2003); CN-P-97 (Mar. 7, 2003).

154. *See, e.g.,* Graubart, *supra* note 79, at 444.

155. CEC, A14/SEM/97-001/05/RSP, BC HYDRO – PARTY RESPONSE X (1997) *available at* http://www.cec.org/Storage/87/8430_97-1-RSP-E.PDF.

156. BC Hydro, *Financing Water Use Plans, Background Paper* (on file with author).

157. BRIDGE RIVER POWER DEVELOPMENT WATER USE PLAN (March 17, 2011) (on file with author).

1990s, demands from environmental groups and First Nations, coupled with litigation and technical studies examining the operation of the hydroelectric facilities, generated pressure on the federal and provincial governments to address many of the impacts.

In response to these demands, the DFO began to pursue enforcement actions in the early 1990s, and BC Hydro subsequently proposed the WUPP, which was intended to address all non-power impacts, and not just those associated with fisheries. By the time the factual record was prepared in the late 1990s, many of the enforcement issues were already being addressed and the WUPP was subsequently implemented by BC Hydro for all of its hydroelectric facilities. Thus, the factual record focused on an enforcement issue that already was receiving considerable attention, so its utility as a spotlight remedy was limited. According to one government official, in hindsight the factual record came along a couple of years too late.

Several of the government officials directly involved in developing the governments' response to the Secretariat felt that, overall, the citizen submission process was very politicized. For example, the DFO staff in British Columbia had wanted to provide considerable technical information to the Secretariat and Expert Group for the factual record, to ensure the record included a complete picture of the enforcement situation for BC Hydro. However, Environment Canada and the Canadian Department of Foreign Affairs and International Trade in Ottawa severely reduced and sanitized the information that was provided. Several government officials also felt the process, was overall, time-consuming and frustrating, if not outright abusive. Moreover, they did not view the final product as very factual or complete; in their opinion, a lot of information in the factual record was professional judgment or anecdotal.

ii. Metales y Derivados Factual Record (Mexico)

The Metales y Derivados factual record examined the failure of Mexico to effectively enforce provisions of the *Ley General del Equilibrio Ecológico y la Protección al Ambiente*[158] ("LGEEPA") at the

158. Ley General del Equilibrio Ecológico y la Protección al Ambiente [General Law on Ecological Balance and Environmental Protection], Diario Oficial de la Federacion [D.O.] (Jan. 28, 1988) (Mex.) [hereinafter LGEEPA]. The LGEEPA is the principal federal environmental law governing pollution control, natural resource conservation, environmental impact and risk assessment, and ecological zoning and sanctions. At the time the factual record was prepared, Mexico did not have a law that covered the clean-up of contaminated sites such as Metales y Derivados, and thus the provisions of the LGEEPA governed.

Metales y Derivados industrial facility on the outskirts of Tijuana, Baja California.[159] Metales y Derivados is a former lead smelting operation that was permanently shut down by the Mexican government in 1994, after years of noncompliance with environmental laws. The owner of the facility fled to San Diego, California, in 1995 to avoid arrest, leaving the facility with between 6000 and 7000 tons of lead slag and other hazardous wastes on-site.[160] In 1998, two nongovernmental organizations[161] filed a citizen submission with the CEC, citing the failure of the government to enforce Articles 170 and 134 of the LGEEPA; Article 170 sets forth requirements to protect the public health and environment from imminent risk while Article 134 sets forth requirements to control or prevent soil contamination.[162] A factual record was prepared and publicly released in February 2002.[163]

The Metales y Derivados factual record documented existing conditions of the site and vicinity, measures taken by Mexico to prevent contamination at the site and reduce risk to the public health, and the potential health effects of the contamination.[164] Overall, the factual record noted that the site was contaminated with heavy metals and posed a risk to the public yet the government had not taken sufficient measures to prevent access to the site, to prevent dispersal of the contamination on or offsite, to limit exposure of the public to the contamination, or to restore the site to a condition consistent with local zoning. The factual record also noted that SEMARNAT was not forthcoming in providing information for preparation of the factual record.[165]

During the almost three and a half years it took for the CEC to review the Metales y Derivados submission and prepare and publicly release the factual record, the CEC investigation of the enforcement issues received a modest level of press coverage in the U.S. and

159. *See generally* CEC METALES FACTUAL RECORD, *supra* note 76.

160. CEC, A14/SEM/98-007-01-SUB, PETITION BEFORE THE COMMISSION FOR ENVIRONMENTAL COOPERATION, UNDER ARTICLES 13, 14, AND 15 OF THE NORTH AMERICAN AGREEMENT FOR ENVIRONMENTAL COOPERATION (1998) *available at* http://www.cec.org/files/pdf/sem/98-7-SUB-OE.pdf [hereinafter CEC SUB 98-007-01].

161. Environmental Health Coalition (U.S.-based) and Comité Ciudadano Pro-Restauración del Canñon del Padre (Mexico-based). The Comité Ciudadano is a community group comprised of representatives from the Colonia Chilpancingo, located adjacent to the Metales y Derivados site. The Comité Ciudadano subsequently changed its name to Colectivo Chilpancingo Pro-Justicia Ambiental [hereinafter Colectivo Chilpancingo].

162. CEC SUB 98-007-01, *supra* note 160.

163. CEC, C/C.01/02-01/RES/01/FINAL, COUNCIL RESOLUTION 02-01 (2002).

164. *See generally* CEC METALES FACTUAL RECORD, *supra* note 76.

165. CEC METALES FACTUAL RECORD, *supra* note 76, at 18.

Mexico.[166] After the factual record was released in 2002, the case continued to receive press coverage,[167] although it appears that the attention was due mostly to the strong media campaign and community organizing efforts conducted by the submitting organizations.[168]

The groups used the CEC submissions process and factual record to educate the community located adjacent to the Metales site, Colonia Chilpancingo, and to organize numerous activities to keep the Metales case in the news, such as letter writing campaigns to the President and other high ranking Mexican officials, demonstrations and marches on the U.S.-based parent company of Metales, and all-night vigils outside La Procuraduría Federal de Protección al Ambiente ("PROFEPA").[169] As a result of these activities, the groups were able to focus more attention on the contamination and lack of enforcement at the Metales y Derivados site than it otherwise probably would have received with only the release of the factual record.

After the Metales y Derivados submission was made in 1998, the government of Mexico, in conjunction with the U.S. government, undertook a number of steps to address the remediation of contaminated

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166. Marc Lifsher, *Groups Use NAFTA in Move to Clean Up Border Plan*, WALL ST. J., Oct. 21, 1998, at CA1; Edward Worden, *Shuttered Smelter Tests NAFTA,* AM. METAL MARKET**,** Aug. 18, 1999; Ben Fox, *NAFTA Falls Short on Environment: Observer Say a US Company Operating a Lead Recycling Plant in Mexico Leaves Behind a Legacy of Pollution*, PORTLAND OREGONIAN, Apr. 30, 2000; Joe Cantlupe*, Agency to Probe Industrial Waste Site in Tijuana*, SAN DIEGO UNION-TRIB., May 18, 2000, at B1.

167. Joe Cantlupe, *Plan Proposed to Clean Up Toxic Mess; Plant Owner Faces Arrest for Violations in Mexico*, SAN DIEGO UNION-TRIB., Dec. 9, 2002, at B1; Kevin Sullivan, *A Toxic Legacy on the Mexican Border; Abandoned U.S.-Owned Smelter in Tijuana Blamed for Birth Defects, Health Ailments*, WASH. POST, Feb. 16, 2003, at A17; Sandra Dibble, *Grant Targets Abandoned Tijuana Lead Smelter: EPA Funds for Site Cleanup, Restoration,* SAN DIEGO UNION-TRIB., Feb. 27, 2004, at B3; Joe Cantlupe & Sandra Dibble, *Cleanup Approaches for Abandoned Smelter: Mexico to Sign Agreement on Long-awaited Project*, SAN DIEGO UNION-TRIB., June 23, 2004, at B1; Joe Cantlupe, *Cleanup of Toxic Waste at Tijuana Site is Praised*, SAN DIEGO UNION-TRIB., Aug. 6, 2005, at B2; Sandra Dibble, *Former Toxic Waste Dump to Become Public Park*, SAN DIEGO UNION-TRIB., Aug. 16, 2007, at B2.

168. Amelia Simpson, *Warren County's Legacy for Mexico's Border Maquiladoras*, 1 GOLDEN GATE ENVTL. L.J. 153, 169 (2007); David V. Carruthers, *The Globalization of Environmental Justice: Lessons from the U.S.-Mexico Border*, 21 SOC'Y & NAT. RESOURCES 556, 558 (2008).

169. La Procuraduría Federal de Protección al Ambiente is the Mexican attorney general for environmental laws; CEC, Salud Ambiental, Tomando Acción en Colonia Chilpancingo: An Environmental Education and Empowerment Training Program (2001) (on file with author); *see also* H.G. Meyer, *Protesters March on Alleged Polluters; S.D. Firm Accused of Tijuana Abuses*, SAN DIEGO UNION-TRIB., July 18, 2001, at B2; Simpson, *supra* note 168, at 170-172.

sites in general and the Metales y Derivados site in particular. Numerous interviewees felt that some of these actions may have been due to the increased scrutiny of the Metales case from the CEC citizen submission process. For example, in early 2000, the U.S. and Mexico developed a joint policy to promote voluntary remediation of brownfield sites in the border region[170] and the development of this policy was inspired in part by the Metales y Derivados case.[171] In 2002, the U.S. and Mexico incorporated a commitment into the U.S. – Mexico Border 2012 Plan to develop a policy for cleanup of abandoned waste sites[172] in the border region and this action was also inspired in part by the Metales y Derivados case. In 2004, the Secretaría del Medio Ambiente y Recursos Naturales ("SEMARNAT") identified the Metales y Derivados site as its top priority for cleanup within five years, with a commitment of initial funding of about $700,000, including $85,000 from the U.S.[173] and the site was eventually remediated in 2008.[174] Mexico also enacted legislation to regulate and remediate contaminated sites such as Metales y Derivados site[175] in early 2004.

Although the preparation and release of the Metales y Derivados factual record coincided with these various actions, it is difficult to ascertain the real impact that this process had on the governments' behavior. Considering the broader context, the Environmental Health Coalition and Colonia Chilpancingo had already been actively seeking cleanup of the Metales site before filing the CEC submission[176] and they

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170. CEC METALES FACTUAL RECORD, *supra* note 76; EPA/SEMARNAP Joint Policy Statement on the Remediation and Redevelopment of Contaminated Properties in the U.S./Mexico Border Area (May 18, 2000) (on file with author).

171. Lawrence Sperling, Fax Transmittal to Jose Luis Samaniego on upcoming environmental events in Mexico City (Feb. 18, 2000) (on file with author).

172. US EPA, BORDER 2012: U.S.-MEXICO ENVIRONMENTAL PROGRAM (2002) [hereinafter BORDER 2012]. Goal 3, Objective 4: "By 2004, develop a binational cleanup, reuse, and revitalization policy to address abandoned waste sites along the border. By 2007, this policy will be applied at least once in each Workgroup region."

173. Dibble, *supra* note 167; Cantlupe & Dibble, *supra* note 167; Press Release, Environmental Health Coalition, Government funds Tijuana site final cleanup (Aug. 14, 2007),
http://www.environmentalhealth.org/PressReleases/PublicReleases_Archive/PR_Metales8_14_07.htm.

174. Press Release, U.S. Environmental Protection Agency, U.S. EPA, Mexican environmental agencies celebrate cleanup of former abandoned lead smelter (Jan. 28, 2009),
http://yosemite.epa.gov/opa/admpress.nsf/0/F2FBFB057587A0418525754C00763C42.

175. Ley General para la Prevenión y Gestión Integral de los Residuos [Law for the Prevention and Integral Management of Wastes], Diario Oficial de la Federacion [D.O.], 8 de octubre, 2003 (Mex).

176. Residents from Colonia Chilpancingo had submitted complaints about possible

continued to do so after the factual record was completed. Moreover, Mexico had been working to address the cleanup of contaminated sites since the early 1990s. Mexico had initiated a Program for Identification and Attention to Contaminated Sites with Hazardous Wastes in 1995, completed an inventory of sites, began characterizing the highest priority sites starting in 1997, and initiated cleanup at some sites within the country.[177]

The U.S. and Mexican governments had also been working to address cleanup of industrial sites along the border before the Metales y Derivados submission. Contaminated sites, therefore, were already receiving attention in Mexico before the CEC submission on Metales was made. The value-added from the process appears to be that the factual record both provided some new information on the contamination problem at the Metales site and substantiated the claims of the community regarding the nature and severity of contamination and the potential health risk. The site was tested and confirmed to be contaminated, although as a practical matter, this was never really in doubt. Through this substantiation, the credibility of the Environmental Health Coalition and Colectivo Chilpancingo was enhanced, thereby increasing the validity of their claims.

iii. Migratory Birds Factual Record (U.S.)

A coalition of nine nongovernmental organizations[178] from the U.S., Mexico, and Canada alleged in the Migratory Bird submission that the U.S. was failing to effectively enforce section 703 of the *Migratory Bird Treaty Act*[179] ("MBTA") against logging operations on federal and non-

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environmental and health risks from operations of the Metales y Derivados facility to the SEMARNAT since it began operation in 1972; Metales y Derivados, New Frontier Trading Corporation, Chronology of the Case (on file with author).

177. PROFEPA Presentation, Summary of Brownfield Brainstorming Session (2000) (on file with author).

178. Alliance for the Wild Rockies, Center for International Environmental Law, Centro de Derecho Ambiental Noreste de Mexico, Centro Mexicano de Derecho Ambiental, Friends of the Earth, Instituto de Derecho Ambiental, Pacific Environment and Resource Center, Sierra Club of Canada, and West Coast Environmental Law Association.

179. 16 U.S.C. § 703–712 (1918). The MBTA is the federal law that enforces international conventions for the protection of migratory birds; the MBTA establishes a prohibition to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, ….., at any time, or in any manner, any migratory bird" covered in four separate international conventions with Canada, Japan, Mexico and Russia established for the protection of shared migratory bird resources. Under the MBTA, migratory birds may be killed or taken only with a valid permit authorized by the U.S. Fish and Wildlife Service.

federal land throughout the U.S.[180] According to the submission, the U.S. has enforced the MBTA against agricultural interests, real estate developers, and private landowners, amongst others, but has never enforced the law against logging operations.[181] Moreover, this widespread pattern of non-enforcement of the MBTA is based on a longstanding unwritten policy of the U.S. government to not take enforcement or investigative actions against logging operations.[182]

In their submission, the environmental groups sought a review of the non-enforcement of the MBTA for all logging operations nationwide, however, the Council restricted the scope of the factual record to examining only the federal non-enforcement of two specific cases in which migratory bird nests were destroyed by logging operations in California and were prosecuted by the state.[183] The factual record provided a discussion of the enforcement actions taken by California in each of these cases and a review of whether additional federal enforcement of the cases under the Petite Policy[184] was warranted. The factual record also prominently highlighted the fact that the Council had reduced the scope of the factual record from that sought by the petitioners and recommended by the Secretariat.[185]

In the factual record, the U.S. acknowledged that it has never prosecuted any logging operation under the MBTA, but contended that its lack of prosecution constituted a reasonable exercise of enforcement discretion and allocation of resources to higher enforcement priorities.[186] Moreover, the U.S. claimed that it employed non-enforcement strategies to protect migratory birds from logging activities, such as landscape level planning, public outreach, and avian mortality studies, amongst others.[187] Overall, the Migratory Bird factual record noted that the two cases examined in the process were "consistent with the federal government's record to date of never having enforced the MBTA in regard to logging operations."[188]

When the Migratory Bird factual record was released, it received

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180. *See generally* CEC MIGRATORY BIRDS FACTUAL RECORD, *supra* note 140.

181. CEC, MIGRATORY BIRDS – SUBMISSION (1999).

182. *Id*.

183. *Id.*

184. U.S.A.M. Ch. 9-2.031. The Petite Policy establishes guidelines for deciding whether to bring a federal prosecution based on conduct involved in a prior state or federal proceeding.

185. CEC MIGRATORY BIRDS FACTUAL RECORD, *supra* note 140, at 8, 18-19.

186. CEC MIGRATORY BIRDS FACTUAL RECORD, *supra* note 140, at 15-17.

187. CEC MIGRATORY BIRDS FACTUAL RECORD, *supra* note 140, at 17.

188. CEC MIGRATORY BIRDS FACTUAL RECORD, *supra* note 140, at 63.

practically no press coverage in the U.S.[189] According to a government official involved with this submission and one of the submitters, the factual record had absolutely no impact on the U.S. enforcement of the MBTA against logging operations. The submitter, however, noted that the factual record was useful for demonstrating that enforcement of the MBTA could feasibly be undertaken with respect to logging operations, contrary to claims of the U.S. government.

Considering the broader context of the MBTA, there has been a long history of litigation over implementation of this law and its applicability to direct and incidental takings of migratory birds.[190] The MBTA is a criminal statute that does not allow for private citizen lawsuits for non-enforcement.[191] Environmental groups have pursued litigation under the Administrative Procedures Act to address non-enforcement against logging operations, but to no avail. The CEC citizen submission process offered a new legal avenue to address non-enforcement of the MBTA for these groups[192] but in the end it proved ineffective; the factual record did not generate any political pressure within the U.S. to improve enforcement of the MBTA.[193]

c. Survey Results

The opinion survey provides data on the collective perspective of stakeholders on the submission process. According to survey respondents, the overall effectiveness of the citizen submission process is ranked, on average, 2.6 (n=206) on a scale of 1 to 5, indicating that respondents viewed the process as being less than somewhat effective.[194] Figure 2 illustrates the distribution of the responses, by nationality of respondents.[195] With respect to the independence of the Secretariat in administering the process, respondents indicated that the Secretariat had a slightly above moderate level of independence, ranking it 3.2, on

189. Laura Miura, *FWS Illegally Exempting Loggers From Treaty, Groups Say*, LAND LETTER, May 1, 2003.

190. *See generally* Helen M. Kim, *Chopping Down the Birds: Logging and the Migratory Bird Treaty Act*, 31 ENVTL. L. 125, (2001); CEC MIGRATORY BIRDS FACTUAL RECORD, *supra* note 140; CEC MIGRATORY BIRDS – SUBMISSION, *supra* note 181.

191. CEC MIGRATORY BIRDS – SUBMISSION, *supra* note 181.

192. *Id.*

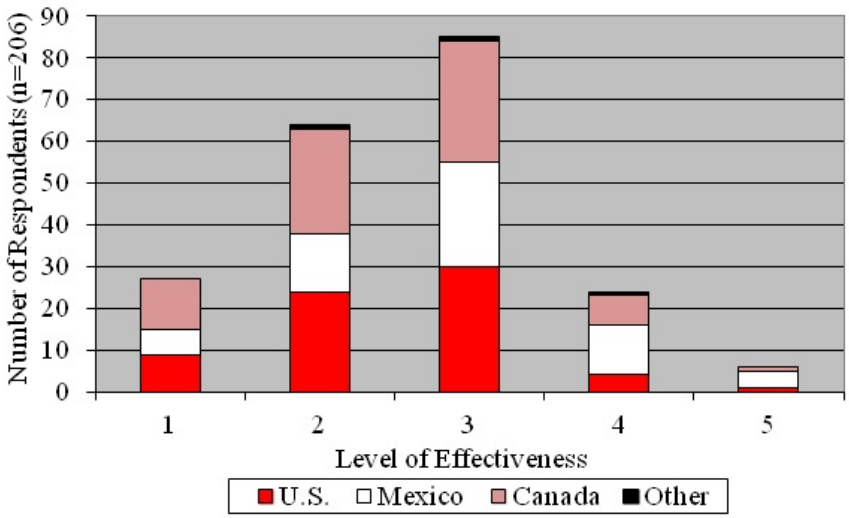
193. *See also* Wold *et al.*, *supra* note 123.

194. CEC Effectiveness Survey, *supra* note 94, Question 11. Likert scale 1 to 5: 1 = not being achieved, 3 = moderately being achieved, 5 = completely being achieved.

195. CEC Effectiveness Survey, *supra* note 94, Questions 2 and 11.Testing for differences in responses based on nationality, Mexican respondents were significantly more likely to rank the effectiveness of the citizen submission process as greater than 3 compared to U.S. and Canadian respondents (Pearson chi2(2) = 10.5054, Pr = 0.005).

average, on a scale of 1 to 5[196] (n=176). Figure 3 illustrates the distribution of the responses, by nationality of respondents.[197]

Figure 2: Effectiveness of the Citizen Submission Process (n=206)



Numerous respondents commented that the level of independence of the Secretariat had been higher in the past, but there has been a trend towards less independence. This trend was due to efforts by the governments to constrain the authority of the Secretariat in administering the citizen submission process by changes to procedures and the addition of "gateways." However, one survey respondent noted that within the bounds of the NAAEC, the CEC wields as much independence as is possible for an organization that reports to the governments that it is monitoring.[198] Thus, it is unlikely that the CEC could exercise a high degree of independence given that it is a creature of the governments. Oversight by the government allows them to ensure that the CEC does not infringe on state sovereignty or create other political problems, because as another respondent observed, for the CEC "political considerations are critical as with any other intergovernmental organization."[199]

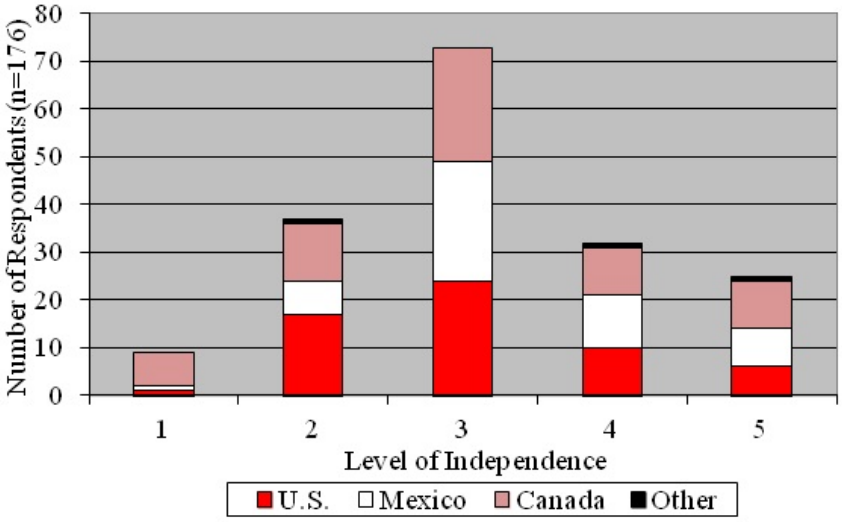
196. CEC Effectiveness Survey, *supra* note 94, Question 11. Likert scale 1 to 5: 1 = no independence, 3 = moderate independence, 5 = high independence.

197. CEC Effectiveness Survey, *supra* note 94, Questions 2 and 11.

198. CEC Effectiveness Survey, *supra* note 94, Survey Number US66.

199. CEC Effectiveness Survey, *supra* note 94, Survey Number CN496.

Figure 3: Independence of the CEC Secretariat (n=176)



D. Integrating Trade and Environment Mandate

Integrating trade and the environment under NAFTA was considered one of the principal mandates of the CEC when it was created and was intended to ensure that environmental impacts of NAFTA were taken into consideration during its implementation. In general, this mandate consists of providing assistance and advice to the FTC on environmental matters and monitoring of the environmental effects of NAFTA.[200] Overall, there has been no meaningful coordination between the Council and FTC up through 2010. However, the CEC has undertaken assessments of the environmental effects of NAFTA, although it appears that these assessments have had no significant impact on public policy in any of the three countries.

200. NAAEC, *supra* note 2, art. 10 § 6.

1. Assisting in the NAFTA FTC

The CEC Council is responsible for providing environmental expertise and guidance to the NAFTA FTC on environmental issues that might arise during implementation of NAFTA. Specifically, the Council: (1) serves as a point of inquiry for public comments on the environmental goals and objectives of NAFTA; (2) provides assistance in consultations under Article 1114 of NAFTA; (3) makes recommendations to the FTC with respect to avoiding environmental disputes; and (4) identifies experts to provide information or technical advice to NAFTA committees, working groups, and other NAFTA bodies.[201]

Since the mid-1990s, the Council has attempted to coordinate with and provide assistance to the FTC, but there have been very few, if any, tangible results due to reluctance on the part of the FTC to establish strong linkages with the CEC. Trade and environment officials have conducted meetings since 1998 to identify environmental trade-related work under Article 10(6) of mutual interest to the Council and FTC.[202]

Initial meetings focused on responding to inquiries from nongovernmental organizations regarding NAFTA Chapter 11, but trade officials rejected any meaningful role for the CEC in responding to these inquiries. Subsequent meetings between trade and environment officials largely focused on procedural rather than substantive issues.[203] According to officials both inside and outside of the governments in all three countries, the meetings to coordinate with the FTC have been extremely disappointing.[204]

Since 1996, the Council has also proposed conducting a ministerial-level meeting between environment and trade officials that could visibly demonstrate coordination between the Council and the FTC.[205] As of

201. NAAEC, *supra* note 2, art. 10 § 6. NAFTA, *supra* note 1, art. 1114 pertains to environmental measures.

202. CEC, FINAL COMMUNIQUÉ OF THE NAFTA ENVIRONMENT COMMISSION'S 4TH ANNUAL SESSION (1997); CEC, COUNCIL FINAL COMMUNIQUÉ (1999) [hereinafter 1999 FINAL COMMUNIQUÉ].

203. Secretariat Note, Summary of 10(6) Environment and Trade Officials Meeting (Jan. 18, 2002) (on file with author).

204. One substantive outcome was a meeting between the trade and environment officials and the NAFTA Working Group on Standard-Related Measures in 2000; CEC, FINAL COMMUNIQUÉ (2000).

205. CEC, FINAL COMMUNIQUÉ: NORTH AMERICAN ENVIRONMENT MINISTERS ACCELERATE ENVIRONMENTAL PROTECTION EFFORTS (1996); CEC, CEC COUNCIL COMMUNIQUÉ (2001). Final Communiqué of the annual meeting of the CEC Council in 1996: "The Council agreed to seek a joint meeting with trade ministers of the three countries to review the North American experience towards integrating trade and environment policies."

2010, however, such a meeting had not occurred, despite continued interest from the environment officials and pressure from the environmental community.[206] Some government officials cite the lack of a substantive agenda as the primary reason that a meeting has never materialized, although other officials inside and outside of the governments contend that the trade ministers have no interest in meeting with their environment counterparts to discuss environmental issues of NAFTA because such a meeting would only serve to strengthen the linkages between the two policy spheres, which trade officials strongly oppose.

For its part, the FTC has never solicited advice from the Council on environmental matters, despite facing issues that could warrant some advice, such as several NAFTA Chapter 11 investor – state dispute settlement cases.[207] In response to concerns over Chapter 11 panel rulings on environmental cases, the Council considered providing advice in the form of a Council Resolution, but the advice was never finalized and formally transmitted to the FTC.[208] Lastly, the Council has never developed a list of experts to provide technical advice or information to the various NAFTA bodies, as stipulated under Article 10(6);[209] the development of such a list was proposed in a draft of the first annual work plan for the CEC in 1995,[210] but instead of a list of experts, the Secretariat prepared a report on dispute avoidance.[211]

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206. JPAC ADVICE TO COUNCIL NO. 98-08. RE: ARTICLE 10(6) OF THE NORTH AMERICAN AGREEMENT ON ENVIRONMENTAL COOPERATION (1998); NATIONAL ADVISORY COMMITTEE ADVICE NO. 98-8, IMPLEMENTATION MECHANISM FOR COMMUNICATION AND COORDINATION BETWEEN THE CEC AND THE FREE TRADE COMMISSION UNDER ARTICLE 10(6) OF THE AGREEMENT (1998) (on file with author). In 2008, the CEC prepared a background paper for a proposed meeting of senior trade and environment officials, but the meeting did not occur; CEC, POSITIONING THE CEC'S WORK ON THE ASSESSMENT OF TRADE AND ENVIRONMENT LINKAGES FOR THE NEXT DECADE: OUTCOMES OF THE EXPERTS' ROUNDTABLE (2008) [hereinafter POSITIONING THE CEC'S WORK ON THE ASSESSMENT OF TRADE AND ENVIRONMENT LINKAGES].

207. 1999 FINAL COMMUNIQUÉ, *supra* note 202, "The Council fully supports and encourages the Free Trade Commission (FTC) to continue discussions on the NAFTA Chapter 11 (relating to the investor-state dispute settlement process). The Council offers to provide any assistance required by the FTC." *See also* Letter from CEC Council members Christine S. Stewart, Julia Carabias, and Carol M. Browner to Free Trade Commission members Sergio Marchi, Herminio Blanco Mendoza, and Charlene Barshefsky (Dec. 1, 1998) (on file with author).

208. Documents released under FOIA Request HQ-RIN-01005-03 indicate that the Council developed a "draft Council resolution re investor-state issues" (on file with author). However, the resolution has never been approved, *see* CEC, http://www.cec.org/ (last visited Jan. 26, 2011).

209. FOIA Request HQ-RIN-00457-04, *supra* note 114.

210. CEC, TABLE OF CONTENTS AND SUMMARY OF THE STATUS OF PROJECTS (on

Overall, there has been no meaningful cooperation between the FTC and the Council to address environmental issues associated with NAFTA, despite considerable pressure and effort to identify areas for coordination.[212] In general, the trade officials have successfully resisted giving the environment a greater substantive role in trade policy implementation under NAFTA, and the environment ministers have hesitated taking on the trade ministers given that the Council does not have a strong institutional prerogative to pursue cooperation unilaterally.[213]

a. Survey Results

According to survey respondents, the degree to which the CEC is successfully cooperating with and providing assistance to the FTC was ranked, on average, 2.2 on a scale of 1 to 5,[214] with over one third of the respondents (thirty-six percent) indicating that this objective has not been achieved at all.[215] Figure 4 illustrates the distribution of survey responses by nationality of respondent.[216]

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file with author).

211. CEC, 1995 PROGRAM REPORT (1996); CEC, DISPUTE AVOIDANCE: WEIGHING THE VALUES OF TRADE AND THE ENVIRONMENT UNDER THE NAFTA AND THE NAAEC (1996); Stephen Mumme, *The North American Commission on Environmental Cooperation: Towards a Working Agenda for the First Three Years* (1994) (on file with author).

212. *See generally* Kelly & Reed, *supra* note 61; Abel, *supra* note 61; Mann, *supra* note 61; Ferretti, *supra* note 61; Carlsen & Salazar, *supra* note 61; Sanchez, *supra* note 62.

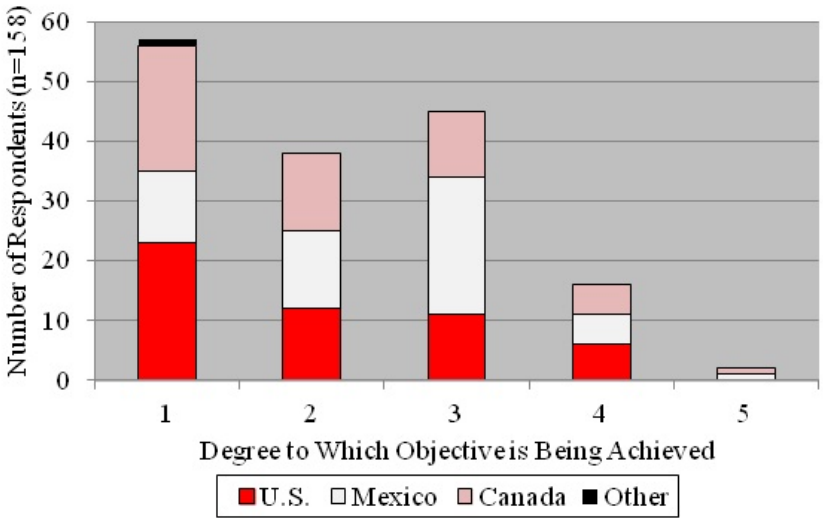
213. NAAEC, *supra* note 2, art. 10(6) establishes the basis for cooperation between the CEC and FTC. Art. 10(6) sets for four specific functions the CEC can perform to support the FTC, but it cannot do so without the acknowledgement and cooperation of the FTC. *See, e.g.,* Abel, *supra* note 61; Mann, *supra* note 61; Ferretti, *supra* note 61; Sanchez, *supra* note 62. *See also* Interview Numbers CN-G-62 (Feb. 10, 2003); US-G-80 (Feb. 26, 2003); US-G-77 (Feb. 24, 2003); MX-G-121 (Apr. 3, 2003); CN-G-68 (Feb. 13, 2003).

214. CEC Effectiveness Survey, *supra* note 94, Question 7. Likert scale 1 to 5: 1 = not being achieved, 3 = moderately being achieved, 5 = completely being achieved.

215. CEC Effectiveness Survey, *supra* note 94, Question 7.

216. CEC Effectiveness Survey, *supra* note 94, Questions 2 and 7.

Figure 4: Cooperating with and Providing Assistance to the NAFTA FTC (n=158)



Numerous survey respondents noted that the lack of coordination between the two institutions was due to the fact that the FTC was not interested in cooperating with the CEC.[217] One respondent noted that the environment ministers "are no match for their trade colleagues"; thus the CEC has been marginalized on trade issues.[218] Another respondent contended that there is more of a "trade vs. environment mentality rather than a trade and environment mentality" in both the CEC and the FTC.[219]

2. NAFTA Environmental Effects Program

The other principal component of the trade and environment integration mandate of the CEC is the conducting of assessments of the environmental effects of NAFTA. The CEC has been slightly more successful in carrying out this portion of the mandate because the work does not rely on the active participation of the FTC.[220] The assessment

217. CEC Effectiveness Survey, *supra* note 94, Survey Number CN32; US233; US843; CN11; MX10; US47; US380.

218. CEC Effectiveness Survey, *supra* note 94, Survey Number US21.

219. CEC Effectiveness Survey, *supra* note 94, Survey Number US274.

220. NAAEC, art. 10(6)(d) establishes that the CEC Council shall cooperate with

work, however, has been somewhat controversial because of the political sensitivity of empirically evaluating the environmental effects of NAFTA. According to officials both inside and outside of the governments in the three countries, the assessments of environmental effects of NAFTA have not had any major impact on public policy in any of the countries.

Concerns over the potential environmental impacts of trade and investment liberalization under NAFTA were the driving force behind creation of the NAAEC and there has been a continuing interest within academia, environmental groups, and others in assessing empirically the effects of NAFTA *ex post*.[221] In response, NAFTA Environmental Effects Program[222] was established in 1995, at the initiative of the Secretariat, to assess the impacts of NAFTA on the environment.[223] Under the program, the CEC has developed an analytical framework, completed an initial set of studies examining three sectors of the economy to test the framework, and conducted symposia highlighting independent research on the environmental effects of NAFTA.

The environmental agencies in the three countries generally supported establishment of the NAFTA Environmental Effects program, with the exception of the Mexican trade ministry, SECOFI,[224] which opposed from the onset any meaningful assessment of the environmental effects of liberalized trade and investment flows under NAFTA. The SECOFI viewed the CEC as a "monster" whose principal role was to interfere with industry and economic development and to close markets in Mexico. Mexican trade officials believed that the NAFTA

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the NAFTA Free Trade Commission by "considering on an ongoing basis the environmental effects of the NAFTA." This provision does not require any action on the part of the FTC, rather the CEC can undertake the ongoing evaluation of the environmental effects of the NAFTA unilaterally.

221. *See* CEC, ENVIRONMENTAL ASSESSMENT OF NAFTA: LESSONS LEARNED FROM CEC'S TRADE AND ENVIRONMENT SYMPOSIA, at 8 (Apr. 2008). *See also* Chantal Line Carpentier, *NAFTA Commission for Environmental Cooperation: Ongoing Assessment of Trade Liberalization in North America*, 24 IMPACT ASSESSMENT & PROJECT APPRAISAL 259 (2006)**;** KEVIN GALLAGHER, FREE TRADE AND THE ENVIRONMENT, MEXICO, NAFTA, AND BEYOND (2004); POSITIONING THE CEC'S WORK ON THE ASSESSMENT OF TRADE AND ENVIRONMENT LINKAGES, *supra* note 204; CEC, CEC COUNCIL COMMUNIQUÉ, NINTH REGULAR SESSION OF THE CEC COUNCIL, Jun. 19, 2002; CEC MINISTERIAL STATEMENT TWELFTH REGULAR SESSION OF THE CEC COUNCIL, Jun. 22, 2005; CEC MINISTERIAL STATEMENT THIRTEENTH REGULAR SESSION OF THE CEC COUNCIL, Jun. 28, 2006.

222. This initiative has undergone numerous names changes over the years, but will be referred to herein as the NAFTA Environmental Effects Program.

223. CEC, 1995 CEC ANNUAL REPORT (1995).

224. The Mexican trade ministry was previously called Secretaría de Comercio y Fomento Industrial (SECOFI), but is now called Secretaria de Economia (SE).

Environmental Effects program would only highlight the negative impacts of NAFTA and they did not want any criticism of the trade agreement. In their view, the primary purpose of the NAFTA Environmental Effects program was to make Mexico look bad.

Given the opposition of the SECOFI to directly studying the environmental effects of NAFTA, the Secretariat initially focused on developing an analytical framework,[225] which was perceived to be non-threatening. Once the framework was developed, the Secretariat then completed three sector-specific studies[226] to test the framework, but these studies proved to be politically sensitive and the governments repeatedly sought to delay their completion and release. Given this opposition, the Secretariat began utilizing a symposium format where third-parties conducted the research rather than the Secretariat. The symposium approach was more palatable to the trade officials, but it served to lower the quality of the research. As of 2010, the Secretariat had conducted symposia in 2000, 2003, 2005, and 2008 examining a wide range of environmental effects.[227]

The NAFTA Environmental Effects program has generated some credible research on the effects of trade and investment liberalization.[228]

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225. CEC, ASSESSING THE ENVIRONMENTAL EFFECTS OF THE NORTH AMERICAN FREE TRADE AGREEMENT (NAFTA): AN ANALYTIC FRAMEWORK (PHASE II) AND ISSUES STUDIES (1999). At the same time, the CEC completed studies that examined more general NAFTA environmental effects; CEC, A SURVEY OF RECENT ATTEMPTS TO MODEL THE ENVIRONMENTAL EFFECTS OF TRADE: AN OVERVIEW AND SELECTED SOURCES (1995); CEC, POTENTIAL NAFTA EFFECTS: CLAIMS AND ARGUMENTS 1991-1994 (1995).

226. CEC MAIZE IN MEXICO: SOME ENVIRONMENTAL IMPLICATIONS OF THE NORTH AMERICA FREE TRADE AGREEMENT (NAFTA), *available at* http://www.cec.org/Page.asp?PageID=30101&ContentID=17060&SiteNodeID=509&BL_ExpandID= (1999); CEC, ELECTRICITY IN NORTH AMERICA: SOME ENVIRONMENTAL IMPLICATIONS OF THE NORTH AMERICA FREE TRADE AGREEMENT (NAFTA) *available at* http://www.cec.org/Page.asp?PageID=30101&ContentID=16727&SiteNodeID=509&BL_ExpandID= (1999); CEC, FEEDLOT PRODUCTION OF CATTLE IN THE UNITED STATES AND CANADA: SOME ENVIRONMENTAL IMPLICATIONS OF THE NORTH AMERICA FREE TRADE AGREEMENT (NAFTA) *available at* http://www.cec.org/Page.asp?PageID=30101&ContentID=17061&SiteNodeID=509&BL_ExpandID= (1999).

227. *Environment, Trade and Sustainability: Environmental Assessment of NAFTA*, CEC, http://www.cec.org/Page.asp?PageID=924&SiteNodeID=588 (last visited Oct. 14, 2011).

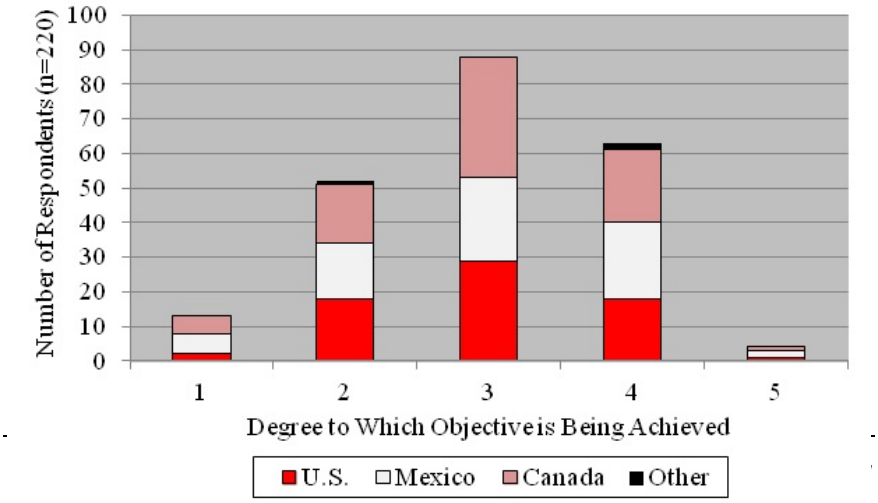
228. *See, e.g.,* SCOTT VAUGHAN, *Understanding the Environmental Effects of Trade: Some Lessons from NAFTA*, in LINKING TRADE, *supra* note 75, at 225; KAREL MAYRAND & MARC PAQUIN, UNISFÉRA INT'L CENTRE, THE CEC AND NAFTA EFFECTS ON THE ENVIRONMENT: DISCUSSION PAPER), *available at* http://unisfera.org/IMG/pdf/Unisfera_-_NAFTA_effects.pdf); Carpentier, *supra* note 221.

However, it has also underscored the difficulties in isolating the specific impacts of NAFTA on the environment. According to officials familiar with the program, the use of these studies by either the government or other groups to inform the policy-making process has been minimal. There is just one well-known instance where the research has had a direct impact: a study by Jacott, Reed and Winfield[229] that highlighted increased trans-boundary shipments of hazardous waste from the U.S. to Canada. However, the changes in shipments of waste between the countries were not due to implementation of NAFTA, but rather pre-existing differences in regulations.

a. Survey Results

According to survey respondents, the degree to which the CEC is achieving the objective of evaluating environmental and trade linkages of NAFTA is ranked, on average, 3.0 on a scale of 1 to 5[230] (n=220), indicating that the objective is being moderately achieved.[231] Figure 5 illustrates the distribution of responses by nationality of respondents.[232]

Figure 5: Evaluating Trade and Environment Linkages of the NAFTA (n=220)



between Mexico, Canada, and the United States, 1990-2000, *in* THE ENVIRONMENTAL EFFECTS OF TRADE, PAPERS PRESENTED AT THE NORTH AMERICAN SYMPOSIUM ON ASSESSING THE LINKAGES BETWEEN TRADE AND ENVIRONMENT (OCTOBER 2000), 161, 197 (Commission for Environmental Cooperation, 2002), *available at* http://www.cec.org/Storage/45/3763_symposium-e.pdf (2000).

230. CEC Effectiveness Survey, *supra* note 94, Question 7. Likert scale 1 to 5: 1 = not being achieved, 3 = moderately being achieved, 5 = completely being achieved.

231. CEC Effectiveness Survey, *supra* note 94, Question 7.

232. CEC Effectiveness Survey, *supra* note 94, Questions 2 and 7.

E. Independent Reporting Mandate

The independent reporting mandate of the CEC allows the Secretariat to conduct independent reviews of environmental issues that have regional implications or may further objectives of the NAAEC.[233] As of autumn 2011, the Secretariat had prepared seven independent reports examining: (1) causes of a massive bird die-off in Silva Reservoir in Mexico; (2) watershed management issues for the Upper San Pedro River in Arizona; (3) long-range transport of air pollutants in North America; (4) environmental impacts of deregulation and integration of the electricity sector in North America; (5) the impacts of transgenic maize on biodiversity in Mexico; (6) policies and practices associated with green buildings; and, (7) the steps needed to reduce greenhouse gas emissions from freight transportation in North America.[234] The assessment examined, using process tracing, the impacts of five reports.

1. Ribbon of Life Report

The Upper San Pedro River report focused on water management of the U.S. reach of the Upper San Pedro River as it related to impacts on its riparian zone, which is an important habitat for migratory songbirds.[235] The preparation of the report generated considerable media interest within Arizona, resulting in the direct involvement of members of the Arizona Congressional delegation, then Secretary of the Interior

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233. NAAEC, *supra* note 2, art. 13.

234. CEC SILVA RESERVOIR REPORT**,** *supra* note 64; CEC RIBBON OF LIFE REPORT, *supra* note 68; CEC CONTINENTAL POLLUTANT PATHWAYS REPORT, *supra* note 66; CEC, ENVIRONMENTAL CHALLENGES AND OPPORTUNITIES FOR EVOLVING NORTH AMERICAN ELECTRICITY MARKET (2002), *available at* http://cec.org/Storage/31/2244_CEC_Art13electricity_Eng.pdf [hereinafter CEC EVOLVING ELECTRICITY MARKET REPORT]**;** CEC, MAIZE AND BIODIVERSITY, THE EFFECTS OF TRANSGENIC MAIZE IN MEXICO (2004), *available at* http://www.cec.org/Storage/56/4837_Maize-and-Biodiversity_en.pdf [hereinafter **C**EC MAIZE AND BIODIVERSITY REPORT]**;** CEC, GREEN BUILDINGS IN NORTH AMERICA, OPPORTUNITIES AND CHALLENGES (2008), *available at* http://www.cec.org/Storage/61/5386_GB_Report_EN.pdf; CEC, DESTINATION SUSTAINABILITY, REDUCING GREENHOUSE GAS EMISSIONS FROM FREIGHT TRANSPORT IN NORTH AMERICA (2011), *available at* http://www.cec.org/Storage/61/5386_GB_Report_EN.pdf.

235. The San Pedro River is a transboundary water body originating in Mexico and flowing north into the U.S. For general information on the San Pedro River, *see* Upper San Pedro Partnership, A Working Water Conservation Plan, *available at* http://www.usppartnership.com/docs/USPPConservPlan030212.pdf [hereinafter USPP]; Hector M. Arias, *International Groundwaters: The Upper San Pedro River Basin Case,* 40 NAT. RESOURCES J. 199 (2000).

Babbitt, the Governor of Arizona, and local elected officials.[236] Prior to the completion of the CEC report, on-going efforts at the local level to improve water management in the river basin had had limited effectiveness and, overall, the Secretariat report served to strengthen these efforts.

In particular, the report contributed to the establishment of the Upper San Pedro Partnership for the coordination of a range of stakeholders in the management of the river.[237] Through the Partnership, numerous recommendations in the report have been implemented, such as the purchase of conservation easements close to the border.[238] Efforts to address the need for conservation along the Mexican reach of the river that were highlighted in the report have continued to face challenges. However, overall, the Secretariat report increased awareness locally and nationally regarding the significance of the San Pedro River for migratory species and appears to have contributed to the improved management of water resources in the San Pedro River basin.

2. Silva Reservoir Report

The Silva Reservoir study examined the causes of a massive die-off of migratory waterbirds at a large surface water impoundment in Mexico in the winter of 1994 – 95.[239] The report identified a link between the bird die-off and industrial pollution to the Turbio River, the major tributary to the Reservoir. Since the late 1980s, Mexico had sought to address pollution in the Turbio River, and the Secretariat report served to increase attention focused on the problem and on-going efforts to clean-up the River.[240] During the preparation of the report, Mexico established the Turbio River Comprehensive Clean-up Program.[241] After the report's

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236. Linda Valdez, *NAFTA's Environmental Frankenstein has potential for good*, ARIZ. REPUBLIC**,** July 25, 1997, at B1; Bill Hess, *Officials seek smoother start to new river study,* SIERRA VISTA HERALD, July 23, 1997, at page 1A; Bill Hess, *Trade debate,* SIERRA VISTA HERALD, Sept. 14, 1997, at 1A, 11A; Steve Yozwiak, *NAFTA to study San Pedro River***,** ARIZ. REPUBLIC, May 29, 1997, at A1, A23.

237. *See generally* Varaday et al., *supra* note 69; Arias, *supra* note 69; USPP, *supra* note 235.

238. USPP, *supra* note 235, at 16-17; ELIZABETH HARRIS ET AL, TRANSBOUNDARY COLLABORATION IN ECOSYSTEM MANAGEMENT: INTEGRATING LESSONS FROM EXPERIENCE, 209, 224 (2001), *available at* http://www.snre.umich.edu/ecomgt/pubs/transboundary/TB_Collab_Full_Report.pdf.

239. *See* CEC SILVA RESERVOIR REPORT, *supra* note 64, at 15.

240. Allen Blackman & Nicholas Sisto, *Voluntary Environmental Regulation in Developing Countries: A Mexican Case Study*, 46 NAT. RESOURCES J. 1005**,** 1031 (2006).

241. CEC SILVA RESERVOIR REPORT, *supra* note 64, at 5; Blackman & Sisto, *supra* note 240, at 1032; Nauman, *supra* note 65; at 96-99; *see also* Christopher Bolinger,

release, the Reservoir was designated a State Natural Protected Area in 1997 and funding was provided for wetlands and restorations projects at the Reservoir in 1998.[242] However, as of the mid-2000s, there had been limited progress made in reducing pollution to the River.[243]

3. Continental Pollutant Pathways Report

The Secretariat report on long-range transport of air pollutants examined the nature and extent of major pollutant pathways to, from, and within the North American continent.[244] In general, this report inventoried existing air quality modeling and data collection efforts, and reviewed tri-national patterns of pollutant exchange.[245] According to government and CEC officials, the report by itself did not have any direct impact on policy in any of the three countries, but it subsequently served as a technical basis for further cooperative efforts on air quality issues between the three countries under the auspices of the CEC.[246]

4. Electricity and the Environment Report

The study of the environmental effects of integration of the electricity sector in North America examined a range of policy issues related to integration of the electricity sector, including subsidies, energy efficiency and renewables, and trade in electricity.[247] The report, however, was not supported by the U.S. Department of Energy and the U.S. subsequently opposed releasing it to the public.[248] The report was eventually released, but according to government and CEC officials familiar with the report, it has not had any impact on public policy or inspired any government action.[249]

Assessing the CEC on its Record to Date, 28 LAW & POL'Y INT'L BUS. 1107, 1117 (1997).

242. Ana Escamilla & Meredith Gutowski, *Project Profiles – Mexico, From Tragedy to Triumph at La Presa de Silva*, U.S. FISH & WILDLIFE SERVICE, CONSERVATION LIBRARY, NATIONAL CONSERVATION TRAINING CENTER, (April 1, 2010), http://library.fws.gov/Birdscapes/fall00/Ppmx.html.

243. Blackman & Sisto, *supra* note 240, at 1039-1042.

244. *See* CEC CONTINENTAL POLLUTANT PATHWAYS REPORT, *supra* note 66.

245. *Id*.

246. *See, e.g.,* ENVTL. ECON. CEC, ENHANCING NORTH AMERICAN AIR QUALITY MANAGEMENT (2001), *available at*, http://www.cec.org/ (last visited Apr. 16, 2011).

247. CEC EVOLVING ELECTRICITY MARKET REPORT, *supra* note 234.

248. Interview Numbers US-C-95 (Mar. 7, 2003); CN-C-86 (Feb. 28, 2003).

249. Interview Numbers US-C-95 (Mar. 7, 2003); US-C-103 (Mar. 12, 2003); CN-C-157 (Jul. 2, 2003); Survey Numbers US663, US67, US233, CN278, US472.

5. Maize and Biodiversity Report

The study of the impacts of transgenic maize or corn examined the potential risks associated with the increased imports or production of transgenic species of corn on biodiversity in Mexico.[250] Given the political, cultural, and economic importance of corn in Mexico as well as the fact that the U.S. was a major exporter of transgenic corn to Mexico, the study was highly controversial.[251] Prior to the report, the Mexican government already had a moratorium on planting genetically modified corn in 1998, but the moratorium had limited effectiveness.[252] The report offered a number of recommendations to further mitigate the risk from transgenic species of corn; the most significant was a requirement that all corn exported from the U.S. into Mexico each year be milled at the border before entering the country.[253] This recommendation was strongly opposed by the U.S. and has never been implemented.[254] Overall, the report served to focus attention on potential risks for transgenic corn, but given the controversy surrounding the preparation and recommendations of the report, perhaps its' most significant outcome was the realization by the three governments that the Secretariat could not be entrusted to undertake independent studies of highly sensitive issues.[255]

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250. CEC MAIZE AND BIODIVERSITY REPORT, *supra* note 234.

251. Interview Number CN-C-4 (Jun. 9, 2003); Survey Number MX171. *See also* Joel Wainright & Kristin L. Mercer, *Transnational transgenes: the political ecology of maize in Mexico*, in GLOBAL POLITICAL ECOLOGY 412 (Richard Peet, Paul Robbins, & Michael J. Watts, eds. 2011); Peter Canby, *Retreat to Subsistence*, THE NATION, (June 16, 2010), *available at* http://www.thenation.com/article/36330/retreat-subsistence; Elizabeth Fitting, *Importing Corn, Exporting Labor: The Neoliberal Corn Regime, GMOs, and the Erosion of Mexican Biodiversity*, 15 AGRIC. & HUMAN VALUES 23 (2006); TIMOTHY A. WISE, GLOBAL DEVELOPMENT AND ENVIRONMENT INSTITUTE, WORKING PAPER NO. 07-01; Tim Wise, POLICY SPACE FOR MEXICAN MAIZE: PROTECTING AGRO-BIODIVERSITY BY PROMOTING RURAL LIVELIHOODS (2007), *available at* http://www.ase.tufts.edu/gdae/Pubs/wp/07-01MexicanMaize.pdf.

252. CEC MAIZE AND BIODIVERSITY REPORT, *supra* note 234, at 16.

253. *Id.* at 31.

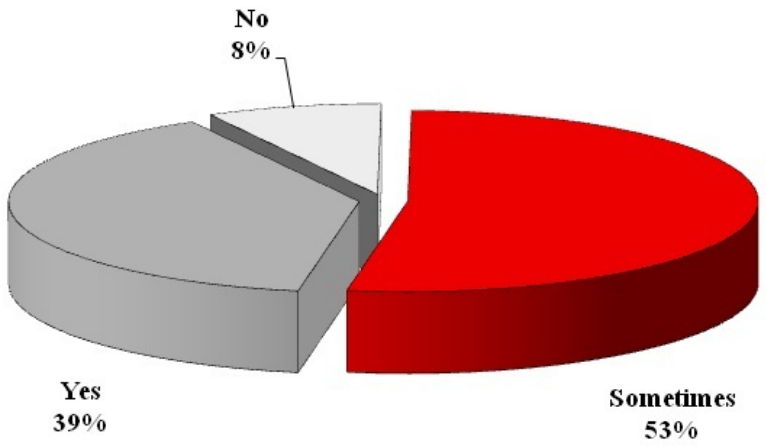
254. Canby, *supra* note 251; *see also U.S. Calls NAFTA Environmental Report "Flawed, Unscientific"*, OFFICE OF THE U.S. TRADE REPRESENTATIVE, EXEC. OFFICE OF THE PRESIDENT, http://www.ustr.gov/about-us/press-office/press-releases/archives/2004/november/us-calls-nafta-environmental-report-8220 (Nov. 9, 2004).

255. In 2005, the Council disapproved a request from the Secretariat to complete an independent report on transboundary environmental impact assessments, a sensitive issue for the three countries, *see Council Resolution: 05-07*, *Decision Regarding the Proposal by the Secretariat of the Commission for Environmental Cooperation (CEC) to Prepare an Article 13 Report on Case Studies on Transboundary Environmental Impact Assessment,* CEC (Aug. 31, 2005), http://www.cec.org/Page.asp?PageID=122&ContentID=986&SiteNodeID=268. Since

6. Survey Results

Approximately two fourths (40%) of the survey respondents indicated that the Secretariat reports prepared under Article 13 had been effective (n=173) in improving the governments' understanding of important environmental issues or strengthening environmental programs while over half (53%) responded that the reports were sometimes effective.[256] Figure 6 illustrates the distribution of responses.[257] Written comments provided on the surveys, however, indicated that many of the respondents were confusing the reports prepared under Article 13 with other reports prepared by the Secretariat under the CEC's cooperative environmental initiatives. As such, these data should be evaluated with some caution.

Figure 6: Effectiveness of Secretariat Reports in Increasing Understanding of Important Environmental Issues (n=173)



Although numerous survey respondents identified the San Pedro River, Silva Reservoir, and the electricity sector studies as inspiring government actions or providing useful comparative environmental information for the North American region, other respondents questioned the value of the reports and the quality of the analyses due to, as one

2005, the Secretariat has been authorized to complete reports on two non-sensitive issues, green buildings and sustainable freight transportation, *Independent Secretariat Reports*, CEC, http://www.cec.org/Page.asp?PageID=924&SiteNodeID=332 (last visited Oct. 15, 2011).

256. CEC Effectiveness Survey, *supra* note 94, Question 10.

257. *Id.*

respondent described "an unfortunate history of unbalanced journalistic reporting of information and opinions on some issues, which diminishes the credibility of all the reports in the eyes of the governments, scientists, and private sector".[258] Another respondent noted that "[t]he information and science behind the environmental issues is pretty well-known, at least in the U.S. What is lacking is the political will to do much of anything about it, except perhaps cosmetic tinkering."[259] However, one respondent surmised that "[t]he process of producing the report (negotiation, mediation, information gathering) is where most of the value is derived, the reports themselves have limited utility."[260]

With respect to the independence of the Secretariat in preparing the Article 13 reports, respondents indicated that the Secretariat had an above moderate level of independence, ranking it, on average, 3.5 on a scale of 1 to 5 (n=165). [261] Figure 7 illustrates the distribution of the responses, by nationality of respondents.[262] Overall, comments provided by survey respondents did not indicate any problems with the independence of the Secretariat in preparing the reports, especially when compared to its independence in administering the citizen submission process.[263] Still some respondents acknowledged that it is very difficult for the CEC to act as a "supranational entity"[264] given that it is a "representative of the three governments."[265]

258. CEC Effectiveness Survey, *supra* note 94, Question 10, Survey Number CN278.

259. CEC Effectiveness Survey, *supra* note 94, Question 10, Survey Number US292.

260. CEC Effectiveness Survey, *supra* note 94, Question 10, Survey Number US66.

261. CEC Effectiveness Survey, *supra* note 94, Question 10. Likert scale 1 to 5: 1 = no independence, 3 = moderate independence, 5 = high independence.

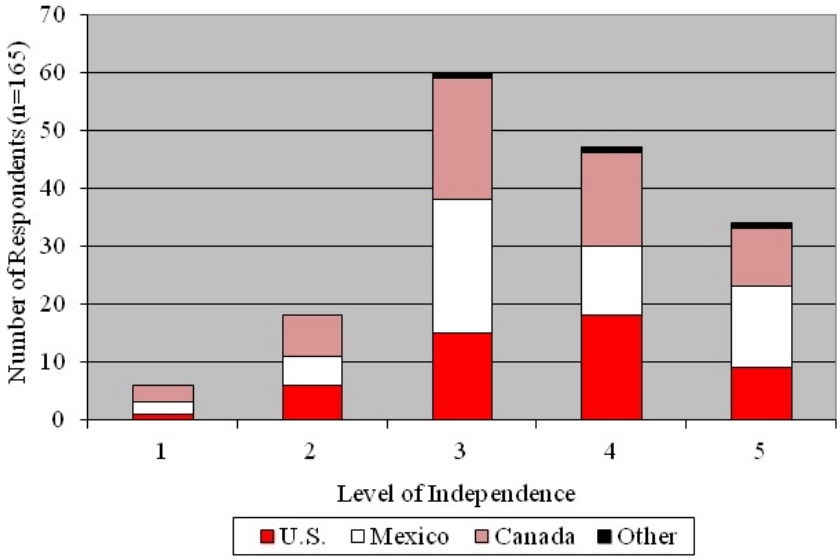
262. CEC Effectiveness Survey, *supra* note 94, Questions 2 and 10.

263. CEC Effectiveness Survey, *supra* note 94, Questions 10 and 11. Five respondents provided comments reflecting problems with the independence of the Secretariat for preparing Article 13 reports while twenty-two respondents provided comments reflecting problems with the independence of the Secretariat for administering the Article 14 and 15 process.

264. CEC Effectiveness Survey, *supra* note 94, Question 10, Survey Number MX324.

265. CEC Effectiveness Survey, *supra* note 94, Question 10, Survey Number US846.

Figure 7: Independence of Secretariat in Preparing Article 13 Reports (n=165)



F. Environmental Cooperation Mandate

The mandate of the CEC to undertake voluntary environmental cooperation has been considered by the governments to be the primary mandate for the CEC and designed to endure over the long-term.[266] Since the CEC was established, environmental cooperation initiatives have constituted the majority of its work and have generally focused on fostering greater policy coordination between the three countries.[267] The CEC has implemented a wide variety of cooperative initiatives that have varied considerably in scope and duration under four areas since 1995.[268] The empirical assessment focused on a single initiative from each of the four core programmatic areas to assess its impact on government action or public policy. The primary criterion used to select the initiatives was its duration or longevity.[269] In general, there has been considerable turnover of the CEC portfolio largely due to changing interests of the governments. Thus, longer-lived initiatives were selected for review because, as a practical matter, these initiatives are more likely to have an

266. *See, e.g.,* Inside U.S. Trade, *supra* note 24; Interview Numbers US-G-80 (Feb. 26, 2003); CN-G-63 (Feb. 11, 2003); US-G-126 (Apr. 26, 2003); MX-G-154 (Jun. 24, 2003); US-G-107 (Mar. 17, 2003); CN-G-62 (Feb. 10, 2003); US-G-77 (Feb. 24, 2003).

267. *Supra* notes 30, 31.

268. *Supra* note 31, *see also*, Table 1.

269. *Supra* note 91.

impact than initiatives that were short-lived or partially implemented and terminated. Table 6 lists the environmental cooperative initiatives examined in this assessment.[270]

Table 6: Environmental Cooperation Initiatives

Core Programmatic Area	Cooperative Initiative
Pollutants and Health	Sound Management of Chemicals
Conservation of Biodiversity	North American Bird Conservation Initiative
Law and Policy	Enforcement and Compliance Cooperation Forum
Environment, Economy, and Trade	NAFTA Environmental Effects Program

The Environment, Economy, and Trade core programmatic area has historically consisted of a number of small, short-lived initiatives. The NAFTA Environmental Effects Program was selected for the empirical assessment because it was the longest in duration. However, this initiative is also considered a central element of the integrating trade and environment mandate, and thus is discussed under that section. The following provides an overview of the other three cooperative initiatives and a discussion of the outcomes and impacts of the initiatives on government action or public policy.

1. Sound Management of Chemicals

The Sound Management of Chemicals ("SMOC") is a flagship initiative for the CEC and is considered one of its most successful programs.[271] In general, the SMOC is focused on improving the management and use of certain persistent, bio-accumulative, and toxic substances through the development of North American Regional Action Plans ("NARAP") that outline differentiated commitments to take action on each targeted substance.[272] At the end of 2010, NARAPs had been

270. Allen, *supra* note 5; *see also*, note 31.

271. The Sound Management of Chemicals was established in 1995 and has been continuously funded and implemented up through end of 2010. *Council Resolution 95-05, Sound Management of Chemicals* (Oct. 13, 1995) [hereinafter *Council Resolution 95-05*], *available at* http://www.cec.org/Page.asp?PageID=122&ContentID=1189&SiteNodeID=280&BL_ExpandID=.

272. TASK FORCE ON CRITERIA, CEC, PROCESS FOR IDENTIFYING CANDIDATE SUBSTANCES FOR REGIONAL ACTION UNDER THE SOUND MANAGEMENT OF CHEMICALS INITIATIVE, REPORT TO THE NORTH AMERICAN WORKING GROUP ON THE SOUND MANAGEMENT OF CHEMICALS BY THE TASK FORCE ON CRITERIA (1997), *available at* http://www.cec.org/Storage/44/3631_Crit-2-e_EN.pdf.

developed and completely or partially implemented for dichlorodiphenyltrichloroethane ("DDT"), chlordane, mercury, polychlorinated biphenyls ("PCBs"), lindane, and hexychlorocyclohexane.[273] As of 2010, the three countries had also developed a NARAP for environmental monitoring and assessment, and were evaluating poly brominated diphenyl ethers as a potential candidate for a future NARAP, as well as alternative strategies for improving management of dioxins, furans, and hexachlorobenzene in lieu of a NARAP.[274]

The most frequently cited SMOC success story has been elimination of the use of DDT and chlordane in Mexico.[275] However, other achievements include the completion of the first inventory of atmospheric mercury emissions in Mexico and establishment of a partial monitoring network for mercury in North America. Also in Canada, the SMOC has lead to the deregistration of lindane for agricultural uses in 2004,[276] an increased rate of destruction of PCBs nationwide, an expanded mercury program to focus on new sources, particularly on coal-fired power plants, and changed reporting levels for mercury under its national pollutant transfer and release registry. In the U.S. the SMOC has not had any major impact on policy or government action.

The actions taken by Mexico and Canada related to the targeted chemicals, however, may not be attributed entirely to the SMOC. According to some officials associated with the SMOC, the actual impact of the SMOC on policy or government action has probably been minimal. For the phase-out of DDT in Mexico, the Mexican government already had a strong domestic policy in place prior to the SMOC to

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273. The initial list of targeted substances included 12 persistent organic pollutants (the "Dirty Dozen") identified in the United Nations Environment Programme Governing Council Decision 18/32 of May 1995: PCBs, dioxins, furans, aldrin, dieldrin, DDT, endrin, chlordane, hexachlorobenzene, mirex, toxaphene, heptachlor, along with certain heavy metals, such as mercury, cadmium, and lead. *Council Resolution: 95-05, Sound Management of Chemicals*, CEC (Oct. 13, 1995), *available at* http://www.cec.org/Page.asp?PageID=924&ContentID=1189; CEC, THE SOUND MANAGEMENT OF CHEMICALS (SMOC) INITIATIVE OF THE COMMISSION FOR ENVIRONMENTAL COOPERATION OF NORTH AMERICA, OVERVIEW AND UPDATE (2003) [hereinafter CEC SMOC], *available at* http://cec.org/Storage/52/4474_SMOC-OverviewUpdate_Oct03_en.pdf.

274. CEC, 2010 OPERATIONAL PLAN, *supra* note 31.

275. Canada and the U.S. both banned the use of chlordane and DDT prior to establishment of the SMOC. *North America ahead of the game on DDT elimination*, TRIO, CEC (July 1, 2001), http://www.cec.org/Page.asp?PageID=122&ContentID=2452&SiteNodeID=462.

276. *Consumer Product Safety, Re-evaluation Note REV2009-08, Lindane Risk Assessment*, HEALTH CANADA (Aug. 27 2009), http://www.hc-sc.gc.ca/cps-spc/pest/part/consultations/_rev2009-08/lindane-eng.php.

identify and implement DDT alternatives and had made considerable progress on reducing use of the pesticide since the 1980s. From a historical usage of 25,000 tons per year in the 1970s,[277] Mexico had reduced its use to less than 600 tons by 1997.[278] The SMOC provided assistance on alternatives to reduce the remaining DDT, facilitating an earlier phase-out than might have otherwise occurred, but its overall influence was minimal.[279]

Similarly with chlordane, Mexico had already severely restricted the use of this chemical prior to establishment of the SMOC and usage had dropped to less than 20 tons per year by 1996.[280] The SMOC was useful for providing information on chlordane alternatives, but according to one government official, chlordane was a minor chemical to eliminate and would have been eliminated easily anyway.[281] This official considered "the SMOC a façade; it looks like a lot is being done, but the work is only on small projects that have marginal effects given the overall scope of the environmental programs in the countries."[282] With respect to Canada, some of the actions it has undertaken with respect to the targeted chemicals, such as changing reporting levels for mercury or eliminating the use of lindane, may have already been in progress prior to implementation of the SMOC.[283]

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277. CEC, HISTORY OF DDT IN NORTH AMERICA IN 1997 4 (1997), *available at* http://www.cec.org/Storage/40/3241_historyddte_en.pdf. Usage of DDT was higher in the late 1950s and early 1960s, but no specific data exist on use levels (for graphical representation of usage).

278. North American Working Group for the Sound Management of Chemicals Task Force on DDT and Chlordane, *North American Regional Action Plan on DDT*, CEC (June 1997), http://cec.org/Page.asp?PageID=924&ContentID=1262 (use restricted to malaria control). Prior to the SMOC, Mexico had planned to phase out use of DDT by 2007.

279. Interview Numbers CN-G-70 (Feb. 14, 2003); US-G-76 (Feb. 24, 2003); CN-G-109 (Mar. 19, 2003); US-G-105 (Mar. 12, 2003); US-G-48 (Jan. 22, 2003); MX-G-120 (Apr. 3, 2003); MX-G-122 (Apr. 4, 2003); US-G-100 (Mar. 11, 2003).

280. North American Regional Action Plan on DDT, North American Working Group for the Sound Management of Chemicals Task Force on DDT and Chlordane CEC (June 1997) (on file with author); History of DDT in North America to 1997 (on file with author).

281. Interview Number MX-G-122 (Apr. 4, 2003).

282. Interview Number MX-G-122 (Apr. 15, 2003).

283. Interview Numbers CN-G-70 (Feb. 14, 2003); CN-G-109 (Mar. 19, 2003); *see also Mexico to Eliminate Toxic Chemical Lindane*, TRIO, CEC (Oct. 8, 2004), http://www.cec.org/Page.asp?PageID=122&ContentID=2101&SiteNodeID=359. (Winter 2004/2005). According to interviewees, Canada had taken specific actions on some chemicals under the SMOC; it had deregistered uses, increased the rate of its destruction of PCBs nationwide, expanded its mercury program to focus on new sources of mercury from coal-fired power plants, and changed reporting levels for mercury under its national pollutant transfer and release registry.

Considering the SMOC in a broader context, this initiative coincided with other domestic and international efforts to improve management or reduce the use of certain toxic substances[284] in the three countries. All three countries had already implemented policies to ban or severely restrict use of many substances on the original list of targeted chemicals. In light of these pre-existing efforts, many government officials and others familiar with the SMOC program indicated that the government actions that occurred under the SMOC would have occurred anyway, but probably were achieved a little more quickly as a result of the initiative. Given the fact that the U.S. and Canada already had well-established programs for toxics management, the real purpose of the SMOC was to harmonize the Mexican regulatory system for toxic substances with those of the other two countries.

Despite considerable activity early in the SMOC program, efforts by the governments to take action on other chemicals have become stalled and very little new work has been undertaken since about 2001.[285] For example, lead was first considered a candidate for action under the SMOC in 1998,[286] yet the U.S. and Mexico have delayed making specific commitments on this heavy metal for a number of years due to strong opposition from industry.[287] It took until 2003 for the countries to formally propose a NARAP be prepared for lead;[288] however, as of the end of 2010, a final decision on developing a NARAP for this metal had

284. There are numerous other international agreements under which cooperation occurs, including: Stockholm Convention on Persistent Organic Pollutants, May 22, 2001, 40 I.L.M. 532; Convention on Long-Range Transboundary Air Pollution, Nov. 13, 1979, 34 U.S.T. 3043, 1302 U.N.T.S. 217; U.S.-Canada Great Lakes Water Quality Agreement, as Amended, U.S.-Can., Nov. 22, 1978, 30 U.S.T. 1384.

285. Interview Numbers US-G-100 (Mar. 11, 2003); CN-G-70 (Feb. 14, 2003); US-G-76 (Feb. 24, 2003); MX-G-120 (Apr. 3, 2003); MX-G-122 (Apr. 4, 2003). The Council authorized development of only one new NARAP, for Lindane and hexychlorocyclohexane, between 2001 and 2010, compared with six NARAPs between 1995 and 2001, *see* CEC COUNCIL RESOLUTIONS 06-12 (Nov. 30, 2006), 02-07 (Jun. 19, 2002); 99-01 (Jun. 28, 1999); 99-02 (Jun. 28, 1999); 95-05 (Oct. 13, 1995); see also CEC annual plans, *supra* note 31. In 2008, the Council reversed its decision to prepare a NARAP for dioxins, furans, and hexachlorobenzene, *see* CEC COUNCIL RESOLUTION 08-06 (Jun. 26, 2008). *See also* KATE DAVIES, REVIEW OF THE PROCESS FOR IDENTIFYING CANDIDATE SUBSTANCE FOR REGIONAL ACTION UNDER THE SOUND MANAGEMENT OF CHEMICALS INITIATIVE (Jun. 2001).

286. CEC, NOMINATION DOSSIER ON LEAD (1998).

287. Interview Numbers CN-G-101 (Mar. 12, 2003); US-G-100 (Mar. 11, 2003); US-G-76 (Feb. 24, 2003); MX-G-122 (Apr. 4, 2003).

288. CEC, DECISION DOCUMENT ON LEAD UNDER THE SOUND MANAGEMENT OF CHEMICALS INITIATIVE (2003). *See* also JPAC ADVICE TO COUNCIL 00-06 (Jul 6, 2000), recommending development of a NARAP for lead.

not been made.[289]

Similarly, lindane was first considered a candidate for action under the SMOC in 1998[290] and the governments agreed to develop a NARAP in 2002,[291] which was completed and adopted by the Council in 2006.[292] The delay in preparing the lindane NARAP was due in part to industry opposition in the U.S.[293] The Council also authorized preparation of a NARAP for dioxins, furans, and hexachlorobenzene in 1999,[294] and a draft was developed in 2002.[295] However, the U.S. delayed the finalization of this NARAP[296] and in 2008, the Council decided to develop a strategy rather than a NARAP for these chemicals.[297]

The SMOC has also served to help the countries develop regional policy positions on toxic substances for international fora. According to some officials, the SMOC has also helped to build capacity and foster more openness, transparency, and public participation in environmental decision-making in Mexico.[298] From a broader institutional perspective, the SMOC also served as an important first initiative for demonstrating the potential of the CEC to foster voluntary environmental cooperation between the countries.[299] This was particularly important during the early

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289. *See, e.g.,* Luke Trip, *Case Study: The North American Regional Program on Sound Management of Chemicals*, http://web.idrc.ca/en/ev-83361-201-1-DO_TOPIC.html (last visited Oct. 2, 2011), stating that the lead was being evaluated as a candidate for a NARAP in 2005.

290. CEC, DECISION DOCUMENT ON LINDANE UNDER THE PROCESS FOR IDENTIFYING CANDIDATE SUBSTANCES FOR REGIONAL ACTION UNDER THE SOUND MANAGEMENT OF CHEMICALS INITIATIVE (2000).

291. CEC, COUNCIL RESOLUTION: 02-07, DEVELOPING A NORTH AMERICAN REGIONAL ACTION PLAN (NARAP) ON LINDANE (2002).

292. CEC, COUNCIL RESOLUTION 06-12, ADOPTING THE NORTH AMERICAN REGIONAL ACTION PLAN (NARAP) ON LINDANE AND OTHER HEXACHLOROCYCLOHEXANE ISOMERS.

293. Interview Numbers MX-C-55 (Feb. 4, 2003); US-G-100 (Mar. 11, 2003).

294. CEC, COUNCIL RESOLUTION 99-01, DEVELOPING A NORTH AMERICAN REGIONAL ACTION PLAN FOR DIOXINS AND FURANS, AND HEXACHLOROBENZENE (1999).

295. CEC, REPORT OF THE ACTING EXECUTIVE DIRECTOR. COMMISSION FOR ENVIRONMENTAL COOPERATION. TENTH REGULAR SESSION OF THE CEC COUNCIL (2003).

296. *Id.*

297. *Council Resolution: 08-06, Instruction to the Sound Management of Chemicals Working Group of the Commission for Environmental Cooperation to promote the sustained sound management of chemicals in North America*, CEC (June 26, 2008), http://www.cec.org/Page.asp?PageID=122&ContentID=949.

298. Interview Numbers US-G-100 (Mar. 11, 2003); MX-G-122 (Apr. 4, 2003); CN-P-69 (Feb. 14, 2003); US-G-75 (Feb. 22, 2003).

299. Interview Numbers MX-G-122 (Apr. 4, 2003); US-G-75 (Feb. 22, 2003).

years of the CEC when there was so much contention surrounding implementation of its other mandates related to enforcement of environmental laws.[300]

Overall, the SMOC has been a very ambitious initiative that has received considerable funding and in-kind contributions from the three governments. The high level of activity under the SMOC created the impression that governments were making great strides in taking action on the targeted chemicals, however, it appears that these actions were minimal and would have occurred anyway without the SMOC. Overall, the SMOC has had limited impact on policy or government action since it was established in 1995. Numerous government and SMOC working group officials felt that the SMOC's greatest contributions were more procedural than substantive; it has served to strengthen communications, facilitate sharing of information, and raise awareness between the countries.

2. North American Bird Conservation Initiative

The North American Bird Conservation Initiative ("NABCI"), first proposed in 1995 as a project to identify Important Bird Areas[301] in North America, evolved into a tri-national effort to promote integrated conservation of all birds,[302] both migratory and non-migratory. Under NABCI, the U.S., Mexico, and Canada have developed an overall framework for integrated bird conservation, including identification of Bird Conservation Regions ("BCRs") across the entire continent; established institutional mechanisms for implementation of the framework, including trinational and national steering committees and national coordinators, and the initiation of a set of tri-national pilot projects linking bird conservation efforts in the countries.[303] In 2005, CEC ended funding for the NABCI committees and the administration of the initiative has since been wholly supported by the three countries.[304]

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300. Interview Numbers CN-G-66 (Feb. 12, 2003); US-C-14 (Jul. 18, 2001); US-C-51 (Jan. 27, 2003).

301. Important Bird Areas are conservation units developed by BirdLife International as a mechanism for bird conservation that have been used in many countries around the world; CEC, NORTH AMERICAN IMPORTANT BIRD AREAS, A DIRECTORY OF 150 KEY CONSERVATION SITES (1999) [hereinafter CEC IMPORTANT BIRD AREAS].

302. *Id.* There are approximately 1400 species of birds that regularly inhabit North America; over 1000 species reside in Mexico for all or part of their life, over 800 species in the U.S., and over 600 species in Canada; more than 250 species are migratory.

303. ART MARTELL, HUMBERTO BERLANGA, DAVID PASHLEY, & JURGEN HOTH, REVIEW OF PROGRESS OF THE NORTH AMERICAN BIRD CONSERVATION INITIATIVE; CEC, NORTH AMERICAN BIRD CONSERVATION INITIATIVE (2000).

304. CEC provided funding for NABCI committees up through 2004. *See* CEC,

According to almost all of the officials interviewed for this assessment, the NABCI did contribute to changes in policy and government actions related to bird conservation in the three countries. The most frequently cited impact has been the change in perspectives and approaches to bird conservation to encompass all types of birds and habitats, as opposed to just migratory game birds and wetlands. Historically, bird conservation in North America has been on focused on game birds, in particular waterfowl. This conservation has been undertaken largely at the insistence of the U.S. and has been achieved principally through implementation of the North American Waterfowl Management Plan[305] ("NAWMP") with funding from the North American Wetlands Conservation Act[306] ("NAWCA"). However, the NABCI served to foster interest and support for integrated bird conservation, a marked departure from past bird conservation efforts.

Another achievement of the NABCI was the development of BCRs[307] in the three countries which provide a consistent spatial framework for bird conservation in North America and were based on a scale-flexible, hierarchical framework of nested ecological units previously developed by the countries through the CEC.[308] According to some officials both inside and outside of government, "the NABCI was key to identifying bird conservation areas or regions that cut across

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NORTH AMERICAN AGENDA FOR ACTION 2003-2005, *supra* note 31; NORTH AMERICAN AGENDA FOR ACTION 2004-2006, *supra* note 31; OPERATIONAL PLAN: 2004-2006, *supra* note 31; OPERATIONAL PLAN: 2006-2008, *supra* note 31; PROPOSED BUDGET FOR 2005 CEC WORK PROGRAM (on file with author).

305. *See, e.g.,* U.S. DEPARTMENT OF THE INTERIOR & ENVIRONMENT CANADA, NORTH AMERICAN WATERFOWL MANAGEMENT PLAN (1986); U.S. DEPARTMENT OF THE INTERIOR, ENVIRONMENT CANADA, & SEMARNAP, 1994 UPDATE TO THE NORTH AMERICAN WATERFOWL MANAGEMENT PLAN. EXPANDING THE COMMITMENT (1994); U.S. DEPARTMENT OF THE INTERIOR, ENVIRONMENT CANADA, & SEMARNAP, 1998 UPDATE TO THE NORTH AMERICAN WATERFOWL MANAGEMENT PLAN, EXPANDING THE VISION (1998); US DEPARTMENT OF THE INTERIOR, ENVIRONMENT CANADA, SEMARNAP, 2004 STRATEGIC GUIDANCE, NORTH AMERICAN WATERFOWL MANAGEMENT PLAN, STRENGTHENING THE BIOLOGICAL FOUNDATION (2004).

306. The North American Wetlands Conservation Act, 103 Stat. 1968; 16 U.S.C. 4401-4412, Pub. L. No. 101-233, enacted Dec. 13, 1989, is a U.S. law that provides funding for implementation of the NAWMP. Between 1986 and 2009, more than $4.5 billion in federal and matching funds were invested to protect, restore, and/or enhance over 15.7 million acres of waterfowl habitat in North America under the NAWMP, *see* U.S. Fish and Wildlife Service, http://www.fws.gov/birdhabitat/nawmp/index.shtm.

307. BCRs are ecologically-based conservation units with similar biotic and abiotic characteristics; David Pashley, *An Introduction to the NABCI Bird Conservation Regions,* 33 BIRDING 30 (2001).

308. CEC, ECOLOGICAL REGIONS OF NORTH AMERICA: TOWARD A COMMON PERSPECTIVE (1997).

boundaries to facilitate landscape planning over the North American region"[309] and the resultant BCRs have "fundamentally changed perspectives on bird conservation in North America and how it is delivered."[310]

Since NABCI was established, there has been a considerable effort in the three countries to better integrate the waterfowl conservation efforts with other non-game and non-migratory bird conservation programs, such as the North American Colonial Waterbird Conservation Plan, Partners in Flight, and Western Hemisphere Shorebird Reserve Network.[311] The primary institutional mechanisms for promoting this integration have been the national coordinators for NABCI, fully or partially funded in the initial years by the CEC, and national NABCI steering committees[312] established in each country.[313]

In the U.S., the government instituted a policy change that redefined the scope of bird conservation within the existing habitat conservation units established under the NAWMP, known as Joint Ventures, to include species other than waterfowl.[314] As a result of this policy change, at least nine out of the eighteen existing Joint Ventures[315] in the U.S. have adopted integrated bird conservation strategies and are developing projects for conservation of non-waterfowl species. In addition, some of the areas are also utilizing the BCRs[316] for conservation planning and evaluation as well as to identify birds likely to become candidates for listing under the Endangered Species Act.[317]

In Canada, the NABCI has likewise fostered a change in attitude

309. Interview Number US-G-38 (Jan. 8, 2003).

310. Interview Number CN-N-47 (Jan. 20, 2003).

311. Paul Baicich, *Is there a NABCI in our future?* 31 BIRDING 210 (1999); Matt Schlag-Mendenhall, *Could Ducks Save the Rest of Our Birds?* BIRDER'S WORLD 55 (2001); Andrews & Andres, *supra* note 57.

312. In Canada, an existing institutional mechanism, the North American Wetlands Conservation Council in Canada, which was responsible for overseeing the NAWMP, expanded its mandate and membership in 2000 and became the NABCI Canada Council and oversees the NABCI in Canada, *see* http://www.terreshumidescanada.org/main.html.

313. MARTELL, ET AL., *supra* note 303.

314. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Director's Order No. 146, Joint Venture Administration (2002) (on file with author).

315. A joint venture is a self-directed partnership of agencies, organizations, corporations, tribes, or individuals that has formally accepted the responsibility of implementing national or international bird conservation plans within a specific geographic area or for a specific taxonomic group, *see id*.

316. Joint Venture, http://www.fws.gov/birdhabitat/jointventures/index.shtm (last visited Oct. 21, 2011).

317. U.S. Department of the Interior, U.S. Fish and Wildlife Service Birds of Conservation Concern (2002) (on file with author).

and generated greater buy-in for integrated bird conservation at higher levels in government and throughout the bird conservation community. According to some officials inside and outside of the government, these changes in perspectives and support have led to multi-bird, multi-habitat conservation efforts being undertaken throughout Canada. These conservation efforts, however, are still subject to the funding constraints associated with waterfowl conservation; therefore, the actual on-the-ground integrated bird conservation may be limited. These officials, however, did not feel the impacts of the NABCI had been as far-reaching in Canada as in the U.S. because there is, in general, less political support and interest in Canada for bird conservation and greater resistance to change by the old guard associated with waterfowl conservation.

The changes in Mexico due to the NABCI are a little more difficult gauge. According to some government officials and others familiar with the NABCI in the three countries, Mexico has probably embraced the NABCI principles of integrated bird conservation to the greatest extent because Mexico has traditionally taken a more holistic approach to conservation of biodiversity, using an ecosystem-based rather a taxonomic-based approach. However, bird conservation is in its infancy in Mexico; there is very little capacity, no pre-existing bird conservation programs to leverage, and a lack of constituencies and political support, thus actual on- the- ground conservation has been limited.

Nonetheless, the NABCI has served to raise the profile of bird conservation at the national level and bring together all of key stakeholders in the bird conservation community within Mexico, as well as establish some basic institutional structures for planning and implementation of bird conservation at the national level. In addition, the identification of Important Bird Areas has helped Mexico develop a systematic approach to developing domestic priorities for bird conservation and the demonstration projects have helped build a limited amount of capacity in Mexico.

Considering these changes in bird conservation within a broader historical context, the U.S., Mexico, and Canada have been cooperating on protection of migratory birds since the early twentieth century under the Convention for the Protection of Migratory Birds and subsequent treaties.[318] Large scale on-the-ground conservation was initiated starting in the 1980s with a focus on migratory waterfowl habitat under the NAWMP.[319] Starting in the early 1990s, the focus of conservation efforts

318. U.S. DEPARTMENT OF INTERIOR AND ENVIRONMENT CANADA, *supra* note 305.

319. *Id.*

expanded to include integrated bird conservation of all species;[320] this expansion is reflected in the establishment of the Partners in Flight and Western Hemisphere Shorebird Reserve Network initiatives and efforts to coordinate these initiatives with the NAWMP.[321]

By the mid-1990s, the bird conservation community, at least in the U.S., was already contemplating integrated bird conservation, but it did not have an established strategy or framework. The CEC proposal for trilateral cooperation on bird conservation coincided with these initial efforts to promote integrated bird conservation and the CEC provided a forum for developing a framework and strategy. According to some government officials and others who have worked on the NABCI, the advent of integrated bird conservation within North America would have occurred anyway, but, as one government official noted, it would have "had a more difficult birth and would have taken much longer."[322]

Other government and CEC officials felt that although integrated bird conservation might have occurred without NABCI, it would have been different.[323] For example, there may have been less attention given to endemic species compared to migratory species because the U.S. and Canada probably wouldn't have been made aware of the endemic species of Mexico and supported efforts to conserve these species, while Mexico would not have worked as much on migratory species. The U.S. and Canada had historically been interested in migratory species, which had limited benefit for Mexico, where the majority of birds are endemic.[324]

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320. *See, e.g.,* Herb Raffaele, Memorandum on North American Bird Conservation Discussion, U.S. Department of the Interior, U.S. Fish and Wildlife Service (Dec. 13, 1995) (on file with author).

321. *See generally,* David Pashley & Rick Warhurst, *Conservation Planning in the Prairie Pothole Region of the United States: Integration Between an Existing Waterfowl Plan and an Emerging Non-game Bird Model*, *in* STRATEGIES FOR BIRD CONSERVATION: THE PARTNERS IN FLIGHT PLANNING PROCESS (Rick Bonney, David N. Pashley, Robert J. Cooper, & Larry Niles, eds. 1995) [hereinafter STRATEGIES FOR BIRD CONSERVATION], http://www.birds.cornell.edu/pifcapemay/pashleywarhurst.htm; Cynthia R. Brown, Charles Baxter, & David N. Pashley, *The Ecological Basis for the Conservation of Migratory Birds in the Mississippi Alluvial Valley*, *in* STRATEGIES FOR BIRD CONSERVATION, *available at* http://www.birds.cornell.edu/pifcapemay/brown.htm.

322. Interview Number US-G-40 (Jan. 8, 2003).

323. Interview Numbers MX-G113 (Mar. 28, 2003); MX-C-59 (Feb. 6, 2003); CN-G-79 (Feb. 23, 2003); US-G-37 (Jan. 8, 2003).

324. Rosa Ma. Vidal, Humberto Berlanga, & María del Coro Arizmendi, *Important Bird Areas AMERICAS Mexico*, *in* IMPORTANT BIRD AREAS AMERICAS - PRIORITY SITES FOR BIODIVERSITY CONSERVATION, 269 (C. Devenish, D. F. Díaz Fernández, R. P. Clay, I. Davidson & I. Yépez Zabala, eds. 2009), http://www.birdlife.org/datazone/userfiles/file/IBAs/AmCntryPDFs/Mexico.pdf (last visited Oct. 21, 2011).

The inclusion of all birds under NABCI helped ensure that Mexico's national priorities for bird conservation were given equal consideration in the trilateral cooperation.

Still other officials felt that without the NABCI, the programs for bird conservation in the three countries wouldn't have been as well integrated in general. The U.S. and Canada were already working on expanding conservation programs, but would have continued on the same path of individual programs. The Partners in Flight, for example, would have become sophisticated, but would have developed in isolation from the other conservation programs. Another official from a bird conservation organization felt that the international aspect of the NABCI would not have developed at all; bird conservation efforts would have remained largely bilateral in nature. Thus, it is unlikely that the tri-national demonstration projects linking conservation efforts in the three countries would have occurred.

Overall, the NABCI has helped to foster increased awareness and support for integrated bird conservation; it has helped breakdown artificial barriers between game and non-game bird conservation and to build bridges between the different factions within the bird conservation community. As a result, there has been a major change in mindset and conservation culture, facilitating a shift in the approach to bird conservation efforts to encompass all birds and all habitats. The end result has been better coordination between different bird conservation groups and programs. These changes appear to be most pronounced in the U.S., which has the strongest constituencies for bird conservation and the greatest resources. There are mixed views on whether the outcomes realized under the NABCI would have been the same without the initiative.

3. Enforcement and Compliance Cooperation Forum

The Enforcement and Compliance Cooperation Forum, established in 1995, consisted of two working groups of enforcement officials: a Working Group on Environmental Enforcement and Compliance Cooperation ("EWG"), that is primarily concerned with brown environmental enforcement issues, such as those associated with hazardous waste and toxic substances, and a North American Wildlife Enforcement Working Group ("NAWEG"),[325] focused on wildlife trafficking under the Convention on International Trade in Endangered

325. The North American Wildlife Enforcement Working Group was a pre-existing group established under the Canada/Mexico/U.S. Trilateral Committee for Wildlife and Ecosystem Conservation and Management.

Species ("CITES").[326] Through these working groups, the governments pursue a range of activities to promote effective enforcement of laws, build enforcement capacity, and report on domestic enforcement activities.[327]

When the enforcement and compliance forum was established, it was given a relatively broad mandate. Over the years, the EWG has worked on a variety of issues, including the transboundary movement and tracking of hazardous wastes, indicators of effective environmental enforcement, environmental management systems, trafficking in illegal substances, and environmentally sound management of hazardous wastes.[328] In addition, the EWG compiled information on enforcement activities of the governments for the annual report and served as a forum for exchanging intelligence on illegal activities that may require bilateral or trilateral coordination.

According to numerous government and CEC officials, the EWG helped to improve communications and information sharing between the governments as well as build some capacity, primarily in Mexico, but beyond that, it has had no noticeable impact on enforcement programs in the three countries. The EWG's work on trans-boundary shipments of hazardous waste and environmentally sound management of hazardous waste has potential to improve the management of these materials, but these improvements have yet to be realized, although the governments largely ignored earlier work on hazardous waste.[329]

Compared to the EWG, the NAWEG has been more focused in its cooperative work agenda, largely because it had originally been established outside of the context of the CEC and had a more clearly defined focus and purpose from the onset. The NAWEG sought an

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326. Convention on International Trade in Endangered Species of Wild Flora and Fauna, Mar. 3, 1973, 12 I.L.M. 1085; *see generally,* 1995 CEC ANNUAL REPORT, *supra* note 31; 1995 PROGRAM REPORT, *supra* note 31; CEC, COUNCIL RESOLUTION NO. 96-06. RESOLUTION TO ESTABLISH THE NORTH AMERICAN WORKING GROUP ON ENVIRONMENTAL ENFORCEMENT AND COMPLIANCE COOPERATION (1996) [hereinafter RESOLUTION NO. 96-06].

327. *See, e.g.*, 1995 PROGRAM REPORT, *supra* note 31.

328. *See, e.g.,* CEC, VOLUNTARY MEASURES TO ENSURE ENVIRONMENTAL COMPLIANCE, A REVIEW AND ANALYSIS OF NORTH AMERICAN INITIATIVES (1998); CEC, TRACKING AND ENFORCEMENT OF TRANSBORDER HAZARDOUS WASTE SHIPMENTS IN NORTH AMERICA (1999); CEC, INDICATORS OF EFFECTIVE ENFORCEMENT (1999); CEC, IMPROVING ENVIRONMENTAL PERFORMANCE AND COMPLIANCE, 10 ELEMENTS OF EFFECTIVE ENVIRONMENTAL MANAGEMENT SYSTEMS (2000); CEC, CROSSING THE BORDER, OPPORTUNITIES TO IMPROVE TRACKING OF TRANSBOUNDARY HAZARDOUS WASTE SHIPMENTS IN NORTH AMERICA (2004).

329. CEC, TRACKING AND ENFORCEMENT OF TRANSBORDER HAZARDOUS WASTE SHIPMENTS IN NORTH AMERICA (1999).

affiliation with the CEC solely to have access to its resources. Since 1995, the NAWEG has undertaken a series of training workshops for enforcement and customs officials focused on trafficking of endangered species under CITES, training on wildlife forensics, and other similar capacity building activities.[330] In addition to this training, the NAWEG has also served as a forum for exchanging intelligence on illegal activities that may require bilateral or trilateral coordination.

Most government and CEC officials familiar with the enforcement working groups generally viewed the NAWEG as being more effective than the EWG.[331] The NAWEG has created an effective network of enforcement professional for CITES, improved communications and information sharing, and helped build capacity, especially in Mexico. The NAWEG has also been useful for identifying weaknesses in domestic enforcement systems, such as those in Canada's import/export controls at its borders. However, the goal of increased cooperation on CITES prosecutions between the countries, has not materialized. According to several government and CEC officials, the NAWEG would have undertaken its activities without the CEC, but it would have struggled due to lack of resources.

Considering enforcement within a broader context, the three countries have cooperated on enforcement in the past, but largely on a bilateral basis, with the U.S. working with its neighbors to the north and south. This cooperation has occurred through various mechanisms, such as Interpol, Mutual Legal Assistance Treaties, and other international agreements governing border environmental issues, like the La Paz Agreement with Mexico and the Agreement Concerning the Transboundary Movement of Hazardous Wastes with Canada.[332] Enforcement cooperation has also occurred through other informal, ad-hoc bilateral exchanges. Overall, officials interviewed for this research felt that the enforcement cooperation under the CEC initiative would have occurred anyway and there would not have been any significant differences in outcomes.

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330. *See, e.g.,* CEC, NORTH AMERICAN AGENDA FOR ACTION 2003-2005, *supra* note 31.

331. Interview Numbers CN-G-71 (Feb. 13, 2003); MX-G-20 (Aug. 6, 2001); US-G-87 (Mar. 3, 2003); CN-C-9 (Jul. 17, 2001).

332. Scott C. Fulton & Lawrence I. Sperling, The Network of Environmental Enforcement and Compliance Cooperation in North America and the Western Hemisphere, 30 INT'L LAW. 111 (1996); BORDER 2012, *supra* note 172; Agreement on Cooperation for the Protection and Improvement of the Environment and Transboundary Problems, also known as the La Paz agreement, Aug. 14, 1983, U.S.-Mex. T.I.A.S. No. 10827; Agreement Concerning the Transboundary Movement of. Hazardous Wastes, Oct. 28, 1986, U.S.-Can., T.I.A.S. No. 11099.

a. Survey Results

According to survey respondents, the degree to which the CEC is achieving its objective of facilitating voluntary environmental cooperation overall between the U.S., Mexico, and Canada was ranked, through its numerous cooperative environmental initiatives including the three discussed above, was ranked, on average, 3.1 on a scale of 1 to 5 (n = 253),[333] indicating that this objective is being moderately achieved. Figure 8 illustrates the distribution of survey responses, by nationality of the respondent.[334]

Survey respondents were also asked whether some CEC cooperative programs were more effective than others; eleven respondents felt that there was no difference in effectiveness of the cooperative programs, while 105 of the respondents indicated that some programs were more effective.[335] In a follow-up to that question, respondents were then asked to identify which programs were more effective. Categorizing the open-ended responses under the CEC's four core programmatic areas: seventy respondents identified Pollutants and Health or one of its initiatives as being the most effective, twenty-six respondents identified Conservation of Biodiversity or one of its initiatives, fourteen respondents identified Law and Policy or one of its initiatives, and thirteen respondents identified Environment, Economy, and Trade or one of its' initiatives.[336]

The top three individual initiatives identified were: SMOC (seventeen respondents), Pollutant Release and Transfer Registries (twelve respondents), and NAWEG (five respondents).[337] According to respondents that identified specific programs or initiatives as being more effective, many indicated that the reason the program was effective was because it had clear, achievable goals or it produced concrete or tangible results, such as the reduction in the usage of DDT in Mexico or providing hands-on training and capacity building. Other survey respondents noted that the reason some programs were more effective was because the specific issues being addressed by the program were not politically sensitive.

333. CEC Effectiveness Survey, *supra* note 94, Question 7. Likert scale 1 to 5: 1 = not being achieved, 3 = moderately being achieved, 5 = completely being achieved.

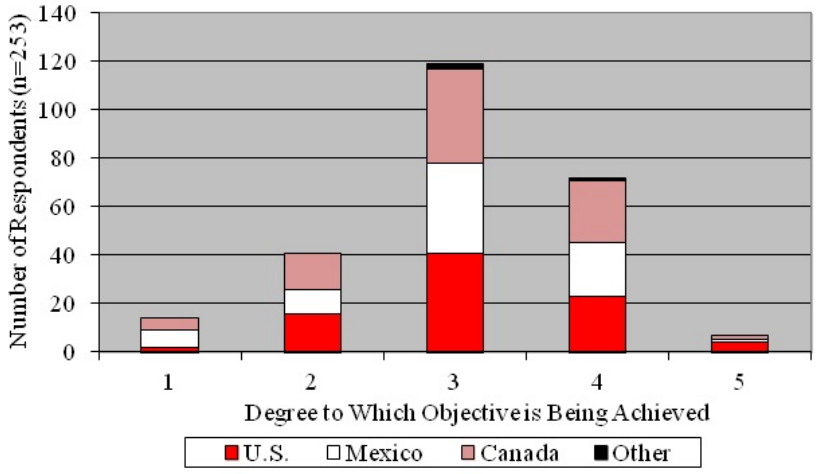
334. CEC Effectiveness Survey, *supra* note 94, Questions 2 and 7

335. CEC Effectiveness Survey, *supra* note 94, Question 7.

336. *Id.*

337. *Id.*

Figure 8: Facilitating Voluntary Environmental Cooperation (n=253)



VIII. CONCLUSIONS

Over the past 15 years, the U.S., Mexico, and Canada have invested over $140 million into the work of the CEC, an international institution created to address the environmental effects of NAFTA. An empirical assessment of the CEC indicates that its overall effectiveness in achieving its principal mandates and fostering tangible changes in policy or government action has been quite limited. The CEC has been the most effective in facilitating cooperation between the three NAFTA countries, somewhat less effective in improving the enforcement of environmental laws through the citizen submission process, minimally effective in undertaking independent reporting of environmental issues of regional significance, and not effective in integrating trade and environment in support of the goals of NAFTA.

Historically, the majority of the CEC's work has been focused on environmental cooperative initiatives. An in-depth review of four long-running initiatives—SMOC, NABCI, Enforcement and Compliance Cooperation Forum, and NAFTA Environmental Effects—indicates that the effectiveness of these initiatives has been mixed. The SMOC appears to have had minimal impact on policy or government action related to toxic substance usage that would not have occurred in the absence of the CEC while the NABCI appears to have had tangible impacts on policy and government action related to bird conservation in the three countries. The work of the EWG and NAWEG appears to have had very limited

impact on overall enforcement programs in the three countries and the CEC work to evaluate the environmental impacts of NAFTA has generated some credible research on the effects of trade and investment liberalization; however, the studies have not had any major impact on policy or government action.

According to officials both inside and outside of the governments, many of the changes that could be attributed to the CEC cooperative initiatives would probably have occurred anyway. Thus, the CEC appears to have provided a convenient forum for pursuing cooperation, but in its absence, the countries still would likely have taken some of the same actions. Notwithstanding the limited substantive impacts of these initiatives on policies or government actions, the initiatives did appear to foster procedural changes, such as improving communication, information sharing, and coordination between the countries. Considering both the substantive and procedural impacts of the CEC cooperative initiatives, the CEC appears to have been moderately effective at promoting environmental cooperation to improve domestic environmental programs, with the greatest impact likely occurring in Mexico.

The two institutional mechanisms established to redress the lax enforcement of environmental laws—the state-to-state consultation and dispute resolution process and citizen submission process—have had limited to no impact on enforcement levels in the three countries. The consultation and dispute resolution process has never been initiated. Establishing this process under the CEC was a political imperative in the U.S., however, the process is a historical artifact and is unlikely to ever have an impact on enforcement levels in the three countries.

The citizen submission process has had limited effectiveness in improving enforcement levels in specific instances, but its impact on enforcement writ large in the countries has been insignificant. The process appears to be most useful for validating the claims of the submitters, increasing their credibility and allowing them to more effectively advance their claims within a broader context. The factual records also serve to establish a baseline for discussion, creating a compilation of facts derived from all interested stakeholders. The process has not been used extensively, however, which may be due to the fact that it is very time-consuming, onerous, and overly legalistic, and an inherently weak mechanism for influencing government behavior.

The Secretariat's independent reports appear to have raised awareness of specific environmental issues to varying degrees and prompted or contributed to tangible government actions on a limited basis; however, the up-take or long-term impact of these reports has been quite mixed and limited, and in some instances, non-existent due to the

controversial nature of the content of some of the reports. The independent reporting mandate was established to provide the environmental community a mechanism for scrutinizing environmental issues that otherwise might not receive attention from the governments; however it does not appear to be widely known or used by the environmentalists.

The CEC's efforts to integrate trade and environment during NAFTA implementation have not been effective. There has been no meaningful coordination between the CEC Council and the NAFTA FTC; the limited efforts of the CEC to integrate trade and environment have largely been ignored or marginalized. The lack of effectiveness in integrating trade and environment under NAFTA is largely due to the fact that the linkages between the CEC and the FTC established under the NAAEC are limited in scope, voluntary in nature, and designed to give almost total deference to the FTC.

This empirical assessment provides a snapshot of the CEC's effectiveness in carrying out its principal mandates. In general, the CEC is most effective in facilitating environmental cooperation, the mandate that was least controversial when the CEC was created and that requires the Secretariat to function in a more traditional role of convener and coordinator with minimal independent decision-making authorities. The CEC is less effective in carrying out its other three mandates, all of which were controversial when it was created, and some of which require the Secretariat to exercise its independent decision-making authorities, or deal with politically sensitive issues or infringe on the sovereignty of the countries.

Given that the CEC is a creation of sovereign states, it is not surprising that its operation would reflect and be sensitive to the interests and concerns of the three countries. The inclusion of unprecedented authorities or mandates under the CEC, such as the citizen submission process, was a direct result of the strong political pressure from the environmental community in the U.S. when the NAAEC was negotiated. In order for those aspects of the CEC to be effective, there needs to be continued political pressure from external stakeholders. Unfortunately, the strong political support for the CEC that existed when it was created and during its initial years of operation has been greatly diminished over the years, limiting the effectiveness of many aspects of the CEC.

APPENDIX A:

Table 1: Summary of the CEC's Cooperative Environmental Initiatives, 1995 to 2010

Cooperative Initiative	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Conservation of Biodiversity																
North American Bird Conservation Initiative	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**						
Gap Analysis and Conservation Status Assessment		**X**														
Mapping of Ecological Regions of North America	**X**	**X**														
Cooperation on Forest Habitat	**X**	**X**														
Quality of North American Information	**X**															
Trilateral Media Initiative for Environmental Education	**X**	**X**														
Indigenous Peoples and Ecosystem Protection	**X**															
Cooperation in Conservation of Monarch Butterflies			**X**													
North American GIS Coordination		**X**														
North American Biodiversity Information Network		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**							
Protection of Marine and Coastal Area Ecosystems		**X**	**X**	**X**	**X**	**X**										
NGO Participation in Conservation of Protected		**X**														

Areas and Land Holdings																
Ecosystem Monitoring					X	X										
Conservation of Migratory and Transboundary Species					X	X										
Global Programme for Protection of Marine Environment from Land-based Activities							X									
Strategic Directions & Cooperation for Conservation of Biodiversity					X	X	X	X	X							
Mapping Marine and Estuarine Ecosystems					X		X	X								
North American Marine Protected Areas Network					X	X	X	X	X	X						
Conserving Species and Spaces of Common Concern							X	X	X	X						
Closing Pathways of Aquatic Invasive Species							X	X	X					X		
Grassland Ecosystem Network										X						
Building Local Capacity for Integrated Ecosystem Management to Conserve Critical Species and Spaces												X	X			
Guidelines for Risk Assessment of Invasive												X	X			

Alien Species and their Pathways																
Recovering the Vaquita and Promoting Sustainable Local Livelihoods														X	X	
Conserving the Monarch Butterfly and Promoting Sustainable Livelihoods														X	X	X
Conserving Marine Species and Spaces of Common Concern															X	X
Protecting Priority Conservation Areas from Invasive Alien Species														X	X	X
Conserving North American Grasslands															X	X

Cooperative Initiative	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pollutants and Health																
Limits of Specific Pollutants/Sound Management of Chemicals	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Pollutant Release and Transfer Registries	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Cooperation on North American Air Monitoring, Inventories, and Modeling	X	X	X	X	X	X	X	X	X	X						
Transboundary Environmental Impact Assessment		X														
ISO 14000 in North America	X	X														

Facilitating Energy Efficiency in North America	X	X														
Cooperation on Climate Change and Green House Gas Emissions	X	X	X													
Climate Change Impact on Transboundary Water Resources		X														
Environmental Training and Education	X	X														
Cooperation/Capacity Building on Pollution Prevention	X	X	X	X	X	X	X	X	X	X						
Technology Clearinghouse	X	X	X	X												
Science Liaison, Cooperation and Coordination		X														
Capacity Building in Environmental Management in Guanajuato (Silva Reservoir)		X														
North American Trade and Transportation Corridors					X	X	X	X								
Technical and Strategic Tools for Improved Air Quality					X	X	X	X								
Children's Health and the Environment						X	X	X	X	X						
Enhancing North America Air Quality Management												X	X	X	X	X
Monitoring and Assessing Pollutants Across North America												X	X	X	X	X

Cooperative Initiative	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010

Economy, Environment, and Trade																
Methodology for Assessing Impacts/NAFTA Environmental Effects	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**	**X**	**X**
Economic Instruments for Environmental Protection	**X**	**X**														
Emerging Environmental Trends in North America				**X**	**X**	**X**	**X**	**X**								
Sustainable Tourism in Natural Areas				**X**	**X**	**X**										
Shared Approaches to Byproduct Synergy				**X**												
Linkages between Trade and Species Conservation				**X**												
Linkages between Environment and Trade				**X**												
Facilitating Conservation of Biodiversity related to Trade in Wildlife Species					**X**	**X**										
Sustainable Use of Natural Resources/Agriculture					**X**											
Promoting Trade in Green Goods				**X**												
Supporting Environmental Protection and Conservation through Green Goods and Services							**X**	**X**								
Financing in Support of Environmental Protection and Conservation						**X**		**X**	**X**							
Trade in Environmentally-Preferable Goods and Services						**X**			**X**							
Market and Financial Mechanisms in Support of the Environment/Sustainability							**X**									
Market Mechanisms for Carbon Sequestration, Energy Efficiency, and Renewable Energy								**X**								
Environmental Labeling										**X**						
Greening Supply Chains in North America														**X**		
Harnessing Market Forces for Sustainability												**X**	**X**			

Supporting Growth of Green Building															X	X
Supporting Sectoral Environmental Sustainability and North American Competitiveness														X	X	
Conserving Biodiversity through Trade														X	X	
Trade Flows of North American Used Electronics															X	X
Encouraging Green Purchasing										X		X	X	X	X	
Promoting Renewable Energy Market										X			X	X		
Trade, Transportation, and Environment															X	

Cooperative Initiative	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Law and Policy																
Enforcement and Compliance Cooperation/Enforcement Working Group	X		X	X	X	X	X	X	X	X						
Enforcement of Pollution Control Laws, Hazardous Waste, Environmentally Sound Management of Waste			X	X	X											
Dialog on Environmental Law		X														
Strengthening Enforcement of Wildlife Laws/North American Wildlife Enforcement Group	X	X	X	X	X	X	X	X					X	X	X	X
Survey of North American Voluntary Compliance	X	X														
Comparative Environment Law Database	X	X														
Public Access to Information and Public Participation	X	X														
Transboundary Environmental Agreements	X															

Economic Instruments	X														
Environmental Laboratory Standards	X														
Natural Resource Accounting	X														
Cooperation between Environmental Laboratories	X				X	X		X							
New Approaches for Improving Environmental Performance			X												
Indicators of Effective Enforcement			X	X	X	X									
Environmental Management Systems to Promote Compliance				X			X	X	X						
Tracking Transboundary Hazardous Waste								X	X	X					
Sustainable Use and Conservation of Freshwater in North America								X	X						
Enforcement and Compliance Capacity Building							X								
Enforcement and Compliance Reporting							X	X							
Comparative Report on Environmental Standards							X	X	X						
Trade and Enforcement of Environmental Laws											X	X	X	X	X
Improving Private and Public Sector Environmental Performance											X	X			

Environmental Information															
Mapping North American Environmental Issues											X	X	X	X	X
Managing CEC Environmental Information											X				

Notes & Comments

Home Sweet Home: How the 'Purpose of the Reservation' Affects More Than Just the Quantity of Indian Water Rights

Jessica Lowrey*

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I. INTRODUCTION

There are 565 federally recognized Indian Tribes in the United States and many of their members live on federally reserved land totaling about 56 million acres.[1] Modern Indian reservations are among the poorest places in the country due to the lack of jobs and tribal businesses.[2] In fact, on the Pine Ridge Reservation in South Dakota, ninety-seven percent of residents live below the poverty level.[3] In the western United States, however, one commodity that most tribes do have is water.

Under the Federal Reserved Rights doctrine, when the federal government created each Indian reservation, the government impliedly reserved sufficient water resources for each tribe to serve the purposes of that reservation.[4] Although the water was reserved, the amount reserved was not quantified when the reservation was created. Thus, over the years, there has been great confusion over how much water was actually allotted to tribes.[5]

Western states use stream or river adjudications to quantify the water rights in a given watershed,[6] including the federal reserved water rights for Indian tribes.[7] One widely accepted method for quantifying Indian water rights is to determine how much water a tribe would need to irrigate its reservation for agricultural purposes.[8] The rationale is that, beginning in the 1850s, the federal government created Indian reservations with the intention that tribes use them as homelands and form agrarian societies.[9] In cases resolving disputes about quantifying Indian water rights, the Supreme Court has held that the purpose of an Indian reservation was agricultural development.[10] The Court has

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1. ROBERT T. ANDERSON ET AL., AMERICAN INDIAN LAW, CASES AND COMMENTARY 3–5 (2d ed. 2010).

2. *Id.* at 7–8.

3. *See* Stephanie M. Schwartz, *The Arrogance of Ignorance: Hidden Away, Out of Sight and Out of Mind*, NATIVEVILLAGE.ORG (Oct. 15, 2006), http://www.nativevillage.org/Messages%20from%20the%20People/the%20arrogance%20of%20ignorance.htm.

4. Winters v. United States, 207 U.S. 564, 577 (1908).

5. COHEN'S HANDBOOK OF FEDERAL INDIAN LAW § 19.03[1] (Neil Jessup Newton ed., 2005) (hereinafter COHEN'S HANDBOOK).

6. 1 WATERS AND WATER RIGHTS § 16.01(Robert L. Beck & Amy L. Kelley, eds., 3d ed. LexisNexis/Matthew Bender 2010).

7. 2 *Id.* § 37.04(a).

8. COHEN'S HANDBOOK, *supra* note 5, § 19.03[5][b]. The PIA standard was first adopted by the Supreme Court in *Arizona v. California* (*Arizona I*), 373 U.S. 546, 600–01 (1963).

9. COHEN'S HANDBOOK, *supra* note 5, § 19.03[5][b].

10. *See, e.g.*, *Winters*, 207 U.S. at 576–77; *Arizona I*, 373 U.S. at 600–01; Wyoming v. United States, 492 U.S. 406 (1989).

therefore found that water rights should be quantified according to the agricultural potential of the reserved land.[11]

Unfortunately, deciding the amount of water reserved to each tribe does not the end the inquiry or resolve the dispute concerning federal reserved water rights for Indian tribes. Many tribes in the arid western United States find it impractical to use their water for agriculture given the high costs of starting a large agricultural enterprise and the low profit margins.[12] On the other hand, selling or leasing water rights to industrial and municipal entities off the reservation has the potential to bring additional income to the tribal communities with little business risk to the tribe.[13] However, court decisions and federal statutes have limited tribes' ability to use their water for purposes other than agriculture on the reservation[14] and off-reservation water leases/transfers.[15] Thus, some tribes who are in dire need of economic development are restricted from using their water rights in ways that could bring significant income to their reservations.

Recently Arizona courts have embraced a new method of quantifying Indian water rights. This method focuses on the federal government's intention to create a "homeland" for the tribes, rather than its intention that the tribes form agrarian societies. Using this method, the Arizona courts quantify water rights based on the purpose of the reservation being a "homeland" for tribes rather than based on the land's agricultural potential.[16] The homeland purpose centers on the idea that reservations were fundamentally created as homelands for Indian people either as explicitly stated in various treaties or based on how the tribes themselves would have interpreted their treaties.[17] However, in the

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11. *See, e.g.*, *Winters*, 207 U.S. at 576–77; *Arizona I*, 373 U.S. at 600–01; Wyoming v. United States, 492 U.S. 406.

12. Barbara A. Cosens, *The Measure of Indian Water Rights: The Arizona Homeland Standard, Gila River Adjudication*, 42 NAT. RESOURCES J. 835, 846–47 (2002); *see also*, David H. Getches, *Management and Marketing of Indian Water: From Conflict to Pragmatism*, 58 U. COLO. L. REV. 515, 543–44 (1988) (noting that agriculture may be culturally strange for some nomadic tribes).

13. Getches, *supra* note 12, at 543; Lee Herold Storey, *Leasing Indian Water Off the Reservation: A Use Consistent With the Reservation's Purpose*, 76 CAL. L. REV. 179, 217–18 (1988).

14. *In re* Gen. Adjud. of All Rights to Use Water in the Big Horn River Sys. (*Big Horn III*), 835 P.2d 273, 279 (Wyo. 1992); *infra* Part IV.b.

15. Indian Intercourse Act of 1834, 25 U.S.C. § 177 (2011) (alternatively called the Indian Nonintercourse Act); *infra* Part IV.c.

16. *In re* Gen. Adjud. of All Rights to Use Water in Gila River Sys. & Source (*Gila V*), 35 P.3d 68, 76 (Ariz. 2001).

17. United States v. Winans, 198 U.S. 371, 380–81 (1905) ("And we have said we will construe a treaty with the Indians as 'that unlettered people' understood it, and 'as justice and reason demand, in all cases where power is exerted by the strong over those to whom they owe care and protection,' and counterpoise the inequality 'by the superior

context of water rights adjudication, courts have traditionally held that the purpose of Indian reservations was limited to agriculture.[18] Breaking with precedent, in 2001, the Arizona Supreme Court held that Indian water rights should be quantified based on a broader "homeland standard," especially for tribes that do not find it economically profitable or feasible to use their water for agriculture.[19]

This Note examines how expanding the notion of water rights related to "reservation purpose" from exclusively agriculture to multi-faceted homeland purpose may strengthen tribal sovereignty and improve tribal self-sufficiency. After a thorough examination of these concepts, I argue that courts should adopt the "homeland standard" for quantifying Indian water rights. Such a standard will not only improve how water rights are quantified, but will also increase tribes' freedom to decide how best to use water to maintain their reservations as viable homelands.

Part II first explains western water law and the doctrine of prior appropriation and then describes federal Indian law and reserved water rights for tribes. Part III describes how the purpose of the reservation is used to quantify Indian water rights and examines the differences between the agricultural and homeland standard. Finally, Part IV explores how using the homeland purpose to quantify tribes' water rights will give tribes more freedom to use or transfer their water in the future. Like all other water users in the west, tribes desire independence and self-sufficiency. Tribes should be able to decide what is in their best interest and be able to use their water in any manner that is considered a beneficial use by western water law standards. Indian tribes are typically poor and should not be further prevented from making money from the sale or lease of one of their most valuable resources: water.

II. LEGAL BACKGROUND

Indian water rights are created, maintained, and distributed according to two legal doctrines: federal reserved water rights and prior

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justice which looks only to the substance of the right, without regard to technical rules'") (citations omitted); Winters v. United States, 207 U.S. at 576 ("By a rule of interpretation of agreements and treaties with the Indians, ambiguities occurring will be resolved from the standpoint of the Indians"); *see also*, Menominee Tribe of Indians v. United States, 391 U.S. 404, 406–07 (1968); Colville Confederated Tribes v. Walton, 647 F.2d 42, 47–49 (9th Cir. 1981).

18. *See, e.g.*, Arizona v. California (*Arizona I*), 373 U.S. 546, 601 (1963); *In re* Gen. Adjud. of All Rights to Use of Water in the Big Horn River Sys. (*Big Horn I*), 753 P.2d 76, 94–97 (Wyo. 1988), *aff'd mem. sub. nom.*, Wyoming v. United States, 492 U.S. 406 (1989).

19. *Gila V*, 35 P.3d at 76.

appropriation.[20] Through decades of legal battles and court decisions, parties—both Indian and non-Indian—and courts have found a way to creatively combine the two doctrines to address the unique issue of Indian water rights. In the western United States water rights are managed according the system of prior appropriation, which gives rights in priority to the entity that first diverts water from each stream.[21] This ensures that entities with the most senior water rights, based on their earliest water use, will be protected from junior water users in the event of a drought. Each western state following the prior appropriation doctrine has both common law and statutes that govern the administration of water rights.[22]

When the federal government reserves public lands, for example to create Indian reservations or national parks, it also reserves the water rights necessary to fulfill the purpose of the reservation.[23] In the western United States, these federal reserved water rights have a priority date so they can be administered in priority along with other water rights in accordance with states' prior appropriation system.[24] As explained below, Indian water rights have a priority date and are managed by state agencies, but are the property of the federal government held in trust for each respective tribe.

A. Western Water Law: The Prior Appropriation Doctrine

In the arid and semi-arid western United States rainfall averages between 9.5–22 inches per year,[25] much less than the average 40 inches per year in the eastern United States.[26] The semi-arid and arid climates in the West also have high evaporation rates. For both these reasons agriculture in the West requires more water per acre than the amount

20. *See infra* Part II. a–b.

21. 1 WATERS AND WATER RIGHTS, *supra* note 6, § 11.01. Eighteen western states apply the prior appropriation doctrine to surface water: Alaska, Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. 1 *Id.* § 12.2(d), Table 12-1.

22. *See* 1 *id.* § 11.04(b).

23. 2 *Id.* § 37.01; Winters v. United States, 207 U.S. 564, 577 (1908).

24. 2 WATERS AND WATER RIGHTS, *supra* note 6, § 37.01.

25. Based on average annual precipitation between 1971–2000 for Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. W. Reg'l Climate Ctr , *Average Statewide Precipitation for the Western States*, http://www.wrcc.dri.edu/htmlfiles/avgstate.ppt.html (last visited Nov. 15, 2011).

26. U.S. Dept. of Interior Bureau of Reclamation, *Water Conservation Field Services Program*, http://www.usbr.gov/waterconservation/ (last visited Nov. 15, 2011).

needed to irrigate the same crops in the East.[27] Moreover, annual precipitation in the West can vary more widely from year to year and droughts are not uncommon.[28] Thus, western states developed a system to manage water rights that protects owners of water rights from shortages due to drought or overuse where each water right's protection is relative to its seniority, or how early it was first diverted from the stream and used.

In order to compensate for the relative scarcity of water, water law in western states guarantees those who used water first a higher priority to withdraw water in times of drought or water shortage.[29] A person or entity creates a water right by withdrawing water from a stream and putting it to beneficial use.[30] Each water right is given a priority date based on the year of that first withdrawal.[31] "Senior" water rights are those associated with the earliest priority dates while rights associated with later priority dates are "junior."[32] Owners of junior rights may not have any water left to withdraw in a drought or water shortage.[33]

Water rights adjudicated under this prior appropriation doctrine are controlled and managed by the states, but the right is generally considered a property right owned by the entity that owns the land where the water was first applied or used.[34] While the original water right is not purchased, but rather granted, water rights are generally transferrable and they can be sold either with or without the land.[35] As will be explained below, non-Indian water rights owners are permitted to sell or lease water rights for great profit, while Indian tribes are not.[36]

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27. *See generally* Edward T. Lincare, *A Simple Formula for Estimating Evaporation Rates in Various Climates, Using Temperature Data Alone*, 18 AGRIC. METEOROLOGY 409 (1977) (demonstrating inputs to evaporation models); *see also*, David Pimentel et al., *Water Resources: Agriculture, the Environment, and Society*, 47 BIOSCIENCE 97, 99 (1997) (discussing how irrigation needs of crops varies based on climate).

28. KATHLEEN A. MILLER, CLIMATE VARIABILITY, CLIMATE CHANGE, AND WESTERN WATER 9 (1997), *available at* http://www.isse.ucar.edu/water_climate/references/climate.pdf.

29. 1 WATERS AND WATER RIGHTS, *supra* note 6, § 12.02(e).

30. 1 *Id.* § 12.02(c)(2). The scope of beneficial use has changed over time, but basically it means that the water was used for a legitimate purpose such as agriculture, municipal, or industrial uses.

31. 1 WATERS AND WATER RIGHTS, *supra* note 6, § 12.02(e).

32. 1 *Id.*

33. Colo. River Water Conservation Dist. v. United States, 424 U.S. 800, 805 (1976); 1 WATERS AND WATER RIGHTS, *supra* note 6, § 12.02(e).

34. 1 WATERS AND WATER RIGHTS, *supra* note 6, § 12.02(e).

35. 1 *Id.* § 14.04(a).

36. *See infra* Part IV. b–c.

B. Indian Law: Federal Reserved Water Rights

As opposed to non-Indian water rights, Indian water rights are not owned by tribes or managed by states. Much like reservation land, the federal government owns Indian water rights and holds them in trust for the exclusive use and benefit of specific tribes.[37] These water rights are called "federal reserved rights" because the federal government reserved the water for each tribe at the time land was taken into trust and thereby reserved for the tribe.[38] Tribes may not use their water rights until their rights are quantified through adjudication in state court through litigation or settlement.[39] While Indian water rights are not owned or controlled by the state, they are given a priority date so that they can be administered within the state system of prioritizing withdrawals in time of shortages.[40] Often, the priority date is either time immemorial or the date the reservation was created,[41] but there are some exceptions that will be explained below. Effectively, this means that Indian water rights are often senior to all other non-Indian users on the stream because Indians and Indian reservations were often present long before non-Indian settlers moved out west and began appropriating water.[42]

The senior nature of Indian water rights causes much turmoil and distress among states and non-Indian water users because before Indian water rights are adjudicated, non-Indian water users divert water that may actually belong to tribes.[43] After Indian water rights are quantified and used by tribes, a senior water user that was accustomed to taking its full allotment each year might be curtailed in dry years because Indian water rights have a higher priority date.[44] Thus, when Indian water rights are being adjudicated and quantified, almost all other users on the stream or river have great incentive to raise any argument that the tribe should be granted little or no water.

Unlike state water rights owners, tribes do not own their water rights—the federal government does.[45] Thus, tribes have restrictions on

37. COHEN'S HANDBOOK, *supra* note 5, § 19.06.

38. *See, e.g.*, Winters v. United States, 207 U.S. 564, 577 (1908); Arizona v. California (*Arizona I*), 373 U.S. 546, 600 (1963); *see also* COHEN'S HANDBOOK, *supra* note 5, § 19.03[1].

39. *See generally* COHEN'S HANDBOOK, *supra* note 5, § 19.03[5].

40. Cappaert v. United States, 426 U.S. 128, 138 (1976).

41. *See, e.g.*, *Winters*, 207 U.S. at 577 (priority date is the date the reservation was created); United States v. Adair, 723 F.2d 1394, 1414 (9th Cir. 1983) (priority date is time immemorial).

42. 2 WATERS AND WATER RIGHTS, *supra* note 6, § 37.01(c)(1).

43. Getches, *supra* note 12, at 520.

44. 2 WATERS AND WATER RIGHTS, *supra* note 6, § 37.01(c)(1).

45. COHEN'S HANDBOOK, *supra* note 5, § 19.06.

how they can use and alienate their rights.[46] As described below, the interplay between state water rights systems and federally owned reserved water rights for Indian tribes leads to generally negative results for tribes.

III. USING THE PURPOSE OF THE RESERVATION TO QUANTIFY INDIAN WATER RIGHTS

The federal government's underlying purpose in creating each reservation is used to determine the quantity of water allocated to the tribe in subsequent stream adjudications and settlements. Stream adjudications involving Indian water rights really began in 1908 with *Winters v. United States*.[47] Many are ongoing today,[48] and many more have yet to begin. In these adjudications state courts determine how much water the federal government intended to reserve to the tribes,[49] for example by creating a reservation or signing a treaty.[50] The Supreme Court has approved the use of an agricultural standard to determine the quantity of water rights reserved for each tribe.[51] This is based on the original idea that reservations were created so Indians could adopt an agrarian lifestyle.[52] Because today not all Indian tribes want to become farmers or use their water exclusively for agrarian purposes, the agricultural standard may no longer be an appropriate one.[53]

A. History and Application of the Agricultural Standard

Many years after the federal government created Indian reservations

46. As a trust asset of the federal government, Indian water rights are inalienable without the consent of the federal government. Indian Intercourse Act of 1834, 25 U.S.C. § 177 (2011) (alternatively called the Indian Nonintercourse Act).

47. 207 U.S. 564 (1908).

48. *See, e.g.*, Superior Ct. of Maricopa County, *Arizona's General Stream Adjudications*, http://www.superiorcourt.maricopa.gov/SuperiorCourt/Adjudications/Index.asp (last visited Nov. 15, 2011).

49. Federal reserved water rights may be adjudicated in state courts under the McCarran Amendment, which waived federal sovereign immunity for the joinder of the United States as a defendant in general stream adjudications in state courts. 43 U.S.C. § 666; United States v. Dist. Ct. in and for Eagle County, Colo., 401 U.S. 520, 524 (1971).

50. COHEN'S HANDBOOK, *supra* note 5, § 19.03[5].

51. Arizona v. California (*Arizona I*), 373 U.S. 546, 601 (1963); *In re* Gen. Adjud. of All Rights to Use of Water in the Big Horn River Sys. (*Big Horn I*), 753 P.2d 76, 94–97 (Wyo. 1988), *aff'd mem. sub. nom.*, Wyoming v. United States, 492 U.S. 406 (1989).

52. *See, e.g.*, Winters v. United States, 207 U.S. 564, 576–77 (1908).

53. *In re* Gen. Adjud. of All Rights to Use Water in Gila River Sys. & Source (*Gila V*), 35 P.3d 68, 78 (Ariz. 2001).

in the western United States, settlers arrived and immediately tension over water arose between the tribes and the non-Indians.[54] In *Winters v. United States*, the Supreme Court decided that in reserving a permanent homeland for Indian tribes (specifically, the Indians associated with the Belknap Indian Reservation), the federal government also reserved adequate water for tribes to live on the land.[55] Because the primary purpose of creating the Belknap Indian Reservation was to encourage an agrarian lifestyle, the *Winters* court held that the government reserved sufficient water for the Indians to farm on their reservation.[56]

Later, in a case involving federal reserved water rights for a national monument, the Court held that the federal government reserved only the amount of water sufficient to accomplish the purpose of the reservation.[57] In a case about dividing water rights on the Colorado River between Arizona and California, the Court recognized the practicably irrigable acreage ("PIA") standard that is now used to quantify Indian water rights in most stream adjudications and settlements.[58] The Court in *Arizona I* held that once it was established that the purpose of a reservation was agriculture, the amount of water reserved for Indian tribes would be quantified based on the amount of water necessary to irrigate all the land on the reservation that could be feasibly and economically irrigated.[59] The Court reasoned that if a reservation was created for agrarian purposes, then the water reserved was also for that purpose.[60]

The PIA methodology was further clarified in the Wyoming Supreme Court case *Big Horn I*, which was later affirmed by the U.S. Supreme Court.[61] *Big Horn I* established that the Wind River tribes of northern Wyoming had reserved water rights from their treaty with the United States.[62] The Wyoming Supreme Court found that the reservation was created with an agricultural purpose,[63] so the Tribe's water right should be quantified using the PIA method.[64] The court held that a PIA analysis requires proof of arability and the engineering feasibility of irrigating the land.[65] Thus, PIA is calculated based on the quantity of

54. 2 WATERS AND WATER RIGHTS, *supra* note 6, § 37.01(a).
55. *Winters*, 207 U.S. at 565, 576–77.
56. *Id.*
57. Cappaert v. United States, 426 U.S. 128, 141 (1976).
58. Arizona v. California (*Arizona I*), 373 U.S. 546, 600 (1963).
59. *Id.* at 600–01.
60. *Id.*
61. *In re* Gen. Adjud. of All Rights to Use of Water in the Big Horn River Sys. (*Big Horn I*), 753 P.2d 76, 101 (Wyo. 1988).
62. *Id.* at 91.
63. *Id.* at 96.
64. *Id.* at 100–01.
65. *Id.* at 101 ("The determination of practicably irrigable acreage involves a two-part analysis, i.e., the PIA must be susceptible of sustained irrigation (not only proof of

water necessary to irrigate as much land as it is economically feasible to irrigate.[66]

B. Perceived Problems with the Agricultural Standard

Although PIA is a relatively easy and straightforward calculation, it may not be the most appropriate standard to use in all Indian water rights cases. In an adjudication for the Gila River in southern Arizona, the Arizona Supreme Court rejected the use of the PIA standard as the sole determinant for Indian water rights.[67] The *Gila V* court observed that because such a standard implicitly forced tribes into an agricultural lifestyle it would not fulfill the purpose of the reservation.[68] The *Gila V* court held that Indian reservations were created to serve as a homeland for tribes, whether the document creating the reservation said so explicitly or not.[69] The court then laid out four reasons why the PIA standard does not always ensure that tribes will be granted sufficient water to make their reservations a permanent homeland.

First, the PIA standard is unfairly biased against tribes whose reservations are on land of poor agricultural quality.[70] For example, the Mescalero Apache Tribe, located in a mountainous region of south-central New Mexico, did not receive any reserved water under the PIA standard because it failed to show that agriculture would be economically feasible on its reservation.[71] Thus, tribes in mountainous regions may not be granted enough water to meet their needs under the PIA standard. Denying tribes any water because agriculture is infeasible is inconsistent with the principle established in *Winters* that tribes need water in order to enable their reservations to be a permanent homeland.[72]

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the arability but also of the engineering feasibility of irrigating the land) and irrigable 'at reasonable cost'").

66. 2 WATERS AND WATER RIGHTS, *supra* note 6, § 37.02(c)(1).

67. *In re* Gen. Adjud. of All Rights to Use Water in Gila River Sys. & Source (*Gila V*), 35 P.3d 68, 76 (Ariz. 2001).

68. *Id.* at 78.

69. *Id.* at 77–78 ("But it seems clear to us that each of the Indian reservations in question was created as a 'permanent home and abiding place' for the Indian people, as explained in *Winters* . . . . Such a construction is necessary for tribes to achieve the twin goals of Indian self-determination and economic self-sufficiency . . . . We therefore hold that the purpose of a federal Indian reservation is to serve as a 'permanent home and abiding place' to the Native American people living there.").

70. *Id.* at 78.

71. State ex rel. Martinez v. Lewis, 861 P.2d 235, 246–51 (N.M. Ct. App. 1993); *see also Gila V*, 35 P.2d at 78.

72. *Gila V*, 35 P.3d at 78 ("This inequity is unacceptable and inconsistent with the idea of a permanent homeland.").

The *Gila V* court's second reason the PIA standard might not give tribes adequate water for permanent homelands was that the PIA standard may force some tribes into an agricultural lifestyle, even when such a lifestyle might be extremely risky and/or only marginally profitable.[73] Third, the court noted that, to maximize a water right the PIA standard gives tribes an incentive to create irrigation plans that include more agriculture activity than they actually expect to engage in.[74] Finally, the court noted that tribes that ultimately have no desire to start farming may be granted more water than is actually necessary for them to have a viable homeland.[75]

C. The Homeland Standard as an Alternative to PIA

In order to ensure greater diversity in the possible uses of water by tribes,[76] the Arizona Supreme Court in 2001 adopted a more flexible "homeland standard" in order to quantify water rights for tribes in the Gila River adjudication.[77] Quantification under the homeland standard is based on actual current and projected future uses of water on the reservation.[78] Under the homeland standard, water quantification is not limited to only the amount of water necessary for economically feasible agriculture.[79] The *Gila V* court suggests using the following factors in a homeland standard analysis to determine the amount of water reserved to a tribe: historical and cultural water uses, land use plans, population projections, geography, and economic base.[80] Thus, under the homeland standard, a reservation would secure a tribe sufficient water rights for current and future needs and would not limit the tribe to only the water necessary for future agriculture.[81]

While the Supreme Court has affirmed the use of the PIA standard to quantify water rights for tribes since *Arizona I*,[82] this expanded "purpose of a reservation" developed in *Gila V* has not been tested before the Supreme Court. However, these two standards are not mutually

73. *Id.*

74. *Id.* ("Limiting the applicable inquiry to a PIA analysis creates a temptation for tribes to concoct inflated, unrealistic irrigation projects.").

75. *Id.* at 79 ("The PIA standard also potentially frustrates the requirement that federally reserved water rights be tailored to minimal need. Rather than focusing on what is necessary to fulfill a reservation's overall design, PIA awards what may be an overabundance of water by including every irrigable acre of land in the equation.").

76. *Id.* at 77–81.

77. *Id.* at 77.

78. *See, e.g.*, Arizona v. California (*Arizona I*), 373 U.S. 546, 601 (1963).

79. *Gila V*, 35 P.3d at 79–80.

80. *Id.*

81. *Id.*

82. Wyoming v. United States, 492 U.S. 406 (1989).

exclusive. The Supreme Court in *Arizona I* affirmed the PIA standard,[83] but later qualified that once Indian water rights are quantified, tribes should not be limited to using the water for agriculture.[84] Thus, the Supreme Court allows for water to be used for homeland purposes, but has, thus far, only used the PIA standard to quantify them.

While the agricultural standard might be beneficial to some tribes, it is not appropriate for all tribes. Many tribes will not get any water under the PIA standard or will get insufficient water for use in areas other than agriculture.[85] However, the adequacy of the PIA standard to quantify Indian water rights is not the end of the issue. As explained below in Part IV, the use of the agricultural standard in quantifying water rights has two negative consequences. It can affect the priority date of the water right, and it can limit a tribe's ability to change its water uses on the reservation or transfer or lease water rights off the reservation. This note argues that quantifying Indian water rights using the homeland, instead of the agricultural standard, will give tribes more freedom to use their water for the uses they deem most valuable in order to make their reservations permanent and sustainable homelands.

IV. QUANTIFYING INDIAN WATER RIGHTS WITH THE HOMELAND STANDARD MAY GIVE TRIBES MORE FREEDOM TO MAINTAIN A VIABLE HOMELAND

Reservations were created as homelands for tribes.[86] Most tribes are poor, and water is one of their most valuable resources.[87] Tribes need flexibility in their use of land and water resources; they should not be tied to an agricultural economy that might not be profitable or practical in the twenty-first century. For instance, a tribe may wish to use its water for nonagricultural purposes, like riparian habitat restoration or energy development. In addition, a tribe may wish to sell or lease a portion of its water because doing so would be more economically efficient than developing agriculture. These are all acceptable water uses, open to other water rights owners in the prior appropriation system, but not necessarily open to all Indian tribes.

Originally, reservations were established with the hope that tribes

83. *Arizona I*, 373 U.S. at 600–01.

84. Arizona v. California (*Arizona II*), 439 U.S. 419, 422 (1979).

85. *See Gila V*, 35 P.3d at 78–79.

86. Winters v. United States, 207 U.S. 564, 565 (1908); *Arizona I*, 373 U.S. at 599; *Gila V*, 35 P.3d at 74.

87. Chris Seldin, *Interstate Marketing of Indian Water Rights: The Impact of the Commerce Clause*, 87 CAL. L. REV. 1545, 1546 (1999).

would farm and create agrarian societies as that is what the government was encouraging all settlers to do in the West.[88] Some tribes developed their agrarian base, but many did not. Today, farms are disappearing in the West because agriculture is no longer profitable compared to other industries and uses of the land.[89] It has taken over a century to get some Indian water rights adjudicated and many are left to be adjudicated. Yet Indian water rights are still largely being quantified based on the PIA standard.

The PIA standard can be a double-edged sword for many tribes. When agriculture requires a lot of water, the water rights granted to tribes under this standard are large. However, quantifying water rights with the PIA standard has its price because it can limit tribes' use of their water rights. For example, tribes in Wyoming are prevented from using their water for nonagricultural purposes, like instream flow.[90] Unlike the PIA standard, quantifying water rights based on a homeland standard does not have the negatives associated with restricting use to agriculture because a homeland standard more accurately focuses the use of water on any purpose a tribe feels is necessary to maintain a viable homeland on the reservation.

It is well established that the way a court defines the purpose of an Indian reservation directly affects the quantity of water that a tribe can expect to get in a stream adjudication or settlement.[91] But the way a court defines the purpose of a reservation has other impacts on Indian water rights, both in the adjudicative process and beyond, as tribes attempt to use their water to foster economic development. If a reservation's purpose is to create a homeland for the tribe, it implies that the tribe should be able to use its water in whatever way it chooses to maintain or create a permanent, viable, and sustainable homeland now and in the future. Thus, while most courts agree that, in general, Indian reservations were created as places for tribes to establish a permanent homeland, the disagreement about the "purpose of the reservation" in the context of quantifying water rights, and the way it might limit future uses of water, also affects the ability of tribes to actually maintain a viable homeland on their reservations.

Quantifying Indian water rights based on the homeland standard may give tribes more freedom to use their water rights in ways that will benefit their people now and in the future. First, tribes may be able to

88. *Winters*, 207 U.S. at 566.

89. Thomas Garry, *Water Markets and Water Rights in the United States: Lessons from Australia*, 4 MACQUARIE J. INT'L & COMP. ENVTL. L. 23, 33–34 (2007).

90. *In re* Gen. Adjud. of All Rights to Use Water in the Big Horn River Sys. (*Big Horn III*), 835 P.2d 273, 279 (Wyo. 1992).

91. COHEN'S HANDBOOK, *supra* note 5, at § 19.03[5][a].

expand the water uses associated with the most senior "time immemorial" priority date under the theory that command of resources since time immemorial entitles them to the ongoing ability to use those resources for any purpose necessary to maintain a viable homeland. Second, establishing a homeland purpose in a water rights adjudication may give tribes more freedom to change their use of water and not be forced to continue farming because the water was quantified for agriculture. Finally, although tribes are not permitted to sell or lease their water rights without consent from the federal government, such permission might be easier to secure under the homeland standard where selling or leasing water rights would increase the economic self-sufficiency of a tribe.

A. Time Immemorial Priority Date

The priority date for Indian water rights is typically the date the reservation was established.[92] However, courts have also recognized an earlier priority date if the reserved land is part of the tribe's aboriginal territory.[93] When it is clear that tribes have been using the water since before white settlers came into the tribe's aboriginal territory, tribes are granted a "time immemorial" priority date, which means there can be no other water rights more senior.[94] In the past, tribes have only been given a time immemorial priority date for aboriginal uses of water.[95] However, some tribes in the Southwest hope to expand this rule and secure a time immemorial priority date for future uses of water, where the tribe was "in command of the streams" since time immemorial.[96] These tribes argue that when their reservations are part of their aboriginal territory, they never gave up the beneficial uses of the waters in their command and thus should be granted a time immemorial priority date for any current or future uses of that water, not just for historic or aboriginal uses.[97] The

92. *See, e.g.*, *Winters*, 207 U.S. at 577; *Arizona I*, 373 U.S. at 600.

93. *See, e.g.*, United States v. Adair, 723 F.2d 1394, 1414 (9th Cir. 1983) (water necessary for Klamath Tribes' treaty rights of hunting and fishing given time immemorial priority date); New Mexico ex rel. Reynolds v. Aamodt, 618 F. Supp. 993, 1009–1010 (D.N.M. 1985) (time immemorial priority date granted for water necessary to irrigate aboriginal lands still owned by Pueblo tribes).

94. COHEN'S HANDBOOK, *supra* note 5, at § 19.03[3].

95. *Id.*

96. *See* United States Brief in Support of its Motion for Summary Judgment at 12–13 *In re* Gen. Adjud. of All Rights to Use Water in the Little Colorado River Sys. & Source, No. 6417-201 (Super. Ct. of Az. in and for the county of Apache Mar. 26, 2010); United States Brief in Response to Motion for Partial Summary Judgment at 36–37, New Mexico ex rel. State Engineer v. Abeyta, (D.N.M. Aug. 19, 1995).

97. United States Brief in Support of its Motion for Summary Judgment, *supra* note 96, at 10–15; United States Brief in Response to Motion for Partial Summary Judgment, *supra* note 96, at 45.

homeland standard furthers this argument because it acknowledges that the purpose of reservations is to create sustainable homelands for tribes, not limit tribes to aboriginal uses of water.

Tribes are typically granted time immemorial priority dates because of the tribe's aboriginal use of the water.[98] In essence, this means that the use of water was reserved by the tribe even though the tribe ceded other lands to the federal government.[99] For example, in *United States v. Adair*, the Ninth Circuit found that one of the primary purposes of creating the Klamath Reservation was to preserve the Tribe's aboriginal hunting and fishing rights.[100] Thus, the Klamath Reservation necessarily included sufficient water for the Tribe to continue hunting and fishing in their aboriginal lands.[101] The court concluded that those water rights necessary for hunting and fishing would necessarily have a time immemorial priority date.[102]

The Pueblo tribes of New Mexico were recently granted a time immemorial priority date for their water rights.[103] The Pueblos have historically been an agrarian people. In *New Mexico ex rel. Reynolds v. Aamodt*, the U.S. District Court of New Mexico held that the Tribes' ownership of their aboriginal land had been recognized by both Spain and Mexico since before the United States secured the land from Mexico.[104] Further, even though Mexico ceded its lands to the United States in the Treaty of Guadalupe Hidalgo, the Pueblos did not cede their lands and thus retained aboriginal title.[105] The *Reynolds* court addressed water rights in its holding that, along with aboriginal title to their lands, the Pueblo Tribes retained the most senior water rights (i.e. time immemorial) to water necessary for domestic and agricultural uses on the part of their lands historically irrigated.[106]

While in the past time immemorial priority dates have only been granted for tribes' aboriginal uses of water, Supreme Court precedent coupled with the use of the homeland standard would allow tribes to get a time immemorial priority date for any current or future uses of water as long as it is applied on their aboriginal territory. *United States v. Winans* stands for the principle that in treaties between the federal government and Indian tribes, the United States did not grant Indian tribes special

98. COHEN'S HANDBOOK, *supra* note 5, at § 19.03[3].

99. *See, e.g.*, United States v. Adair, 723 F.2d 1394, 1414 (9th Cir. 1983); New Mexico ex rel. Reynolds v. Aamodt, 618 F. Supp. 993, 1009–1010 (D.N.M. 1985).

100. 723 F.2d at 1409.

101. *Id.* at 1410.

102. *Id.* at 1414.

103. *Reynolds*, 618 F. Supp. at 1009–10.

104. *Id.* at 998.

105. *Id.* at 1006–09.

106. *Id*.

rights to use or live on their aboriginal territories. Rather the treaties merely stated which rights the tribes were giving up to the federal government, such as parts of their aboriginal territory.[107] In *Winters v. United States*, the Supreme Court had previously reasoned that when reservations are carved from larger tracts of aboriginal territory, tribes do not give up either the command of the lands and the waters or the command of all their beneficial uses.[108] Similarly, in *United States v. Shoshone Tribe*, the Supreme Court recognized a tribe's aboriginal rights to mineral deposits because a treaty did not explicitly grant the mineral rights to the United States.[109] The *Shoshone* court reasoned that, "[s]ubject to the conditions imposed by the treaty, the Shoshone Tribe had the right that has always been understood to belong to Indians, undisturbed possessors of the soil from time immemorial."[110] In sum, when tribes continue to live on a part of their aboriginal territory, they retain all rights to use the land's resources unless those rights were explicitly ceded to the United States in a treaty or other agreement.

If a court establishes that a reservation was created with a homeland purpose and that the tribe was in command of the waters since time immemorial, then it follows that the tribe should be able to use its water for any past, present, or future uses that would enable the tribe to maintain a viable homeland on that reserved land. The time immemorial priority date would not be tied to strictly aboriginal uses of water. Such flexibility with water use is crucial to enabling tribes to develop a wide range of modern activities that might not have existed during the time of treaty negotiations, for example power plants. Likewise, tribes could use their water for instream flows to protect scenic or wildlife habitats that are not tied to aboriginal hunting and fishing, but are now valuable to the tribes on their reservations.

This argument faces challenges. Courts have granted time immemorial priority dates sparingly and only for original aboriginal uses of water.[111] Further, courts have restricted increases in the amount of water allowed under the time immemorial priority date to aboriginal uses.[112] For example, while the *Adair* court allowed for an expansion in

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107. 198 U.S. 371, 381 (1905) (Treaties and agreements are "not a grant of rights to the Indians, but a grant from them— a reservation of those not granted.").

108. 207 U.S. 564, 576 (1908).

109. 304 U.S. 111,117 (1938).

110. *Id.*

111. *See, e.g.*, United States v. Adair, 723 F.2d 1394, 1414 (9th Cir. 1983) ("Thus, we are compelled to conclude that where, as here, a tribe *shows its aboriginal use* of water to support a hunting and fishing lifestyle, and then enters into a treaty with the United States that *reserves this aboriginal water use*, the water right thereby established retains a priority date of first or immemorial use.") (emphasis added).

112. *Id.* at 1415 (quoting Washington v. Fishing Vessel Ass'n, 443 U.S. 658, 686 (1979)).

the quantity of water under its time immemorial priority date to support the needs of future generations, only the water that was required to support the aboriginal hunting and fishing lifestyle was given a time immemorial priority date.[113] Further, in *Reynolds*, the court focused on the fact that the Pueblo tribes used the land for farming since before the Spanish discovery, and thus found that the tribes should get a time immemorial priority date for any past, present, or future *agricultural uses* of water on land that was historically irrigated.[114] The argument stemming from the combination of principles set forth in *Winans* (that tribes reserve any rights not explicitly granted to the US) and *Winters* (that tribes were in command of the streams since time immemorial) is not widely accepted and may not sway courts to expand the time immemorial priority date to any future use that will help the tribe create and maintain a viable homeland. Thus, establishing a homeland purpose standard to expand the types of uses permitted with a water right may have an insignificant effect on priority dates.

B. Change of Use on the Reservation

A potential problem with the PIA standard is that it may limit a tribe's use of water to agricultural purposes. Change of use is typical for non-Indian western water rights, either by the original owner or by a subsequent owner.[115] Like any water right owner in the West, tribes may want to apply to change the use of their water from the original adjudicated use. While most Indian tribes have not been constrained in their efforts to change the use of water on their reservations,[116] the Wind River Tribes in Wyoming have not been permitted to change from agricultural (consumptive) to instream flows (non-consumptive) uses.[117] Indian tribes should not be constrained in their future water uses based on the "purpose of the reservation" that was used to quantify those rights. Nonetheless, in Wyoming the PIA standard did just that.[118]

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113. *Id.* at 1414–15.

114. New Mexico ex rel. Reynolds v. Aamodt, 618 F.Supp 993, 1009–10 (D.N.M. 1985).

115. *See* 1 WATERS AND WATER RIGHTS, *supra* note 6, at § 14.04(a).

116. *See, e.g.*, Arizona v. California (*Arizona II*), 439 U.S. 419, 422 (1979); Coleville Confederated Tribes, 647 F.2d 42 (1981); COHEN'S HANDBOOK, *supra* note 5, at §19.03[6].

117. *In re* Gen. Adjud. of All Water Rights in the Big Horn River Sys. (*Big Horn III*), 835 P.2d 273 (Wyo. 1992).

118. *Id.* at 278; *see also*, Peggy Sue Kirk, *Water Law—Indian Law—Cowboys, Indians and Reserved Water Rights: May a State Court Limit How Indian Tribes Use Their Water?*, 28 LAND & WATER L. REV. 467 (1993); Wes Williams, Jr., *Changing Water Use for Federally Reserved Indian Water Rights: Wind River Indian Reservation*, 27 U.C. DAVIS L. REV. 501 (1994).

After the Supreme Court upheld *Big Horn I*, maintaining that the PIA standard should be used to quantify the reserved water rights because the primary purpose of the Wind River Indian Reservation was agriculture,[119] the Wind River Tribes wanted to use a portion of their newly quantified water right to promote instream flows and to maintain fish habitats.[120] In *Big Horn III*, the Wyoming Supreme Court ruled against the Tribes in a plurality opinion, holding that they could not change their water use from agricultural to instream flow; however the justices did not agree on why. Three of the five justices agreed that the tribes should not be able to change their agricultural water rights into instream flow rights.[121] Justice Macy and Justice Thomas reasoned that the original purpose of the reservation was agriculture and not fishing[122] and, further, Wyoming state water law prevents any entity beside the state from holding instream flow water rights.[123] Justice Cardine did not agree that the Tribes' water uses were limited to agricultural uses or that state water laws must apply, but reasoned that the Tribes must first use their water right before being applying to change the water right to an instream flow use.[124] The dissenting justices, Justice Brown and Justice Golden, agreed that under Supreme Court precedent in *Arizona I*, Tribes should be able to change water uses to any lawful purpose on the reservation because federal reserved water rights are not bound by state water laws.[125]

While *Big Horn III* is only persuasive outside of Wyoming, the decision is problematic for practical and legal reasons. As a practical matter, the decision resulted in inefficient use of water resources. By not allowing the Tribes to leave water in the stream, the decision hurt not only their interest, but also the interests of junior users downstream, who would have benefited from the extra water left in the stream. As a legal matter, Indian water rights are federal reserved water rights, and they come from outside the state water law system.[126] Thus, by saying that

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119. *In re* Gen. Adjud. of All Rights to Use of Water in the Big Horn River Sys. (*Big Horn I*), 753 P.2d 76, 96 (Wyo. 1988), *aff'd mem. sub. nom.*, Wyoming v. United States, 492 U.S. 406 (1989).

120. *Big Horn III*, 835 P.2d at 275–76. Between *Big Horn I* and *Big Horn III*, the Wyoming Supreme Court decided *Big Horn II*, but it only related to the standing of non-Indian claimants who had not participated in *Big Horn I*. *In re* Gen. Adjud. of All Rights to Use Water in the Big Horn River Sys. (*Big Horn II*), 803 P.2d 61 (Wyo. 1990).

121. *Big Horn III*, 835 P.2d at 275–88.

122. *Id.* at 278 (Macy, J., majority opinion).

123. *Id.* at 284 (Thomas, J., concurring specially).

124. *Id.* at 285 (Cardine, J., concurring in part and dissenting in part).

125. *Id.* at 288–89 (Brown, J., dissenting); *id.* at 294 (Golden, J., dissenting).

126. *See* Kirk, *supra* note 118, at 484–85 (arguing that court is misinterpreting the *Winters* doctrine, which provides that federal reserved water rights are exempt from appropriation under state laws).

Indian water rights must fit into the state water law system, Justices Macy and Thomas went against established legal principles by allowing state law to supersede federal law.[127]

Effectively, the *Big Horn III* decision would limit tribes to an agricultural lifestyle; thus, if agriculture is no longer economically feasible, tribes could no longer use their water rights at all.[128] Tribes should be able to decide what is in the best interest of their homeland and how to best use their water rights. A tribe whose water rights were adjudicated for a broader homeland purpose could more easily use their water rights for any purpose on the reservation.[129]

C. Transfer/Lease off the Reservation

If the purpose of Indian reservations is to create a permanent homeland for tribes, and not to force Indians into a permanent agricultural lifestyle, tribes should be able to use their water rights awarded under a homeland standard for any purpose that would create a sustainable economy for tribal members.[130] The ability to lease or transfer water rights off the reservation would help tribes fulfill their homeland purpose. However, tribes are currently prevented from selling or leasing water off reservation by the Indian Intercourse Act of 1834.[131] Under the Indian Intercourse Act, the sale, lease, or grant of tribal property is prohibited without the consent of the federal government.[132] Although most courts have not considered this specific question, it is likely that the Indian Intercourse Act applies to Indian water rights.[133] The inability of tribes to lease water rights off their reservations because of the Indian Intercourse Act is likely denying many tribes the economic benefit they could derive from selling or leasing water that they are not using.[134]

In general, under prior appropriation, owners of water rights may permanently sell or temporarily lease their water right to another

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127. *Id.* at 483.

128. Kirk, *supra* note 118, at 485–486; *see generally In re* Gen. Adjud. of All Rights to Use Water in Gila River Sys. & Source (*Gila V*), 35 P.3d 68, 76 (Ariz. 2001).

129. *See* Cosens, *supra* note 12, at 857–58.

130. Storey, *supra* note 13, at 213; *see also* Getches, *supra* note 12, at 543.

131. Indian Intercourse Act of 1834, 25 U.S.C. § 177 (2011) (alternatively called the Indian Nonintercourse Act) ("No purchase, grant, lease, or other conveyance of lands, or of any title or claim thereto, from any Indian nation or tribe of Indians, shall be of any validity in law or equity, unless the same be made by treaty or convention entered into pursuant to the Constitution.").

132. *Id.*

133. COHEN'S HANDBOOK, *supra* note 5, § 19.03[7][c].

134. Storey, *supra* note 13, at 217–20.

entity.[135] The law and practice associated with water rights transfer and leasing is derived from state laws.[136] Because each water right consists of a quantity and priority date, the original owner sells both and the purchaser can use the water for a different use and in a different location, while retaining the priority date. The only restriction is that the new use cannot "harm" any junior water users on the river. No matter where the new use occurs, junior water users will still get the same amount of water to their diversions that they would have with the original use.[137] Therefore, the purchaser can only use the quantity of water associated with the consumptive use of the original owner.[138] The state engineer is typically responsible for ensuring that no harm befalls junior water users after a water right transfer, but each state has different rules and practices.[139] Laws for water leasing have similar restrictions to selling, but water leasing is not permitted in all states.[140]

Recently, throughout the western United States, water leases and transfers tend to occur from agriculture to municipalities as cities grow and farming becomes less profitable.[141] Selling water rights is big business in the West.[142] Water rights with early priority dates are worth more because there is a much higher degree of certainty that the water user will get to use the water in any given year. As described earlier, Indian water rights typically have very high priority dates because Indians and Indian reservations were present long before white settlers began appropriating water from streams. Thus, tribes could get top dollar for their valuable senior water rights. Similarly, non-Indian water users, such as growing western cities, would benefit from being able to purchase or lease Indian water rights with early priority dates because these rights will contribute to a more reliable water supply.[143]

In addition to the economic benefits of leasing, tribes could lease water to a diversion downstream of the reservation as a way to ensure

135. 1 WATERS AND WATER RIGHTS, *supra* note 6, § 14.01(b)(2).

136. *See generally* 1 *id.* note 6, at §14.

137. 1 *Id*. § 14.04(c).

138. 1 *Id*. § 14.04(c)(1). The consumptive use for agriculture, for example, equals the amount of water diverted from the stream minus the amount that is not used by the crops and goes back into the stream. Water resource engineers have formulas they use to calculate the consumptive use based on the type of crop, the size of the area irrigated, and the climate.

139. 1 *Id.* § 14.04(c).

140. 1 *Id.* § 14.01(b)(2)(B).

141. Garry, *supra* note 89, at 34.

142. Jedidiah Brewer et al., *Water Markets in the West: Prices, Trading, and Contractual Forms* 20–25 (Nat'l Bureau of Econ. Research, Working Paper No. 13002, Mar. 2007), *available at* http://www.nber.org/papers/w13002.

143. Getches, *supra* note 12, at 544.

that water stays instream on the reservation.[144] For example, if a water right is leased to a diversion downstream, then the water will have to continue to flow through the reservation to make it to the diversion off the reservation. Such an arrangement might provide a backdoor to ensure instream flow and avoid a *Big Horn III*-type ruling.

Currently, tribes cannot sell or lease their water off the reservation under the Indian Intercourse Act without express authorization from Congress.[145] This limitation applies to tribes who have already had their water rights adjudicated, and getting Congressional approval for any transfer or lease of water off a reservation would be an onerous process without any precedent. Leasing water rights to non-Indian entities is currently permitted, but only when land is leased and the water is used on that land.[146] However, several recent Indian water rights settlements that have been approved by Congress contain provisions allowing tribes to transfer or lease water rights off reservation in the future.[147] The prevalence of these provisions in settlement agreements indicates non-Indian acceptance of tribal water marketing, albeit under strictly controlled terms. Tribes however want all restrictions to be lifted so that they can freely market their water, even if they do not choose to exercise that option.[148]

Because economic development is necessary to maintain a viable homeland on the reservation, tribes should be able to sell or lease their water rights in order to take advantage the best use of their resources.[149] With the money from the sale or lease of their water rights, tribes would have the opportunity to improve the economic conditions of their people. Under the homeland purpose, water rights should be available for use to support Indian economies on the reservation and profits from the sale or lease of water off reservation.[150]

Of course, transfers of water off the reservation to non-Indian water users may not ultimately be consistent with the purpose of an Indian reservation, which is to provide a homeland for the tribe *on the reservation*.[151] For example, if tribes sell their water rights, they would

144. *Id.*

145. Indian Intercourse Act of 1834, 25 U.S.C. § 177 (2011) (alternatively called the Indian Nonintercourse Act); *see also* Getches, *supra* note 12, at 542.

146. Getches, *supra* note 12, at 542.

147. *Id.* at 546–47; Seldin, *supra* note 87, at 1554–55; Peter W. Sly, *Urban Perspectives of Off-Reservation Tribal Water Leases*, 10 WTR NAT. RESOURCES & ENV'T 43, 45–46 (1996).

148. DALE PONTIUS, COLORADO RIVER BASIN STUDY: COMMISSION FINAL REPORT 77 *(1997), available at* www.colorado.edu/colorado_river/docs/pontius%20colorado.pdf.

149. Getches, *supra* note 12, at 542; Storey, *supra* note 13, at 217–18.

150. Getches, *supra* note 12, at 543; Storey, *supra* note 13, at 217–18.

151. Getches, *supra* note 12, at 542–43.

get a sum of money but not a more permanent source of income that might be derived from other activities such as agriculture. Further, if water is removed from a reservation, the potential for development on the reservation is reduced. As a result, tribal members may leave the reservation to seek work elsewhere, further decreasing the reservation's value as a homeland for the tribe.[152]

There are two additional difficulties that tribes face if they want to transfer or lease their water off the reservation: quantifying consumptive use of unexercised rights and the tension between federal and state laws. A non-Indian water right vests when a quantity of water is diverted from the stream and put to beneficial use;[153] thus state water laws for change-of-use generally do not permit selling a water right that has never been used or put to beneficial use.[154] Because many tribes have not actually put their water rights to beneficial use, it will be difficult for a state to determine the amount of water that can be transferred without harming junior users;[155] especially because junior non-Indian water users are currently developing new water rights with the expectation that tribes will not use their senior rights.[156] Thus, determining the appropriate quantity of water that a tribe could lease or sell/transfer would require either state engineers, state legislatures, courts, or a combination of all three to develop a new method to calculate estimated consumptive use.

The second potential problem with tribes transferring or leasing water off reservation is the tension between federal Indian law and state water laws. Indian water rights, like all federal reserved water rights, are based on federal law.[157] Indian water rights were not developed as part of the state water law system.[158] Thus, there are limits on what tribes can do with their water rights that do not limit other water users managed by the state system. The most glaring example of federal restrictions that apply only to Indian water rights and not state rights is the Indian Intercourse Act mentioned above, which restricts tribes' ability to transfer or lease water off reservations.[159]

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152. *Id.* at 543.

153. 1 WATERS AND WATER RIGHTS *supra* note 6, at § 12.02(c)(1)–(2).

154. 1 *Id.* § 14.04(b).

155. Recall that one of the consenting opinions in *Big Horn III* said that tribes should be able to change their uses of water, but only after the water is first put to a beneficial use as irrigation for agriculture. *In re* Gen. Adjud. of All Water Rights in the Big Horn River Sys. *(Big Horn III)*, 835 P.2d 273, 285–86 (Wyo. 1992).

156. Getches, *supra* note 12, at 545–46 (arguing that the reliability of southern California's water supply depends on Indian tribes remaining financially unable to develop their water rights on the Colorado River).

157. COHEN'S HANDBOOK, *supra* note 5, at § 19.03[1].

158. *Id.*

159. Indian Intercourse Act of 1834, 25 U.S.C. § 177 (2011) (alternatively called the Indian Nonintercourse Act); Getches, *supra* note 12, at 542.

Even though Indian water rights are not considered to be controlled by state law, state water laws are additional barriers to tribes transferring or leasing water off the reservation. Western states forbid the transfer of water out of state, but markets for Indian water rights may exist in a different state.[160] Given that two Wyoming justices felt that state water laws should substantially limit the use of Indian water rights,[161] even if Congress approves out-of-state water transfers, Wyoming and other states might argue that Indian interstate water transfers are not legal under state law.[162] Thus, even if a homeland purpose of the reservation is established for quantifying water rights, tribes might nonetheless be restricted from making the best economic use of their water resources under state and federal statutes.

In the end, quantifying Indian water rights based on the homeland standard will likely give tribes more freedom to use their water rights in ways that will benefit their people now and in the future. First, tribes may be able to expand the water uses associated with the most senior "time immemorial" priority date, which would entitle them to use those resources to maintain a viable homeland. Second, establishing a homeland purpose in a water rights adjudication may allow tribes to change their use of water and not be forced to continue an agricultural lifestyle. Finally, under the homeland standard, Congress may be more inclined to permit a lease or transfer of water rights off the reservation because doing so would increase the economic self-sufficiency of a tribe. Ultimately, the homeland standard is closer to the original purpose of Indian reservations, which was to create a permanent place for Indian tribes to call home.

V. CONCLUSION

The homeland standard is consistent with Supreme Court jurisprudence and it is the best way to make certain that tribes have the fundamental ability to use their water rights in order to ensure that reservations can remain permanent homelands for Indian tribes. Today, many tribes are relatively poor and need to improve economic development so they can make their reservations homelands for their people. Tribes should have the ability to decide what is in their best

160. Getches, *supra* note 12, at 547.

161. *In re* Gen. Adjud. of All Water Rights in the Big Horn River Sys. *(Big Horn III)*, 835 P.2d 273, 278 (Wyo. 1992) (Macy, J., majority opinion); *id.* at 283 (Thomas, J., concurring specially).

162. *But see* Getches, *supra* note 12, at 547–48; Sly, *supra* note 147, at 46; *and* Seldin, *supra* note 87, at 1553 (all arguing that if states prevent the interstate transfer of water, they may be violating the Dormant Commerce Clause).

interests and what will give them the most economic stability; thus, tribes should not be limited in the use or alienation of their water resources.

While this country has a long history of quantifying Indian water rights based on the amount necessary for all potential agriculture on the reservation, the Arizona Supreme Court found two good reasons to instead use a homeland standard. First, not all reservations are suitable to agriculture, and second, agriculture is not necessary today for tribes to maintain a homeland on their reservations.[163] In some cases, using the agricultural standard to quantify Indian water rights has led to insufficient water for tribes to meet basic needs because the tribes could not prove that agriculture was viable on their reservation.[164] Other states should follow the Arizona Supreme Court in adopting the homeland standard for quantification of Indian water rights because it is a valid, equitable method for ensuring that tribes can make a sustainable homeland on their reservations.

Moreover, the way a court conceptualizes the purpose of an Indian reservation in a water rights adjudication has three additional effects beyond the quantity of water associated with a reserved water right. First, a homeland purpose could help tribes get a time immemorial priority date for any current or future uses of waters that are tied to their aboriginal lands. Second, tribes could use a water right granted for a homeland purpose for any use on the reservation, not just agriculture. And finally, tribes may be able to get Congressional approval of transfers or lease of water off their reservations if they are not limited to maintaining only agricultural uses of water.

All these features have the potential to expand economic opportunities for tribes that are struggling to meet their needs. Water rights in the West are scarce. The western population is rapidly increasing and with it grows its need for water. Tribes should be able to grow as well. They should have the opportunities to both sell their water and to change the use of their water to develop nonagricultural industries on their reservations.

Moving from the agricultural standard to the homeland standard may not make all these changes possible because there are other obstacles and precedents in the way of substantial change to federal Indian law. However, it would be an acknowledgement that Indian tribes can maintain their culture and societies on their reservations but also have the freedom to change with the times like the rest of us.

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163. *In re* Gen. Adjud. of All Rights to Use Water in Gila River Sys. & Source (*Gila V*), 35 P.3d 68, 78 (Ariz. 2001).

164. *Id.*

Activism is the New Black! Demonstrating the Benefits of International Celebrity Activism Through James Cameron's Campaign Against the Belo Monte Dam

Jacquelyn Amour Jampolsky*

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I. INTRODUCTION

On a hot, muggy day in May of 2010, James Cameron and his wife began their first journey deep into the Amazon Basin. Accompanied by a representative from Amazon Watch, their adventure embodied a tone of mysticism perhaps only attainable by people who work in Hollywood. "The snake kills by squeezing very slowly . . . this is how the civilized world slowly, slowly pushes into the forest and takes away the world that used to be."[1] In a scene that can only be described as surreal, the indigenous people of the Xingu dressed Mr. Cameron in traditional garb and gifted him spears and headdresses as he addressed more than seventy community members who had come to hear from a "powerful ally."[2] The community members knew of Cameron only because they had gathered to watch "Avatar" the night before. In the words of Arara chief José Carlos Arara, "what happens in the film is what is happening here."[3] During his speech, he encouraged the native people to remain united in their plight against the dam exclaiming, "that is what can stop the snake; that is what can stop the dam."[4] As if part of one of Cameron's fantastical plots, a poisonous green snake fell from the tree. The invigorated group symbolically killed the snake, and the inspired Cameron left the Amazon with his wife and three bodyguards with a promise to return.[5]

James Cameron's encounter in the jungle represents the newest phase of a broader Tinseltown crusade to use "celebrity" to promote issues of social and environmental justice. In the United States, celebrities have proven uniquely influential both on the American public,[6] and on federal lawmakers,[7] by lobbying, participating in Congressional hearings, fundraising, and more broadly endorsing causes that represent their particular passion.[8] Recently however, stars have moved beyond the role of publicist, and are posing as experts and activists for some of the most pressing issues of our time.[9] As

1. Alexei Barrionuevo, *Tribes of the Amazon Find an Ally out of 'Avatar'*, N.Y. TIMES, Apr. 10, 2010, at A1 *available at* http://www.nytimes.com/2010/04/11/world/americas/11brazil.html?_r=1.

2. *Id.*

3. *Id.*

4. *Id.*

5. Linda J. Demaine, *Navigating Policy by the Stars: The Influence of Celebrity Entertainers on Federal Law Making*, 25 J.L. & POL. 83, 105 (2009).

6. Kathryn Gregg Larkin, *Star Power: Models for Celebrity Political Activism*, 9 VA. SPORTS & ENT. L.J. 155, 184, 178 (2009).

7. *See* Demaine, *supra* note 5.

8. *See id.*; *see* Larkin, *supra* note 6.

9. Demaine, *supra* note 5.

exemplified by Cameron, but also celebrities such as Bono for Red, Leonardo DiCaprio for Save the Tigers, and Hayden Panettiere for anti-whaling, celebrities are reaching beyond the confines of their own domestic problems to save the world, one issue at a time.

This Note aims to prove that celebrity activism can be a powerful tool for promoting social causes, by analyzing James Cameron's successful campaign against Belo Monte Dam in Brazil. First, the Note highlights the complexities of celebrity activism by discussing arguments for and against the utility of celebrity activism as a tool for exacting social change. Second, the Note sets up the case study by contextualizing Belo Monte's place in the broader history of energy infrastructure in Brazil. Third, it discusses the history of the dam from its inception to its most recent provision, illuminating the prevalence and success of social protest before James Cameron entered the scene. Fourth, the Note outlines the most recent grass roots and legal campaigns the people of Xingu have launched to stop the construction of the dam. Finally, it addresses the criticisms of Cameron's involvement in Brazil by couching it within the broader debate of the efficacy of international celebrity activism, and showing why his campaign against Belo Monte was a success.[10] This Note aims to illuminate the unconventional and idiosyncratic dimensions of international celebrity activism, but ultimately show that it is an effective tool for lawyers and policy makers to advance their respective social and environmental causes.

II. CELEBRITY ACTIVISM

Celebrities are becoming increasingly more involved in social and political causes, stimulating passionate debate about the role celebrities should play in the political landscape. Regardless of whether one feels intrigued, enraged, or ambivalent towards celebrities' role in politics, one thing remains true. "The phenomenon of celebrity activism in international affairs has become too serious to be ignored."[11]

A. Evolving Celebrity Political Involvement & Influence

Changes in Hollywood power dynamics coupled with the increasing

10. Whether or not the Belo Monte Dam will be constructed remains an ongoing battle. Without Cameron's timely involvement, this likely would not be the case, and the Dam may already have been constructed. For this reason, this note qualifies James Cameron's campaign against Belo Monte as a success regardless of the final outcome.

11. Heribert Dieter and Rajiv Kumar, *The Downside of Celebrity Diplomacy: The Neglected Complexity of Development*, 14 GLOBAL GOVERNANCE 259, 260 (2008).

power of alternative news sources have allowed stars to critically engage in political activism.[12] Celebrities have recently become more involved in social causes for two main reasons. First, the nature of the entertainment industry has changed, and celebrities no longer fear jeopardizing their jobs by speaking out about controversial issues.[13] Celebrities have gained new leverage in the entertainment industry, which affords them the "autonomy to adopt pet causes, policy initiatives and make their own publicity missteps."[14] Second, celebrities seek philanthropic outlets to shape a positive personal image.[15] Marshall Stowell, the charity manager for Population Services International, who works to secure celebrity supporters, describes celebrity philanthropic interest this way: "They want to find something that's somewhat proprietary and are interested in who else might be involved. There's a personal interest there but also a professional interest, as they are trying to build their own brand."[16]

Concurrently, celebrities are also becoming more influential in promoting humanitarian causes, primarily due to the way the Internet has changed how people obtain and share information.[17] The Internet facilitates the movement of ideas and information and makes it easier for stars to mount their respective agendas.[18] Studies have shown that citizens are increasingly relying on "soft news"[19] sources, which report on pop and celebrity news and reach a much broader audience than "hard news" sources.[20] Some argue that this shift in media influence makes celebrities more influential than politicians because hard news sources report on celebrity news too.[21] Furthermore, the force of a cause depends on how many people are interested in it, and celebrities are simply more apt at cultivating audience interest.[22] Factors such as excitement, popularity, and simplicity of an issue influence how much interest the

12. *See* Daniel W. Drezner, *Foreign Policy Goes Glam*, THE NATIONAL INTEREST 22 (Nov./Dec. 2007).

13. *Id.* at 23.

14. *Id.*

15. Caroline Preston, *Putting Stars to Work for Good Causes: Tips from Nonprofit Experts*, 21 CHRONICLE OF PHILANTHROPY 16, 16 (Oct. 2008).

16. Preston, *supra* note 15.

17. Drezner, *supra* note 12, at 24.

18. *Id.*

19. Non-traditional news sources such as US Weekly, Vanity Affair, Access Hollywood, and PerezHilton, as compared to traditional "hard news" sources such as the New York Times or Nightline.

20. Drezner, *supra* note 12, at 24.

21. *Id.*

22. Larkin, *supra* note 6, at 161.

public will have in a given topic,[23] each of which entertainers are gifted at conveying. Thus, "whether scholars like it or not, packaging information as entertainment increases the likelihood that information will be consumed."[24]

B. Critiques of Celebrity Activism

Scholars, the public, and international politicians remain deeply divided as to whether celebrity activism is good or bad for global policy and problem solving.[25] While nongovernmental organizations ("NGOs") and charities enthusiastically seek celebrities to endorse their cause,[26] a 2007 survey conducted by CBS and the New York Times revealed that forty-nine percent of people living in the United States believe celebrities have no place in politics.[27] Critics tend to attack activist celebrities on three major fronts: their competency to handle global issues, their motives behind endorsing specific causes, and their inability to actually make change.[28]

Critics point out that celebrities are often not intellectually, emotionally, or politically capable of seriously advocating for global causes, and tend to oversimplify issues.[29] As one critic describes, "[t]he 'analysis' rests in the language of rock songs, Hollywood, and Ronald Reagan. The world is painted in black and white and good is pitted against evil. Nuance is inevitably lost. Historical experience is disregarded."[30] The inability of celebrities to fully understand and aptly convey risks the promulgation of bad policy.[31] For example, in 2006, George Clooney spoke to the United Nations ("UN") Security Council imploring them to intervene to stop the war in Darfur, and launched a

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23. *Id.* (referencing a study conducted by John R. Zaller in "The Nature and Origins of Mass Opinion" in which he identified certain factors that tend to increase public attentiveness).

24. *Id.* at 162.

25. Andrew F. Cooper, *Beyond One Image Fits All: Bono and the Complexity of Celebrity Diplomacy*, 14 GLOBAL GOVERNANCE 265, 265 (2008); Dieter & Kumar *supra* note 11 (arguing celebrities are ill-equipped as celebrity activists); S. Barreto Motta, *James Cameron almeja exterminar futuro do Brasil,* MONITOR MERCANTIL, 29 Mar. 2010, *available at* http://www.monitormercantil.com.br/mostranoticia.php?id=76825 (translated by author).

26. *See* Preston, *supra* note 15.

27. Drezner, *supra* note 12, at 28.

28. Deiter & Kumar, *supra* note 11, at 259.

29. *Id.* at 260.

30. *Id.*

31. *Id.*

large-scale public campaign rallying for the involvement of UN troops.[32] United States officials revealed that the public pressure garnered by Clooney motivated the U.S. government to impose UN peacekeeping too quickly, and too aggressively.[33] "This, in turn, inflamed Khartoum's suspicions, emboldened its enemies, and undermined slow-maturing efforts to find a compromise that would end the war."[34] This demonstrates the ability of celebrity to influence global politics, and the danger of that influence being implemented without an accompanying educated strategy.

Furthermore, not all press is good press, and ill-advised celebrities can compromise the legitimacy of a cause.[35] For example, at a Live Earth[36] concert, performer Akon divulged to the press that before he arrived at the concert, he had no idea what "being green" meant.[37] In another famous example of celebrity activism gone wrong, actor Richard Gere directly affronted Hindu custom when he publicly kissed Indian movie star Shilpa Shetty at an AIDS demonstration, inspiring conservatives across India to burn images of both Gere and Shetty in protest.[38] Shetty addressed the kiss in an interview, highlighting how Gere's ignorance compromised the purpose of the event. She stated, "I think it is not even an issue. There are bigger issues like AIDS in our country, which no one seems to be interested in talking about."[39] The volatile nature of celebrity scandal highlights the importance of critiques about the capability of celebrities as political activist.

Critics similarly attack the dualistic nature of celebrity motivation for getting involved in social causes.[40] For example, Bono's band U2 grossed $389 million in concert ticket sales, and sold nine million album copies of the concert album following its last tour, amounting to the second most lucrative tour in history.[41] Critics are suspicious as to how the success of U2 concert and album sales may motivate the fervor of his social campaigning; Bono's refusal to disclose if any concert proceeds go

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32. Alex de Waal, *The Humanitarian Carnival: A Celebrity Vogue*, WORLD AFFAIRS 43, 45 (Fall 2008).

33. *Id.*

34. *Id.*

35. Larkin, *supra* note 6, at 171–72.

36. Benefit concerts thrown to raise money and awareness for social and environmental causes.

37. Drezner, *supra* note 12, at 27.

38. Simon Robinson, *Richard Gere's Scandalous Smooch,* TIME.COM (Apr. 7, 2007), http://www.time.com/time/world/article/0,8599,1611428,00.html.

39. *Id.*

40. Dieter & Kumar *supra* note 11, at 263.

41. *Id.*

to the charitable organizations he has set up underscores these suspicions.[42] Although critics concede that "it would be wrong to suggest that the celebrity diplomats from the Anglo-sphere are 'tragedy voyeurs' . . . celebrity diplomats may still use Africa to promote their own agenda, which may or may not be benign."[43] This makes celebrity benevolence appear inauthentic, and has the potential to demerit the underlying cause. In the words of one critic, "[t]he biggest peril for the movie star on the famine stage comes from the lure of playing the hero. It's an old-fashioned role, but it still has an appeal, perhaps especially to those who play fictional heroes whom they could never reprise in real life."[44]

Finally, critics claim that celebrities have failed to make actual, positive change through their activism.[45] "Highlighting a problem is not the same thing as solving it, however—and the celebrity track record at affecting policy outcomes could best be characterized as mixed."[46] For example, celebrities themselves question the value of the benefit concerts, perhaps the most popular manifestation of celebrity activism, because they tend to be disorganized, don't raise as much money as they should, and don't focus enough on the issues.[47] Bob Geldof complained, "Live Earth doesn't have a final goal . . . [s]o it's just an enormous pop concert or the umpteenth time that, say, Madonna or Coldplay get up on stage."[48] Roger Daltery of The Who followed in the line of celebrity naysayers, averring that "[t]he last thing the planet needs is a rock concert."[49] John Lennon espoused that benefit concerts are a "rip-off."[50]

Critics find other attempts at celebrity activism similarly futile. Consider Bono's (Product) Red campaign to raise money for the UN Global fund by selling Red products and donating a portion of the profits.[51] Allegedly the campaign netted a mere $18 million after the fist year, following expenditures of nearly $100 million on marketing.[52] Some attribute Red's debatable economic success to the flawed founding principle of the campaign: we can shop our way out of misery.[53] Contrary campaigns operate under the principle that "Shopping is not a

42. *Id.*
43. *Id.* (quoting Andrew F. Cooper).
44. Alex de Waal, *supra* note 32, at 44.
45. Dieter & Kumar, *supra* note 11, at 259.
46. Drezner, *supra* note 12, at 25.
47. *Id*. at 26; Alex de Waal, *supra* note 32, at 51.
48. Drezner, *supra* note 12, at 26.
49. *Id*.
50. Alex de Waal, *supra* note 32, at 51.
51. Drezner, *supra* note 12, at 26.
52. *Id*.
53. *See* Alex de Waal, *supra* note 32, at 48.

solution: Buy (Less). Give More," and explain how to donate to UN Global Funds directly.[54] Furthermore, celebrity activism can be ineffective because the hype can sometimes overshadow the issue.[55] For example, when Hayden Panettiere visited Capitol Hill to denounce whaling, "few starry-eyed staffers could recall the issue discussed."[56]

Critics make strong and passionate arguments about the potentially negative impacts of celebrity activism. However, their critiques are based on the same truth that makes celebrity a good tool for enacting change: the sheer momentum of celebrity influence in political affairs is unmatched by policy wonks, NGOs, or politicians.[57] The volatile nature of such influence can, as critics have pointed out, be dangerous in the hands of celebrities who may be poorly equipped to direct political affairs, and can have the potential to be counterproductive.[58] These risks, however, present a reciprocally momentous potential for positive change. Accordingly, the diatribes of critics themselves are a "testament to the authentic importance of celebrity agency—a step in the right direction—since the phenomenon is being accorded a fairly serious treatment."[59]

C. Proponents of Celebrity Activism

Proponents generally consider the influence of celebrity an inevitable shift in the socio-political landscape as a result of globalization, the rising value of alternative news sources and social networking websites, and the public's growing frustration with the traditional institutions in control of global political choices.[60] They recognize that people tend to relate to celebrities better than politicians, and that celebrities represent a more accessible source of influence for the broader public.[61] "Modern technology has added a quasi-hallucinogenic element to the social environment . . . [and] the public often comes to view celebrity entertainers as social intimates and places more importance on their opinions. . . ."[62] To proponents, the benefit of celebrity is exactly that—unprecedented public influence. Thus, instead

54. *Id*.

55. Larkin, *supra* note 6, at 171.

56. *Id.* at 171–72.

57. *See generally* Drezner, *supra* note 12 (describing the evolving influence and complexities of celebrity activism); Larkin, *supra* note 6 (promoting three models for celebrity activism for the most effective politics); Demaine, *supra* note 5 (tracking celebrity influence in congressional testimonies).

58. *See generally* de Waal, *supra* note 32; Dieter & Kumar, *supra* note 11.

59. Cooper, *supra* note 25, at 265.

60. *Id.*

61. Demaine, *supra* note 5, at 113.

62. *Id.* at 113–14.

of denying celebrities' inexorable role in politics, they hone in on the positive ways in which celebrity influence can be used in politics and social activism.[63] In the words of Bono:

> It is absurd if not obscene that celebrity is a door that such serious issues need to pass through before politicians take note. But there it is. Jubilee can't get into some of the offices and I can. But the idea has a kind of force of its own. I'm just making it louder. And you know, making noise is a job description really for a rockstar.[64]

Three examples of how lobbyists, NGOs, and litigators have used celebrity activism prove its utility for enacting positive social change. First, proponents point to the history of congressional testimony to demonstrate the scope of the positive influence celebrity can have on humanitarian politics.[65] The presence of a celebrity at congressional testimony encourages congressmen to show up, and facilitates initiatives for increasing funding.[66] The president of the National Organization of Rare Diseases described the positive influence of celebrity activism this way: "Normally if you go to testify for funding, there is maybe one congressman there. But if you bring a movie star or sports figure, all the congressmen show up."[67] When the congressmen show up, so do the funds. After Michael J. Fox testified about his experience with Parkinson's disease, funding for research increased $275 million.[68]

In addition to funding, celebrities have been associated with passing positive legislation. The National Child Protection Act of 1993 is casually known as the "Oprah Bill," and arguably passed as a result of her steadfast support of the bill, including her testimony in support of the legislation before Congress.[69] Congressmen are enamored with stars just like the broader public is, and it is undeniable that "[c]elebrity entertainer witnesses guide legislators into addressing social issues and adopting perspectives on social policy that would not otherwise prevail."[70]

Second, the fact that the phenomenon of celebrity activism has spurned an entire new industry—where experts strategically match charitable organizations with the appropriate celebrity advocate—demonstrates the positive influence it can have on social movements.[71]

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63. *Id.*
64. Larkin, *supra* note 6, at 176 (quoting Bono).
65. *See* Demaine, *supra* note 5.
66. *Id.* at 99.
67. *Id.*
68. *Id.* at 104.
69. *Id.* at 105.
70. *Id.* at 125.
71. Preston, *supra* note 15.

For example, Marshall Stowell is the charity manager for Population Services International, and his job largely consists of garnering and managing celebrity support.[72] "Mr. Stowell's duties represent a growing trend in the non-profit world, as more and more organizations give staff members formal responsibility for reaching out to Hollywood glitterati."[73] Keystone humanitarian organizations such Oxfam, the American Red Cross, and Save the Children each have employees with the specific job of managing celebrity support.[74] Thus, in addition to the phenomenon of celebrity pet causes, established social organizations are capitalizing on the celebrity do-gooder trend, and recruiting stars to promote their causes. Celebrity activism has become such an important tool for social advocates that scholars and non-profit practitioners alike have developed strategic frameworks and sets of "best practices" to help best utilize star power.[75]

Most importantly, litigators are starting to pick up on the utility of celebrity activism, and have begun using it to bolster their client's position in complex or controversial adjudications.[76] For example, when John J. Michels Jr. represented six unnamed military personnel in a pro bono case against the Federal Food and Drug Administration ("FDA") challenging the legality of the anthrax vaccine absorbed ("AVA"), he contacted the heavy metal group Anthrax to publicize the issue, and speak out against mandating the AVA vaccine for troops.[77] In choosing to contact the band, Michels strategized about the audience he hoped to reach: "The music these guys play is popular with the troops . . . [t]hey weren't playing the Carpenters when they were storming Baghdad. They were playing Anthrax."[78]

Michels made an unconventional and risky choice by using the controversial metal band Anthrax as the celebrity spokesperson for the plaintiffs' cause, but it worked. In *Doe v. Rumsfeld*, the judge ruled in favor of the plaintiffs, finding that the FDA violated the Administrative Procedure Act by refusing to accept public comment, and enjoined further vaccination of military personnel.[79] The court stated, "The men

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72. *Id.*

73. *Id.*

74. *Id.*

75. *Id.*; Larkin, *supra* note 6, at 12 (discussing three models for effective celebrity political activism: The Entertainer, the Spokesperson, and the Advocate).

76. Molly McDonough. *When the Stars Align: Enlisting Celebrity Support for Legal Causes Can Influence the Court of Public Opinion*, 91-SEP A.B.A. J. 20, 21 (2005).

77. *Id*. at 20.

78. *Id*. at 20–21.

79. *Doe v. Rumsfeld*, 341 F.Supp.2d 1, 19 (D.D.C. 2004) (this decision was appealed and mooted in an unpublished decision because the FDA conducted proper

and women of our armed forces deserve the assurance that the vaccines our government compels them to take into their bodies have been tested by the greatest scrutiny of all—public scrutiny."[80] Here, Anthrax encouraged "public scrutiny," and this dictum demonstrates the power public influence can have on judicial decisions in controversial litigation.

Like congressmen, judges are not immune from the influence of public opinion. Celebrity activism can be used as a tool to increase public awareness of legal issues, and can pressure courts by forcing them to listen to a perspective that may not necessarily be reflected in the law. The senior vice president for strategic communications at the litigation research firm DecisionQuest acknowledged the positive utility of celebrity activism in legal causes.[81] In cautioning litigators to choose the best advocates for raising public awareness about a particular case, he states, "lawyers who need to build support for litigation need to reach out and create a wider base of support. If a celebrity is possible, find one—like, for example, Bruce Springsteen—who has broader appeal."[82]

The innovative ways lobbyists, charitable organizations, and lawyers have successfully used celebrity to bolster their respective causes supports the idea that celebrity activism should be considered a formal strategic tool more regularly. Examples of successful celebrity activism also highlight the crux of the debate between critics and proponents; big risks come with big rewards. These are choices that every agency should consider before enlisting celebrity influence as part of their legislative or legal strategy; however successful instances share a few common themes. The celebrity should be neutral in terms of appealing to a broad audience, should be educated about the issue, and should be personally invested in the issue.[83] James Cameron embodies the neutrality characteristic because he is a director of universally successful films, spends less time in the public eye, and has cultivated the other two characteristics through the production of his latest film, Avatar.

III. AVATAR

In 2009, Avatar ascended as the single largest grossing movie of all

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testing and found the drug safe for consumption in *Doe v. Rumsfeld*, 172 Fed.Appx. 327 (2006)).

80. *Id.*

81. McDonough, *supra* note 76, at 21.

82. *Id*.

83. *See generally* Larkin, *supra* note 6; Demaine, *supra* note 5; and McDonough, *supra* note 76.

times. [84] The movie brought in more than $2 billion from international box office sales alone; tens of millions of people around the world have seen the movie,[85] and been touched its message.[86] The stereotypical plot portrays the ultimate battle against good and evil: a foreign corporation invades the paradisiacal and virgin planet of "Pandora," and wage war against the idyllic native "Na'vi" in search of the valuable mineral, "unobtanium." Anglo ex-pat Jake Sully initially arrives on the planet to support the corporate takeover and expulsion of the Na'vi, but has a change of heart when he falls in love with the chief's daughter Neytiri. Sully leads the Na'vi to stop the complete destruction of Pandora, defeat his ultimate opponent, Colonel Miles Quaritch, and in the end, permanently morphs into his Avatar, becoming a Na'vi.[87]

If Cameron's goal was to depress the world into caring about the environment, most accounts say he succeeded. After watching the film audience members across the world reported feeling "Avatar depression," resulting from the disheartening message of the emotional screenplay.[88] In the words of one audience member from Sweden,

> When I woke up this morning after watching Avatar for the first time yesterday, the world seemed . . . gray. It was like my whole life, everything I've done and worked for, lost its meaning . . . It just seems so . . . meaningless. I still don't really see any reason to keep . . . doing things at all. I live in a dying world.[89]

Audience members took the plot in Avatar seriously, to say the least, elevating Cameron's credibility as an invested, and informed environmental activist in the minds of millions.[90] Cameron's public persona, coupled with the plot and momentum of the film, created the ideal situation for a successful celebrity campaign. Amazon Watch honed in on this unique potential when it organized a trip for Mr. Cameron to visit the Amazon. [91] They took Cameron to the site of the proposed Belo

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84. Bloomberg Businessweek, http://www.businessweek.com/news/2010-02-01/-avatar-tops-box-office-passes-2-billion-in-worldwide-sales.html.

85. *Id.*

86. Joe Piazza, *Audiences Experience 'Avatar' Blues*, CNN ENTERTAINMENT, Jan. 11, 2010, *available at* http://articles.cnn.com/2010-01-11/entertainment/avatar.movie.blues_1_pandora-depressed-posts?_s=PM:SHOWBIZ.

87. AVATAR (20th Century Fox 2009).

88. Piazza, *supra* note 86.

89. *Id.*

90. Jeremy Hance, *James Cameron, In Real Life, Fights to Save Indigenous Groups From Massive Dam Construction in Brazil*, MONGABAY, Apr. 10, 2010, *available at* http://news.mongabay.com/2010/0401-hance_cameron.html.

91. Nikolas Kozloff, *Talking the Amazon rainforest with Avatar's James Cameron,* MONGABAY, May 11, 2010, *available at* http://news.mongabay.com/2010/0511-

Monte Dam, which risked the flooding of thousands of indigenous people, and hundreds of hectares of Amazonian rainforest.[92] But before being able to honestly judge the success of Cameron's campaign in the Amazon, it is important to highlight the long, complex, and emotional history of the dam, as well as the value of the dam to the majority of the Brazilian people.

IV. BRAZIL, BELO MONTE, AND THE IMPENDING ENERGY CRISIS

It is impossible to understand the conflict surrounding Belo Monte without understanding the current state of energy and development in Brazil. Brazil's argument for the construction of Belo Monte results from the need to provide energy to support unprecedented growth, coupled with a vulnerable energy infrastructure and domestic policy favoring renewable energy resources. The Belo Monte dam project has become an important piece of Brazil's energy puzzle, and as the conflict deepens with time, viable alternatives seem more difficult to construe.

A. Growth

Brazil is home to more than 200,000,000 people, is the fifth most populated country in the world, and the second most populated country in the Western hemisphere.[93] Brazil boasts the world's eighth-largest economy,[94] and is projected to grow by five percent by the end of 2010.[95] As Brazil's population and economy continue to grow, so does the need for energy. Electricity consumption in Brazil increased 5.6 percent in 2007 alone, and demand is projected to increase an average of 3.5 percent per year.[96] In 2008, the Energy Ministry, Ministério de Minas e Energia ("MME"), released its ten-year energy expansion plan in an attempt to prepare for the projected increase in energy demand.[97] The plan expects consumption will grow between forty-five and fifty percent by 2017, and dedicates more than $103 billion to develop energy

kozloff_avatar.html.

92. *Id.*

93. Cent. Intelligence Agency, *CIA World Factbook: Brazil*, last updated November 15, 2011, https://www.cia.gov/library/publications/the-world-factbook/geos/br.html (last visited Nov. 10, 2011).

94. Sonal Patel, *Brazil: Latin America's Beacon*, 154 POWER 1, 48 (Jan. 2010).

95. *CIA World Factbook*, *supra* note 93.

96. Patel, *supra* note 94, at 53.

97. *Id.*

infrastructure, including new sources such as the Belo Monte Dam.[98] Brazil's unique energy infrastructure provides a complicated framework for developing the details of such a plan.

B. The Grid

Brazil's energy system is unique in two primary ways. First, ninety-seven percent of Brazil's electricity is distributed from only three interconnected grids.[99] Although this integrated grid system facilitates both transmission and expansion, it also places Brazil in an extremely vulnerable situation should there be electricity shortages or problems with transmission lines.[100] For example, in 1999 a lightening bolt hit a substation in the state of São Paulo, leaving ninety- seven million people without power for five hours.[101] This event ushered in a millennial energy crisis, forcing citizens to ration supply and deal with wide-scale rolling blackouts.[102] In June of 2001, President Fernando Henrique Cardoso created a rationing scheme to support a twenty percent cut in electricity consumption in order to avoid a large-scale, catastrophic collapse of the grid.[103] Some energy experts predicted that the crises would wipe out between twenty and thirty years of economic growth in as little as a year.[104]

The threat of grid collapse continues to plague the Brazilian people. In November of 2009, eighteen of Brazil's twenty-six states found themselves without power for more than three hours due to a failure of three transmission lines transporting power from the Itaipú Dam.[105] The collapse took fifty percent of the power from the grid plunging tens of millions of people into darkness, including all of Rio de Janeiro and São Paulo, and enveloping thousands people in Paraguay and parts of Argentina to boot.[106] In light of these vulnerabilities, the MME plans to increase total electricity generation by 219,300 megawatts by 2030.[107]

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98. *Id.*
99. *Id.* at 58.
100. *Id.*
101. *Id.* at 59.
102. *Id.* at 50.
103. *Id.*
104. *Id.*
105. *Id.* at 48.
106. *Id.* at 50.
107. *Id.* at 52.

C. Renewables

The second way in which Brazil's energy system proves unique is its focus on renewable generation. Brazil generates almost ninety percent of their energy from renewable sources.[108] Not only does Brazil boast a laudable past of renewable power generation, but in November 2009, the country vowed to cut greenhouse gas emissions by forty percent by 2020. [109] In pursuing this ambitious, if not impossible task, Brazil will focus primarily on reducing deforestation,[110] but will also need to develop low emitting energy sources for the future. The MME incorporates the need for renewables by concentrating energy development on new nuclear, thermal, but primarily hydropower generation. The MME ten-year plan proposes increasing hydroelectric generation by forty-one percent by 2016, introducing another 109,058 megawatts to the grid; ninety percent of this electricity is to come from new hydroelectric plants in the Amazon. [111]

D. A Necessary Evil

The idiosyncrasies of Brazil's energy infrastructure make two things very clear; more power needs to be generated, and at least some of it will come from new dams in the Amazon. In a country where about eighty-seven percent of electricity already comes from hydroelectric generation,[112] and another forty percent of future energy goals will come from new dams, it is safe to say that the need to build dams in the Amazon cannot be eliminated completely. The likely use of hydroelectric power to make up the growing energy gap highlights a myriad of complicated issues that pit development concerns against environmental claims, and broader issues of social justice. These divergent and convergent issues are specifically highlighted through the history of one, infamous dam project that has popped in and out of the global spotlight since the 1970s: The Belo Monte.

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108. Georgia O. Carvalho, *Environmental Resistance and the Politics of Energy Development in the Brazilian Amazon*, 15 J. ENV'T & DEV. 3, 257 (2006).

109. Patel, *supra* note 94, at 56.

110. *Id.*

111. *Id.* at 52.

112. Carvalho, *supra* note 108, at 248.

V. THE BELO MONTE DAM PROJECT

A. Once, Belo Monte was BIGGER

The Brazilian utility company Electronorte first introduced plans to build the Belo Monte Dam in 1975.[113] Initially, Belo Monte consisted of two dams, the Karaô and the Babaquara, as a part of the larger Hydroelectric Complex of Altamira.[114] Together, these two dams would have flooded the entire Paquiçamba indigenous reserve.[115] The Altamira Complex originally called for four additional dams and five generating plants along the Xingu River, which would have flooded 22,000 square kilometers of the Amazon Rainforest, and either displaced or directly affected more than twelve indigenous groups.[116] The majority of the financing for the initial project was to come from the World Bank.[117]

The immense environmental and social ramifications of the initial project motivated widespread and collaborative social mobilization against the dams. In 1989, more than one thousand people, including environmental NGOs, indigenous groups, journalists, and government officials, gathered in the city of Altamira to protest the dams.[118] The collaboration between environmental and indigenous groups during the height of each respective movement, coupled with the increased focus on the detrimental effects of World Bank projects, formed a uniquely effective lobby and the World Bank withdrew its support of the project, along with the funding.[119] Without foreign financing, Electronorte was forced to abandon the project altogether.[120]

B. The "Better" Belo Monte

In 1998, the project resurfaced with a new plan, a new name, and new momentum. Electronorte renamed the Karaô Dam "Belo Monte",[121] and established a somewhat less invasive plan. The new Belo Monte design calls for two smaller dams reducing the flooded region to around

113. Edna Maria Ramos de Castro (tanslated by Blanka Bracic), *Water Without Dams: Women Organizing in the Amazon Region*, WOMEN AND ENV'TS INT'L, Oct. 1, 2004, at 9, 10, *available at* www.weimag.com.

114. *Id.*

115. *Id.*

116. Carvalho, *supra* note 108, at 257.

117. *Id.*

118. *Id.* at 257–58.

119. Carvalho, *supra* note 108, at 258.

120. *Id.*

121. *Id.*

400 square kilometers, and reducing the potential capacity to about 11,000 megawatts of power.[122] The first dam would sit on the main bed of the Xingu, creating the Sítio Pimental Reservoir.[123] From the Sítio Pimental, the water would be diverted through two channels and into a second dam where the generating plant would be built.[124] Although the revised project would no longer flood the Paquiçamba Reserve, the revisions reduce the efficiency of the dam. Because the dam would not be able to rely on a large reservoir for water supply during the dry season, the dam would not function for nearly five months of the year,[125] and would make the dam's viability dependent on building more dams and reservoirs in the future.[126] Recent amendments to the project only serve to reduce capacity and increase costs further, placing generating costs at between US $ 28 and US $41 per megawatt-hour of power,[127] which falls only slightly below the average cost of hydropower generation.[128]

C. Environmental Impacts

Although Belo Monte substantially reduces the impacts of the original plan, building the dam would still cause adverse environmental consequences. If built, the Belo Monte would be the world's third largest dam, and would divert more than eighty percent of the Xingu's 1,700-mile long tributary leaving a sixty-two mile stretch called the "Big Bend" in permanent drought.[129] This would not only destroy aquatic and riparian flora and fauna, but would stress terrestrial animals that rely on the river for sustenance by flooding more than 400 square kilometers of the Amazon Rainforest.

The Belo Monte would also bring about other environmental problems common to large-scale dams. For example, human-made reservoirs emit large amounts of methane and carbon dioxide gas that contribute to global warming.[130] The Balbina Dam of the Amazon basin

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122. *Id.*

123. *Id.*

124. *Id.*

125. *Id.*

126. *Id.* at 259.

127. *Id.*

128. *See* International Energy Agency, Renewable Energy Essentials: Hydropower 2 (OECD/IEA) (2010) *available at* http://www.iea.org/publications/free_all_papers.asp.

129. Sara Diamond & Christian Poirier, *Brazil's Native Peoples and the Belo Monte Dam: A Case Study*, NACLA REPORT ON THE AMERICAS: AFTER RECOGNITION, Sept.-Oct. 2010, at 25, 26.

130. Karlie Shea Clemons, *Hydroelectric Dams: Transboundary Environmental*

produces between twenty and forty times more carbon dioxide than coal power plants producing equivalent amounts of energy.[131] Additionally, changing the course of the Xingu would compromise natural flood control, contribute to ecosystem fragmentation, displace sediments, further degrade the adjacent forest, and pollute groundwater.[132] Furthermore, although Belo Monte is promoted as critical for adding essential electricity to the grid, the majority of the electricity generated would likely be consumed by local mining operations before the remainder is divvied out to the rest of Brazil.[133]

D. Social Impacts

In addition to the adverse environmental effects of constructing Belo Monte, the dam would also jeopardize the cultural and economic livelihood of thousands of people living in the Xingu basin. Between 20,000 and 40,000 people will be directly or indirectly displaced by the dam[134] due to flooding, construction, loss of access to the river, and degradation of fisheries.[135] Specifically, underrepresented indigenous populations including the Assurini, Arawetê, Parakanã, Kararaô, Xicrin do Bacajá, Arara, Xipia, Kaiapó, Juruna, and Kuruaia peoples will be most affected by the dam.[136]

Beyond the actual, physical displacement of the region's indigenous peoples, the Big Bend remains a sacred place for the cultures of the Xingu.[137] The word "Xingu" translates to "house of God," and the Big Bend is the birthplace of civilization for local indigenous groups.[138] The destruction of the Xingu and the direct placement of Belo Monte on the Big Bend "will represent nothing less than a cosmological catastrophe" to the people of the Xingu.[139] José Carlos Arara explained the value of the land as essential to the cultural survival of their people; "[o]ur ancestors are there inside this land, our blood is inside the land, and we have to pass on this land with the story of our ancestors to our children."[140]

Effects and International Law, 36 FLA. ST. U. L. REV. 487, 492 (2009).

131. *Id.*

132. *Id.* at 493–97.

133. Diamond & Poirier, *supra* note 128, at 26.

134. *Id.* at 27.

135. Carvalho, *supra* note 108, at 259–60.

136. *Id.*; Diamond & Poirier, *supra* note 128, at 27.

137. de Castro, *supra* note 113, at 10.

138. Diamond & Poirier, *supra* note 128, at 27.

139. *Id.*

140. *Id.* at 29.

Despite the grave social and environmental ramifications of Belo Monte, the Brazilian government insists on constructing the dam, both to meet growing energy demands, and to continue integrating the Amazon into the larger national infrastructure.[141] Recent campaigns to stop Belo Monte have proven weak in comparison to the resounding defeat of the Karaô in the 1980s, and on April 20, 2010, the Brazilian government awarded the contract to build Belo Monte to a consortium of nine local construction companies led by the state-owned hydropower generator, Compañía Hidroeléctrica do São Francisco.[142]

E. Resistance: Grass Roots Campaigns

Inadequacies in the new plan for Belo Monte inspire continued resistance from indigenous groups, NGOs, and environmentalists alike. The general strategy of the opposition is to form a strong, unified, and multifaceted alliance against Belo Monte.[143] One Kaiapó leader, Megaron Txukarramãe of the village of Mentuktire and director of the regional office of the Fundação Nacional do Índio ("FUNAI"), began organizing meetings and launched a substantial political campaign to unite all of the people of the Xingu.[144] Today, the alliance consists of at least twenty five distinct indigenous groups, local NGOs and environmental activist groups, as well as the settlers of the Xingu basin, including the people of Altamira.[145]

The alliance "insist[s] that they are not opposed to development as such, but rather the approach to development perennially favoured by the Brazilian government planners."[146] The alliance criticizes Belo Monte on the grounds that Electronorte and the Lula administration failed to divulge the true magnitude of Belo Monte; that the project would cause irreparable harm to the river ecosystems and flood large portions of indigenous territory; and that Belo Monte violates Article 231 of the Brazilian Constitution, which mandates a congressional debate with participants from affected communities for any project to be built on

141. Carvalho, *supra* note 108, at 258.

142. C. J. Schenexnayder, *Brazil Approves 11,200-MW Monte Dam,* ENR: ENGINEERING NEWS-RECORD, May 3, 2010, at 1; *Power and the Xingu*, THE ECONOMIST, Apr. 22, 2010, http://www.economist.com/node/15954573.

143. Terence Turner & Vanessa Fajans-Turner, *Political Innovation and Inter-Ethnic Alliance: Kayapo Resistance to the Developmentalist State,* 22 ANTHROPOLOGY TODAY 3, 4 (2006).

144. *Id.*

145. *Id.*

146. *Id.*

Indigenous lands.[147] The campaign consisted of large symposium meetings, protests of weeklong road blockades, and picketing in the capital of Brasilia.[148] Although the alliance has succeeded in keeping their demands on the political table and maintaining pressure on government officials, the Lula administration remains unscathed.

F. Resistance: Reasons for Failure

There are a few reasons why the opposition to Belo Monte has failed to be as successful as the campaign against Karaô. First, Belo Monte will be almost entirely locally funded and constructed.[149] More than eighty percent of the total US $17 billion project will come from the Brazilian Development Bank ("BNDES"), and the Electronorte construction consortium consists primarily of state-run electric companies and investment funds.[150] This relegates the lobby to local forums because it disaggregates Belo Monte from geopolitical criticism of International Monetary Fund policy and pressure from foreign entities. Second, the downscaling of the Karaô and revival of Belo Monte represents a viable compromise to many who are not adamantly opposed to development in the Amazon. However, Belo Monte remains only one component of the larger complex, which is to include at least four more upstream dams. The decoupling of Belo Monte from the entire dam complex falsely diminishes the scale of the issue at hand. Third, in the face of a perpetually impending energy shortage, Brazil awaits hosting the World Cup in 2012, and the Olympic Games in 2014. The country needs to produce more energy, period. Finally, in the epitome of the climate change debates, hydropower is couched in the broader push for renewables.[151] Therefore, for the larger population of Brazil, Belo Monte

147. *Id.* at 5.

148. *See id.*

149. *BNDES Defines Support Conditions for the Construction of Belo Monte Hydro Power Plant*, BRAZILIAN DEVELOPMENT BANK (Apr. 16, 2010), http://www.bndes.gov.br/SiteBNDES/bndes/bndes_en/Institucional/Press/Noticias/2010/20100416_BeloMonte.html.

150. Demétrio Weber, Gustavo Paul, Mônica Tavares & Flávia Barbosa, *Consorcio Liderado por Bertin Vence Leilao de Belo Monte; Terceira Liminar Contraria Cassada*, O GLOBO: ECONOMIA (Apr. 20, 2010), *available at* http://oglobo.globo.com/economia/mat/2010/04/20/consorcio-liderado-por-bertin-vence-leilao-de-belo-monte-terceira-liminar-contraria-cassada-916391469.asp; *Lack of Private Sector in Belo Monte Signals Investor Concerns Over Financial Risks,* INTERNATIONAL RIVERS (Jul. 16, 2010), *available at* http://www.internationalrivers.org/2010-7-15/lack-private-sector-belo-monte-consortium-signals-investor-concerns-over-financial-risks.

151. *See generally* Intergovernmental Panel on Climate Change, CLIMATE CHANGE 2007: Synthesis Report (2007) *available at*

represents a necessary, viable, and laudable solution.

Introducing new energy into the grid is essential, and the Amazon houses a vast, resource of hydropower power. Belo Monte at least marginally serves the greater good of Brazil, and the monolithic idea that Brazil should never build any dams in the Amazon should perhaps be rethought. That being said, Belo Monte is a bad dam. The environmental, economic, social, and cultural costs to build Belo Monte far outweigh the benefits. Beyond the science, the opacity of the licensing process, and the ostensibly corrupt legal and congressional response to adverse findings demonstrate the inadequacies of Belo Monte.

G. Resistance: Legal Attempts

Unlike the United States, the Brazilian government is not immune from suit. Brazil's legal system authorizes the Ministério Público ("MP"), a government funded agency commonly analogized to the Office of the Attorney General, to prosecute the government for violating its own laws.[152] The opposition has exhausted domestic recourse, and launched a legal campaign to match the thoroughness of local grass roots campaigns against Belo Monte.

According to Brazilian Law No. 7345/85, the MP may file an *ação civil pública* ("ACP"), or "public civil action," seeking injunctive relief or monetary damages should a party injure the environment, the consumer, the urban order, the artistic, aesthetic, historic, or touristic value, or the personal or communal economic value of the land.[153] In 2001, the MP of the state of Pará initiated its first ACP to suspend the license to construct Belo Monte granted by the Secretaria Executiva de Ciência, Tecnologia e Meio Ambiente ("SECTAM").[154] The MP made four allegations in its ACP: (1) that an illegally hired firm conducted the environmental impact assessment ("EIA"); (2) that no other bids from competing firms were considered; (3) that SECTAM and the environmental agency of the state of Pará did not have jurisdiction to

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http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm.

152. Colin Crawford, *Defending Public Prosecutors and Defining Brazil's Environmental "Public Interest": A Review of Lesley McCallister's Making Law Matter: Environmental Protection and Legal Institutions in Brazil*, 40 GEO. WASH. INT'L L. REV. 619, 620 (2009).

153. Lei No. 7347, de 24 de Julho de 1985 (Braz).

154. Carvalho, *supra* note 108, at 261; *Conheça histórico das ações do MPF contra o caso Belo Monte*, XINGU VIVE PARA SEMPRE (Feb. 3, 2010), *available at* http://xingu-vivo.blogspot.com/2010/02/conheca-historico-das-acoes-do-mpf.html (hereinafter Conheça histórico).

grant a license for a project affecting two states and federally controlled indigenous lands; and (4) that project licenses affecting indigenous lands need special authorization from Congress.[155]

While the ACP was being adjudicated, Electronorte attempted to secure the license to build Belo Monte by appealing to Congress.[156] In 2003, Congress called for new studies, and a new licensing process for Belo Monte, this time placing the power to grant the license in the hands of Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis ("IBAMA"),[157] or the Brazilian equivalent of the EPA. In 2005, the Belo Monte lobby found even greater reprise in Congress, when the Brazilian government entered a Legislative Decree giving permission to start construction on Belo Monte.[158] Later that year, the Procurador da República, or federal equivalent of the MP, filed a direct action in the Supreme Court challenging the constitutionality of Legal Decree 788, but lost when Congress amended the legal proceedings and mooted the case.[159]

In 2006, the MP won the ACP filed in Pará, and succeeded in suspending the initial phase of the project until the irregularities in the licensing process had been resolved.[160] But, irregularities continued to plague the licensing process under IBAMA, and the MP filed four more ACPs in Altamira and Pará between 2007 and 2009. These ACPs challenged newly granted licenses and suspended the current license, effectively delaying the project for almost ten years from when the first action was filed in 2001.[161] By February of 2010, the MP had succeeded in securing two applicable legal injunctions against the construction of Belo Monte.[162] On appeal, both injunctions were overturned, and the auction for the construction of Belo Monte was scheduled to take place on April 20, 2010.[163]

Minutes before the auction began, the federal judge of Altamira granted a third injunction due to the misinformation included in the final EIA.[164] The judge ruled that the a new EIA must be submitted before the

155. *Id.*

156. Carvalho, *supra* note 108, at 261.

157. *Id.*; Conheça histórico, *supra* note 153.

158. Decreto No. 788/2005, de 13 de julho de 2005, D.O.U. de 13.07.2005 (Braz.).

159. Carvalho *supra* note 108, at 261; Conheça histórico, *supra* note 153.

160. Conheça histórico, *supra* note 153.

161. *Id.*

162. *Stop the Belo Monte Monster Dam*, AMAZON WATCH, http://www.amazonwatch.org/amazon/BR/bmd/index.php? (last visited Nov. 10, 2011).

163. *Id.*

164. *Id.* The decision was published somewhere between 12:25 and 1:00pm, and the auction started between 1:20 and 1:24 pm.

auction took place, because the data for the reservoir size in the provisional license was thirty percent smaller than that in the plan submitted to the auction.[165] Although it appears the parties were notified before the auction started, the preliminary license was upheld, the bidding took place, and the project was successfully auctioned off that afternoon.

On January 12, 2011, the president of IBAMA, Abelardo Bayma, resigned for "personal reasons,"[166] allegedly due to pressures for refusing to grant a second license authorizing initial construction on the dam.[167] Quickly thereafter, on January 26, 2011, IBMA granted the second license,[168] which authorized Norte Energia to install basic infrastructure, including deforesting 238.1 acres of Amazonian forest for housing, an industrial center, and to store a stock pile of construction materials.[169] In response, the MP filed another action challenging the second license, stating that "since the preliminary license was granted, eleven general conditions have not been met, two were only partially met, and above all, there is just no information."[170]

VI. SAVING PANDORA

Activists opposing Belo Monte were stuck. They had exhausted domestic legal forums, and maintained dramatic pressure on the Brazilian government for almost twenty years to no avail. It was at this

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165. *Id.*

166. Reuters, Valor Online and Agência Brasil, *Presidente do IBAMA alega motives pessoias e pede demissão*, O GLOBO: PAÍS, *available at* http://oglobo.globo.com/pais/mat/2011/01/12/presidente-do-ibama-alega-motivos-pessoais-pede-demissao-923483290.asp.

167. Zachary Hurwitz, *IBAMA President Resigns Over Belo Monte Licensing*, INTERNATIONAL RIVERS, 13 Jan. 2011, *available at* http://www.internationalrivers.org/en/blog/zachary-hurwitz/2011-1-13/ibama-president-resigns-over-belo-monte-licensing.

168. Ministério do Meioambiente: Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis,"Prcedimento on line," *available at* http://www.ibama.gov.br/licenciamento/index.php.

169. *Site do Ibama informa liberação de licença para Belo Monte Início das obras depende de aprovação do órgão ambiental. Assessoria confirmou licença para instalação de canteiro de obra,* O GLOBO: NATUREZA, 26 Jan. 2011, *available at* http://g1.globo.com/natureza/noticia/2011/01/site-do-ibama-informa-liberacao-de-licenca-para-belo-monte.html.

170. *PF entra com ação contra licença do Ibama para Belo Monte Órgão ambiental liberou instalação de canteiro de obra nesta quarta (26). Ministério Público alega que exigências ambientais não foram cumpridas*, O GLOBO: NATUREZA, 27 Jan 2011, *available at* http://g1.globo.com/natureza/noticia/2011/01/mpf-entra-com-acao-contra-licenca-do-ibama-para-belo-monte.html# (quoting Ubiratan Cazetta).

moment, a few weeks before the contract to build Belo Monte was auctioned off, that James Cameron entered the scene.

A. Cameron's Activist Agenda

Respecting his promise to the people of the Xingu, James Cameron returned to the Amazon in April of 2010.[171] This time, Cameron was not alone. He brought along members of the Avatar cast, including Sigourney Weaver and Joel David More, and together they filmed "A Message from Pandora," a three minute trailer linked to the Avatar website and featured on Amazonwatch.org.[172] The trailer documents the plight of the people of the Xingu against Belo Monte, and strangely, yet seamlessly splices scenes from the Avatar film with images and narrative interviews from the cast in the Xingu.[173] In the words of Cameron himself: "I wound up going to Brazil, and found myself living in Avatar."[174] Cameron's dedication to helping the people of the Xingu fight against the Brazilian government did not end with the production of the movie trailer, but rather began to take on a more serious political tone.

On April 8th, 2010, James Cameron wrote a letter to former president Lula asking him to halt the construction of the Belo Monte Dam.[175] In his letter, Cameron asked Lula to be "a world leader, to take decisive action in the immediate short-term to demonstrate Brazil's commitment to these vital issues . . . I believe strongly that this project should not go forward, and I appeal to you on the basis of logic and compassion, to intercede to prevent its progress."[176] In doing so, he ironically cites to Avatar. He writes,

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171. Associated Press, *James Cameron in Brazil For Protest "Avatar" Director Cameron and Actress Sigourney Weaver Protest in Brazil Against Proposed Dam*, CBS ENTERTAINMENT, 12 Apr. 2010, *available at* http://www.cbsnews.com/stories/2010/04/12/entertainment/main6388903.shtml; Associated Press. *Cameron, Weaver protest against Amazon dam,* BRISBANE TIMES: ENVIRONMENT, 13 Apr. 2010, *available at* http://www.brisbanetimes.com.au/environment/conservation/cameron-weaver-protest-against-amazon-dam-20100413-s6w9.html.

172. Amazon Watch, http://amazonwatch.org/work/belo-monte-dam; Avatar, http://www.avatarmovie.com/.

173. A MESSAGE FROM PANDORA (20th Century Fox) *available at* http://messagefrompandora.org/.

174. *Id.*

175. Letter from James Cameron to President Luis Ingácio Silva. *available at* http://amazonwatch.org/news/2010/0411-letter-from-james-cameron-to-president-luis-inacio-lula-da-silva.

176. *Id.*

> [a]s you may know, "Avatar" is a film about the destruction of the natural world by expanding industrial interests, and the consequent impact to Indigenous populations. The film asks us all to examine our values, and to reconnect with each other and with the natural world. Its unprecedented success indicates the extent to which people, all over the world, are thinking about these issues as never before. In fact "Avatar" is the highest grossing film ever in Brazil, as well as many other countries.[177]

He goes on to recite the environmental and social reservations about Belo Monte, and ends with a request to discuss the dam in person: "I suspect you will consider me a meddling outsider who does not understand the political realities of your country. But I care deeply about the future for all of us, and feel compelled to speak, nevertheless. It would be my great honor to be able to discuss these issues with you directly." Lula never responded to his letter.[178]

Cameron did not give up. On April 12, 2010, he appeared with more than 1,000 demonstrators in Brasilia protesting the dam and imploring President Lula to halt the construction of Belo Monte.[179] He has personally threatened to bring the issue to United States Congressmen to further pressure the government to reconsider its plans.[180] On April 24, Cameron brought his campaign against Belo Monte to New York City, where he held a private screening of the Avatar film and participated in a meeting of indigenous leaders from around the world. This meeting was held in the wake of the meeting of the United Nations Permanent Forum on Indigenous Issues.[181] Cameron has continued with his campaign to stop the Belo Monte, and in one interview he reiterated his commitment to the cause stating that Belo Monte "isn't built yet; it's an ongoing battle."[182]

Although unconventional, Cameron's tactics have worked to the extent that they have ushered a surge of international recognition for the Xingu in a moment where any hope to stop the dam seemed futile. Since his first trip to the jungle in April of 2010, three Facebook groups,[183]

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177. *Id.*

178. A MESSAGE FROM PANDORA, *supra* note 172.

179. Associated Press, *supra* note 170.

180. Hanna Strange, *Avatar director James Cameron speaks out against Belo Monte dam,* THE TIMES*,* 14 Apr. 2010*, available at* http://www.timesonline.co.uk/tol/news/environment/article7096678.ece.

181. U.N. PFII, 9th Sess. (Apr. 19–30 , 2010), *available at* http://www.un.org/esa/socdev/unpfii/en/session_ninth.html.

182. Amy Lieberman, *James Cameron speaks on Avatar, Brazil, and Belo Monte: Europa Newswire's Q&A*, EUROPA NEWSWIRE.

183. Facebook, http://www.facebook.com/pages/Stop-the-Belo-Monte-Dam/114520855235721?v=wall&filter=2#!/pages/Stop-the-Belo-Monte-

countless tweets,[184] and a global petition protesting the dam with more than 500,000 signatures[185] have appeared on the Internet. On November 16, 2010, a global protest opposing Belo Monte took place at Brazilian embassies around the world,[186] and in February, 2011 thousands of indigenous people arrived in Brasilia to protest the dam and to hand deliver a petition with over 600,000 signatures opposing the dam.[187] Regardless of the attention Cameron has brought to the Xingu, critics deny the utility of his campaign by couching Cameron's tactics in generic arguments against international celebrity activism generally.

B. Opposition to Cameron's Involvement in Belo Monte

It is safe to say that the opposition against Belo Monte is strong, and the scientific, social, and economic arguments against the dam are valid; despite this, Cameron's prevalent role in this strictly Brazilian matter proves complex. In one interview Cameron stated, "it's all connected, we are all on the same planet. The winds, the maritime currents and the atmosphere do not respect the borders between countries."[188] Perhaps the atmosphere does not respect borders between countries, but people certainly do. What gives James Cameron the right to interfere in the sovereign processes of the Brazilian government to develop their resources as they see fit? Moreover, is he credible enough to do so? These questions touch on broad critiques of celebrity activism, and Cameron has received harsh criticism not only from the North American public, but, more pertinently, from the public of Brazil.[189]

In one critique of Cameron's campaign against the dam, Conor Foley criticizes Cameron's tactics, and touches on competency and oversimplification arguments espoused by opponents of celebrity

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Dam/114520855235721; http://www.facebook.com/pages/Stop-the-Belo-Monte-Dam/114520855235721?v=wall&filter=2#!/pages/Belo-Monte-Dam/143879925626894.

184. Twitter, http://twitter.com/#!/search/belo%20monte.

185. Avaaz, http://www.avaaz.org/en/amazon_under_threat?fp.

186. *Id.*

187. Amy Fallon, *Brazilian judge blocks plans for construction of Belo Monte dam Project to build world's third-largest hydroelectric plant is suspended after failing to meet environmental requirement,* THE GUARDIAN, 25 Feb. 2011, *available at* http://www.guardian.co.uk/world/2011/feb/26/brazil-belo-monte-dam-ruling.

188. Lieberman *supra* note 181.

189. Conor Foley, *Pandora's Box: James Cameron's misguided crusade in the Brazilian rain forest,* FOREIGN POLICY, 22 Apr. 2010, *available at* http://www.foreignpolicy.com/articles/2010/04/22/pandoras_box; David Cleary, *James Cameron, Celebrity and How Not to Save the Amazon,*THE NATURE CONSERVANCY, 20 May 2010, *available at* http://blog.nature.org/2010/05/avatar-amazon-james-cameron-belo-monte-brazil/; Motta *supra* note 25.

activism.[190] He warns that while Cameron has a valid case against Belo Monte, his interference in Brazil's sovereign right to manage its own affairs runs the risk of alienating the Brazilian public.[191] Foley states, "attempts to impose a Hollywood narrative on the situation ignore the energy needs of Brazil's growing economy, trivialize the political issues, and undermine the credibility of international environmental campaigns."[192] In highlighting the contention that Cameron fails to understand the complexities of Brazil's real need for producing more energy, Foley touches on broader reasons why the Brazilian public finds international campaigners offensive and patronizing.[193] In the end, he reminds Cameron that, "this is not a battle between the Na'vi and the Unobtanium-greedy earthlings, and Cameron should beware of confusing real life with cartoon fiction."[194]

A Brazilian columnist for the Mercador Mercantil went even further, criticizing Cameron's "colonialist message" and dubbing him the "exterminator of the future" of Brazil. [195] The article highlights the irony in Cameron's "conservationist" message, stating that "nobody can pollute anymore, but those who have already polluted are thus in an elite group and can stay that way. . . one would expect Cameron to praise Brazil for its low use of oil and coal to produce energy."[196] Like Foley, the columnist portrays Cameron as ignorant to the deep complexities of Brazilian energy needs, demonstrating the risk of delegitimizing the issue as critics of celebrity activism often point out.

These critiques however, only attest to the success of Cameron's campaign against the dam. The complaints about Cameron's personal capacity to understand domestic politics are irrelevant. When considering the long, tiring history of resistance to the Belo Monte, any press really is good press. Regardless of whether the public is criticizing, poking fun at, or applauding him, the public is talking about James Cameron, and the public is talking about Belo Monte.

C. The Hollywood Ending

On February 25, 2011, Federal Judge Ronaldo Desterro enjoined construction of Belo Monte, and barred BNDES from funding the

190. Foley, *supra* note 188.
191. *Id.*
192. *Id.* at 2.
193. *Id.* at 3
194. *Id.*
195. Motta, *supra* note 25.
196. *Id.*

project.[197] The court ruled in favor of the MP in the ACP challenging the second license, finding that IBAMA failed to ensure that twenty nine environmental conditions had been met before granting the second license.[198] Although on March 3 2011, the appellate court amended the judgment stating that not all environmental conditions need to be satisfied for work to begin,[199] IBAMA has vowed that it will not grant any new license until more of the environmental conditions are fulfilled. [200] The same day the appellate court amended the milestone ruling to enjoin Belo Monte, the president of IBAMA Gaúcho Curt Trennepohl (who assumed control upon Bayma's resignation) confirmed that he would not be granting the license: "the [environmental] conditions still have not been addressed . . . [and] [t]he indigenous question has still not been totally resolved."[201] Compared to the waffling results of previously successful litigation, IBAMA's new position proves a victory for the people of the Xingu. Arguably, it also proves a victory for Cameron.

James Cameron's involvement played an indisputably important role in forcing the IBAMA and the Brazilian courts to seriously consider the complaints of the native and environmental advocates of the Xingu. After nearly twenty years of exhaustive protest, Cameron rallied thousands of people to crusade against Belo Monte within weeks of his first visit to the Amazon, and likely encouraged more international media coverage than Belo Monte had ever seen. At least one reporter, Gary Cassidy writing for the San Francisco Chronicle, recognizes the influence of Cameron's celebrity campaign in the Xingu. [202] In his article entitled "How Avatar Just Saved Pandora in Brazil," he states, "[a]side from adding his voice to the protests against the building of the dam, Cameron helps to bring global awareness to the cause, a real-life Avatar."[203] Considering the waning state of resistance to the dam after

197. *Brazil Judge Blocks Amazon Belo Monte Dam,* BBC NEWS: LATIN AMERICA & CARIBBEAN, Feb. 8, 2011, *available at* http://www.bbc.co.uk/news/world-latin-america-12586170.

198. *Id.*

199. *Brazil Court Reverses Amazon Monte Belo Dam Suspension,* BBC NEWS: LATIN AMERICA & CARIBBEAN, Mar. 3, 2011, *available at* http://www.bbc.co.uk/news/world-latin-america-12643261.

200. Catarina Alencastro and Vivian Oswald, *Licença de Belo Monte não é possível hoje, diz novo presidente do Ibama,* O GLOBO ECONOMIA, Mar. 3, 2011, *available at* http://oglobo.globo.com/economia/mat/2011/02/28/licenca-de-belo-monte-nao-possivel-hoje-diz-novo-presidente-do-ibama-923899573.asp (translated by author).

201. *Id.*

202. Gary Cassidy, *How Avatar Just Saved Pandora in Brazil,* SAN FRANCISCO CHRONICLE, Feb. 28, 2011, *available at* http://www.sfgate.com/cgi-bin/article.cgi?f=%2Fg%2Fa%2F2011%2F02%2F28%2Fbenzinga890532.DTL.

203. *Id.*

twenty years of protest, James Cameron quite possibly could have been the *only* person who could have brought the issue of Belo Monte back to life.

Through publicizing the issues surrounding Belo Monte, Cameron was able to invite hundreds of thousands of global citizens opposing the dam to scrutinize any decisions made by domestic courts and legislatures. In short, Cameron's campaign in the jungle was successful because public opinion influences public policy, period. This process directly mimicked the successful use of celebrity in the Anthrax litigation, and in the countless fruitful congressional testimonies and legislative hearings in the United States; and demonstrates that celebrity activism is a powerful currency in both domestic and international causes.

VII. CONCLUSION

In the words of Lauren Bacall, "[t]he Entertainer should contribute what politicos cannot – an entertaining performance . . . We're doing what they can't do—we can sing and dance and act. They're doing what we can't do—they have access to power, real power."[204] What this paper reveals, however, is that the relationship between celebrities and politicos might actually be the other way around. James Cameron's successful campaign against the Belo Monte dam demonstrates that utilizing this synergy can be a potent resource for litigants, NGOs, charitable organizations, and broader interest groups alike. At the same time, the unconventional and volatile nature of celebrity influence demands that advocates be aware of the potentially adverse consequences espoused by critics. While ambiguities still dominate scholarly discussion of celebrity activism, one thing remains clear: Activism is the new black.

204. Larkin *supra* note 6, at 168–69 (*quoting* Lauren Bacall in Alan Schroeder, CELEBRITY-IN-CHIEF: HOW SHOW BUSINESS TOOK OVER THE WHITE HOUSE198 (2004)).

Free Market Environmentalism: Desalination as a Solution to Limited Water Resources in Northern Chile's Mining Industry

Lindsay B. Masters*

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I. INTRODUCTION

In Chile, an unofficial water policy constrains mining companies' use of Chilean surface and groundwater. Chile's National Commission of the Environment ("CONAMA"), in conjunction with Chile's framework of environmental laws, creates constraints that indirectly force mining companies to bear the true cost of mineral resources development in Chile. This is free market environmentalism at its best. Although Chile's economy is reliant on mining exports, mining companies must evaluate desalination if they are to continue to tap into Chile's vast mineral wealth.

Chile has recognized that it is reliant on its mining industry, but has taken steps to limit its long-term reliance on mining and, in so doing, has shown an unusual amount of forward thinking. Currently:

> Chile is actively cultivating its agriculture and fishing industries to replace mining's dominant role in the Chilean economy, anticipating a time when its mineral resources will be depleted. Until that time, Chile's economic welfare will be dependent on its mineral industry. . . . [I]t cannot afford to enact uneconomic environmental standards that will unreasonably burden the mining industry. Chile, however, cannot afford to ignore its significant air and water quality problems either. It has yet to be seen whether Chile can strike the balance. . . .[1]

Chile attempts to balance these interests by designing economic controls to reign in unwise uses of valuable water resources.

This Note contends that by requiring mining companies to use methods such as desalination to provide the water supply for future projects, Chile will remain true to its free market philosophy while simultaneously revolutionizing environmental protections. Although desalination is expensive and can cause environmental harms, the benefits of desalination outweigh the costs. Desalination will preserve terrestrial water resources for other uses and force mining companies to internalize the costs associated with purely extractive operations. However, desalination plants can also benefit mining companies in the long-run by providing a secure and reliable supply of water for mining operations.

In order to lay the foundation for a discussion of desalination in Chile, this Note surveys relevant economic drivers and Chilean laws. Part I provides an introduction to Chilean geography, its water resources, energy infrastructure, and economic history. Part II explains relevant Chilean laws: La Ley/ Law No. 19,300—Chile's primary environmental

1. Karin Ranta, *Balancing Hardrock Mining and the Environment: The Chilean Model*, 6 COLO. J. INT'L ENVTL. L. & POL'Y 423, 443 (1995).

statute (akin to the United States' National Environmental Policy Act of 1969 ("NEPA")), the Mining Code, Constitutional Law on Mining Concessions, water rights, and the water market. The environmental review process is also discussed; environmental impact statements are required for certain development projects, many of which relate to mining operations. Part III discusses mining in Chile and why water is necessary for project operations; current water use issues are also considered. Increasing water scarcity, in particular, is a growing concern. Mining operations require water; however, increased competition from other economic sectors has resulted in high-priced water rights, which may no longer be the most cost-effective water source option for mines. Part IV analyzes the advantages and disadvantages of desalination as applied to Chilean mining operations and also discusses mitigation of negative impacts.

II. CHILEAN GEOGRAPHY AND ECONOMY

The Republic of Chile is located on the southern coast of South America and is sandwiched between the Pacific Ocean and the Andes Mountains. "Chile has a market-oriented economy characterized by a high level of foreign trade[2] . . . ." Its economy is generally focused on the production of minerals and agricultural products.[3] Chile's economic success is directly linked to its mining industry; "[c]opper alone provides one-third of the government's revenue."[4]

A. Geology and Climate

Chile is geologically blessed. The country sits atop the Pacific Plate's eastern Pacific subduction zone, where oceanic crust collides with the continent. Because of its location, Chile is one of the Earth's major continental igneous rock provinces.[5] Igneous rocks (such as granite), which develop from cooled lava or magma, often harbor rich mineral deposits and ore veins. These deposits are mapped and mined by numerous companies. Chilean hardrock mines produce a number of valuable metals, including: gold, silver, molybdenum, iron, rhenium, and

2. *Chile, World Factbook*, CENTRAL INTELLIGENCE AGENCY, https://www.cia.gov/library/publications/the-world-factbook/geos/ci.html (last visited November 15, 2011).

3. *Id.*

4. *Id.*

5. STANLEY CHERNICOFF & DONNA WHITNEY, GEOLOGY: AN INTRODUCTION TO PHYSICAL GEOLOGY 83 (4th ed. 2007).

copper, which is Chile's main export.[6] Chile's primary mining district is located in the north of the country, in Regions I–VI,[7] with Region I being the furthest north.[8] These regions stretch from the semi-arid Center-North to the arid Atacama Desert in the North.[9] The Atacama is the driest desert in the world; it is so inhospitable that NASA scientists have used the Atacama as a terrestrial proxy for conditions on the planet Mars.[10] Because of its aridity, problems associated with the distribution and use of water resources have arisen.[11] "Surface and groundwater supplies are increasingly limited and degraded."[12] This is a problem for mining operations, which require a reliable water supply. Desert conditions combined with increased scarcity and government constraints have pushed these companies to consider new water generating technologies to supplement their needs.

B. Water Scarcity and Increased Demand

Mining companies have long been aware of the water resources crunch.[13] Yet the country's most profitable asset, copper, lies underground in this harsh climate. The Atacama desert covers almost a

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6. *See* Ranta, *supra* note 1, at 426; A Special Report on Latin America: It's Only Natural, THE ECONOMIST, September 11–17, 2010, at 5; RESEARCH & POLICY PLANNING DEP'T, CHILEAN COPPER COMM'N, COPPER AND GOLD MINING INVESTMENT IN CHILE: ESTIMATIONS FOR 2010–2015 (2010), *available at* http://www.cochilco.cl/english/productos/doc/Copper_and_Gold_Mining_Investment_in_Chile.pdf (hereinafter ESTIMATIONS FOR 2010–2015).

7. Chile is divided into regions, which are the country's first level of administrative division. Each region is divided into provinces.

8. Ana Zuniga, Water and Energy Management in the North of Chile, Presentation at 8th International Conference: Clean Technologies for the World Mining Industry (April 13–16, 2008).

9. *See* JAIME AMEZAGA ET AL., MINING- AND WATER-RELATED LEGISLATION IN PERU, BOLIVIA, AND CHILE - RESULTS FROM THE CAMINAR PROJECT 3 (2008), *available at* http://www.imwa.info/docs/imwa_2008/IMWA2008_135_Amezaga.pdf.

10. Christopher P. McKay, *Two Dry for Life: The Atacama Desert and Mars,* AD ASTRA, May–June 2002, at 30, *available at* http://quest.nasa.gov/challenges/marsanalog/egypt/AtacamaAdAstra.pdf.

11. *See* AMEZAGA ET AL., *supra* note 9, at 3.

12. *See* Jorge Arrueste, International Conference Water in Mining, 2008, Water Scarcity in Northern Chile for Mining Projects: Present and Future, 1, *available at* http://www.hatch.ca/energy/Articles/water_scarcity_chile.htm; Roberto A. Lastrico, Business Development Latin America, Market and EIR Analysis for Chile (2010) (on file with author).

13. Isaac Aranguiz, *Chairman's Address*, *in* WIM 2008: WATER IN MINING, I INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY VII (Jacques Wiertz. ed., 2008).

third of Chile, "and is also the place where most of the most important copper mining operations in the world are located, all of which consume significant water resources for their processes, taken from underground reservoirs in the central valley, or up in the high Andes."[14] Dwindling resources have led to a conflict between Chile's economic sectors and, most critically, to decreased availability of water for human consumption.[15] After years of use, Chile's water resources are overexploited and pressures have made the status quo unsustainable.[16]

Because the Chilean economy thrives on its natural wealth, it is crucial for the country's economic well- being that mining operations continue despite limited water resources. But mining interests must be balanced with other sectors' welfare. Mining is inherently extractive and ore supplies are limited; one day, there will be no more profitable copper deposits to mine. Chile must find a way to sustain its economy's strength through other avenues. Water is not only a critical resource for mines; it is also the keystone that allows agricultural operations to flourish and urban development to continue.

C. Effects of Water Scarcity

The negative effects of such high demand on the environment and reservoirs have resulted in growing social pressures and the reduction of authorized water rights.[17] Climate change is another variable to consider. One climate model predicts a reduction of approximately seventy percent in net runoff in the alpine watersheds of central Chile, along with marked changes to seasonal weather and hydrologic cycles due to decreased snow pack.[18] Almost all climate models predict significant drying and warming in central Chile if greenhouse gas emissions remain unchecked.[19]

In the agricultural Copiapo Valley, for example, water extraction has resulted in a deficit of more than 110 million cubic meters of water due to overexploitation of the resource.[20] Such water scarcity has

14. *See* Arrueste, *Water Scarcity, supra* note 12, at 1.

15. Ana Zuniga, Water and Energy Management in the North of Chile, Presentation at 8th International Conference: Clean Technologies for the World Mining Industry (April 13–16, 2008).

16. *See* Arrueste, *Water Scarcity*, *supra* note 12, at 1.

17. *Id.*

18. Mark Falvey, Climate Change and Chile's Water Resources, DEPARTAMENTO DE GEOFISICA, UNIVERSIDAD DE CHILE, 24 (October 16, 2007), http://www.dgf.uchile.cl/~rgarreau/ACI6/falvey.pdf.

19. *Id.* at 23.

20. *See* Arrueste, *Water Scarcity, supra* note 12, at 2.

significantly increased the cost of water rights in Chile, which uses a water market system.[21] Prices for water rights in northern Chile have recently "skyrocketed" because "[t]here are no more freshwater rights in northern Chile for mining and an extra liter is really hard to find right now."[22]

D. Agriculture

Chile's major industries include copper and other mineral mining, iron and steel production, as well as production of wood and wood products, agricultural products, transportation equipment, and textiles.[23] Agricultural products, such as wine, fruits, and vegetables, are significant exports.[24] In the north-central part of Chile, there are large cultivable areas that "in times of adequate water supply support a thriving agricultural industry. . . [but] because of the dry climate . . . [are] almost exclusively dependent upon irrigation."[25] As a result, the increased demand for water has fueled competition for water resources between mining operations, growing cities, and agriculture.[26]

E. A Mining-Based Economy

Mining companies are aware of the increased cost of water rights that, when coupled with high metal prices, make water development technologies such as desalination more attractive.[27] Yet the high cost of water is not a foreseeable barrier to future mining projects in the short term. The Chilean Copper Commission ("COCHILCO"), estimates that planned investment in Chilean copper and gold mining, including projects under construction and those likely to begin construction

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21. Eusebio Ingol, *Water Market System: Study Case in Chile*, DEP'T CIV., ARCHITECTURAL, & ENVTL. ENGINEERING, U. TEX., 1 (2008) http://www.ce.utexas.edu/prof/mckinney/ce397/Topics/Markets/Markets(2008).pdf.

22. Victor Henriquez, Scarcity, Demand Cause Water Rights Prices to Skyrocket, BUSINESS NEWS AMERICAS (2010), *available at* http://www.bnamericas.com/news/waterandwaste/Scarcity,_demand_cause_water_rights_prices_to_skyrocket1.

23. *CIA World Factbook*: Chile, *supra* note 2.

24. *Id.*; A Special Report on Latin America: It's Only Natural, THE ECONOMIST, September 11–17, 2010, at 6.

25. John W. Lloyd, The Hydrogeology and Water Supply Problems in North-Central Chile, 30 PACIFIC SCIENCE 91, 91 (1976).

26. *See* Arrueste, *Water Scarcity, supra* note 12, at 2.

27. *See id*.

between 2010–2015, stand at an estimated US$50 billion.[28] COCHILCO estimates that maximum copper production potential will be achieved between 2016–2020, with copper production in 2017 at about 7.58 million tonnes.[29] According to the Ministry of Mining "[i]n 2007, the Chilean mining industry produced the equivalent to 5.5 million tonnes of fine copper, which account[ed] for more than 33% of the world's production.[30] The contribution of the mining business to Chile's GDP was 24% . . . Copper accounted for 58% of total shipments overseas."[31] Chile's economy and people have much to gain from continued copper extraction. Individual mine investment estimates can range from hundreds of millions of dollars (US$) to well over two billion dollars.[32]

In addition to copper, Chile has deposits of gold, silver and other metals. The development of new gold mining projects over the next decade is expected to "place Chile squarely among leading world producers."[33] For example, Cerro Casale is advertised as one of Chile's largest undeveloped gold deposits.[34] Predicted global production from the mine stands at an estimated 1 million ounces of gold, as well as co-production of significant amounts of silver and copper.[35] The estimated investment amount for the Cerro Casale project is US$4.2 billion.[36] Such planned project development depends on two factors: water, the subject of this Article, and, energy availability, briefly discussed below.

F. Energy Imports

While Chile exports a large number of raw materials, energy is not among them. In 2007, Chile imported approximately 1.628 billion kilowatt hours ("kWh") of electricity with no exports.[37] While small amounts of natural gas and oil are produced, consumption outstrips the

28. ESTIMATIONS FOR 2010–2015, *supra* note 6, at 10.

29. *Id.* at 11.

30. Isaac Aranguiz, *Chairman's Address*, *in* WIM 2008: WATER IN MINING, I INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY VII (Jacques Wiertz. ed., 2008).

31. *Id.*

32. ESTIMATIONS FOR 2010–2015, *supra* note 6, at 1.

33. *Id.*

34. *Id.* at 14; Barack Gold Corporation, *Cerro Casale*, http://www.barrick.com/GlobalOperations/Projects/CerroCasale/default.aspx (last visited Nov. 15, 2011).

35. ESTIMATIONS FOR 2010–2015, *supra* note 6, at 17.

36. *Id.* at 17, 19 (investment estimates are allocated on a per-annum basis).

37. *CIA World Factbook*: Chile, *supra* note 2.

production rate for petroleum hydrocarbons.[38]

As a potential solution to its energy woes, Chile plans to construct a number of new hydroelectric dams in Chilean Patagonia.[39] Patagonia is a famous wild and forested region at the southern tip of South America and encompasses parts of both Chile and Argentina. Endesa, a Spanish utility company, and Colbun, a leading Chilean electric company, plan to construct at least five dams on two of the nation's largest rivers, the Baker and the Pascua.[40] Known as the HydroAisen project, most of the energy would be sent north via massive transmission lines to fuel industry and mining projects.[41]

A greener option is the use of geothermal energy. The Chilean government recently announced the availability of US$400 million to be allocated to "Non-Conventional Renewable Energy" (NCRE) projects.[42] Geothermal energy production—the running of steam naturally produced by the heat of the Earth's core through a turbine to generate electricity—is a clean and renewable source and qualifies as a NCRE.[43] Geothermal energy law is governed by three main documents. The regulation of geothermal energy exploration and exploitation is essentially governed by Law (Ley) No. 19,657; Supreme Decree No. 32/2004 governs the granting of geothermal exploration and exploitation concessions; and, Supreme Decree No. 142/2000 identifies possible geothermal fields where concessions may only be assigned by public bid.[44] Chile's undeveloped geothermal energy potential is estimated at approximately 16,000 megawatts ("MW").[45]

G. Role of the "Chicago Boys" and the Free Market in Recent Chilean History

Chile is one of Latin America's most prosperous nations, which some argue is due the influence of American economics and the "Chicago Boys" who reformed Chilean economic policies during

38. *Id.*

39. Editorial, Patagonia Without Dams, N.Y. TIMES, April 1, 2008, *available at* http://www.nytimes.com/2008/04/01/opinion/01tue3.html.

40. Natural Resources Defense Council, Stop Electrocuting Patagonia, http://www.nrdc.org/international/patagonia/patagonia.pdf (last visited Nov. 15, 2011).

41. *Id.*

42. Paul M. Kiernan et al., International Energy and Natural Resources, 44 INT'L LAW. 367, 369 (2010).

43. *Id.* at 370.

44. *Id.*

45. *Id.* at 371.

General Augusto Pinochet's dictatorship (1973–1990). The "Chicago Boys" were a group of Latin American economists educated at the University of Chicago.[46] The "Chicago Boys" generally advocated widespread deregulation, privatization, and other free market policies. While criticized for working with the divisive dictator, their free market reforms led to a strong period of annual growth in per capita real income from 1985 to 1996 (average of 5%).[47] As a result of a long period of growth, Chileans have become South America's richest people; they also have the continent's lowest level of corruption, the lowest infant-mortality rate, and the lowest number of people living below the poverty line.[48]

The "Chicago Boys" free market thinking also influenced environmental laws and policies in Chile. In 1980, the Chilean government began privatizing the mining industry.[49] The first step was the enactment of the Constitution of the Republic of Chile, which began privatization by providing that (1) the Chilean state owns all mines and minerals within Chilean borders—the basis of mineral law in Chile—and, (2) that new laws be created to regulate public and private extraction of minerals.[50] In 1983, the government passed the Chilean Mining Code and the Constitutional Law on Mining Concessions that allows for mineral concessions to private entities.[51] The privatization and liberalization of Chilean mining laws "immediately attracted the attention of multinational mining companies . . . [which brought] a rapid increase in mineral production and a huge influx of foreign capital."[52]

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46. Gary S. Becker, What Latin America Owes to the "Chicago Boys", HOOVER INSTITUTION, STANFORD UNIVERSITY (Oct. 20, 1997), http://www.hoover.org/publications/hoover-digest/article/7743 (last visited Nov. 15, 2011).

47. *Id.*

48. Bret Stephens, How Milton Friedman Saved Chile, THE WALL STREET JOURNAL (Mar. 1, 2010), http://online.wsj.com/article/SB10001424052748703411304575093572032665414.html?mod=WSJ_hps_sections_opinion (last visited Nov. 15, 2011).

49. Ranta, *supra* note 1, at 427.

50. *Id.*

51. *Id.*

52. *Id.* at 427–28.

III. CHILEAN ENVIRONMENTAL LAW

A. Ley de Bases del Medio Ambiente/ Ley Numero

The General Bases of the Environment (Law No. 19,300, published March 9, 1994)[53] is Chile's primary environmental statute. The law was created by CONAMA in order to organize Chile's environmental laws and to establish clearer standards for environmental quality and control.[54] The law accomplishes three new objectives: (1) it redefines the role of CONAMA while establishing regional environmental authorities; (2) it sets up a formal system of review for the environmental impacts of proposed projects; and (3) it allows for citizen suits to be filed against polluters, including the Chilean government.[55]

General Provision Article 1 of this statute grants Chile's citizens "the right to live in an environment free of pollution," and Article 2 establishes a two-tiered priority system.[56] Human health is the primary concern regarding environmental quality and environmental interests are the secondary concern.[57] Title 2, Paragraph 2, created the Environmental Impact Assessment System ("EIS"), which is similar to the United States' NEPA.[58]

Law No. 19,300 defines "projects or activities susceptible to causing environmental impact, at any of their phases, that shall be subject to the environmental impact assessment system" in Article 10.[59] Such projects and activities include, but are not limited to, aqueducts and other water development projects, high voltage power transmission lines, large (>3 megawatt) electric power generating plants, transportation stations and roads, ports, industrial and real estate projects, mining development plans, mining pipelines, agro-industries, forestry development, and treatment plants or drinking water systems.[60] Law No. 19,300 subsequently defines the standards for environmental impact studies (Title II, Paragraph 2, "EISs"), how communities may participate in the process (Title II, Paragraph 3), and further defines boundaries of

53. *See generally* Law No. 19300, Marzo 9, 1994, DIARIO OFICIAL [D.O.] (Chile).

54. Ranta, *supra* note 1, at 432.

55. *Id.* at 433.

56. Law No. 19300, Marzo 9, 1994, DIARIO OFICIAL [D.O.] (Chile).

57. *Id.*

58. *Id.* tit. 2, ¶ 2.

59. *Id.* art. 10.

60. *Id.*

the EIS process.[61]

B. The Mining Code

Along with the Law on Mining Concessions, the Chilean Mining Code came into effect in 1983.[62] Article 1 of the Mining Code stipulates that the State possesses exclusive and inalienable rights of ownership of all mines, but that concessions may be granted by permit pursuant to Article 2.[63] Once a mining permit has been granted, the concession constitutes a property title. The right is independent from the property of the surface land on which the mining is being carried out.[64] A mining concession may be granted for either exploration or exploitation; a mining concession for exploitation is equivalent to a mining claim in the US, which grants a subsurface title distinct from the surface property right.[65]

C. Organic Constitutional Law on Mining Concessions

The Organic Constitutional Law on Mining Concessions, published on January 21, 1982, fleshes out the Mining Code's basic doctrine. [66] Title I on Mining Concessions, Article 1, provides that mining concessions can be for exploration or exploitation.[67] Article 2 states that mining concessions are "real and immovable rights; different and independent from the surface land ownership."[68] Article 3 outlines which minerals are grantable. Precious metals such as copper and gold are grantable, whereas petroleum hydrocarbons, lithium, and deposits deemed "important to the national security" are not available for mining concessions.[69]

Title II outlines the rights of mining concessionaires. Article 7 grants exclusive prospecting and excavation rights to the mining

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61. *See id.*

62. *See* Ranta, *supra* note 1, at 427.

63. Código de Minería [Cód. Min.] arts. 1–2, CHILEAN COPPER COMMISSION, *available at*
http://www.cochilco.cl/english/normativa/descarga/mining_code.pdf.

64. AMEZAGA ET AL., *supra* note 9.

65. *See* Law No. 18097, Enero 21, 1982, DIARIO OFICIAL [D.O.] (Chile).

66. *Id.* at art. 1.

67. *Id.*

68. *Id.* at art. 2.

69. *Id.* at art. 3.

concession owner, but a public interest clause reserves rights for the public, providing that ". . . mining concessionaire[s]. . . shall be subject to limitations prescribed in the Mining Code. The limitations shall always be established to prevent damages to the owner of the land or to protect public interest purposes."[70] Article 8 provides that concession owners are entitled to the establishment of easements necessary for mining exploration and exploitations (such as water pipelines and supporting plant operations).[71] Under Title IV, a mining concession for exploration lasts for a four-year term, and exploitation concessions continue indefinitely.[72]

D. Water Rights and Water Law in Chile

The 1980 Constitution established that a water right conferred on a private holder was a property right.[73] Chile uses a water market system, which allows free transfer of water rights to another user.[74] Water rights—as in the Western United States, Australia, and Spain—are separate from the land[75] and can be freely transferred, sold, and bought.[76] Chile implemented its Water Code in 1981, which provided that a water resource specified in a right is essentially private property and can be used anywhere.[77] The Water Code also "abolished all law that undermines the property on water . . . [and] eliminated the possibility of expire [sic] water rights."[78] Lease contracts are also potential options, in which the owner of the water right conserves title but rents water use for an agreed upon time period.[79]

Water rights may be for either consumptive or non-consumptive uses. There are three ways to get a water right in Chile: (1) purchase it on the water market; (2) apply to the Water General Direction (DGA,

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70. *Id.* at art. 7.

71. *Id.* at art. 8.

72. *Id.*

73. *See* Ingol, *supra* note 21.

74. *Id.*

75. A prior appropriation system allocates water rights based on quantity, use, time of use, and generally treats the right to use water as private property. In contrast, a riparian system allocates water among landowners adjacent to the surface water source. Under prior appropriation, a water right is not tied to land—in contrast to the riparian system, which ties the right to use water to a land parcel.

76. *See* Ingol, *supra* note 21.

77. AMEZAGA ET AL., *supra* note 9.

78. *See* Ingol, *supra* note 21.

79. *Id.*

Direccion General de Aguas); or (3) make an offer at a water auction.[80]

Legislators foresaw that the water market would play a crucial role in two areas: the allocation of original water rights and the reallocation of rights conceded.[81] The water market increasingly results in water being sold or leased to agricultural buyers during droughts and times of water scarcity, because they have permanent crops such as fruit trees, which must receive a steady water supply.[82] As mentioned in the mining section above, mining companies are aware of the increasing competition and therefore increased cost of purchasing water rights on the market. In addition, the water market system has resulted in some negative outcomes, such as speculation and water monopolies.[83] Because of the changing status quo, mining companies are considering new technologies to supplement or replace water rights. One such technology, desalination, provides a potential solution to mining companies' water needs.

E. The EIA Process & CONAMA

CONAMA's mission is to promote environmental sustainability, and "public awareness [of environmental protection] is becoming in Chile . . . one of the main factors to be taken into consideration during the process of project approval, with emphasis on water consumption and contamination."[84] Although environmental concerns are secondary to human health concerns under Law No. 19,300, communities in Chile are interested in environmental protection and have different concerns and opinions as to how water consumption and contamination should be addressed.[85] Because water resources are already stressed in the north, mining projects are facing water scarcity and social pressures from local interest groups.[86]

As a result, water scarcity has increased the cost of water rights, which has allowed mining companies to justify the use of new technologies to improve water use efficiency or provide new water sources. Options include the implementation of improved tailing dewatering systems and the use of either desalinated or fresh sea water in mining operations.[87] The use of saline groundwater as an alternative for

80. *Id.*

81. *Id.*

82. *Id.*

83. *See* AMEZAGA ET AL., *supra* note 9.

84. *See* Arrueste, *Water Scarcity, supra* note 12, at 4.

85. *Id.*

86. *Id.*

87. *Id.*

mining operations has also been explored in the Andean Highland basins in northern Chile.[88] While it is an additional water source, saline groundwater can be three or four times more salinated than fresh groundwater. It is highly corrosive as well, requiring the use of special equipment and costly maintenance.[89]

It seems unlikely that simple water rights exchanges or saline groundwater reserves will be sufficient in the future. Climate change is expected to increase overall temperatures in Chile and reduce rainfall during the "Bolivian winter"—the season that provides the main source of groundwater recharge to Northern Chile's aquifers.[90] It appears certain that water costs will only continue to rise over the coming decades as pressures on the scarce resource mount.

Since many potential new development projects fall within Law No. 19,300, Article 10's list of projects or activities subject to the EIS process (i.e. desalination plants, pipelines, dams, etc.), CONAMA plays a critical role in the development of future mining projects and the country's overall management of water resources.[91] CONAMA should act as a proposed project gatekeeper. Although these projects require analysis under EIS standards, there are concerns that despite the apparent promotion of environmental legislation, the government's position on the environment is "ambiguous."[92]

One group, the Catchments Management and Mining Impacts in Arid and Semi-Arid South America ("CAMINAR") Project, found that Law No. 19,300's standards have not been fully applied because economic pressures conflict with technical legal rules.[93] CAMINAR asserted that the Law No. 19,300 was not fully applied for four reasons: (1) economic criteria are often weighed more heavily than technical or environmental concerns; (2) stakeholder and public participation in the process is hindered by insufficient administrative support and assistance and the environmental impact assessment time frame "is not long enough for people to understand the depth of the implications for each project"; (3) control of the projects is technically under jurisdiction of local administrative services, but these services generally do not have

88. Orlando Acosta & Pablo Rengifo, *Saline Groundwater: An Alternative for Sustainable Exploration of Andean Highland Groundwater Reserves, in* WIM 2010:PROCEEDINGS OF THE 2ND INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY, 157–165 (Jacques Wiertz ed., 2010).

89. *Id.*

90. *See* Arrueste, *Water Scarcity, supra* note 12, at 4.

91. *See* Law No. 19300, Marzo 9, 1994, DIARO OFICIAL [D.O.] (Chile).

92. *See* AMEZAGA ET AL., *supra* note 9.

93. *Id.*

sufficient resources to adequately process proposed projects; and (4) Law No. 19,300 allows projects to start before approval.[94] These four factors result in economic interests slipping past environmental regulators.

Article 11 of Law No. 19,300 states that an EIS is required for projects that have "significant adverse effects on the quantity or quality of renewable natural resources, including land, water and air."[95] The EIS must describe the project or activity, mitigation measures for potential adverse effects, and repair actions pursuant to Article 12.[96] An EIS is accepted or refused under Article 16, pursuant to Article 11. Article 16 states that "an EIS shall be approved if it complies with the environmental legislation and in the event it fulfills the effects, characteristics or circumstances set forth in Article 11, it proposes adequate mitigation, restitution or compensation measures. On the contrary, it shall be refused."[97] CONAMA (or "COREMA") must issue an opinion on the study within 120 days after its submission.[98] An appeal may be made to the CONAMA Board of Directors within thirty days of notification of a study's rejection.[99]

The practical reality is that the EIS process touches the bedrock of the Chilean economy: mining projects. When the framework law for the EIS process was first implemented, success lagged due to the delay in promulgation of regulations—as a result, mining and other activities caused significant environmental impacts.[100] Despite mining's continued prominence in the Chilean economy, there are signs that CONAMA has not only smoothed over these initial issues, but has shifted its underlying policies for project approval. Chile cannot rely on mining alone to sustain economic growth in the long term and must protect natural resources, especially water, for future use by the agriculture industry and growing urban populations.

IV. MINING

Mineral exports finance Chile's economic success and national laws facilitate business transactions with, and often cater to, the mining

94. *Id.*

95. Law No. 19300, Marzo 9, 1994, 6–7, DIARO OFICIAL [D.O.] (Chile).

96. *Id.* at 7–8.

97. *Id.* at 9.

98. Paul J. Schlauch & Lawrence J. Jensen, *Chilean Environmental Framework Law,* 7 COLO. J. INT'L ENVTL. L. & POL'Y 319, 322 (1996).

99. *Id.* at 323.

100. *Id.* at 328.

industry's needs. For example, the Foreign Investment Statute ("Decree Law 600") specifically extends contract time limits to twelve years only for mining investments.[101] Indefinite exploitation concessions under the Mining Code provide stable property rights, which allow mining companies to effectively price resources. COCHILO, in its report on copper and gold mining investment from 2010–2015, affirmed, "it is in Chile's interest to ensure that valuable projects not suffer unnecessary delays . . . [and it is] in line with the Ministry of Mines policy to encourage mining investment."[102] While these two organizations are close to the heart of the mining industry, they nonetheless are allowed to shape Chilean mining policy. Despite the free market policies and laws that specifically favor the mining industry, water supply has become a limiting factor, along with energy, for the development of new mining projects and the expansion of old ones.[103]

A. Current Mining Operations and Water Use

Water requirements for mining operations vary by method; the two primary ore extraction methods are concentration and hydrometallurgy.[104] Copper concentration plants are the most water intensive facilities, followed by hydrometallurgical plants.[105] Fresh water consumption rates for concentration range between 0.3 and 2.1m^3/tonne; for hydrometallurgy, water consumption rates range between 0.08 and 0.25m^3/tonne.[106] Although mines have increased efficient use of water, mining companies recognize that the pressures on water resources are becoming unsustainable.[107]

The projected growth in concentrate output suggests that more water will be required on a per ton basis over the next decade.[108] COCHILCO projected that copper mine output

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101. *See* Law No. 600, art. 3, Diciembre 16, 1993, DIARIO OFICIAL [D.O.] (Chile).

102. ESTIMATIONS FOR 2010–2015, *supra* note 6, at 1.

103. WIM 2008: WATER IN MINING, I INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY IX (Jacques Wiertz. ed., 2008).

104. *See generally* ESTIMATIONS FOR 2010–2015, *supra* note 6; WIM: International Congress on Water Management in the Mining Industry, July 9–11, 2008.

105. Arrueste, *Water Scarcity, supra* note 12, at 3.

106. Isaac Aranguiz, *Chairman's Address*, *in* WIM 2008: WATER IN MINING, I INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY VIII (Jacques Wiertz. ed., 2008), *available at* www.gecamin.com/pdf_literatura/tablas_contenido/wim_2008.pdf.

107. Arrueste, *Water Scarcity, supra* note 12, at 1.

108. *See* ESTIMATIONS FOR 2010–2015, *supra* note 6, at 10.

> [W]ill stand at 7.29 million tons refined copper by the year 2020, a 35.2 percent increase for the period under review . . . most expected growth is taking place in concentrate output, which will go from 3.28 million tons in 2009 to 5.73 million tons in 2020, a 74.9 percent increase for the period under review.[109]

Mines have already refined their water use. Two general methods of water conservation are available: water reclamation and better control of water losses, such as evaporation in the arid climate.[110] Mines use "thickened" tailing dams[111] as well as water saving and recycling measures.[112] Filtrate tailing dams are also being assessed as a potential alternative water-saving measure.[113] One of the most important measures for increasing water efficiency is to reuse the water accumulated behind a tailing impoundment by using a Water Recovery System ("WRS").[114]

Some argue that additional water should be extracted from groundwater reserves to meet the growing water needs. Deep, untapped groundwater reserves are a potential target.[115] Water developers argue that those who misunderstand the issue interpret extraction as "an uncontrollable exploitation of the aquifer." These developers contend that groundwater extraction is not simply exploitation and should be analyzed as an option for potential net benefits to northern Chilean communities.[116] Chilean law treats surface water and groundwater as independent entities from a legal standpoint, which makes integrated water resources management difficult with this option. Yet the proponents of further groundwater extraction seem undeterred by the fact

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109. *Id.*

110. WIM 2008: WATER IN MINING, I INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY IX (Jacques Wiertz. ed., 2008).

111. "Thickened" tailings are significantly dewatered mining tailings.

112. Arrueste, *Water Scarcity, supra* note 12, at 4; Jorge Arrueste, 8th International Conference: Clean Water Technologies for the World Mining Industry, April 13–16, 2008, Water Availability for Mining Usage Crisis and Solution.

113. Arrueste, *Water Scarcity, supra* note 12, at 4.

114. Jorge Serey & Arnaldo Santander, Analysis and Technico-Economic Optimisation of a Long Distance Water Recovery System, in WIM 2010: PROCEEDINGS OF THE 2ND INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY 167 (Jacques Wiertz ed., 2010).

115. Pablo Rengifo, Edgardo Dzogolyk, and Orlando J. Acosta, Use of Deep Groundwater Reserves, *in* WIM 2010: PROCEEDINGS OF THE 2ND INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY, 127 (Jacques Wiertz ed., 2010).

116. Orlando Acosta, A Socially Sustainable Approach for the Intensive Use of Aquifers in Northern Chile, *in* WIM 2010: PROCEEDINGS OF THE 2ND INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY 147 (Jacques Wiertz ed., 2010).

that these aquifers do affect the water table and generate public concern. They go so far as to state that:

> [I]t is obvious that the water table has dropped . . . The continuous descent of groundwater levels usually creates a lot of concern in public opinion, and the use of terms such as collapse, crisis, shortage, depletion, and others, is not infrequent. However . . . the only real effect . . . is that some shallow wells have to be deepened a few more meters . . . .[117]

However, there is strong evidence that groundwater usage has reached its capacity limits, especially in arid regions.[118] In northern Chile's Coposa catchments, the impacts of groundwater extraction were underestimated at the Collahuasi Mine— "after five years of groundwater extraction from Coposa, the hydraulic impacts were equivalent to those predicted after 20 years of extraction."[119]

Such groundwater drawdown not only impacts potential human use, but may negatively impact local ecology, depending on local groundwater flow. A significant number of terminal saline basins, called *salares*, are found in the north of Chile.[120] In particular, the Soncor lacustrine ecosystem is an important protected area within Flamingos National Park—a major feeding, mating, and nesting site for migrating birds.[121] The lagoons within the Soncor ecosystem are hydrologically connected to surrounding aquifers.[122] Overexploitation of groundwater due to human activity could threaten desert oases for wildlife and associated Altiplano tourism.

A third option is a technological solution, such as seawater desalination or direct pumping of seawater for metallurgical processes through pipelines to mines in the interior.[123] It should be noted that

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117. *Id.* at 148.

118. Raymond Phillipe, Richard E. Dixon & Silvana Dal Pozzo, Sal or Desal: Sea Water Supply Options for the Mining Industry, *in* WIM 2010: PROCEEDINGS OF THE 2ND INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY 14 (Jacques Wiertz ed., 2010).

119. Claire M. Cote, Chris J. Moran & Orlando J. Acosta, Progressing towards Sustainability*: From Water Efficiency to Water Effectiveness at the Collahuasi Mine*, *in* WIM 2010: PROCEEDINGS OF THE 2ND INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY 37 (Jacques Wiertz ed., 2010).

120. Ramon Aravena et al., Evaluation of Sources of Water to Lagoons, Salar de Atacama Basin: An Isotope and Geochemical Approach, in WIM 2010: PROCEEDINGS OF THE 2ND INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY 48 (Jacques Wiertz ed., 2010).

121. *Id.*

122. *See id.*

123. Arrueste, *Water Scarcity, supra* note 12, at 4.

groundwater extraction is far cheaper than seawater desalination, which is expensive not because of the plant construction costs but because of the high cost of pumping water through pipelines to the remote, high altitude, mine location.[124] Seawater desalination costs approach about US$2/meter,[3] including pumping to the plant site and the high cost of energy.[125] While the distance from the coast to inland mining sites is relatively small, the increase in elevation from sea level to the high Altiplano requires significant energy expenditures. Despite the high cost of seawater desalination, the uncertain availability of groundwater and high cost of water rights suggest that because seawater is a more secure resource it could become cost-effective.

B. Water as a Limiting Factor

Water rights are already limited and increasingly costly, and projections indicate that mining will boom in the next decade as new projects come online. More water will be needed if Chile wishes to avoid conflict between sectors and continue to reap the economic benefits of mineral exploitation. Between 2010 and 2012, COCHILCO projects a period of strong sustained growth with a 9.7% global production increase in copper between 2009 and 2012.[126] Medium term projections from 2013 to 2015 show an even larger copper production output, with an expected increase of 14.3% between 2012 and 2015.[127] Long-term predictions are that copper production will peak in 2017 with a maximum copper production of 7.58 million tons, which will then gradually begin to decline.[128] By 2020, the expected mining water requirements will have grown 45% compared to 2009 levels.[129]

Because water rights are increasingly costly and subject to a prior appropriation system, the availability of a certain amount of water is no longer a guarantee.[130] In addition, Chile's water requirements will increase as water resources are limited by social pressures and competition with agricultural and urban areas. Thus, current water use is

124. Telephone Interview with Roberto A. Lastrico, Business Development Latin America, Israeli Desalination Engineering (Oct. 11, 2010).

125. Arrueste, *Water Scarcity, supra* note 12, at 4.

126. ESTIMATIONS FOR 2010–2015, *supra* note 6, at 10–11.

127. *Id.* at 11.

128. *Id.*

129. Phillipe et al., *supra* note 118, at 14.

130. Jorge Arrueste, 8th International Conference: Clean Water Technologies for the World Mining Industry, April 13–16, 2008, Water Availability for Mining Usage Crisis and Solution.

unsustainable given limited resources. Mines will need a reliable alternative to local surface and ground water. In light of these pressures and the finite nature of groundwater, mining projects must use an alternative water source.

CONAMA has also increased the rigor of its analysis before approving new projects. CONAMA's "mission is to promote the environmental sustainability."[131] In order for a mining project's environmental impact assessment to be approved by CONAMA, mining companies need to show that they will not diminish surface or groundwater resources in Chile despite their water rights.[132]

For CONAMA to approve projects, a Water Management Plan ("WMP") needs to be established for water resources in the project areas, which also outlines how a project will minimize potential aquifer depletion.[133] "Currently, the use of non-conventional water resources, such as desalinated or fresh sea water, would be an important added value in the process of project approval" by CONAMA.[134] A mine's water right is of no value by itself, because it can only be used after permits are granted pursuant to a completed CONAMA EIS. Thus, CONAMA has essentially presented mining companies one option for future freshwater supplies on new projects: desalination.

V. DESALINATION

Desalination is the removal of dissolved solids, such as minerals and salts, from a saline water source, usually seawater.[135] A variety of methods are used to desalinate saline water. The two primary methods in use are (1) thermal distillation, where the saline water is heated to the boiling point and separated from the salts and minerals, and (2) Reverse Osmosis ("RO"),[136] where the saline water passes through a semi-permeable membrane that separates salts from water. Desalination of seawater to supply mines is an expensive process, largely due to the costs of pumping the newly created fresh water a long distance uphill.[137]

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131. Arrueste, *Water Scarcity, supra* note 12, at 4.

132. *Id.*

133. *Id.*

134. *Id.*

135. *Id.* at 5.

136. RO technology is what is already being used in Chile. Arrueste, *Water Scarcity, supra* note 12, at 5.

137. Thomas M. Missimer & Robert G. Maliva, Alternative Intake Designs to Reduce Costs of Sea Water Desalination Systems for Mine Water Supply, *in* WIM 2010: PROCEEDINGS OF THE 2ND INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE

There are three distinct components of desalination facilities: (1) the intake and outfall; (2) the treatment process (pre-treatment and membrane process); and, (3) the pipeline, including pumping stations.[138] Pre-treatment processes remove marine organisms, sediments, bacteria, and large organic molecules that are present in seawater before the water passes through membranes (or another process).[139] Desalination costs for water treatment depend primarily on the size of the facility and electricity costs, but the intensity of the overall treatment process also affects costs.[140] Alternative intakes, which pull water through wells, beach galleries, or seabed filters, can significantly reduce capital operating costs because they pull water through natural filters.[141] Alternative intakes can also reduce harm to marine life, an added benefit.[142] These intakes are site-specific, however, and thus not available for every plant.

Desalination has a number of advantages and disadvantages for Chilean mining.[143] Desalination provides the following advantages: (1) consistent water quality; (2) a reliable water resource; (3) a buffer against droughts and decreased groundwater and surface water recharge due to decreased snow pack in the Andes (and climate change's influence); (4) full control by the mine company over its mine's local water supply (if desalination plants are privately owned and operated); and, (5) the potential for future use by the local municipality after ore bodies have been fully mined, or by the mining company for profit.[144] Because CONAMA is apparently reticent to dole out limited water resources, mining companies and corporations must create their own water because the nation's water is increasingly protected for other types of domestic use.

Desalination has some costs as well. First, desalination depends heavily on an energy supply to be cost-effective.[145] But, technological advancements that conserve energy can offset some of these costs. For example, RO membrane-based systems "have only become an economically viable option within the last decade, largely due to

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MINING INDUSTRY, 197–202 (Jacques Wiertz ed., 2010).

138. *Id.* at 197.

139. *Id.*

140. *Id.*

141. *Id.* at 198-99.

142. *See infra* p. 26 and note 151.

143. *See* COOLEY, ET AL., DESALINATION, WITH A GRAIN OF SALT: A CALIFORNIA PERSPECTIVE 39–81 (2006).

144. *Id.*

145. *Id.*; Arrueste, *Water Scarcity, supra* note 12, at 1.

advancements in membrane technology as well as the refinement of energy-capturing devices that reduce the overall energy consumption of the process."[146] RO improvements include: greater membrane life; development of corrosion-resistant heat-transfer surfaces; using off peak energy to produce base-load plants; co-generation of thermal energy and electricity; as well as, co-locating desalination and energy plants.[147] Additional engineering advances could make systems even more affordable.

Second, desalination can be prohibitively expensive depending on the price of metals.[148] Desalination is feasible when the price of metals is high. Given COCHILO's copper and gold investment projections, however, it appears that the production of metals will increase, and copper prices will continue to rise, especially as China's economy recovers from the global recession and continues to grow.[149] Because copper prices continue to rise, desalination will become increasingly feasible.

A third concern with desalination is that chemicals and unregulated contaminants introduced by the plant into end product water may affect human health.[150] Chemicals within the plants may enter the water source. This is a nonissue for Chilean mines, however, because the water would be used for production, not human consumption. The only potential threat to public health would be in the disposal of any contaminated water. Additional contaminants should not be cause for alarm, as wastewater should be properly processed before disposal. Conservative wastewater disposal procedures can decrease the risk of groundwater contamination.

Fourth, desalination can cause damage to the environment in a number of ways. Four major drawbacks include: (1) the production of toxic salt concentrate; (2) harm to marine life; (3) changes in local ecology; and (4) energy use that contributes to climate change.

Local environmental effects are directly related to water intake and output. Concentrated salts discharged from the desalination process are

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146. Arrueste, *Water Scarcity, supra* note 12, at 5–6.

147. COOLEY, ET AL., *supra* note 143, at 44.

148. *Id*. at 41–45; Arrueste, *Water Scarcity, supra* note 12, at 4.

149. Matt Whittaker, Copper Hits Record on China Appetite, Chile Strike, WALL ST. J., Nov. 11, 2010, http://online.wsj.com/article/SB10001424052748703848204575608682052917368.html?mod=rss_whats_news_us&utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+wsj%2Fxml%2Frss%2F3_7011+%28WSJ.com%3A+What%27s+News+US%29 (last visited Nov. 16, 2011).

150. COOLEY, ET AL., *supra* note 143, at 53–55.

toxic to the environment, especially to marine life.[151] Even worse for public relations is the fact that large marine organisms, such as adult fish, invertebrates, birds, and even mammals are killed on water intake screens (impingement); organisms small enough to pass through an intake screen are killed during the processing of the salt water (entrainment).[152] But there are ways to mitigate the impact of salt concentrate.

Two types of intakes can minimize these deaths. Alternative intakes, which pull water through wells, beach galleries, or seabed filters, reduce impingement and entrainment because they pull water through natural filters like sediments.[153] Open or direct intakes provide another intake alternative; they suck in water at a very slow rate, which minimizes the disturbance to the aquatic ecosystem by reducing the force of the intake's cone of depression[154] in the water column.[155]

Desalination can also upset the local water budget and ecology if water is not properly managed, but the effects of any project will have to be analyzed on a case-by-case basis. Individualized solutions based on geology, marine ecology, project budget, and technology provide a suite of options. In addition, the EIS process adds an additional buffer that would require projects to meet national environmental policy standards. It is unlikely CONAMA would want to be associated with marine mammal impingement.

Finally, energy use by desalination plants is expensive and can contribute to climate change. Because desalination is energy intensive, relying on it creates or increases the water producer's exposure to energy price variability.[156] Yet Chile is working to address its insufficient energy resources problem through the development of hydroelectric projects and renewable resources. Chile is currently looking to develop geothermal energy resources with its northern neighbor, Bolivia.[157] A more

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151. KERRY J. HOWE, UNIV. OF N.M., TECHNICAL CHALLENGES TO CONCENTRATE DISPOSAL FROM INLAND DESALINATION (2004).

152. COOLEY, ET AL., *supra* note 143, at 59.

153. *Id.*

154. A cone of depression is the area of water influenced by an intake. The term comes from the field of hydrogeology where a depression in the potentiometric surface of groundwater has the shape of an inverted cone around a well from which water is being withdrawn.

155. Telephone Interview with Roberto A. Lastrico, Business Development Latin America, Israeli Desalination Engineering (Oct. 11, 2011).

156. COOLEY, ET AL., *supra* note 143, at 55.

157. Todd White, Chile May Develop Geothermal Energy with Bolvia, BLOOMBERG BUSINESSWEEK

(on file with author).

conventional option is to place desalination plants by existing power stations to reduce the cost of energy transfers, which has an added environmental benefit of keeping industrial operations in already industrialized areas. New desalination technologies may also reduce the impact of a potential plant. For example, novel Sea Water Desalination Vessels ("SDVs") integrate a power plant and water treatment facility in a seagoing tanker.[158] An environmental assessment indicated that the discharge system's environmental footprint is more favorable than a land-based facility; with an SDV, the concentrate can dilute in the full water column as opposed to a land-based operation.[159] Additional concerns include rising sea levels due to climate change, which could threaten coastal desalination plant locations, and difficulty in getting accurate cost estimates.[160]

But desalination is already in use in Chile, and desalination plants are currently sustained by the strong minerals market:

> [M]embrane seawater desalination by Reverse Osmosis is the preferred technology, coupled with pumping and pipelines to the plant facilities, implying a total desalination water supply cost of about US$1.8-2.0/$m^3$. These high water costs are not representing a limitation to mining projects development and operation, being sustained in the high metal prices [sic].[161]

Given that the next decade will be one of tremendous growth in the mining industry, desalination is a cost-effective solution to mining operations' need for a steady water supply. Cheaper alternative intakes can be used, assuming appropriate site locations, to (1) lower some costs of operation, and (2) provide natural filters that minimize direct impacts to marine life. The capital saved by using a natural filter could then be applied to technology to offset the effects of toxic salt discharges. Suitable site selection seems key to minimizing environmental impacts and the EIS process can act as a check on plant construction.

VI. CONCLUSION

By forcing mining companies to use methods like desalination for future mining projects' water supply, Chile will remain true to the

158. Lisa Henthorne & Jose Pesce, Flexible and Sustainable Water Supply: Sea Water Desalination Vessel Options and Analysis, *in* WIM: INTERNATIONAL CONGRESS ON WATER MANAGEMENT IN THE MINING INDUSTRY 212–216 (Jacques Wiertz ed., 2010).

159. *Id.* at 214–215.

160. COOLEY, ET AL., *supra* note 143, at 43–45.

161. Arrueste, *Water Scarcity*, *supra* note 12, at 1.

country's free market history while simultaneously revolutionizing environmental protections. Water scarcity has increased the cost of water rights, "impelling and justifying the implementation of approved tailing dewatering systems, and the use of either desalinated or fresh sea water."[162] Although desalination has high economic and environmental costs, the benefits of desalination outweigh the negatives. In addition, Chile is embracing free market environmentalism by making mining companies bear the full cost of mineral exploration and development by paying the full cost of water production and energy for transport.

Foreign companies must bear the risk of a mining investment, not Chile. Desalination forces these mining companies to internalize negative externalities and take responsibility for any environmental damage. Domestic water resources are then unofficially reserved for domestic purposes, such as agriculture and urban use, and can be used to benefit Chileans in a direct manner. Because mining is necessarily extractive and mineral deposits are finite, Chile is protecting its long-term economic welfare by securing domestic surface and groundwater resources without undermining its water market system. By protecting terrestrial freshwater resources, CONAMA protects another economic driver, agriculture, which will continue to sustain Chile once mineral resources have been extracted. Water can also be saved for droughts and used to offset the effects of climate change.

Desalination also benefits mining companies. Mining companies get full control over water production and projects in their entirety. A water production plant, which has a virtually unlimited amount of seawater as a supply source, will protect mining operations from drought period limitations and increased aridity due to climate change or the effects of El Nino.[163] Even if mining companies choose not to develop mineral resources because it is too expensive, companies would still have water production capacity and could potentially sell water on the market in a desperately dry area.

Because this beneficial policy remains unwritten and coincidental, Chile should adopt an official written policy banning appropriation of water for consumptive mining uses. By making extractive operations bear the full cost of their legal property right, Chile will further incentivize water use efficiency, protect its domestic economy, and minimize the negative environmental effects of consumptive water use by large industry. Further, subsidization by implication is simply not in line with free market economics; mining companies need to internalize

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162. *Id.* at 4.

163. *See* NAT'L ENVTL. COMM'N., CLIMATIC VARIATION IN THE CHILEAN TERRITORY IN THE XXI CENTURY (2007).

the full cost of their operations. When fresh water is in short supply, it should not be free for consumptive use. Chile's free market history has already blended with its water policies to create a custom that complements both economic and environmental goals. Why not make it official?