

WIND POWER, WILDLIFE, AND THE MIGRATORY BIRD TREATY ACT: A WAY FORWARD

BY

MEREDITH BLAYDES LILLEY* AND JEREMY FIRESTONE**

We begin this paper by discussing the rapid domestic growth of wind power and the implications for turbine-related avian and bat impacts, and then examine other anthropogenic sources of avian mortality. Next, we provide a broad overview of the U.S. wildlife laws most pertinent to the conservation of bats and migratory birds, before moving on to provide a detailed account of the legislative history and judicial interpretation of liability for incidental take under the Migratory Bird Treaty Act (MBTA). We analyze in detail whether a court would be likely to find that the liability provisions for avian take under the MBTA reach wind turbine operators, with the authors providing opposing arguments. We then broaden our view and consider the take of migratory birds by wind turbines in context—that is, we compare the effects of wind turbines on wildlife to the impacts caused by other means of electricity generation. Finally, we suggest a way forward, including recommendations for: updating the regulatory regime under the MBTA with clear permitting requirements and compliance standards; establishing an equally effective legal and regulatory regime for federal bat protection; developing commensurate standards for other energy sources and anthropogenic activities with wildlife impacts; and improving coordination between the wind industry and the United States Fish and Wildlife Service—all in an effort to ensure that wind power, which provides a cost-competitive, clean, noncarbon dioxide-producing source of energy, can become a significant fraction of domestic electricity supply while at the same time minimizing avian and bat impacts.

* Meredith Lilley is a Ph.D. Candidate in the College of Marine and Earth Studies and a Research Assistant at the Center for Carbon-free Power Integration, University of Delaware. She is researching both energy and climate change policy, including the development of offshore wind power and other renewable energy applications. She holds a Bachelor of Science in Bioenvironmental Sciences and a Master of Marine Policy.

** Jeremy Firestone is Associate Professor, College of Marine and Earth Studies and Senior Research Scientist, Center for Carbon-free Power Integration, University of Delaware. He teaches courses on offshore wind power and climate change law and policy. Previously he was an environmental lawyer for the United States Environmental Protection Agency and for the State of Michigan, where he was the state's lead lawyer in hydroelectric dam relicensing proceedings.

I.	INTRODUCTION - EMERGENCE AND RAPID GROWTH OF MODERN WIND POWER IN THE UNITED STATES	103
II.	AVIAN AND BAT IMPACTS	104
III.	PERTINENT FEDERAL WILDLIFE LAWS	110
IV.	INCIDENTAL TAKE OF BIRDS UNDER THE MIGRATORY BIRD TREATY ACT	111
A.	<i>Legislative History of the Migratory Bird Treaty Act</i>	112
1.	<i>Early History of Migratory Bird Conservation in the United States</i>	112
2.	<i>Protected Species Under the Migratory Bird Treaty Act</i>	114
3.	<i>Migratory Bird Treaty Act Administration and Provisions</i>	114
B.	<i>Judicial Review of MBTA Application to Incidental Take</i>	116
1.	<i>Cases Addressing the Question of MBTA Applicability to Incidental Take and Legal Developments</i>	116
2.	<i>Jeremy Firestone – Courts Will Tend to Find that the MBTA Does Not Reach Wind Turbine Takes</i>	121
3.	<i>Meredith Lilley – Courts Will Tend to Find that the MBTA Does Reach Avian Take from Wind Facilities</i>	125
4.	<i>Cases Further Addressing the Breadth of Incidental Take Under the MBTA</i>	128
C.	<i>Enforcement Issues and Prosecution Likelihood</i>	131
1.	<i>Cases Addressing Enforcement Issues</i>	131
2.	<i>Likelihood of Prosecution</i>	132
V.	AN EXAMINATION OF COMPARATIVE IMPACTS OF ELECTRICITY PRODUCTION	136
VI.	NEXT STEPS	140
A.	<i>Onshore Wind Sites</i>	140
B.	<i>Offshore Wind Sites</i>	142
C.	<i>Scientific Research Recommendations</i>	143
D.	<i>MBTA Shortcomings and Legal Recommendations</i>	144
1.	<i>The MBTA Should Be Amended to Allow Incidental-Take Permits</i>	146
a.	<i>Preconstruction Monitoring Protocols</i>	146
b.	<i>Postconstruction Monitoring Protocols</i>	146
c.	<i>Field-Tested and Validated Mitigation Measures</i>	147
d.	<i>Increased Coordination Between Wind Facilities and the FWS</i>	147
2.	<i>The MBTA Should Be Amended to Include Opportunity for Public Comment, Civil Sanctions, and Citizen Suit Provisions</i>	148
E.	<i>Additional Recommendations</i>	148
1.	<i>Bats</i>	148
2.	<i>Increased Federal Funding</i>	149
3.	<i>Improved Analysis</i>	149
F.	<i>Conclusion</i>	150

I. INTRODUCTION - EMERGENCE AND RAPID GROWTH OF MODERN WIND POWER IN THE UNITED STATES

Wind power is the world's most rapidly growing source of energy.¹ In the United States alone from 1980 through 2007, installed wind energy capacity increased from effectively zero² to more than 16,800 megawatts (MW),³ where one MW of wind power generates enough energy for approximately 230 homes.⁴ This upsurge has largely been attributed to rising energy costs, a desire to decrease domestic dependence on foreign oil,⁵ and governmental incentives, which in turn, have been driven by increased environmental concerns over air quality and climate change impacts of fossil-fuel electricity.⁶ Furthermore, advances in wind turbine technology have made wind power more reliable, efficient, cost-effective, and thus more competitive against traditional forms of energy generation, such as coal and natural gas.⁷

All of these changes have indeed created an "unparalleled opportunity for wind energy to emerge as a viable mainstream electricity source and a key component of the world's environmentally sustainable development path."⁸ Unlike fossil fuels, wind is inexhaustible. The planet's wind resource potential, in fact, is about five times the global energy demand.⁹ Furthermore, given present trends, the continued integration of wind power into the energy sector could achieve a 4.5% reduction in carbon dioxide emissions by 2020.¹⁰ Yet, the "challenges facing wind energy remain both substantial and complex."¹¹ Wildlife impacts serve as one such obstacle for the wind industry, and as wind power expands in the United States, so too do concerns about the impact of wind farms on avian and bat species.¹²

In Part II of this paper, we discuss anthropogenic effects on avian and bat species with particular emphasis on wind turbines. In Part III, we provide a broad overview of the U.S. wildlife laws most pertinent to the conservation of bats and

¹ Charles J. Smith, *Winds of Change: Issues in Utility Wind Integration*, IEEE POWER & ENG'G MAGAZINE, Nov.–Dec. 2005, at 20, 22.

² NAT'L RESEARCH COUNCIL, ENVTL. IMPACTS OF WIND-ENERGY PROJECTS 1 (2007).

³ AM. WIND ENERGY ASS'N, AWEA 2007 MARKET REPORT 1 (2008), available at http://www.awea.org/Market_Report_Jan08.pdf. Almost 5000 MW were installed in 2007 alone. *Id.*

⁴ See Texas State Energy Conservation Office, Texas Wind Energy, http://www.seco.cpa.state.tx.us/re_wind.htm (last visited Sept. 18, 2008).

⁵ Fredric C. Menz & Stephan Vachon, *The Effectiveness of Different Policy Regimes for Promoting Wind Power: Experiences from the States*, 34 ENERGY POL'Y 1786, 1786 (2006).

⁶ Jeffery B. Greenblatt, Wind as a Source of Energy, Now and in the Future 1 (Oct. 1, 2005) (unpublished manuscript commissioned by the InterAcademy Council).

⁷ ROBERT Y. REDLINGER ET AL., WIND ENERGY IN THE 21ST CENTURY: ECONOMICS, POLICY, TECHNOLOGY, AND THE CHANGING ELECTRICITY INDUSTRY xiii (2002).

⁸ *Id.*

⁹ Christina L. Archer & Mark Z. Jacobson, *Evaluation of Global Wind Power*, GEOPHYSICAL RESEARCH, June 15, 2005, at 1, 17, available at <http://www.stanford.edu/group/efmh/winds/2004jd005462.pdf>.

¹⁰ NAT'L RESEARCH COUNCIL, *supra* note 2, at 63.

¹¹ REDLINGER ET AL., *supra* note 7, at xiii.

¹² See U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-05-906, WIND POWER: IMPACTS ON WILDLIFE AND GOVERNMENT RESPONSIBILITIES FOR REGULATING DEVELOPMENT AND PROTECTING WILDLIFE 1 (2005), available at <http://www.gao.gov/new.items/d05906.pdf> [hereinafter GAO WIND POWER].

migratory birds, before moving on to Part IV, where we provide a detailed account of the legislative history and judicial interpretation of liability for incidental take under the Migratory Bird Treaty Act (MBTA).¹³ In Part V, we broaden our view and consider the take of migratory birds by wind turbines in context—that is, we compare the effects of wind turbines on wildlife to the impacts caused by other means of electricity generation. Finally, in Part VI, we suggest a way forward.

II. AVIAN AND BAT IMPACTS

Avian and bat impacts of wind-energy facilities are not homogeneously distributed across the United States, but instead vary by species and region.¹⁴ Studies show high levels of bird and bat kills at wind farms in California and Appalachia, respectively, while studies on wind facilities in other regions of the country reveal lower mortality levels.¹⁵ While overall the most frequent fatalities at wind farms are night-migrating passerines,¹⁶ the case is quite different at the Altamont Pass wind facility in northern California, where over 1000 raptors are killed annually.¹⁷ These avian impacts, ongoing for over twenty years,¹⁸ have generated a high level of concern among biologists, as has the more recent discovery¹⁹ of unprecedented bat kills at wind facilities in West Virginia and Pennsylvania²⁰—for example, over 2000 at sixty-four turbines over one six-week period.²¹ Compared to other species, fatalities such as these probably have more damaging population effects on raptors and bats, as both are long-lived with characteristically low reproductive rates, and also due to the “relatively low abundance of raptors.”²² Further, little is currently known about bat movement, migration, and behavior,²³ thus making effective avoidance and mitigation planning difficult, if not impossible.

More positively, a recent National Research Council study found “no evidence of significant impacts” on avian populations in general at the present

¹³ 16 U.S.C. §§ 703–712 (2006).

¹⁴ GAO WIND POWER, *supra* note 12, at 2.

¹⁵ *Id.* at 2–3.

¹⁶ NAT’L RESEARCH COUNCIL, *supra* note 2, at 7.

¹⁷ GAO WIND POWER, *supra* note 12, at 10–11.

¹⁸ *See id.* at 10.

¹⁹ Bat fatalities have been recorded at wind farms around the world for decades, and for the first time domestically in the early 1990s. Edward B. Arnett et al., *Patterns of Bat Fatalities at Wind Energy Facilities in North America*, 72 J. OF WILDLIFE MGMT. 61, 61 (2008), available at <http://www.batsandwind.org/pdf/arnett2008patbatfatal.pdf>. Yet in North America, bat mortality at wind power sites received limited attention until 2003 when approximately 1400–4000 bat deaths occurred in West Virginia at the Mountaineer Wind Energy Center. *Id.*

²⁰ Unexpectedly high bat mortality levels at wind facilities have now moved beyond Appalachia. Surveys conducted in 2007 at Judith Gap wind farm in Montana revealed more than 1200 bat kills over a seven-month period. Renewable Energy News, *Bat death survey a nasty surprise at Judith Gap*, RENEWSAMERICAS, July 17, 2008, at 4, 4.

²¹ *Id.* at 14.

²² NAT’L RESEARCH COUNCIL, *supra* note 2, at 7.

²³ NAT’L WIND COORDINATING COMM., WIND TURBINE INTERACTIONS WITH BIRDS AND BATS: A SUMMARY OF RESEARCH RESULTS AND REMAINING QUESTIONS 6 (2004), available at http://www.nationalwind.org/publications/wildlife/wildlife_factsheet.pdf.

installed U.S. wind power generation level.²⁴ Bird collisions with wind turbines were estimated to be between 20,000 and 37,000 in 2003, according to the Council.²⁵ In another congressionally commissioned study, the Government Accountability Office (GAO) noted that if wind power expansion in the United States meets its stated goal—growing from generating less than 1% of U.S. electricity in 2004 to 5% by 2020—over 62,000 wind turbines would need to be constructed, adding to the 16,000 turbines already in existence.²⁶ This growth could bring the estimated annual total of bird fatalities to approximately 217,000.²⁷ According to Erickson et al., however, even if the number of domestic wind turbines expanded to one million, they would still most likely “cause no more than a few percent of all [avian] collision deaths related to human structures.”²⁸

Indeed, wind turbines are not the only anthropogenic source of avian mortality, as illustrated in Table 1 below. The leading contributors to bird fatalities in the United States are: collisions with buildings, power lines, and automobiles (with a combined total in the hundreds of millions, possibly over a billion); domestic and feral cats (possibly over 100 million); pesticide use (ranging from 67 to 72 million); and communication tower collisions (ranging from as low as 4.5 to 50 million). Collisions with wind turbines and airplanes fall at the lower end of the spectrum, numbering in the tens of thousands. Collectively, these human-caused avian fatalities range from hundreds of millions to well over a billion annually.

²⁴ NAT’L RESEARCH COUNCIL, *supra* note 2, at 2.

²⁵ *Id.*, at 71–72.

²⁶ GAO WIND POWER, *supra* note 12, at 6–7, 9. These figures are based on the installed wind capacity (6740 MW) and the average capacity of a wind turbine installed (1.5 MW) as of 2005. *Id.* at 6, 9. To reach the 5% goal, wind energy would need to supply 100,000 MW, 6740 MW of which was supplied by 16,000 turbines as of 2004. *Id.* The remainder, 93,260 MW, would be supplied by 1.5 MW turbines, resulting in the construction of over 62,000 turbines (93,260 divided by 1.5 equals 62,173).

²⁷ See Wallace P. Erickson et al., *A Summary and Comparison of Bird Mortality from Anthropogenic Causes with an Emphasis on Collisions*, in U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE GENERAL TECHNOLOGY REPORT PSW-GTR-191 1029, 1036 (2005), available at http://www.fs.fed.us/psw/publications/documents/psw_gtr191/Asilomar/pdfs/1029-1042.pdf. In the study conducted by Erickson et al., they present annual mortality predictions for wind power (2.11 per wind turbine and 3.04 per MW). Thus, approximately 130,820 (62,000 multiplied by 2.11) to 304,000 (100,000 multiplied by 3.04) birds would die annually from wind turbine collisions with this projected increase in domestic wind power. The average of this range is 217,000. These estimates are conservative, given their derivation from studies of land-based wind sites rather than a mix of on and offshore facilities, the latter of which, according to recent studies, result in fewer bird mortalities than their land-based counterparts. See Mark Desholm & Johnny Kahlert, *Avian Collision Risk at an Offshore Wind Farm*, 1 BIOLOGY LETTERS 296, 297 (2005).

²⁸ WALLACE P. ERICKSON ET AL., NATIONAL WIND COORDINATING COMMITTEE, AVIAN COLLISIONS WITH WIND TURBINES: A SUMMARY OF EXISTING STUDIES AND COMPARISONS TO OTHER SOURCES OF AVIAN COLLISION MORTALITY IN THE UNITED STATES 1 (2001), available at http://www.nationalwind.org/publications/wildlife/avian_collisions.pdf.

Table 1. Estimated Annual Bird Mortality from Anthropogenic Sources in the United States				
Source of mortality	FWS (2007) ²⁹	Erickson et al. (2005) ³⁰	FWS (2002) ³¹	Erickson et al. (2001) ³²
Building collisions	97–976 million	550 million	97–976 million	98–980 million
Power line collisions	Tens of thousands–174 million	130 million	Tens of thousands–174 million	130–174 million
Cats	100's of millions	100 million	100's of millions	100 million
Motor vehicle collisions	60–80 million	80 million	60 million or more	60–80 million
Pesticide poisoning	Probably hundreds of millions	67 million ³³	At least 72 million	
Communication tower collisions	4–5 million, possibly closer to 40–50 million	4.5 million	4–5 million, possibly closer to 40–50 million	4–50 million
Oil and wastewater pits	Significant reduction from 2 million estimate ³⁴		Up to 2 million	
Wind turbine collisions	33 thousand	28.5 thousand	33 thousand	10–40 thousand
Airplane collisions	>3,100 in 2000 (Air Force) >5,800 in 2000 (civilian)	25 thousand	Far fewer than automobiles	

²⁹ DIV. OF MIGRATORY BIRD MGMT., U.S. FISH & WILDLIFE SERV., ESTIMATES OF ANNUAL HUMAN-CAUSED MORTALITY TO NORTH AM. BIRDS (WITH LITERATURE CITES) 2–6 (2007) [hereinafter FWS ESTIMATES].

³⁰ Erickson et al., *supra* note 27, at 1039.

³¹ U.S. FISH & WILDLIFE SERV., MIGRATORY BIRD MORTALITY: MANY HUMAN-CAUSED THREATS AFFLICT OUR BIRD POPULATIONS (2002), available at <http://www.fws.gov/birds/mortality-fact-sheet.pdf>.

³² ERICKSON ET AL., *supra* note 28, at 7–16.

³³ This estimate only considers agricultural pesticide use, not lawn, golf course, or turf pesticide use. Erickson et al., *supra* note 27, at 1037.

³⁴ Cooperative efforts between the United States Fish and Wildlife Service and oil producers have significantly reduced the previous mortality estimate of two million from oil and wastewater pits. FWS ESTIMATES, *supra* note 29, at 4.

20xx]

A WAY FORWARD

107

	aircraft) ³⁵			
Source of mortality	FWS (2007)	Erickson et al. (2005)	FWS (2002)	Erickson et al. (2001)
Bycatch from U.S. fisheries	Tens to hundreds of thousands from gillnet entanglement in U.S. Territorial Sea and Economic Exclusion Zone ³⁶		Tens to hundreds of thousands	
Power line electrocutions	Tens of thousands, but seldom monitored and not systematically		Tens of thousands	

The above estimates are not particularly robust, however, given that: the United States Fish and Wildlife Service (FWS) stopped collecting and publishing incidental avian mortality data (e.g., collisions, electrocutions, and poisonings) in 1975; and the majority of human-caused mortality factors are not systematically monitored or assessed. Instead, these estimates are “at best, extrapolations or ‘best guesses’ of the likely ranges of mortality.”³⁷ The actual fatality levels from various anthropogenic sources are probably higher in reality than projected. For example, according to the FWS Division of Migratory Bird Management, Erickson et al.’s 2001 estimate of 2.19 annual bird fatalities per turbine (upon which the 33,000 mortality figure from wind power facilities is based) is “likely low, possibly by an order of magnitude.”³⁸

Obtaining a random sample representative of the particular structure or activity under investigation is essential for accurate estimates of fatality rates. Data quality issues that reduce the precision of these estimates, sometimes by orders of magnitude, include: lack of comprehensive and long-term data; nonrandom and

³⁵ An estimated 80% of the civilian aircraft strikes were unreported. *Id.* at 2.

³⁶ Globally, longline fishing gear results in the death of hundreds of thousands of seabirds by drowning, strangulation, and injury from hooks and longlines. *Id.* at 4.

³⁷ *Id.* at 1.

³⁸ *Id.* at 5.

small sample sizes; failure to correct biases associated with carcass detection and scavenger rates; and lack of standardized data collection methods.³⁹

Only in the hunting sector of all the anthropogenic sources of bird mortality are national cumulative impact analyses conducted.⁴⁰ Furthermore, unlike the above-discussed mortality sources, hunting is a permitted activity. In 2006, the U.S. duck harvest was approximately $13,808,100 \pm 4\%$ and the goose harvest was $3,579,100 \pm 5\%$, for a total waterfowl harvest of approximately 17,387,200.⁴¹

Collectively, the various levels of human-induced avian mortality listed in Table 1, even though they are only estimates, are cause for concern. Moreover, the figures do not account for either manmade contributions to the spread of avian diseases or habitat degradation and loss—the foremost threat⁴² to birds and all wildlife—caused by anthropogenic intrusion, development, and despoliation. Combined with bird mortality from natural causes such as inclement weather, predation, and starvation, human-related avian mortality may result in more deaths than a population can endure. Scientists are therefore most concerned with the cumulative pressure of all mortality factors on avian populations. The FWS's legislative mandate is to reduce bird deaths within its control, namely those stemming from anthropogenic sources, and “addressing each of the contributing factors is a priority.”⁴³

Climate change exacerbates these avian mortality threats, both anthropogenic and natural, by causing: habitat loss⁴⁴ and concomitant range reductions;⁴⁵ loss of prey; increased flooding and droughts; changes in precipitation and vegetation; increases in invasive species; and other major ecological changes.⁴⁶ Scientists have already begun observing these stressors. More than 80% of animal and plant species studied have exhibited changes in the timing of reproduction or migration, changes in migratory routes or habitat, or other alterations brought about by climate

³⁹ Erickson et al., *supra* note 27, at 1029–30, 1034; GAO WIND POWER, *supra* note 12, at 16.

⁴⁰ FWS ESTIMATES, *supra* note 29, at 1.

⁴¹ KENNETH D. RICHKUS ET AL., MIGRATORY BIRD HUNTING ACTIVITY AND HARVEST DURING THE 2006 AND 2007 HUNTING SEASONS 26 (2008), available at <http://www.fws.gov/migratorybirds/reports/HuntingStatistics/Migratory%20bird%20hunting%20activity%20and%20harvest%20during%20the%202006%20and%202007%20hunting%20seasons%20-%20Preliminary%20Estimates.pdf>.

⁴² Because climate change so fundamentally alters ecological systems, as discussed in more detail *infra*, it is inextricably tied to habitat modification and destruction as the foremost threat to wildlife.

⁴³ U.S. FISH & WILDLIFE SERV., *supra* note 31, at 2.

⁴⁴ *Gone with the Wind: Impacts of Wind Turbines on Birds and Bats: Oversight Hearing Before the Subcomm. on Fisheries, Wildlife and Oceans of the H. Comm. on Natural Resources*, 110th Cong. 55 (2007), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_house_hearing&docid=f:35058.pdf [hereinafter *Hearings*] (statement of Mike Daulton, Director of Conservation Policy, National Audubon Society).

⁴⁵ Walter Jetz et al., *Projected Impacts of Climate and Land-Use Change on the Global Diversity of Birds*, 5 PLOS BIOLOGY 1211, 1213 (2007).

⁴⁶ *Hearings*, *supra* note 44, at 55 (statement of Mike Daulton, Director of Conservation Policy, National Audubon Society).

change.⁴⁷ Alarming results such as these underscore the deduction that to birds and other wildlife, climate change constitutes a “severe threat.”⁴⁸

A complicating factor, which sets wind power apart from other bird and bat mortality sources and, thus, elevates the concerns over wind-related wildlife impacts, lies in the proposed “significant development”⁴⁹ of wind power into migratory flyways and other areas containing high numbers of species. Rapid development in such areas could further threaten local populations of bird and bat species.⁵⁰ Furthermore, the estimates and projections in Table 1, take into account neither the cumulative impact of man-made structures nor the relative impact of wind facilities on *bat* populations, which in several regions of the United States, including the Mid-Atlantic, “may be particularly at risk.”⁵¹

Whereas the above discussed avian impacts resulting from wind-turbine expansion by 2020 may appear insignificant when compared with other anthropogenic sources of mortality, the implications of that level of expansion for bats are more dire.⁵² Fatality estimates range from 33,000 to 62,000 annual bat fatalities in the Mid-Atlantic Highlands (Maryland, Pennsylvania, Virginia, and West Virginia) based on National Renewable Energy Laboratory (NREL) installed capacity projections, and from 59,000 to 111,000 based on PJM Interconnection projections.⁵³ Considering that these estimates represent impacts in one region over one year, the potential for substantial cumulative impacts nationwide over the life of wind projects (twenty to twenty-five years) is evident.⁵⁴ These implications are compounded by the limited capacity of bats to recover from population declines (as noted previously regarding their low birth rates and consequently slow population

⁴⁷ *Id.* at 57 (statement of Mike Daulton, Director of Conservation Policy, National Audubon Society).

⁴⁸ *Id.* at 55 (statement of Mike Daulton, Director of Conservation Policy, National Audubon Society).

⁴⁹ GAO WIND POWER, *supra* note 12, at 43.

⁵⁰ NAT’L RESEARCH COUNCIL, *supra* note 2, at 2.

⁵¹ *Id.*

⁵² Although fatality rates of birds and bats vary considerably among sites, Robert M.R. Barclay, E.F. Baerwald & J.C. Gruver, *Variation in bat and bird fatalities at wind energy facilities: assessing the effects of rotor size and tower height*, 85 CANADIAN J. OF ZOOLOGY 381, 385 (2007), more bats than birds are killed at most wind energy facilities. In a subsequent paper, the principal authors identified barotrauma as a significant cause of bat deaths at wind turbines, which helps to explain this discrepancy. Erin F. Baerwald, Genevieve H. D’Amours, Brandon J. Klug & Robert M.R. Barclay, *Barotrauma is a significant cause of bat fatalities at wind turbines*, 18 CURRENT BIOLOGY 695, 695 (2008). At wind sites, barotrauma—damage to the tissue of air-containing structures, such as lungs—results from the rapid reduction in air pressure created by moving turbine blades. *Id.* This sudden pressure change, which bats cannot detect, leads to excessive lung expansion, which in turn causes internal hemorrhaging and other injuries (e.g., congestion, edema, and lung collapse) that incapacitate and kill them. *Id.* at 695–96. Unlike birds, bats are susceptible to barotrauma due to their more flexible, less compact lungs. *Id.* at 696. This finding explains in part the comparatively high fatality rates of bats at wind energy facilities, where “90% of bat fatalities involved internal haemorrhaging consistent with barotrauma . . .” *Id.* at 695.

⁵³ Thomas H. Kunz et al., *Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses*, 5 FRONTIERS IN ECOLOGY & ENV’T 315, 319 (2007), available at <http://www.bu.edu/cecb/reprints/2007/Kunz.Bats%20&%20Wind.07.pdf>.

⁵⁴ *Hearings*, *supra* note 44, at 24 (statement of Edward B. Arnett, Conservation Scientist, Bat Conservation International).

growth) which have more traditionally resulted from habitat destruction and degradation, roost loss or disturbance, and persecution from humans.⁵⁵ Although historical and current bat population levels are poorly understood, many species are “believed by scientists to be in substantial decline.”⁵⁶

III. PERTINENT FEDERAL WILDLIFE LAWS

Many of the avian fatalities from the above-listed sources would be deemed as unlawful take under such federal laws as the Endangered Species Act (ESA),⁵⁷ Bald and Golden Eagle Protection Act (BGEPA),⁵⁸ and the MBTA.⁵⁹ Federal law, conversely, does not protect the species of bat killed at wind farms in West Virginia.⁶⁰ In fact, apart from some bat species listed as threatened or endangered under the ESA,⁶¹ bats are generally not federally protected.⁶²

State and local governments are largely responsible for regulating land-based wind facilities because the majority of wind energy development has occurred on nonfederal lands. Regardless of where the activity takes place (on federal or nonfederal land) any killing or taking of an endangered species would only be lawful if the person responsible was in possession of an incidental-take permit issued under the ESA.⁶³ The BGEPA likewise provides a way for development projects posing risks to protected Bald and Golden eagles to abide by its provisions.⁶⁴

None of these wildlife laws requires wind owners and operators to follow specific procedures to ensure that harm to wildlife will not occur during facility

⁵⁵ Bat disease, notably the fatal White-Nose Syndrome, is cause for concern among wildlife managers as well. A wind project in upstate New York has been postponed, and the FWS has requested the same of other nearby wind projects while it conducts studies on the ailment, which has killed bats in New York, Vermont, Massachusetts, and Connecticut. Renewable Energy News, *Bat death probe halts wind work*, RENEWSAMERICAS, June 19, 2008, at 1, 1.

⁵⁶ *Id.* at 23.

⁵⁷ Endangered Species Act of 1973, 16 U.S.C. §§ 1531–1544 (2006).

⁵⁸ 16 U.S.C. §§ 668–668d (2006).

⁵⁹ Migratory Bird Treaty Act, 16 U.S.C. §§ 703–712 (2006); Erickson et al., *supra* note 27, at 1029.

⁶⁰ GAO WIND POWER, *supra* note 12, at 4.

⁶¹ John Arnold McKinsey, *Regulating Avian Impacts Under the Migratory Bird Treaty Act and Other Laws: The Wind Industry Collides with One of Its Own, the Environmental Protection Movement*, 28 ENERGY L.J. 71, 75 (2007). There are 45 bat species in the continental United States. FWS, THE ENDANGERED SPECIES PROGRAM, INTRODUCTION TO BATS, <http://www.fws.gov/Endangered/bats/bats.htm> (last visited September 2, 2008). Eight of these are listed as endangered and one is listed as threatened. FWS, THREATENED AND ENDANGERED SPECIES SYSTEM, http://ecos.fws.gov/tess_public/SpeciesReport.do?groups=A&listingType=L&mapstatus=1 (last visited Sept. 2, 2008). While no member of an endangered or threatened bat species has been found killed by a wind turbine, not all wind sites have been searched thoroughly or consistently (e.g., some sites have not been searched for a number of years) and bats prove difficult to find in searches, largely due to their small body size. Additionally, wind energy is rapidly expanding into the range of threatened and endangered bat species, such as the Indiana bat, the gray bat, and the Virginia big-eared bat. *See Hearings, supra* note 44, at 28 (statement of Edward B. Arnett, Conservation Scientist, Bat Conservation International).

⁶² GAO WIND POWER, *supra* note 12, at 34–35.

⁶³ *Id.* at 21.

⁶⁴ McKinsey, *supra* note 61, at 77.

construction or operation. At the same time, those wind owners and operators could be held liable for any such harm to a protected species that may arise.⁶⁵ Unlike the ESA and BGEPA, the MBTA lacks compliance mechanisms for incidental take, thus lending itself to a fair amount of criticism. By far the country's oldest wildlife protection law, it has been labeled "archaic" and "ancient."⁶⁶ The next section provides a more in-depth discussion of the MBTA, for a better understanding of why it offers no incidental-take permits for any entities, including the wind industry.

IV. INCIDENTAL TAKE OF BIRDS UNDER THE MIGRATORY BIRD TREATY ACT

During the 1800s, unchecked overharvesting of migratory birds in North America brought some to extinction and others to the edge of it. Widespread public concern over the alarming decline of nationwide waterfowl populations led to the passage of the MBTA, one of the nation's first wildlife conservation laws⁶⁷ and the "cornerstone for migratory-bird conservation and protection"⁶⁸ in the United States.

The MBTA was initially designed to protect migratory birds from hunting, and while it has succeeded in that regard, new and very serious threats to migratory birds have emerged over the past century. As noted above, these threats stem from myriad land uses, including hazardous waste pollution, deforestation, the construction of tall buildings and similar structures, and other activities that have contributed to habitat alteration, degradation, and destruction. In response to these modern day stressors, the "primary administrative emphasis" of the MBTA has shifted beyond solely managing sport hunting to include regulating a much broader array of activities that result in the incidental take of migratory birds.⁶⁹

This section focuses on this latter, highly contentious application of the MBTA. It first discusses the origins and major provisions of the Act, and then examines the case law surrounding the extension of MBTA jurisdiction to incidental take. It ultimately outlines enforcement issues, as well as the implications for the wind power industry, which may face criminal prosecution under the MBTA. As this section will demonstrate, district courts across the country have delivered conflicting opinions on whether the MBTA pertains to incidental take and, if so, to what extent. Given the host of current activities that, albeit lawful, result in the take of migratory birds, the courts have most likely not seen the end of MBTA adjudication.

⁶⁵ *Id.*

⁶⁶ *Id.* at 90.

⁶⁷ Laura J. Beveridge, *The Migratory Bird Treaty Act and Wind Development*, N. AM. WINDPOWER, Sept. 2005, at 36.

⁶⁸ Craig A. Faanes et al., *Birders and U.S. Federal Laws*, N. PRAIRIE WILDLIFE RES. CENTER ONLINE, <http://www.npwrc.usgs.gov/resource/birds/birdlaws/index.htm> (last visited Sept. 3, 2008) (citing Craig A. Faanes et al., *Birders and U.S. Federal Laws*, 24 BIRDING 299, 299–302 (1992)).

⁶⁹ George Cameron Coggins, *Federal Wildlife Law Achieves Adolescence: Developments in the 1970s*, 1978 DUKE L.J. 753, 764 (1978).

*A. Legislative History of the Migratory Bird Treaty Act**1. Early History of Migratory Bird Conservation in the United States.*

In the United States, the first indicator of bird species endangerment, on a nationwide scale, emerged during the frontier market of the 19th century.⁷⁰ During this time, overharvesting of animal species was the predominant threat to their survival.⁷¹ The domineering ethic of Manifest Destiny that pervaded the American attitude, coupled with the mass production of shotguns and repeating rifles, resulted in the large-scale destruction of many terrestrial animals.⁷² Such was the fate of the passenger pigeon, whose numbers estimating around five billion⁷³ once darkened the sky for many hours in its cross-country migrations.⁷⁴ While there is some speculation as to the cause of the passenger pigeon's extinction, the most prominent theory is that commercial hunters, who targeted the bird for pigeon meat, and game dealers, who sought it for sport, rendered the bird extinct in the wild by 1900.⁷⁵ The game business also drove other species, such as the heath hen,⁷⁶ golden plover, and Eskimo curlew, to the brink of extinction by 1890.⁷⁷ By the end of the 1800s, the hunting of birds for their fashionable feathers to adorn women's hats⁷⁸ and decorate the platters of fancy restaurants⁷⁹ had reduced many species, including the snowy egret and other colonial wading birds,⁸⁰ to "mere remnants of their historical populations."⁸¹

Public shock over this rapid decline of many migratory bird species and growing opposition to the industrial-scale slaughter of birds for the plume trade led

⁷⁰ BRIAN CZECH & PAUL R. KRAUSMAN, *THE ENDANGERED SPECIES ACT: HISTORY, CONSERVATION BIOLOGY, AND PUBLIC POLICY* 8, 10 (2001).

⁷¹ *Id.*

⁷² *Id.* at 11.

⁷³ Carl McDaniel & John M. Gowdy, *Markets and Biodiversity Loss: Some Case Studies and Policy Considerations*, 25 INT'L J. SOC. ECON. 1454, 1459 (1998).

⁷⁴ JENNIFER PRICE, *FLIGHT MAPS: ADVENTURES WITH NATURE IN MODERN AMERICA* 1 (1999); *see also* National Museum of History, *The Passenger Pigeon*, in *ENCYCLOPEDIA SMITHSONIAN*, http://www.si.edu/Encyclopedia_SI/nmnh/passpig.htm (last visited Sept. 2, 2008).

⁷⁵ PRICE, *supra* note 74, at 4, 6. In 1914, the last passenger pigeon died at the Cincinnati Zoo. CZECH & KRAUSMAN, *supra* note 70, at 10.

⁷⁶ CHRISTOPHER COKINOS, *HOPE IS THE THING WITH FEATHERS: A PERSONAL CHRONICLE OF VANISHED BIRDS* 136 (2001).

⁷⁷ PRICE, *supra* note 74, at 4.

⁷⁸ JENNIFER WHEELER ET AL., *CATALYSTS FOR CONSERVATION: HOW BIRDS INSPIRED SOME OF THE GREATEST ADVANCES IN WILDLIFE PRESERVATION*, available at <http://www.aza.org/publications/2003/05/may2002catalysts.pdf>; *see also* NORTH CAROLINA CHAPTER, AUDUBON SOCIETY, *THE COLONIAL WATERBIRDS OF NORTH CAROLINA: MAKING IT ON A WING AND A PRAYER*, <http://www.audubon.org/chapter/nc/nc/ColonialWaterbirds.html> (last visited Sept. 28, 2008) (wings, skins, and entire dead birds were also used to decorate women's hats.).

⁷⁹ FWS, *A Guide to the Laws and Treaties of the United States for Protecting Migratory Birds*, <http://www.fws.gov/migratorybirds/intrnltr/treatlaw.html> (last visited Aug. 26, 2007) [hereinafter FWS Guide].

⁸⁰ WHEELER ET AL., *supra* note 78 (noting that "snowy egrets, brown pelicans, and over 60 other species of birds" were targeted for the plume trade).

⁸¹ FWS Guide, *supra* note 79.

Congress to pass the Lacey Act⁸² in 1900.⁸³ Known as the federal government's first effort to combat the problem of species scarcity and extinction,⁸⁴ the Act prohibited the shipment of illegally captured birds across state boundaries.⁸⁵ The Lacey Act, however, proved ineffective in halting interstate traffic in the early 1900s, largely due to the substantial profits enjoyed by market hunters and lack of enforcement capability.⁸⁶

In response to this initial failure of the Lacey Act,⁸⁷ Congress passed the Weeks-McLean Law of 1913,⁸⁸ which again sought to stop the illegal hunting and shipment of migratory birds.⁸⁹ When the federal government attempted to sue individuals who had violated the law, those individuals demurred by saying that it was unconstitutional since the federal government could not abrogate states' rights under the Tenth Amendment.⁹⁰ The law was subsequently struck down as unconstitutional.⁹¹

A few years later in 1916, the United States entered into a treaty with Great Britain (in Canada's stead) to save from "indiscriminate slaughter," and ensure the preservation of, "such migratory birds as are either useful to man or harmless."⁹² In 1918, the Migratory Bird Treaty Act⁹³ ratified the treaty and bound the United States to respect stringent prohibitions on the take, capture, hunting, and killing of protected migratory birds.⁹⁴ Shortly thereafter, states challenged the constitutionality of the MBTA; however, since the Act served as implementing legislation for a treaty, which, in turn, invoked the Supremacy Clause, the Supreme Court upheld it.⁹⁵ It is this landmark judgment that led Coggins to state, "[t]he origins of modern federal wildlife law may be traced back to the MBTA."⁹⁶

⁸² Ch. 553, 31 Stat. 187 (1900) (codified as amended at 16 U.S.C. §§ 3371–3378 (2006)).

⁸³ WHEELER ET AL., *supra* note 78.

⁸⁴ See Robert Anderson, *The Lacey Act: America's Premier Weapon in the Fight Against Unlawful Wildlife Trafficking*, 16 PUB. LAND L. REV. 27, 29 (1995).

⁸⁵ Lacey Act, ch. 553, 31 Stat. 187, § 3 (1900) (codified as amended at 16 U.S.C. § 3372 (2006)).

⁸⁶ Anderson, *supra* note 84, at 41–44.

⁸⁷ FWS Guide, *supra* note 79. Although initially unsuccessful, the Lacey Act has become an effective tool for enforcing wildlife protection laws for both the states and the federal government. See also Anderson, *supra* note 84, at 85.

⁸⁸ Ch. 145, 37 Stat. 828, 847 (1913) (replaced by the Migratory Bird Treaty Act in 1918).

⁸⁹ FWS Guide, *supra* note 79.

⁹⁰ See, e.g., *United States v. McCullagh*, 221 F. 288, 290 (D. Kan. 1915); *United States v. Shauver*, 214 F. 154, 155 (E.D. Ark. 1914). The Tenth Amendment of the Bill of Rights states: "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." U.S. CONST. amend. X.

⁹¹ *McCullagh*, 221 F. at 294–95; *Shauver*, 214 F. at 160.

⁹² Convention Between the United States and Great Britain for the Protection of Migratory Birds, U.S.-Gr. Brit. Aug. 16, 1916, 39 Stat. 1702.

⁹³ 16 U.S.C. §§ 703–711 (2006).

⁹⁴ *Id.* § 703; see Convention Between the United States and Great Britain for the Protection of Migratory Birds, *supra* note 92, at 1703–04.

⁹⁵ *Missouri v. Holland*, 252 U.S. 416, 435 (1920); see also William S. Boyd, *Federal Protection of Endangered Wildlife Species*, 22 STAN. L. REV. 1289, 1293–95, 1309 (1970).

⁹⁶ Coggins, *supra* note 69, at 764.

Subsequent MBTA amendments ratified parallel bilateral conventions with Mexico in 1936, Japan in 1972, and the U.S.S.R. in 1976.⁹⁷ Although these treaties became more comprehensive over time in instituting protections not only for bird species, but also for their surrounding environment, the accompanying MBTA amendments did not drastically alter MBTA language to complement the treaties' broader scope.⁹⁸

2. Protected Species Under the Migratory Bird Treaty Act.

Each of the bilateral treaties lists protected species found in both countries, which the birds migrate between at some point in their annual life cycles.⁹⁹ In U.S. states, territories, and commonwealths, over 1000 bird species occur naturally,¹⁰⁰ and of these, more than 800 are covered by the statute.¹⁰¹ The MBTA thus manages a wide variety of species, ranging from barn swallows and turkey vultures to bald eagles and spotted owls.¹⁰²

3. Migratory Bird Treaty Act Administration and Provisions.

Section 704 of the MBTA confers permitting authority to the Secretary of the Interior,¹⁰³ who has, in turn, delegated that authority to U.S. Fish and Wildlife Service. FWS grants permits for otherwise unlawful activities that are compatible with the terms of the treaties, such as scientific research, hunting, and falconry.¹⁰⁴ Significantly, FWS does not provide permits for incidental take.

The only means of enforcing the MBTA is criminally. Unless otherwise permitted, it is unlawful "at any time, by any means, or in any manner" to, *inter alia*, pursue, hunt, take, capture, kill, possess, sell, barter, purchase, ship, import, or

⁹⁷ See Convention between the United States of America and the United Mexican States for the Protection of Migratory Birds and Game Mammals, U.S.-Mex., Feb. 7, 1936, 50 Stat. 1311; Convention Between the Government of the United States of America and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction, and Their Environment, U.S.-Japan, Mar. 4, 1972, 25 U.S.T. 3329; Convention Between the United States of America and the Union of Soviet Socialist Republics Concerning the Conservation of Migratory Birds and Their Environment, U.S.-U.S.S.R., Nov. 19, 1976, 29 U.S.T. 4647.

⁹⁸ See Coggins, *supra* note 69, at 765. After the enactment of the MBTA, the next legislative milestone came in 1929 with the Migratory Bird Conservation Act. Pub. L. No. 770, 45 Stat. 1222 (codified as amended at 16 U.S.C. §§ 715–715s (2006)). Also in response to the rapid decline in nationwide waterfowl populations, this Act established the Migratory Bird Conservation Commission, which was responsible for reviewing and choosing critical waterfowl protection lands for purchase by the Department of the Interior. *Id.* § 2 (codified as amended at 16 U.S.C. § 715a (2006)). This development was the "first acknowledgement of a federal responsibility to protect habitats on a national scale" with many viewing it as the origin of the National Wildlife Refuge System. See CZECH & KRAUSMAN, *supra* note 70, at 18.

⁹⁹ Exec. Order No. 13,186, 66 Fed. Reg. 3853 (Jan. 17, 2001).

¹⁰⁰ Faanes et al., *supra* note 68.

¹⁰¹ See Migratory Bird Conservation Act, 16 U.S.C. § 715j (2006); 50 C.F.R. § 10.13 (2007).

¹⁰² See 16 U.S.C. § 715j (2006); 50 C.F.R. § 10.13 (2007).

¹⁰³ Migratory Bird Treaty Act, 16 U.S.C. § 704 (2006).

¹⁰⁴ See 50 C.F.R. pt. 20, §§ 13.11, 21.11, 21.23, 21.28 (2007).

export “any migratory bird, any part, nest, or eggs of any such bird.”¹⁰⁵ FWS regulations broadly define “take”¹⁰⁶ as meaning to “pursue, hunt, shoot, wound, kill, trap, capture, collect” or attempt to carry out any of these activities.¹⁰⁷

As laid out in section 707, any violator of the Act—whether a “person, association, partnership, or corporation”¹⁰⁸—is subject to penalty. Felony convictions are meted out when any one of these entities “knowingly”¹⁰⁹ takes a migratory bird “for commercial purposes”—that is, for sale or barter—without a permit.¹¹⁰ Such convictions may result in fines of up to \$2000, imprisonment for up to two years, or both.¹¹¹ Those who (without regard to proof of knowledge) take or attempt to take a migratory bird by aid of baiting are subject to a misdemeanor conviction and up to one year of imprisonment.¹¹² Other takes are also deemed misdemeanors and result in fines as high as \$15,000, imprisonment for as long as six months, or both.¹¹³ It is under this last prong that the MBTA could potentially apply to wind turbines. There, in contrast to the felony provisions that require one to act “knowingly” before criminal liability can attach, the MBTA’s criminal misdemeanor provision imposes strict liability—meaning that one does not have to knowingly, or intentionally violate that provision of the Act to be convicted of a misdemeanor.¹¹⁴

By criminalizing the take of migratory birds without a permit and simultaneously granting no permits whatsoever for incidental take, the MBTA creates a conundrum for entities engaged in an array of land uses that might result in, albeit unintentionally, migratory bird deaths.¹¹⁵ Indeed, to the wind industry and to many others routinely involved in activities resulting in incidental take, the MBTA is a formidable statute. The opinion of what constitutes a prosecutable activity under the MBTA, however, varies from court to court. Due to its characterization as a fairly vague statute, coupled with the fact that it has been “highly controversial since its inception,”¹¹⁶ the MBTA has lent itself to a considerable amount of judicial review. The following section discusses the cases brought before the courts to address the incidental take of migratory birds, rather than take for more traditional purposes such as hunting.

¹⁰⁵ 16 U.S.C. § 703(a) (2006).

¹⁰⁶ On January 10, 2001, President Clinton issued Executive Order 13,186, which holds federal agencies liable under the MBTA, along with individuals, associations, partnerships, and corporations. Exec. Order No. 13,186, 66 Fed. Reg. 3853, 3854–56 (Jan. 17, 2001). It further refines the 50 C.F.R. § 10.12 “take” definition to include both “intentional” and “unintentional” take. *Id.* at 3853.

¹⁰⁷ 50 C.F.R. § 10.12 (2007).

¹⁰⁸ 16 U.S.C. § 707(a) (2006).

¹⁰⁹ *Id.* § 707(b).

¹¹⁰ *Id.* § 703(a); Beveridge, *supra* note 67, at 36.

¹¹¹ 16 U.S.C. § 707(b) (2006).

¹¹² *See id.* §§ 704(b), 707(c).

¹¹³ *See* Beveridge, *supra* note 67, at 36.

¹¹⁴ *Id.*

¹¹⁵ *Id.*

¹¹⁶ Coggins, *supra* note 69, at 766.

B. Judicial Review of MBTA Application to Incidental Take

Fifty-five years after the enactment of the MBTA in 1918—following decades of court decisions on intentional takings, such as the baiting, shooting, possession, and sale of protected migratory birds—the first criminal cases were brought against parties that neither engaged in hunting nor intended to kill protected birds. Thus far, the case law surrounding the application of the MBTA to incidental take may be categorized as follows: 1) cases determining whether the MBTA actually applies to incidental take, and 2) cases determining whether the MBTA effectively regulates incidental take resulting from habitat modification or destruction.

1. Cases Addressing the Question of MBTA Applicability to Incidental Take and Legal Developments.

In the early 1970s, *United States v. Union Texas Petroleum* marked the first case dealing with the issue of incidental take.¹¹⁷ Two other cases followed shortly thereafter.¹¹⁸ In all three cases, oil companies kept uncovered pits of toxic oil sludge, which led to migratory bird deaths when the birds landed in and subsequently ingested the contaminated water. Although the defendants intended neither to kill migratory birds nor to violate the MBTA, the bird deaths resulting from their “negligent or ultra-hazardous activities” nonetheless amounted to criminal offenses.¹¹⁹ It is difficult to determine the exact significance of these decisions, as they were “not officially reported.”¹²⁰ Yet, one can surmise that these prosecutions set the stage for future FWS regulation of incidental take.

A few years later in *United States v. FMC Corp.*,¹²¹ a federal court took a huge step in broadening the regulatory ambit of the MBTA, affirmatively introducing FWS to a new world of prosecution possibilities. The case dealt with a chemical company that manufactured a known, toxic pesticide and discharged the pesticide residue into a nearby settling pond. The district court found the company guilty on eighteen counts (although ninety-two total birds died after drinking the poisoned water).¹²² On appeal, the defendant argued that it did not violate the law knowingly, nor did it intend to kill birds,¹²³ but the United States Court of Appeals for the Second Circuit affirmed the conviction regardless of negligence or intent

¹¹⁷ See *United States v. Corbin Farm Serv.*, 444 F. Supp. 510, 533 (E.D. Cal 1978) (discussing *United States v. Union Texas Petroleum*, No. 73-CR-127 (D. Colo. July 11, 1973), which was filed and involved some motion practice, however, a trial was never held because the defendant pled guilty after defendant’s motion to dismiss was denied).

¹¹⁸ *Id.* at 527, n.7 (summarizing incidental take charges in *United States v. Stuarco Oil Co.*, No. 73-CR-129 (D. Colo. Aug. 17, 1973) and *United States v. Equity Corp.*, Cr. No. 75-51 (D. Utah Dec. 8, 1975)); see also Coggins, *supra* note 69, at 773.

¹¹⁹ See Coggins, *supra* note 69, at 773.

¹²⁰ According to Chief Judge Curtin, *United States v. Union Petroleum* “never went to trial” and was “not officially reported.” It thus did not expressly adjudicate the question of intentional killing. *United States v. FMC Corp.*, 428 F. Supp. 615, 617 n.2 (W.D.N.Y. 1977), *aff’d*, 572 F.2d 902 (2d Cir. 1978); see Coggins, *supra* note 69, at 773.

¹²¹ 428 F. Supp. at 615.

¹²² *United States v. FMC Corp.*, 572 F.2d at 903–04.

¹²³ *Id.* at 906.

because the deaths were incidental to a dangerous activity.¹²⁴ The Second Circuit essentially applied a strict liability standard, noting that “[w]hen one enters into a business or activity for his own benefit, and that benefit results in harm to others, the party should bear the responsibility for that harm.”¹²⁵

The issue of MBTA applicability to incidental take again arose in *United States v. Corbin Farm Service (Corbin Farm)*.¹²⁶ In this case, the court considered whether the application of pesticide, in a manner inconsistent with its label, to an alfalfa field and the consequent poisoning of over 1000 American widgeons known to feed there,¹²⁷ constituted a punishable offense. The defendants claimed that they neither knowingly violated the law nor intended to kill the birds,¹²⁸ and that under the government’s overly broad theory of the case, if a widgeon was struck by a car, the driver would be liable under the MBTA. The court rejected this line of argument, noting that “[t]he driver is not reasonably in a position to prevent the bird’s death whereas a person applying pesticide might be able to foresee the danger and prevent it.”¹²⁹ In contrast to the Second Circuit in *FMC*, which interpreted the MBTA as imposing liability without regard to fault, the district court (and hence the Ninth Circuit on appeal) in *Corbin Farm* appears to read into the MBTA a defense of reasonableness.¹³⁰

In addition to contending that they neither knowingly violated the law nor intended to kill birds, as in *FMC*, the defendants in *Corbin Farm* argued before the district court that the MBTA did not apply to them on the grounds that it was solely intended to regulate hunting and capturing activities.¹³¹ The court replied:

It is undeniable that Congress was concerned with hunting and capturing migratory birds when it enacted the MBTA; the legislative history confirms this concern. The fact that Congress was primarily concerned with hunting does not, however, indicate that hunting was its sole concern. Paring the language of section 703 down to its essentials, the section makes it illegal “at any time, by any means or in any manner, to . . . kill . . . any migratory bird” The use of the broad language “by any means or in any manner” . . . belies the contention that Congress intended to limit the imposition of criminal penalties to those who hunted or captured migratory birds. Moreover, a number of songbirds and other birds not commonly hunted are protected by the conventions and so by the Act; Congress imposed criminal penalties on those who killed these birds as well as on persons who hunted game birds. The legislative

¹²⁴ *Id.* at 908 (“Although *FMC* was not aware of the lethal-to-birds quality of the water in its pond (and in fairness to *FMC* this may be assumed) nevertheless it was aware of the danger of carbofuran to humans . . .”).

¹²⁵ *Id.* at 907.

¹²⁶ 444 F. Supp. 510 (E.D. Cal 1978), *aff’d adopting the district court decision*, 578 F.2d 259 (9th Cir. 1978).

¹²⁷ *Corbin Farm*, 444 F. Supp. at 515, 517.

¹²⁸ *Id.* at 532.

¹²⁹ *Id.* at 535.

¹³⁰ *See id.* at 536. (“If defendants acted with reasonable care or if they were powerless to prevent the violation, then a very different question would be presented.”).

¹³¹ *Id.* at 531.

history of the Act reveals no intention to limit the Act so that it would not apply to poisoning.¹³²

In other words, according to the court, Congress delineated its intent to extend the MBTA's authority over both intentional and incidental take.

The *Corbin Farm* court did, however, accept one of the defendants' arguments—that because only one offending transaction was involved, only one charge could be brought against them.¹³³ In other words, even though many birds died, the defendants were found guilty for only one bird death.

At the time in 1978, the court rulings put forth in *FMC* and *Corbin Farm* indicated a possible future in which MBTA prohibitions could be applied to any activity resulting in migratory bird deaths apart from the truly “unforeseeable accident.”¹³⁴ Yet the courts have presented conflicting interpretations on the applicability of the MBTA to incidental take. For example, more than ten years later in *United States v. Rollins*,¹³⁵—a case involving facts similar to those presented in *Corbin Farm*—the district court presented an equally compelling argument for *not* applying the MBTA to incidental pesticide take. Unlike the allegations against the defendants in *Corbin Farm*, the court found that the farmer in *Rollins* did not misapply pesticides, but instead “used the recommended quantities at the appropriate time.”¹³⁶ Noting the unfairness of exposing farmer Rollins to sanctions when other farmers in the area tended their crops in the same manner,¹³⁷ the court stated:

[T]he lack of scienter does make a statute prone to vagueness, and a vague criminal statute will not withstand constitutional scrutiny.

Under our system of government, “which is designed to foster individual liberty and restrict the arbitrary exertion of governmental authority” . . . a criminal statute must define the offense with “sufficient definiteness that ordinary people can understand what conduct is prohibited and in a manner that does not encourage arbitrary and discriminatory enforcement” Any statute which does not give fair notice as to what constitutes illegal conduct so that the individual may conform his conduct to the law violates the first essential of due process of law.¹³⁸

Declaring the statute too vague, the district court therefore held that it would be unconstitutional to impose criminal liability under the MBTA for the poisoning of migratory birds via pesticide, when, as in this case, that pesticide was applied with due care and its use had occurred in the past without serious incident.¹³⁹

¹³² *Id.* at 532.

¹³³ *Id.* at 531.

¹³⁴ Coggins, *supra* note 69, at 773.

¹³⁵ 706 F. Supp. 742 (D. Idaho 1989).

¹³⁶ *Id.* at 744.

¹³⁷ *Id.*

¹³⁸ *Id.* (quoting *United States v. Stenberg*, 803 F.2d 422, 435 (9th Cir. 1982) and *Kolender v. Lawson*, 461 U.S. 352, 357 (1983), and citing *Connally v. Gen. Constr. Co.*, 269 U.S. 385 (1926)).

¹³⁹ *Rollins*, 706 F. Supp. at 744–45.

The district court in *Mahler v. United States Forest Service*¹⁴⁰ also supported a narrow reading of the MBTA liability provisions, but on different grounds than in *Rollins*. The Mahler case reached the court not in the context of a criminal prosecution, but rather in a challenge to a forest management plan. The court was confronted with the issue of whether migratory bird take resulting from logging is cognizable under the MBTA. It opined that “[p]roperly interpreted, the MBTA applies to activities that are intended to harm birds or to exploit harm to birds, such as hunting and trapping, and trafficking in birds and bird parts. The MBTA does not apply to other activities that result in unintended deaths of migratory birds.”¹⁴¹

A court again addressed the issue of whether the MBTA governs incidental take three years later in *United States v. Moon Lake Electrical Association (Moon Lake)*.¹⁴² Noteworthy for the wind industry, it is the first case dealing with the criminal prosecution of bird kills resulting from power line operation.¹⁴³ In this instance, an electricity distributor was charged with six MBTA violations following the electrocution of golden eagles, ferruginous hawks, and a great horned owl.¹⁴⁴ The government alleged that the power poles in question attracted these great birds because they had been placed in an area that otherwise was devoid of perches and resting areas. The government also alleged that had the association installed inexpensive protective equipment on its power poles, these bird takes would have been prevented.¹⁴⁵ Because the argument was presented to the court in a motion to dismiss, the government’s allegations were accepted as true by the court. The defendant contended, however, that the deaths did not constitute MBTA violations because they were neither intentional nor the kind of activity carried out by hunters or poachers.¹⁴⁶ In response to this argument, the district court ruled that Congress’s intent to prohibit conduct beyond hunting and poaching is clear in the MBTA language, which specifically prohibits “killing,” in addition to the activities normally associated with hunting.¹⁴⁷ The court also dismissed the defendant’s lack-of-intent claim with the reminder that the MBTA is a strict liability statute, with no intent or prior knowledge necessary to result in a violation.¹⁴⁸

Additionally, the *Moon Lake* court found that a guilty verdict under the MBTA’s misdemeanor provision, section 707(a), requires a demonstration of proximate causation.¹⁴⁹ Noting that a properly constructed criminal statute cannot rely on the good will of those who enforce it, *Moon Lake* points out that *Mahler* and *FMC* fail to recognize proximate causation, an “important and inherent limiting feature” of section 707(a).¹⁵⁰ According to this analysis, “the government must

¹⁴⁰ 927 F. Supp. 1559 (S.D. Ind. 1996).

¹⁴¹ *Id.* at 1579. *But see* *United States v. Corrow*, 119 F.3d 796, 805–06 (10th Cir. 1997) (asserting that there is no scienter requirement for criminal MBTA violations).

¹⁴² 45 F. Supp. 2d 1070 (D. Colo. 1999).

¹⁴³ *Id.* at 1082–83.

¹⁴⁴ *Id.* at 1071.

¹⁴⁵ *Id.*

¹⁴⁶ *Id.* at 1072.

¹⁴⁷ *Id.* at 1074.

¹⁴⁸ *Id.* at 1073–74.

¹⁴⁹ *Id.* at 1085.

¹⁵⁰ *Id.* at 1084–85.

prove proximate causation, also known as ‘legal causation,’ beyond a reasonable doubt.”¹⁵¹ Thus, there would have been a natural and continuous sequence of events, uninterrupted by any intervening cause, that would have resulted in the death of a bird, and without which the death would not have happened. The death also would have been “reasonably anticipated or foreseen as a natural consequence of the wrongful act.”¹⁵²

Considering that migratory bird deaths are not usually a probable outcome of driving a vehicle, operating an airplane, or installing a picture window at home, the court concluded that these activities would not likely lead to liability, even if such deaths resulted from them.¹⁵³ In distinguishing between activities that do and do not meet its foreseeable criterion, the court in *Moon Lake* in effect narrowed the Act’s purview down to a more manageable size. As the *Moon Lake* court noted, the “proximate causation analysis necessarily requires the trier of fact to determine whether a particular type of physical conduct has a propensity to injure or kill a protected bird.”¹⁵⁴

Before 1999, the MBTA case law had been decidedly divided on the scope of the statute’s liability provisions, as evidenced by the above court opinions. *Moon Lake* thus provided further weight that the MBTA reaches incidental take.¹⁵⁵ Two years later, President Clinton’s issuance of Executive Order 13,186,¹⁵⁶ in tandem with existing FWS regulations, solidified the MBTA’s reach over incidental take. The Order clarifies the “take” definition as including both “intentional” and

¹⁵¹ *Id.* at 1085.

¹⁵² *Id.* (quoting BLACK’S LAW DICTIONARY 1225 (6th ed. 1990)) (emphasis omitted).

¹⁵³ *Id.*

¹⁵⁴ *Id.* at 1077. The closest analogous United States Supreme Court precedent to consider the inter-relationship between strict liability and proximate cause is *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon (Sweet Home)*. 515 U.S. 687 (1995). In a 6–3 opinion by Justice Stevens, the Court indicated that the defendants had provided no reason why the “knowingly violates” criminal provision and “otherwise violates” civil fine under the ESA “should not be read to incorporate ordinary requirements of proximate causation and foreseeability.” *Id.* at 696–97 n.9. In her concurrence, Justice O’Conner bore into this issue in more detail, stating she saw

no indication that Congress, in enacting that section, intended to dispense with ordinary principles of proximate causation. Strict liability means liability without regard to fault; it does not normally mean liability for every consequence, however remote, of one’s conduct In the absence of congressional abrogation of traditional principles of causation, then, private parties should be held liable under § 1540(a)(1) [of the ESA] only if their habitat-modifying actions proximately cause death or injury to protected animals.

Id. at 712. In other environmental statutes, notably, in the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 codified at 42 USC § 9607, however, Congress has rejected such a requirement. *See, e.g., New York v. Shore Realty Corp.*, 759 F.2d 1032, 1044 (2d Cir. 1985) (“Congress specifically rejected including a causation requirement in section 9607(a).”).

¹⁵⁵ As noted by *Moon Lake*, the fact that Congress reviewed and made substantive amendments to the MBTA after both *FMC* and *Corbin Farm* but did not rein in prosecutions for indirect takes is at least suggestive that Congress has acquiesced to the view that incidental takes are regulated. *Moon Lake*, 45 F. Supp. 2d 1070, 1077 (D. Colo. 1999).

¹⁵⁶ Responsibility of Federal Agencies to Protect Migratory Birds, 66 Fed. Reg. 3,583 (Jan. 17, 2001).

“unintentional”¹⁵⁷ take, thereby eliminating confusion over whether the MBTA, in fact, governs incidental take.

Courts have found that liability can attach in several incidental take contexts—that is, take that is incidental to a dangerous activity (e.g., pesticide production or application) and take resulting from the failure to implement inexpensive, avoidance measures (e.g., power line operation). In dicta, courts have also suggested that other incidental take—resulting from collisions with automobiles, picture windows, and buildings—are not cognizable.¹⁵⁸ In light of the Clinton Executive Order, if we assume as a given that incidental take can subject one to MBTA criminal liability in some contexts, these cases raise the question of whether a court would be likely to find a wind turbine operator liable for avian deaths under the MBTA.¹⁵⁹ We do not answer this question. Indeed, the co-authors hold opposing views and instead present their arguments for and against liability as a question of law.

Jeremy Firestone argues that it would be unlikely for a court to find that the criminal liability provisions for avian take under the MBTA reach a wind farm operator. Meredith Lilley then presents the opposing argument. The legal question does not ask whether or not avian impacts from wind turbines *should* be regulated as a policy matter; indeed, both authors believe they should be. The policy question is distinct, and considers whether the MBTA as currently constituted is an appropriate regulatory vehicle, or whether, for example, the MBTA should be modified to authorize not only criminal, but also civil liability and permits for incidental take. Here, we simply pose the legal question of whether courts are likely to find that migratory bird take by wind farms is presently regulated under the MBTA.

2. Jeremy Firestone – Courts Will Tend to Find that the MBTA Does Not Reach Wind Turbine Takes

As an initial matter, it is important to understand that the question is not whether a wind farm operator could be prosecuted—he or she undoubtedly could. Nor is the question whether a court could find liability—again the answer is yes. Rather, the question is whether a judge would likely find that a wind farm operator is criminally liable for an avian take.

To help answer this question, it is useful to reframe the question of whether or not wind-farm takes are regulated by the MBTA in several ways. One could consider whether 1) the operation of a wind turbine is inherently dangerous or not, 2) the take should have been “reasonably anticipated or foreseen”¹⁶⁰ based on a fact-specific inquiry, or 3) a wind turbine is more like a car than a pesticide.¹⁶¹

¹⁵⁷ Intentional take means “the purpose of the activity in question,” whereas unintentional take “results from, but is not the purpose of, the activity in question.” *Id.*

¹⁵⁸ *Moon Lake*, 45 F. Supp. 2d at 1085.

¹⁵⁹ See discussion *infra* Part IV.B.2 to Part IV.B.3.

¹⁶⁰ *Moon Lake*, 45 F. Supp. 2d at 1085.

¹⁶¹ *Corbin Farm*, 444 F. Supp. 510, 535 (E.D. Cal. 1978). One also could ask whether the MBTA reaches incidental takes. See *Rollins*, 706 F. Supp. 742, 743–45 (D. Idaho 1989) (finding that the MBTA is unconstitutionally vague as it applied to an unintentional incidental take). Although one cannot

First, it is difficult to see how a court would come to the conclusion that operating a wind farm is an inherently dangerous activity like the manufacture or application of a pesticide whose manufacture, transport, packaging, labeling, distribution, and disposal is regulated by the federal government and which can be toxic to humans and birds (think DDT and the bald eagle). The fact that wind turbines can result in bird takes does not alone make a wind farm inherently dangerous, if it did, then a better argument could be made that an outdoor cat rather than a wind turbine is inherently dangerous, as stalking birds is part of the intrinsic nature of a cat. Moreover, unlike a pesticide, the purpose of a wind turbine is not to kill life.

Second, one can expect that judges and juries will do what they can to avoid both unfair results and those that would in effect shut down commerce in the United States by imposing liability on *any* operator of a power line (or wind turbine) or owner of a large building with glass windows for any and all takes of migratory birds. Thus, starting from the premise that the *Moon Lake* court was persuaded liability could be imposed given the egregious conduct of the defendant—placing electrical poles in an area that did not otherwise have perches where golden eagles and other raptors would be expected to rest, and failing to implement an inexpensive remedy—it seems reasonable to conclude that even if the otherwise strict liability of the MBTA is qualified by a foreseeability requirement,¹⁶² a judge would be unlikely to impose liability on any wind turbine operator who: undertakes appropriate environmental reviews prior to the turbine's installation and operation; upon completion of the environmental review, takes into consideration known migration information in determining the specific location and operation of the wind farm; implements cost-appropriate mitigation measures; and conducts post-implementation studies. Under those conditions, a court would be hard pressed to find that the wind turbine operator could otherwise have “reasonably” been in a “position to prevent the bird’s death.”¹⁶³

Third, the effects of wind turbines on avian populations are more analogous to the effects of cars than pesticides. To begin with, pesticides, as the warnings on the containers make clear, and as the *FMC* court noted, are per se dangerous,¹⁶⁴ while

answer this question with certainty, I believe courts are more likely to be persuaded that it does and wind turbine developers operate at their peril should they undertake their operations believing otherwise. Indeed, whether a court were to declare the MBTA liability provisions were clear and then find the MBTA reaches incidental takes given that its language suggests no limitation in that regard or instead find that Congress had not considered the precise question and then defer to the administrative interpretation of the MBTA, courts are likely to find that liability attaches to incidental takes. See Chevron U.S.A., Inc. v. Natural Res. Def. Council, 467 U.S. 837, 842-43 (1984).

¹⁶² *Moon Lake*, 45 F. Supp. 2d at 1085.

¹⁶³ *Corbin Farm*, 444 F. Supp. at 535.

¹⁶⁴ See *FMC*, 572 F.2d 902, 907 (2d Cir. 1978); *Corbin Farm*, 444 F. Supp. at 536 (“When dealing with pesticides, the public is put on notice that it should exercise care to prevent injury to the environment and to other persons; a requirement of reasonable care under the circumstances of this case does not offend the Constitution. If defendants acted with reasonable care or if they were powerless to prevent the violation, then a very different question would be presented.”).

the operation of a wind turbine is not. Given the nature of pesticide application,¹⁶⁵ the *Corbin Farm* court had little difficulty applying the United States Supreme Court's public welfare offense doctrine,¹⁶⁶ whereby the government is only required to prove that a defendant knew the nature of his acts and performed them intentionally (general intent) rather than having to meet the stricter standard whereby the defendant knew his acts violated the law (specific intent).¹⁶⁷ In contrast, given that wind turbines are not "deleterious devices or products or obnoxious waste materials," a court may require a higher showing of specific intent to prove a violation.¹⁶⁸

It matters not at all that a wind turbine is *in situ*, while a car moves about nor that a government entity chose where to place the roads on which a car will drive, for some governmental body, be it a municipality or county exercising its zoning authority, or a state exercising its police powers or public trust responsibilities or the federal government operating under its constitutional authority over its property and territories or over commerce, will authorize the placement of the wind turbines. Individual drivers exercise some control over whether or not they will kill a migratory bird based on the route chosen, the time of day and year, the speed at which the vehicle is operated, the skill of the driver, and the size of the vehicle. One can make a case that under certain conditions (someone speeding or driving

¹⁶⁵ *Rollins*, which held that the application of pesticides did not trigger liability under the MBTA, is distinguishable. *Rollins*, 706 F. Supp. 742, 745 (D. Idaho 1989). There, the defendant was initially convicted by the Magistrate Judge. *Id.* at 743. As noted by the district court: the defendant Rollins did not apply the pesticide in a reckless manner. Indeed, Rollins and a farm helper "inspected the field during the spraying and there was no sign of geese feeding on the alfalfa." *Id.* (citations omitted) (quoting the Magistrate Judge). Rollins applied the chemicals "in the recommended quantities at the appropriate time." *Id.* (citations omitted) (quoting the Magistrate Judge). Once the pesticides were applied, "there is no effective way to keep them [the geese] out of their [the farmers'] fields . . ." *Id.* at 743 (citations omitted) (quoting the Magistrate Judge). The district court also noted that the Magistrate Judge concluded that Rollins acted in good faith, had used due care and that there was no effective way for Rollins to keep the geese out of his field. *Id.* at 744. The Magistrate Judge nonetheless "ultimately concluded that 'a reasonable person would have been placed on notice that alfalfa grown on West Lake Island in the Snake River would attract and be consumed by migratory birds.'" *Id.* at 743 (citations omitted) (quoting the Magistrate Judge). In finding the MBTA was unconstitutionally vague as applied, the district court declared that farmers "have a right to know what conduct of theirs is criminal . . ." *Id.* Thus, it would be an error to read *Rollins* as standing for the proposition that avian death as a result of pesticide application is not foreseeable. Rather, the *Rollins* holding is based on the premise that a farmer could not foresee that his action of applying pesticide to his field could lead to potential liability under the MBTA given the MBTA's wording.

¹⁶⁶ *Corbin Farm*, 444 F. Supp. at 535-36.

¹⁶⁷ Jeremy Firestone, *Enforcement of Pollution Laws and Regulations: An Analysis of Forum Choice*, 27 HARV. ENVTL L. REV. 105, 114-15 (2003); *See also* United States v. Int'l Minerals & Chemicals Corp., 402 U.S. 558, 563 (1971).

¹⁶⁸ *Staples v. United States*, 511 U.S. 600, 607 (1994) (quoting *Int'l Minerals & Chemicals Corp.*, 402 U.S. at 565). It should be noted that *Staples* concerned prosecution under the National Firearms Act and that Justice Thomas noted as well that there was a long tradition of widespread lawful gun ownership in the United States and that the statute provided as much as 10 years imprisonment upon a felony conviction. *Staples*, 511 U.S. at 602-03. In contrast, as noted earlier, the prosecution of a wind turbine operator under the MBTA, should it occur, would proceed under its misdemeanor provision that provides for imprisonment lasting no longer than six months. *See supra* notes 108-13 and accompanying text.

under the influence of alcohol), a bird kill by car could have been reasonably avoided, and thus MBTA liability ought to attach (the same could be said of bird take resulting from picture windows and glass buildings).

Avian deaths from automobiles also cannot be simply brushed aside. As noted earlier, it is estimated the automobiles kill at least 60 million birds each year. If one uses the same extrapolation technique as that employed by Erickson (increasing the number of predicted fatalities by the percentage increase in numbers of motor vehicles), 60 million annual bird kills in 1980¹⁶⁹ becomes 92 million in 2006. As there are 244 million motor vehicles in the United States,¹⁷⁰ that translates into one bird death annually for every 2.65 motor vehicles, for an annual fatality rate per motor vehicle of 0.38, hardly a freak occurrence. Indeed, given that the average life of a car is nine years and the average life of a truck is eight years,¹⁷¹ that means that on average, a motor vehicle kills three birds over its time on the road. In comparison, the GAO found that annual raptor fatalities at Altamont Pass ranged from 0.05 to 0.24 per turbine, while annual raptor fatalities elsewhere range from 0 to 0.07 per turbine.¹⁷² Overall bird fatalities ranged from 0 to 7.28 per turbine per year.¹⁷³

Further, when a bird consumes toxic materials such as pesticides several deleterious consequences may result. It may die, in which case a member of another species (e.g., turkey vultures) may eat the bird and die or become sick and/or all or part of the pesticide-laden bird will decompose and become part of the soil, which again could cause death or disease in other creatures. In addition, absent death, the genetic material that a pesticide-laden bird may pass on to its offspring may result in genetic defects.¹⁷⁴ Thus, a pesticide take can keep on taking, whereas when a bird strikes a wind turbine and dies or is injured, other flora and fauna will not be exposed to the above-mentioned, negative consequences.

¹⁶⁹ Erickson et al., *supra* note 27, at 8.

¹⁷⁰ OFFICE OF HIGHWAY POLICY INFO., U.S. DEP'T OF TRANSP., PB 2008, HIGHWAY STATISTICS 2006 tbl.MV-1 (2006), available at <http://www.fhwa.dot.gov/policy/ohim/hs06/pdf/mv1.pdf>.

¹⁷¹ OFFICE OF HIGHWAY POLICY INFO., U.S. DEP'T OF TRANSP., PUB. NO. FHWA-PL-01-1012, OUR NATION'S HIGHWAYS 11 (2000), available at http://www.fhwa.dot.gov/ohim/onh00/our_ntns_hwys.pdf.

¹⁷² GAO WIND POWER, *supra* note 12, at 14.

¹⁷³ *Id.* It is suggested that we look at bird deaths per turbine-blade sweep, as most bird strikes are thought to be the result of birds striking the moving blades. See, e.g., Tony Fox et al., *Birds: Avoidance Responses and Displacement*, in DANISH OFFSHORE WIND: KEY ENVTL. ISSUES 94, 98 (2006), available at http://www.ens.dk/graphics/Publikationer/Havvindmoeller/havvindmoellebog_nov_2006_skrm.pdf (estimating a bird collision rate based on passage of birds through the swept area of the blades). Given a three-blade design, an average of 15 rotations per minute, and a wind turbine operating 80% of the time, even the high of 7.28 fatalities per wind turbine equals only one bird death for every 2.6 million blade-revolutions. See, e.g., G.E. Energy, 1.5 MW Wind Turbine Technical Specifications, http://www.gepower.com/prod_serv/products/wind_turbines/en/15mw/specs.htm (last visited Sept. 3, 2008). Further, although it is not relevant to the present legal question, in the interest of full-disclosure, bat fatalities in Appalachia were higher, ranging from 0 to 4.3 bats per turbine per year. GAO WIND POWER, *supra* note 12, at 14.

¹⁷⁴ See generally DAVID BRUSICK, PRINCIPLES OF GENETIC TOXICOLOGY (2d ed. 1987).

3. Meredith Lilley – Courts Will Tend to Find that the MBTA Does Reach Avian Take from Wind Facilities

In considering whether wind facilities are inherently dangerous, it is first necessary to ask dangerous to whom or to what. The relevant question is not merely whether wind farms are inherently dangerous, but rather whether they are inherently dangerous *to wildlife*, specifically in this context to birds. Given the high levels of bird and bat mortality at existing wind facilities in the United States alone, the answer is most certainly yes. Indeed, one could argue that, depending on its location (e.g., in parts of the Lower Gulf Coast of Texas which are considered to be as biologically productive as a nature reserve,¹⁷⁵ or along ridge-tops in the Mid-Atlantic Highlands where many more bats could be killed) a wind farm could be deleterious to wildlife.

Furthermore, any attempt to reserve MBTA liability solely for activities considered dangerous in the narrowest sense (e.g., those associated with the use of noxious, toxic, or deleterious substances) would be unsuccessful. One might argue that activities resulting in toxic-substance poisoning automatically lead to MBTA liability whereas those resulting in collision mortality will not. Yet neither *Moon Lake* (a nontoxic substance case resulting in an MBTA violation¹⁷⁶) nor *Rollins* (a toxic-substance case that did *not* result in conviction¹⁷⁷) supports this line of argument. Additionally, one might purport that population-level impacts are a prerequisite for MBTA liability; yet again such impacts need not be demonstrated for MBTA prosecution. For that matter, in none of the prosecutions of incidental bird take under the MBTA to date have the courts even heard the argument of a given activity's population-level impacts. *Corbin Farm* further illustrates that the death of even one bird is prosecutable under the MBTA.¹⁷⁸ Indeed, although wind farms could easily be considered dangerous to wildlife, neither the law nor the courts have set forth any requirement that an activity be explicitly "dangerous" at all to be prosecutable. The cause of death (chemical or physical) and the occurrence of population-level impacts are likewise immaterial in determining liability.

At this juncture, the question becomes: what does, in fact, need to be demonstrated for courts to hold an entity liable for incidental bird take under the MBTA's misdemeanor provision? The answer is simple. The MBTA governs bird take "by any means or in any manner."¹⁷⁹ In managing this very broad and vague

¹⁷⁵ Cf. TIMOTHY E. FULBRIGHT & FRED C. BRYANT, THE LAST GREAT HABITAT 1 (Alan M. Fedynich ed. 2002), available at http://ckwri.tamuk.edu/fileadmin/user_upload/docs/misc_PDF/LastGreatHabitat.pdf (discussing how the Lower Rio Grande Valley Wildlife Refuge has more combined amphibian, bird, mammal, plant, and reptile species than Everglades National Park). For more information on the ecological implications of the wind farms proposed in this region, see discussion *infra* Part VI.A.

¹⁷⁶ *Moon Lake*, 45 F. Supp. 2d 1070, 1077 (D. Colo. 1999) (holding that the proximate causation analysis "has no bearing on the particular types of physical conduct prohibited by the MBTA").

¹⁷⁷ *Rollins*, 706 F. Supp. 742, 745 (D. Idaho 1989).

¹⁷⁸ *Corbin Farm*, 444 F. Supp. 510, 529 (E.D. Cal. 1978), *aff'd*, 578 F.2d 259 (9th Cir. 1978).

¹⁷⁹ Migratory Bird Treaty Act, 16 U.S.C. § 703(a) (2006).

statute, the courts have necessarily narrowed prosecution liability to activities resulting in take that is both *direct*¹⁸⁰ and *reasonably foreseeable*.¹⁸¹

Avian deaths from wind turbines meet the court-developed, proximate causation criteria and are thus prosecutable under the MBTA. If, as noted by Firestone, a wind facility took all the necessary steps to prevent incidental bird take (e.g., preconstruction monitoring to prevent siting in a flyway; postconstruction monitoring; and mitigation actions), its prosecution likelihood for subsequent avian take would indeed be diminished considerably. Yet it would not be completely erased thereafter. Even if a wind project operator follows the necessary preconstruction steps to minimize impacts, the wind farm may still have unexpected impacts at the operational stage. As technology progresses over time, those impacts may be more easily addressed and minimized later (as in *Moon Lake*), and insofar as those advancements are made, FWS would retain the authority to request that the wind operator follow the necessary steps to implement them. In the event that cheap, easy-to-install equipment—proven to significantly reduce bird fatalities—becomes available to wind operators, yet is not put into use by them, FWS could take action under the MBTA to protect against unnecessary migratory bird take.

Furthermore, as opposed to Firestone's argument, siting and managing a wind farm is inherently more like applying a pesticide than driving a car. A court would no more likely prosecute a wind farm that follows the appropriate steps to prevent bird deaths than it would a farmer who appropriately applies a pesticide (as in *Rollins*). Both pesticide application and wind farm siting/operation are documented sources of avian mortality for which concerted efforts (e.g., guidance and recommendations) have been made to reduce or minimize impacts. As duly noted by Firestone, vehicles also serve as a significant source of avian mortality. Yet no similar efforts have been made in the transportation sector to reduce bird take. Why does this discrepancy exist? The answer, for a number of reasons, lies in the domain of foreseeability. First, bird flyways rarely align with manmade highways in their trajectory, and never in altitude. It is therefore a rare occurrence for a given car and bird to meet,¹⁸² and moreover, an occurrence that is not foreseeable. Second, vehicle operators simply drive where the road leads them, with no control over the placement of the road they are traversing. They are therefore not responsible for accidentally striking a bird, an event the timing and placement of which is unforeseeable and thus not preventable. Such is not the case for a stationary, utility-scale wind facility planted in the path of a flyway. A wind farm

¹⁸⁰ Habitat destruction has been deemed thus far by the courts as an indirect cause of avian mortality, and as a result has not yet been prosecuted under the MBTA. See discussion *infra* Part IV.B.4. Part IV.B.4 further discusses the distinction drawn by the courts between direct and indirect take.

¹⁸¹ See, e.g., *Moon Lake*, 45 F. Supp. 2d at 1085 (speaking at length about proximate causation, which includes both a direct (uninterrupted) connection between the act and the death of the bird and the requirement that the death be reasonably foreseen).

¹⁸² As noted above, the average car kills 0.38 birds per year. See *supra* text accompanying notes 169–70. Given that the average person drives 13,476 miles per year, approximately one bird death results from every 35,463 miles driven, hardly a common occurrence. Office of Highway Policy Info., U.S. Dep't. of Transp., Average Annual Miles per Driver by Age Group, <http://www.fhwa.dot.gov/ohim/onh00/bar8.htm> (last visited Sept. 3, 2008).

developer, therefore, is reasonably in a position to foresee avian mortality and prevent it, whereas the driver of a car is not and will most likely remain so henceforth. Foreseeability is thus the fundamental distinguishing characteristic between wind farms and cars.¹⁸³

It is true, as Firestone argues, that the purpose of pesticides is to kill life, whereas the purpose of wind turbines is to produce energy. However, it is not the purpose of pesticides to kill birds. The fact they do is an unfortunate side effect, in much the same way that bird deaths from wind turbines are an unfortunate side effect. Indeed, one could legitimately argue that there are many activities which, although not undertaken with the intent of killing birds, have such an incidental effect, including: the maintenance of uncovered oil pits, the release of toxic chemicals into waterways, pesticide application, the operation of uninsulated transmission lines, flying a jet airplane, driving a car, or even baseball pitcher Randy Johnson throwing a fastball and striking a dove that flew into the path of the pitch.¹⁸⁴ The list is practically unending. The fact that some of these activities have been prosecuted under the MBTA whereas others have not leads one to ask why. The answer is, again, foreseeability.

Likening wind turbines to cars because they both result in collision mortality is but a distraction from this wholly relevant criterion. The cause of death between wind farms and cars is their sole similarity, which in no way makes siting and operating a wind farm more like driving a car than applying a pesticide. Any perceived differences in population-level impacts from wind turbines and pesticides, which as noted in the previous discussion may result in takes that keep on taking, are likewise distractions from this core MBTA-liability criterion.

First, as noted previously, the question of a population-level effect is irrelevant in determining MBTA liability. Second, should the courts decide in the future to specifically target activities resulting in such impacts, they would need to look beyond the cause of death (be it chemical or physical) and instead ask whether the avian mortality that occurred was of the magnitude to have detrimental impacts on a population. It matters not that some pesticides persist in the food chain long after their initial use, with ongoing impacts on wildlife, if in the end no difference exists in the number of birds killed among the anthropogenic activities under legal examination, be they pesticides, cars, or wind farms. All of these activities are equally capable of population-level impacts on avian species. For example, even if a bird dies from mere physical injury at a wind site, other flora and fauna will still be exposed to negative consequences. The ecological niche that bird fills will be empty and other birds within the same species, as well as other species, will be negatively impacted to the extent they depend on that now dead bird. This impact is

¹⁸³ Moreover, biologists have noted that bats actually appear to be attracted to wind turbines. See Kunz et al., *supra* note 53, at 317–18. Bats are not protected under the MBTA, nor under a similar federal law. However, as wind power expands, it is only prudent to liken wind farms to chemicals, rather than cars, for the sake of bats' protection needs. Such comparison is appropriate, given the uncertainty with regard to bat behavior and the recent, high levels of turbine-caused bat mortality in Appalachia. See GAO WIND POWER, *supra* note 12, at 2.

¹⁸⁴ This unfortunate event occurred during a spring training game in Tucson, AZ on March 24, 2001. See ESPN, *Bird "Explodes" After Flying in Path of Fastball*, <http://espn.go.com/mlb/news/2001/0325/1161522.html> (last visited Sept. 28, 2008).

even more pronounced when a site, be it a wind facility or a communication tower, results in the death of over a thousand birds annually.

In closing, FWS is paying “special attention” to certain structures in the United States—including power lines, communication towers, and wind turbines—for two reasons: 1) their rapid growth, and 2) the Service feels that the avian impacts from these structures “can or could be significantly reduced or maintained at low levels now and into [the] near future.”¹⁸⁵ Such reductions are possible, and will continue to be, due to their *foreseeability*, and in turn, preventability. Thus a wind farm, by its very nature, easily falls within the realm of incidental take that is prosecutable under the MBTA.

4. Cases Further Addressing the Breadth of Incidental Take Under the MBTA

Having discussed the contrasting federal court decisions over the past few decades on the issue of whether the MBTA is applicable to incidental take, the direction of this Article will now shift to an examination of the scope of the MBTA specifically within the incidental-take realm. Even before Executive Order 13,186, the courts had already begun to hear questions that naturally follow from the case law on this issue. For example, is incidental take solely limited to those involving a direct link? Or do takes resulting from habitat modification or destruction also fall under the purview of the MBTA? This section explores the jurisprudence regarding questions such as these.

In *Seattle Audubon Society v. Evans (Seattle Audubon)*,¹⁸⁶ the Ninth Circuit Court of Appeals addressed the claim that the MBTA prohibits logging activities in areas inhabited by protected migratory birds.¹⁸⁷ In dismissing the claim, the court distinguished previous court cases (for example, *FMC* and *Corbin Farm*) from *Seattle Audubon* by noting the absence of a direct link between habitat modification and bird deaths.¹⁸⁸ Furthermore, the Ninth Circuit noted that the MBTA makes no mention of habitat destruction or modification, unlike the Endangered Species Act, which includes habitat modification in its broader definition of “take.”¹⁸⁹ Largely based on this difference between the plain language of the statutes, the court held that habitat modification from logging activities does not constitute a violation of the MBTA.¹⁹⁰

¹⁸⁵ Albert M. Manville, II, Senior Wildlife Biologist, Div. of Migratory Bird Mgmt., FWS, Address at the RESOLVE Workshop: How Biological Significance is Determined When Assessing Possible Impacts of Onshore Wind Power Facilities: The MBTA, BGEPA, ESA, NEPA and Migratory Birds—Legal and Ecological Implications in Dealing with Biological Significance 4 (Nov. 17, 2003) available at <http://www.nationalwind.org/events/wildlife/2003-2/presentations/Manville.pdf>.

¹⁸⁶ 952 F.2d 297 (9th Cir. 1991).

¹⁸⁷ *Id.* at 302.

¹⁸⁸ *Id.* at 303.

¹⁸⁹ *Id.* at 302–03. To take under the ESA, for example, includes to “harm,” an act that results in death or injury to wildlife. Endangered Species Act of 1973, 16 U.S.C. § 1532(19) (2006). “Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.” 50 C.F.R. § 17.3 (2007).

¹⁹⁰ *Seattle Audubon*, 952 F.2d at 303.

However, in *Moon Lake* (which occurred eight years after *Seattle Audubon*), the court rejected *Seattle Audubon*'s distinction between indirect and direct take, noting that the "definitions of 'kill' and 'take' do not include the word 'directly' or suggest in any way that only direct applications of force constitute 'killing' or 'taking.'"¹⁹¹ Although habitat modification was not at issue in *Moon Lake*,¹⁹² the court's inclusion of that activity in the take definition might be expected to influence future courts. Such was not the case five years later in 2004, however, when the Ninth Circuit reapplied the same rationale it used in *Seattle Audubon* to *City of Sausalito v. O'Neill*.¹⁹³ According to the final judgment, a more direct link than habitat modification is needed for criminal liability under the MBTA.¹⁹⁴

The line between habitat modification and direct harm can be quite fine, if not nonexistent. After *Seattle Audubon*, for example, courts held that no incidental take of migratory birds would result from clear-cutting, which arguably results in direct takes, especially during the nesting season.¹⁹⁵ Perhaps the most dramatic example of an activity that resulted in both the direct killing of migratory birds and habitat destruction took place at Kesterson National Wildlife Refuge.

In 1970, FWS and the United States Bureau of Reclamation (Bureau) signed a formal agreement to cooperatively manage Kesterson Marsh, an artificial wetland covering 518 hectares in central California's Kesterson National Wildlife Refuge.¹⁹⁶ As arranged by both FWS and the Bureau, the marsh served as an important stopover site and breeding ground for migratory birds—several of which were endangered¹⁹⁷—along the Pacific Flyway, as well as a terminus point for selenium-laden irrigation wastewater.¹⁹⁸ Selenium, which is a naturally occurring, but highly toxic element, bioaccumulates in aquatic food webs and results in widespread deaths and deformities.¹⁹⁹ Federal scientists had been aware since 1919 of the toxic contamination that would result from agricultural activities in the region.²⁰⁰ Nevertheless, administrative officials paid little attention to Kesterson

¹⁹¹ *Moon Lake*, 45 F. Supp. 2d 1070, 1078 (D. Colo. 1999).

¹⁹² *Id.* at 1079.

¹⁹³ 386 F.3d 1186, 1225 (9th Cir. 2004).

¹⁹⁴ *Id.* In 1995, the Supreme Court upheld a criminal prosecution under the ESA, for habitat destruction in *Sweet Home*, 515 U.S. 687, 687 (1995). Should this broader interpretation of take occurring from habitat modification also be applied to the MBTA, the resulting impact on numerous land-use activities would be significant. As noted above, however, the ESA includes a habitat protection provision, while the MBTA does not, thus making this possibility less likely. Nevertheless, given the *Sweet Home* ruling, as well as *Moon Lake*'s objection to drawing a line between direct and indirect take, the possibility exists for future court decisions to broaden the "take" definition to include habitat modification. Beveridge, *supra* note 67, at 38.

¹⁹⁵ *Mahler*, 927 F. Supp. 1559, 1575 (S.D. Ind. 1996); PAMELA BALDWIN, THE ENDANGERED SPECIES ACT (ESA), MIGRATORY BIRD TREATY ACT (MBTA), AND DEPARTMENT OF DEFENSE (DOD) READINESS ACTIVITIES: BACKGROUND AND CURRENT LAW 7 (2004).

¹⁹⁶ A. Dennis Lemly & Harry M. Ohlendorf, *Regulatory Implications of Using Constructed Wetlands to Treat Selenium-Laden Wastewater*, 52 ECOTOXICOLOGY & ENVTL. SAFETY 46, 50 (2002).

¹⁹⁷ GEORGE COGGINS ET AL., FEDERAL PUBLIC LAND AND RESOURCES LAW 962 (4th ed. 2001).

¹⁹⁸ WILLIAM T. FRANKENBERGER, JR. & SALLY BENSON, SELENIUM IN THE ENVIRONMENT iv (William T. Frankenger, Jr. & Sally Benson eds., 1994).

¹⁹⁹ A. Dennis Lemly, Richard T. Kingsford & Julian R. Thompson, *Irrigated Agriculture and Wildlife Conservation: Conflict on a Global Scale*, 25 ENVTL. MGMT. 485, 488 tbl.1, 490 (2000).

²⁰⁰ COGGINS ET AL., *supra* note 197, at 963.

until 1983, when FWS biologists discovered grossly elevated deformity rates among the resident waterfowl, including ducks, coots, and grebes.²⁰¹ Embryos and chicks were missing eyes, wings, feet, and beaks.²⁰² The brains of hatchlings had protruded through their skulls and dozens of bloated adult carcasses floated every day in the “refuge’s tea-colored waters.”²⁰³ With around several thousand bird poisonings²⁰⁴ and unprecedented breeding failures, the refuge had become an “avian death trap”²⁰⁵ for the very wildlife it was meant to protect.

Later ranked by the EPA as one of the top thirty regional environmental news stories from 1970 to 2000,²⁰⁶ the ecological disaster at Kesterson began capturing national media attention. Shortly thereafter, the Secretary of the Interior, voicing concern over violating the MBTA, closed the refuge and began working to stop the flow of irrigation water into the reservoir.²⁰⁷ The wetlands were eventually removed from the National Wildlife Refuge System, drained, and capped.²⁰⁸ In short, the contamination that resulted in the direct incidental take of migratory birds at the refuge also resulted in the demise of the Kesterson Marsh altogether.

In the Kesterson example, FWS had a reasonably foreseeable expectation that a catastrophic event would occur at the refuge as a direct result of toxic contamination. Indeed, as co-manager of the Kesterson Marsh, FWS agreed to the drainage of selenium-tainted water into it, and presumably knew of the dangers posed by selenium, considering that scientists had known for decades. Given these conditions, FWS perfectly met the “proximate causation” criteria²⁰⁹ for criminal liability under the MBTA and thus could have been a prime target for prosecution under the very statute it administers. In the end, no lawsuit was filed. Private citizens and environmental organizations did threaten to do so,²¹⁰ however, and Congress held extensive hearings on the matter.²¹¹

Considering that the MBTA is a criminal statute, would it even have been possible for private individuals and groups to enforce it, as attempted after the Kesterson event? The following section briefly examines this question and discusses other developments in the MBTA enforcement arena by reviewing relevant case law.

²⁰¹ *Id.*

²⁰² *Id.*

²⁰³ *Id.*

²⁰⁴ Lemly & Ohlendorf, *supra* note 196, at 51.

²⁰⁵ COGGINS ET AL., *supra* note 197, at 963.

²⁰⁶ Press Release, EPA, EPA at 30: Top Environmental Stories, 1970–2000 (Dec. 28, 2000), <http://yosemite.epa.gov/opa/admpress.nsf/89745a330d4ef8b9852572a000651fe1/50b05eca819f98ec852570d8005e140f!OpenDocument> (last visited Aug. 28, 2008).

²⁰⁷ Lemly & Ohlendorf, *supra* note 196, at 49.

²⁰⁸ *Id.* at 51.

²⁰⁹ See *supra* notes 142–57 and accompanying text.

²¹⁰ Lemly & Ohlendorf, *supra* note 196, at 51.

²¹¹ *Moon Lake*, 45 F. Supp. 2d 1070, 1075 (D. Colo. 1999).

C. Enforcement Issues and Prosecution Likelihood

1. Cases Addressing Enforcement Issues.

Numerous incidental-take cases have addressed the issue of enforcement, further clarifying who can enforce the MBTA and whom the MBTA can be enforced against. Despite attempts by private parties to enforce the MBTA, the courts have rejected claims for a private cause of action²¹² and instead upheld criminal enforcement under the Act as “solely the province of the federal government.”²¹³ A private individual, therefore, cannot sue another individual or corporation for violating the MBTA. Further, the MBTA contains no civil suit provision; thus, private citizens cannot bring a lawsuit specifically under the Act against the federal government for a violation. Citizens can, however, invoke the Administrative Procedure Act (APA)²¹⁴ to sue a federal agency for violating the MBTA, as was done in *Mahler*.²¹⁵ Whether private citizens could assert such an APA claim was at issue in both *Humane Society of the United States v. Glickman*²¹⁶ and *Fund for Animals v. Norton*.²¹⁷ In both cases, the ability for private citizens to require a court to review potentially arbitrary and capricious agency action was upheld by the United States Court of Appeals for the District of Columbia Circuit.²¹⁸

²¹² *Defenders of Wildlife v. EPA*, 882 F.2d 1294, 1301–03 (8th Cir. 1989); *Flint Hills Tallgrass Prairie Heritage Found. v. Scottish Power*, 147 Fed. App’x 785, 787 (10th Cir. 2005) (per curiam); *COGGINS ET AL.*, *supra* note 197, at 962.

²¹³ *See* *Beveridge*, *supra* note 67, at 38.

²¹⁴ 5 U.S.C. §§ 551–559, 701–706, 1305, 3105, 3344, 4301, 5355, 5362, 7521 (2006).

²¹⁵ 927 F. Supp. 1559, 1562 (S.D. Ind. 1996).

²¹⁶ 217 F.3d 882, 886 n.5 (D.C. Cir. 2000).

²¹⁷ 281 F. Supp. 2d 209, 217 (D.D.C. 2003).

²¹⁸ *Id.*; *Glickman*, 217 F.3d at 886 n.5. Although the MBTA’s deficiencies have rendered it largely ineffective at ensuring a proper balance between the demands for nonpolluting and noncarbon dioxide producing wind energy and the protection of migratory birds, a recent development in California suggests that regulatory agencies may increasingly find themselves under an affirmative duty to protect wildlife under the public trust doctrine and wind farm operators may find concerned citizens at the vanguard. *See* *Center for Biological Diversity v. FPL Group, Inc.*, No. A116362, 2008 Cal. App. LEXIS 1441 (Cal. Ct. App. Sept. 18, 2008) (as modified on denial of rehearing on Oct 9, 2008). In *Center for Biological Diversity*, the plaintiffs sued the owners and operators of wind farms at Altamont Pass alleging that they had violated the public trust doctrine by operating wind turbines that kill and injure eagles, hawks, and other raptors. *Id.* at *1–*2. The California Court of Appeals first noted that while “public trust doctrine has evolved primarily around the rights of the public with respect to tidelands and navigable waters,” *id.* at *17, there is growing recognition that “one of the most important public uses of the tidelands . . . is the preservation of those lands in their natural state, so that they may serve as ecological units for scientific study, as open space, and as environments which provide food and habitat for birds and marine life” *Id.* at *20 (quoting *Nat’l Audubon Soc’y v. Superior Court*, 658 P.2d 709, 719 (Cal. 1983)). The court then explicitly held that wildlife is a protected public trust resource in California: “[W]hatever its historical derivation, it is clear that the public trust doctrine encompasses the protection of undomesticated birds and wildlife.” *Id.* at *27. It nevertheless found for the defendants because the plaintiffs brought the case against the wind farm owners and operators rather than against the trustees—the County of Alameda, which authorized the wind farms, and the California Department of Fish and Game, which has statutory responsibility to protect the raptors. *Id.* at *36. As the court noted, if appropriate agencies fail to enforce the trust, “members of the public may seek to compel the

The 2000 *Glickman* decision led, in part, to the issuance in 2001 of Executive Order 13,186 (noted in Part IV.B.1) which states that the MBTA also applies to federal agencies, not just individuals, partnerships, corporations, and associations.²¹⁹ The Order further directs federal agencies to take specific actions to minimize incidental take of migratory birds when carrying out actions that will have a measurable detrimental effect on them.²²⁰ Thus, despite previous rulings from the Eighth and Eleventh Circuits that federal agencies are exempt from MBTA liability,²²¹ such is no longer the case. A year after President Clinton issued the Order, for example, a district court enjoined all military readiness exercises conducted by the United States Navy (including live-fire training activities with machine guns, bombs, and missiles) on a Pacific island housing dozens of migratory birds.²²²

2. Likelihood of Prosecution.

Given that FWS exercises sole prosecutorial discretion, what is its likelihood of prosecuting the “virtually limitless”²²³ number of activities that can cause the death of migratory birds? Not surprisingly, that chance is low. Interpreting the MBTA as prohibiting all activity that causes migratory bird deaths would make it an “uncontrollably expansive criminal law.”²²⁴ Indeed, “[e]nforcing agencies usually do not have sufficient personnel or funds to pursue all possible violations of

agency to perform its duties, but neither members of the public nor the court may assume the task of administering the trust.” *Id.* at *39.

²¹⁹ Ornithological Council, The Migratory Bird Treaty Act: How it Applies to the Federal Government, http://www.nmnh.si.edu/BIRDNET/OC/experthelp/MBTA_fed.html (last visited Sept. 2, 2008).

²²⁰ Exec. Order No. 13,186, 66 Fed. Reg. 3853, 3854 (Jan. 17, 2001); *see also* BALDWIN, *supra* note 195, at 8.

²²¹ *Newton County Wildlife Ass’n v. U.S. Forest Serv.*, 113 F.3d 110, 115 (8th Cir. 1997); *Sierra Club v. Martin*, 110 F.3d 1551, 1555 (11th Cir. 1997).

²²² *See* *Ctr. for Biological Diversity v. Pirie*, 201 F. Supp. 2d 113, 122 (D.D.C. 2002) (issuing a temporary injunction allowing the court to take appropriate action if over the next 30 days, there was congressional or administrative action taken); *see also* *Env’tl. News Serv., Judge Bars Navy Bombing on Farallon de Medinilla*, <http://www.ens-newswire.com/ens/may2002/2002-05-01-07.asp> (last visited Sept. 1, 2008). As justification for the court opinion, Judge Emmet Sullivan stated: “This Court has no authority to read into a criminal statute such as the MBTA an exception for national security or military activities where none exists.” *Ctr. for Biological Diversity v. Pirie*, 201 F. Supp. 2d, at 115. Following this decision, the Navy requested a stay of the injunction pending its appeal to a higher court. The appellate court granted the stay and expedited the appeal. *Ctr. for Biological Diversity v. England*, No. 02-5163, 2002 U.S. App. LEXIS 11493, at *2 (D.C. Cir. June 5, 2002). Before the D.C. Circuit Court of Appeals could rule on the case, the issue had become moot, *Ctr. for Biological Diversity v. England*, No. 02-5163, 2003 U.S. App. LEXIS 1110, at *2 (D.C. Cir. 2003), because the Bush Administration had succeeded, one month prior, in amending section 703 of the MBTA (which outlines the taking, killing, and possession activities proscribed by the Act) to exempt all members of the Armed Forces from incidental takings of migratory birds during authorized, military-readiness operations. *Bob Stump National Defense Authorization Act for Fiscal Year 2003*, Pub. L. No. 107-314, 116 Stat. 2509.

²²³ COGGINS ET AL., *supra* note 197, at 962.

²²⁴ Benjamin Means, *Prohibiting Conduct, Not Consequences: The Limited Reach of the Migratory Bird Treaty Act*, 97 MICH. L. REV. 823, 833 (1998).

the laws they administer.”²²⁵ In allocating their resources, they must weigh factors such as the seriousness of the transgression, the type and quality of available proof, and the deterrent value of prosecuting.²²⁶

Examination of the case law as put forth in the previous section reveals specific criteria, which if met, greatly increase the chances of criminal prosecution under the MBTA. FWS is much more likely to prosecute when entities fail to implement measures to prevent reasonably foreseeable incidental take of migratory birds. To the extent that such take is significant and easily preventable, that likelihood of prosecution will only increase. In *Moon Lake*, for example, generally inexpensive and easy-to-install technological solutions to bird electrocution problems had been identified.²²⁷ But when FWS gave advance warning to the electric association about its need to comply by retrofitting its power poles accordingly, the company still refused to comply. FWS consequently brought criminal charges against it.²²⁸

For various activities resulting in the reasonable expectation that potentially significant bird deaths will result, FWS has issued guidance documents (for example, for communication towers and wind power facilities).²²⁹ The lessons from *Moon Lake* further suggest that as long as these regulated entities take reasonable steps to implement these guidelines, and demonstrate good-faith efforts to reduce their siting and operational impacts, they will most likely not be subject to FWS prosecution.²³⁰ In other words, to avoid MBTA prosecution at present, the wind industry must continue to follow guidelines and work with FWS with the understanding that FWS exercises selective enforcement and, as in *Moon Lake*, will most likely not prosecute unless a wind farm is in flagrant violation after ignoring repeated FWS orders. As a case in point, while environmental groups have brought suit against the communications industry²³¹ and wind power facilities,²³² FWS has yet to take prosecutorial action under the MBTA against their continued development.²³³

²²⁵ ERNEST GELLHORN & RONALD M. LEVIN, ADMINISTRATIVE LAW AND PROCESS 115 (4th ed. 1997).

²²⁶ *Id.* at 115–16.

²²⁷ *Moon Lake*, 45 F. Supp. 2d 1070, 1075 (D. Colo. 1999).

²²⁸ See Beveridge, *supra* note 67, at 38.

²²⁹ See Memorandum from Jamie Rappaport Clark, Dir. at FWS on Serv. Guidance on the Siting, Constr., Operation and Decommissioning of Commc’ns Towers to Reg’l Dirs. (Sept. 14, 2000), <http://www.fws.gov/migratorybirds/issues/towers/comtow.html> (last visited Sept. 28, 2008) (providing an example of communication tower interim guidelines); Memorandum from Marshall Jones, Deputy Dir. at FWS on Serv. Guidance on Serv. Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines to Reg’l Dirs., Regions 1–7 (May 13, 2003), available at www.fws.gov/habitatconservation/wind.pdf (providing an example of wind power facilities interim guidelines).

²³⁰ GAO WIND POWER, *supra* note 12, at 38.

²³¹ Deborah Zabarenko, *U.S. Considers Bird-Friendly Communications Towers*, ENVTL. NEWS NETWORK, Nov. 7, 2006, <http://www.enn.com/wildlife/article/5403> (last visited Sept. 3, 2008).

²³² See, e.g., *Ctr. for Biological Diversity v. FPL Group*, No. A116362, 2008 WL 4255789 (Cal. Ct. App. Sept. 18, 2008).

²³³ GAO WIND POWER, *supra* note 12, at 37.

This examination of both the case law and administrative guidelines firmly establishes the applicability of the MBTA not only to hunting practices but also to incidental take. Although court rulings have not been unanimous in that regard, what remains in question at this stage is the breadth of the MBTA's application in the incidental take arena—that is, whether the MBTA also offers habitat protection. On this issue, fewer cases have been decided and most oppose the regulatory expansion of the MBTA to that degree.²³⁴ The direction that the courts and perhaps Congress will take (should future amendments be applied) in terms of either more narrowly applying the MBTA to only direct, incidental takings, or more broadly applying it to also include habitat modification, remains uncertain. Given the vagueness of the statute, the conflicting interpretations thus far demonstrated within the court system, the ever-shrinking habitat of migratory birds, and the ever-increasing number of activities that result in their take, perhaps the only certainty with regard to the application of the MBTA to incidental take is that litigation and controversy will continue well into the future.

Indeed, considering wind power's projected expansion over the next few decades, and most likely throughout the twenty-first century, many in the wind industry are simply not comforted by FWS's assurances of "prosecutorial discretion." Although FWS has yet to prosecute the wind industry under the MBTA, the risk that some individual or entity will be prosecuted only increases with each new project. The MBTA prohibits unauthorized take;²³⁵ thus, the death of a single migratory bird from a wind turbine constitutes, on its face, a criminal offense. The wind industry's position in relation to other wildlife laws, which, as noted in Part III, allow it to stay within the bounds of compliance, is relatively secure.²³⁶ Contrastingly, the MBTA's vagueness and lack of compliance mechanisms place the industry in a precarious position. The winds of MBTA judicial review could blow in a different direction at any time, causing the MBTA to swoop down on the wind industry like the "sword of Damocles."²³⁷ Thus, even after extensive case reviews, too much uncertainty remains for the wind industry.

Further, while *Moon Lake* illustrates FWS's preference for encouraging mitigation steps before prosecuting, it also delineates that certain forms of incidental take (for example, take resulting from wind turbines and communication towers) fall within the MBTA's prosecutorial jurisdiction. Moreover, *Moon Lake*'s expansion of the take definition to include habitat modification, and the possibility that other courts may follow that precedent, are cause for concern for wind power. Indeed, "[s]uch a shift in the case law would have a significant impact on the wind industry."²³⁸ Under this broadened interpretation, the siting and construction of wind projects, not just avian collision mortality, could result in liability under the MBTA.

Many in the wind industry are concerned about avian and bat impacts, as well as their liability for those impacts under domestic wildlife laws, particularly the

²³⁴ Beveridge, *supra* note 67, at 38.

²³⁵ Migratory Bird Treaty Act, 16 U.S.C. § 703 (2006).

²³⁶ McKinsey, *supra* note 61, at 75.

²³⁷ *Id.*

²³⁸ Beveridge, *supra* note 67, at 38.

MBTA. But perhaps the more important question to ask, regardless of what the MBTA states, is: What prosecution outcomes lie within the realm of reason? Given that logging activities have not resulted in convictions under the MBTA,²³⁹ we would not expect land-clearing activities for a wind facility to result in a conviction. Furthermore, even if the MBTA's take definition was broadened to include habitat destruction, how would the wind industry's land-clearing activities, to set up a roadway infrastructure and erect turbines, for example, differ from the land clearing needed for any other man-made structure, be it a suburban neighborhood, tall office building, monument, communication tower, or power plant? Indeed, any such form of development requires land space for the construction of the structure, and to a lesser or greater degree depending on its location, a connecting roadway system, both of which displace wildlife habitat.

Due to the requirement under the National Environmental Policy Act (NEPA)²⁴⁰ to evaluate potentially significant environmental impacts,²⁴¹ the wind industry must consider habitat destruction from the placement of wind turbines, particularly when proposing to develop on lands (including submerged lands) requiring a federal permit or license. Yet, untouched habitat remains in the spaces between turbines, and combined they occupy less space than would a fossil-fuel power plant producing a comparable level of power. At the same time, however, the infrastructure needed to support a set of land-based wind turbines, including aboveground transmission lines and roads, poses a potentially larger wildlife threat than the turbines themselves because that infrastructure can cause widespread habitat fragmentation and create pathways for exotic species invasion.²⁴² This potential outcome would be expected to pose more of a concern in biologically abundant and unaltered habitats and less of one on lands already converted to farming²⁴³ and ranching uses, with which wind turbines are compatible.²⁴⁴

Do other energy-providing industries share the same habitat destruction and degradation concerns? When entire mountaintops are blown away with dynamite to mine coal, does the coal industry hold the same level of concern? When nonpoint source pollution empties 10.9 million gallons of oil (the equivalent of the *Exxon Valdez* oil spill) into the oceans every eight months, adversely impacting coastal and aquatic habitats and all the organisms that inhabit them,²⁴⁵ does the oil industry stop and examine its potential liability under various wildlife laws?

²³⁹ ALLIANCE FOR THE WILD ROCKIES ET AL., SUBMISSION TO THE COMMISSION ON ENVTL. COOPERATION PURSUANT TO ARTICLE 14 OF THE NORTH AM. AGREEMENT ON ENVTL. COOPERATION 4, 17 (1999), available at <http://www.cec.org/files/pdf/sem/99-2-SUB-E.pdf>.

²⁴⁰ National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321–4370e (2000).

²⁴¹ *Id.* § 4332.

²⁴² William P. Kuvlesky, Jr. et al., *Wind Energy Development and Wildlife Conservation: Challenges and Opportunities*, 71 J. WILDLIFE MGMT. 2487, 2487 (2007); *Hearings*, *supra* note 44, at 55 (statement of Michael Daulton, Director of Conservation Policy, National Audubon Society).

²⁴³ *Hearings*, *supra* note 44, at 58–59 (statement of Michael Daulton, Director of Conservation Policy, National Audubon Society); see Kuvlesky et al., *supra* note 241, at 2493.

²⁴⁴ AM. WIND ENERGY ASS'N, WIND ENERGY AND WILDLIFE: FREQUENTLY ASKED QUESTIONS, http://www.awea.org/pubs/factsheets/050629_Wind_Wildlife_FAQ.pdf (last visited Aug. 25, 2008).

²⁴⁵ COMM. ON OIL IN THE SEA: INPUTS, FATES, AND EFFECTS, NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., OIL IN THE SEA III: INPUTS, FATES, AND EFFECTS 11 (2003).

Perhaps, as a provider of “green” energy, the wind industry simply holds itself to a higher standard. Or perhaps for the same reason, it is held to a higher standard by decision-makers and the public at large. Is wind power subjected to more scrutiny than other power sources? This question brings this paper to a much-needed comparison of wildlife impacts within the energy sector.

V. AN EXAMINATION OF COMPARATIVE IMPACTS OF ELECTRICITY PRODUCTION

There is no disputing that poorly located wind projects can have negative environmental impacts on avian wildlife that may be locally significant.²⁴⁶ As noted previously, some land-based wind farms have been responsible for serious, continuing fatalities of avian species, most notoriously the land-based wind farms at Altamont Pass in California.²⁴⁷ In light of the results from peer-reviewed research of avian impacts at an offshore wind power facility off the Danish coast,²⁴⁸ bird impacts may be lower at offshore wind facilities than at their land-based counterparts, particularly if offshore facilities are placed outside of major migratory flyways. As wind power has grown in mountain locations in the eastern United States, bat fatalities have become a recognized problem as well.²⁴⁹

Altamont Pass is perhaps an anomaly given its older, smaller and faster spinning wind turbines and in light of the comparatively lax standards of environmental assessment that existed when it was first permitted. Yet, even in the instance of Altamont Pass or the eastern mountain sites, where bat mortalities are more prevalent, it is important to consider avian and bat impacts in context. In short, the wildlife impacts of wind power ought to be considered in the wider context of wildlife impacts of energy generation as a whole, and the best metric on which to base such a comparison is the impact per megawatt-hour (MWh) of electricity produced.²⁵⁰ Again, this is not to say that wind power does not result in avian death and habitat exclusion or that marine mammals will not be impacted by sounds generated during the installation of offshore wind power monopiles or operation of the wind turbines blades.²⁵¹ Neither does it suggest that these impacts

²⁴⁶ GAO WIND POWER, *supra* note 12, at 9; Luis Barrios & Alejandro Rodriguez, *Behavioural and Envtl. Correlates of Soaring-Bird Mortality at On-Shore Wind Turbines*, 41 J. APPLIED ECOLOGY 72, 72–73 (2004); Gregory D. Johnson et al., *Mortality of Bats at a Large-Scale Wind Power Dev. at Buffalo Ridge, Minn.*, 150 AM. MIDLAND NATURALIST 332, 340 (2003); Robert G. Osborn et al., *Bird Mortality Associated with Wind Turbines at the Buffalo Ridge Wind Resource Area, Minnesota*, 143 AM. MIDLAND NATURALIST 41, 50 (2000).

²⁴⁷ NAT’L WIND COORDINATING COMM., NWCC WILDLIFE WORKGROUP RESEARCH PLANNING MEETING VI 50 (2007).

²⁴⁸ Desholm & Kahlert, *supra* note 27, at 296. This finding, of course, would need to be confirmed at additional facilities, including those to be located off the U.S. coast.

²⁴⁹ Kunz et al., *supra* note 53, at 315.

²⁵⁰ See, e.g., Willett Kempton, et al., *The Offshore Wind Power Debate: Views from Cape Cod*, 33 COASTAL MGMT. 119, 133 (2005); Christina M. Jarvis, *An Evaluation Of The Wildlife Impacts Of Offshore Wind Development Relative To Fossil Fuel Power Production* 62–64 (Fall 2005) (unpublished M.M.P thesis, University of Delaware) (on file with the University of Delaware Library), available at http://www.ocean.udel.edu/windpower/docs/Jarvis_thesis05.pdf.

²⁵¹ Jeremy Firestone & Christina Jarvis, *Response and Responsibility: Regulating Noise Pollution in the Marine Environment*, 10 J. INT’L WILDLIFE L. & POL’Y 109, 118 (2007).

are not important or should not be minimized, but rather, that any wildlife impacts from wind power projects ought to be compared to the wildlife impacts of other means of electrical generation.

First, consider avian collision mortality from other manmade structures (apart from wind turbines) within the energy sector, such as smokestacks. As noted previously, although wind facilities result in avian fatalities, so do buildings of all shapes and sizes, and fossil-fuel power plants are no exception. For example, at an oil flare smokestack in Alberta, Canada, 1393 dead birds comprised of twenty-four passerine species were found over a two-day period during May 1980.²⁵² A similar episodic mortality event was recorded in Florida, where 1265 passerine carcasses were found at the foot of four smokestacks over the course of two days.²⁵³ Long-term studies conducted over four-year periods in the 1980s at two smokestacks in Citrus County, Florida and Ontario, Canada revealed 2301 and 8531 dead birds, respectively.²⁵⁴ Again, in each case, most of the birds were passerines.²⁵⁵

When comparing the wildlife impacts of different energy sources it is also important to consider impacts to wildlife other than avian and bat species. Consider fisheries. Although we are not aware of any fisheries impacts from land-based wind farms, a “fish to fish” comparison can be made between fossil fuel generation and offshore wind power. For offshore wind power, fisheries can be affected by localized changes in the benthic community and by the addition of hard structures that create artificial reefs.²⁵⁶ Jarvis compared this effect, which is potentially positive, to the approximately 16 billion fish eggs and larvae killed annually from impingement and entrainment at one coal plant on Cape Cod, Massachusetts.²⁵⁷ Similarly, both nuclear and open rack vaporization liquefied natural gas (ORV LNG) facilities each result in the estimated annual mortality of billions of fish eggs and larvae from the hydraulic and mechanical shocks of impingement and entrainment.²⁵⁸ In addition to these direct, physical losses, impacts stem from chemical toxicity and thermal pollution.²⁵⁹ Aqueous biocides used to prevent biofouling and thermal stresses from altered water temperatures add to the mortality levels of surrounding plant and animal species.²⁶⁰

It is difficult to quantify at the species level the adult-equivalent effects of the loss of billions of fish eggs and larvae from the operation of one of these types of power plants. For one ORV LNG terminal approved for the Gulf of Mexico, the

²⁵² Erickson et al., *supra* note 27, at 1031.

²⁵³ *Id.*

²⁵⁴ *Id.* at 1032.

²⁵⁵ *Id.* at 1031–32.

²⁵⁶ See, e.g., Dan Wilhelmsson et al., *Effects of High-Relief Structures on Cold Temperate Fish Assemblages: A Field Experiment*, 2 MARINE BIOLOGY RES. 136, 143–44 (2006).

²⁵⁷ Jarvis, *supra* note 249, at 94.

²⁵⁸ MICHAEL J. KENNISH, POLLUTION IMPACTS ON MARINE BIOTIC COMMUNITIES 83 (1998); NAT’L OCEANIC & ATMOSPHERIC ADMIN., NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION’S RECOMMENDED BEST PRACTICES FOR LIQUEFIED NATURAL GAS TERMINALS 1, 5 (2005), available at http://www.nmfs.noaa.gov/habitat/habitatconservation/publications/Request%20for%20Proposals_April_1_06.pdf.

²⁵⁹ *Id.* at 11.

²⁶⁰ *Id.* at 10; KENNISH, *supra* note 257, at 83.

equivalent-yield loss for total fishery landings of red drum was estimated at 1%–3%.²⁶¹ However, upon multiplying such a loss by the number of ORV LNG facilities expected to be built in U.S. waters, and further by the number of water-dependent coal and nuclear plants already in existence, one can understand the concerns held by marine resource managers regarding the adverse effects of these power sources on fish stocks at the population level, as well as on coastal and marine areas at the ecosystem level.²⁶² Natural gas is indeed a fast-growing component of the energy sector.²⁶³ Even the mining of the fuel itself has environmental impacts, whether through drilling in fragile habitats or through coal-bed methane extraction, which alters and threatens wildlife habitat via the construction of wells, compressor stations, and wastewater pits.²⁶⁴

In addition, other technologies generally thought of as “clean” or environmentally benign, such as ocean thermal energy conversion (OTEC) or hydropower, pose threats to wildlife. If developed on a large scale, OTEC could result in the same impingement and entrainment, chemical, and thermal impacts discussed above, due to its derivation of energy from ocean thermal gradients.²⁶⁵ Furthermore, a typical hydropower facility is more likely to have significant wildlife impacts than a typical wind power facility. Hydropower facilities: cut and kill fish as they pass through power generation machinery (e.g., six projects on the Au Sable river in Michigan were found to entrain thirty-seven different fish species, with an average mortality rate of 24.2%, resulting in 365.5 fish killed/GWh);²⁶⁶ decrease dissolved oxygen, which causes fish mortality; reduce recruitment by preventing fish migration; alter water temperatures, which stresses fish and other wildlife; trap silt, debris and nutrients that would otherwise be used downstream as food and habitat; flood wetlands and wildlife habitat; and convert rivers and streams into impoundments, resulting in a loss of stream fisheries.²⁶⁷

Additionally, any comparison between wind power and other means of electricity generation must account for climate change and its potentially

²⁶¹ JUSTIN E. FARRELL, DEMAND FOR LIQUEFIED NATURAL GAS DEVELOPMENT AND IMPACTS TO ICHTHYOPLANKTON 88 (2006), available at http://www.laseagrant.org/pdfs/JFarrell_DemandLNG.pdf.

²⁶² NAT’L OCEANIC & ATMOSPHERIC ADMIN., *supra* note 257, at 5.

²⁶³ FARRELL, *supra* note 260, at 87.

²⁶⁴ AM. WIND ENERGY ASS’N, WIND ENERGY AND WILDLIFE: IF NOT WIND, THEN . . . ?, http://www.awea.org/pubs/factsheets/050629_If_Not_Wind.pdf (last visited Sept. 27, 2008).

²⁶⁵ Robin Pelc & Rod M. Fujita, *Renewable energy from the ocean*, 26 MARINE POL’Y 471, 473 (2002).

²⁶⁶ See FEDERAL ENERGY REGULATORY COMMISSION (FERC), AU SABLE RIVER MULTIPLE PROJECT ENVIRONMENTAL ASSESSMENT FOR NEW HYDROPOWER LICENSES: AU SABLE RIVER PROJECTS 101–02 (1994); Consumers Power Co., Project No. 2448-011, 68 FERC ¶ 61,072 (1994); Consumers Power Co., Project No. 2453-003, 68 FERC ¶ 61,073 (1994); Consumers Power Co., Project No. 2436-007, 68 FERC ¶ 61,082 (1994); Consumers Power Co., Project No. 2447-008, 68 FERC ¶ 61,081 (1994); Consumers Power Co., Project No. 2450-005, 68 FERC ¶ 61,071 (1994); Consumers Power Co., Project No. 2449-007, 68 FERC ¶ 61,075 (1994).

²⁶⁷ JEREMY FIRESTONE, HYDROPOWER RELICENSING: OPPORTUNITIES FOR AND OBSTACLES TO ENVIRONMENTAL QUALITY IMPROVEMENTS AND RECREATIONAL ENHANCEMENTS ON SOUTHEASTERN RIVERS 4 (2001), available at <http://www.efc.unc.edu/publications/pdfs/HydroLicensing.PDF>; Notice of Proposed Interagency Policy on the Prescription of Fishways Under Section 18 of the Federal Power Act, 65 Fed. Reg. 80,898 (December 22, 2000); AM. FISHERIES SOC’Y, AFS POLICY STATEMENT #25: HYDROPOWER DEVELOPMENT (2008), available at http://www.fisheries.org/afs/docs/policy_25f.pdf.

devastating impacts on wildlife. Thomas and his colleagues estimate that based on midrange predictions of climate warming for 2050,²⁶⁸ 15%–37% of species in their sample of taxa and regions will be “committed to extinction.”²⁶⁹ Focusing more specifically on avian species, Jetz, Wilcove, and Dobson project that the combined effects of climate change and habitat destruction could leave between 950 and 1800 species of birds imperiled by 2100.²⁷⁰ Although for many species these threats may be far-off and difficult to establish and quantify, it is becoming increasingly apparent that climate change is already beginning to have profound impacts on wildlife species such as polar bears, penguins, and walruses, and it also has implications for whales²⁷¹ and other migratory species, including birds and bats.

In addition to its role in global warming, carbon dioxide emissions also are causing ocean acidification, a chemical effect that has received very little attention outside of the environmental, chemistry, and oceanography communities. Researchers predict that if trends continue, perhaps within the next fifty years, tropical coral reefs will no longer be viable nor will many of the world’s shellfish populations.²⁷²

Given the role of carbon dioxide emissions in both advancing climate change and acidifying the oceans, it is perhaps not surprising that a 450 MW wind project proposal off the Atlantic coast of Delaware has received the endorsement of the Delaware Audubon Society and that the controversial Cape Wind project in Nantucket Sound has received the tentative endorsement of the Massachusetts Audubon Society, despite both projects’ potential impacts on avian species.²⁷³ The

²⁶⁸ The midrange scenario is characterized by a 1.8°–2.0°C increase in temperature and a 500–550 part per million atmospheric concentration of carbon dioxide. Chris D. Thomas et al., *Extinction Risk from Climate Change*, 427 NATURE 145, 147 (2004).

²⁶⁹ *Id.* at 145.

²⁷⁰ Jetz et al., *supra* note 45, at 1212.

²⁷¹ See, e.g., Rule to List 12 Penguin Species as Threatened or Endangered Under the Endangered Species Act, 72 Fed. Reg. 37,695, 37,695–96 (proposed Jul. 11, 2007) (to be codified at 50 C.F.R. pt. 17); Rule to List the Polar Bear (*Ursus Maritimus*) as Threatened Throughout its Range, 72 Fed. Reg. 1063, 1071–72 (proposed Jan. 9, 2007) (to be codified at 50 C.F.R. pt. 17); Charles H. Greene & Andrew J. Pershing, *Climate and the Conservation Biology of North Atlantic Right Whales: Being a Right Whale at the Wrong Time?* 2 FRONTIERS IN ECOLOGY & ENV’T 29, 32–33 (2004).

²⁷² See James C. Orr et al., *Anthropogenic Ocean Acidification Over the Twenty-First Century and its Impact on Calcifying Organisms*, 437 NATURE 681, 686 (2005) (predicting effects of ocean acidification on calcifying organisms); THE ROYAL SOC’Y, OCEAN ACIDIFICATION DUE TO INCREASING ATMOSPHERIC CARBON DIOXIDE 1–2 (2005) (discussing causes and possible effects of ocean acidification); Ken Caldeira & Michael E. Wickett, *Anthropogenic Carbon and Ocean pH*, 425 NATURE 365 (2003).

²⁷³ See Bluewater Wind, What Bluewater Wind is Proposing, http://www.bluewaterwind.com/de_overview.htm (last visited Sept. 3, 2008) (containing overview of Delaware wind farm proposal); Del. Audubon Society, Bluewater Wind Reaches Agreement with Delmarva Power, <http://www.delawareaudubon.org/conservation/windpowersettlement.html> (last visited Sept. 3, 2008); The Associated Press, *Audubon Society Backs Controversial Wind Farm*, MSNBC, Mar. 29, 2006, <http://www.msnbc.msn.com/id/12066651/> (last visited Sept. 3, 2008). See also Del. Pub. Serv. Comm’n, State of Del., Delmarva Power RFP, <http://depdc.delaware.gov/irp.shtml> (last visited Oct. 20, 2008). Furthermore, according to the Massachusetts Division of Fisheries and Wildlife, the 130-turbine, 420 MW Cape Wind project does not amount to a “taking” under the Massachusetts Endangered Species Act. Renewable Energy News, *Cape Wind clears wildlife hurdle*, RENEWSAMERICAS, July 17, 2008, at 8, 8.

Delaware Audubon Society endorsement is particularly noteworthy, given that the coastal wetlands adjacent to nearby Delaware Bay constitute one of the world's most important stopovers on international bird flyways.²⁷⁴

Thus, wind power, a clean and renewable form of energy, has modest wildlife impacts overall in comparison with many other energy sources. Moreover, according to the National Research Council, compared to wind facilities, the costs, benefits, and environmental impacts of other energy sources are "seldom evaluated [as] comprehensively."²⁷⁵ Furthermore, despite having an incidental bird take of less than 0.01% per year in the United States,²⁷⁶ the wind industry is the most heavily scrutinized among all the anthropogenic contributors to avian mortality, including the construction of buildings and communication towers. In fact, no other industry's avian mortality rate is as closely monitored and the proportion of wind facilities that have been examined is "quite high relative to any other source of avian collision mortality."²⁷⁷

It is time to do away with disproportionate levels of scrutiny and consider avian—and, more broadly, wildlife impacts—in a context where wind power is assessed against a range of energy alternatives rather than against none at all. Until then, suboptimal land use and energy policy decisions will continue. In the face of unbalanced regulation, ongoing wind development may proceed at a less than optimal level, while development of other sectors of society with greater wildlife impacts may continue relatively unabated. This statement is by no means a call for relaxed environmental standards for the wind industry. Rather, it is a call for a new, more thoughtful analysis of comparative environmental impacts and for environmental regulation of different activities and industries in proportion to their environmental impact.

VI. NEXT STEPS

A. Onshore Wind Sites

While wind power has fewer wildlife impacts as a whole than many other forms of energy, both the industry and regulators should nonetheless take the necessary steps to minimize the wildlife impacts it does have. Avian and bat mortality from wind projects vary significantly from site to site, thus making siting the single most important environmental consideration for the wind industry.²⁷⁸ Two cases in point are the wind facilities located at Altamont Pass and in the Mid-Atlantic Highlands (discussed in more detail in Part II) where high levels of avian

²⁷⁴ See U.S. Dep't of the Interior, Bird Checklists of the United States: Birds of Cape May County, <http://www.npwrc.usgs.gov/resource/birds/chekbird/r5/cape.htm> (last visited Sept. 2, 2008).

²⁷⁵ NAT'L RESEARCH COUNCIL, ENVIRONMENTAL IMPACTS OF WIND-ENERGY PROJECTS – REPORT IN BRIEF 4 (2007), available at http://dels.nas.edu/dels/rpt_briefs/wind_energy_final.pdf

²⁷⁶ Erickson et al., *supra* note 27, at 1039.

²⁷⁷ ERICKSON ET AL., *supra* note 28, at 18.

²⁷⁸ See *Hearings*, *supra* note 44, at 59 (statement of Michael Daulton, Director of Conservation Policy, National Audubon Society); M.L. MORRISON, BIRD MOVEMENTS AND BEHAVIORS IN THE GULF COAST REGION: RELATION TO POTENTIAL WIND ENERGY DEVELOPMENTS, NOVEMBER 22, 2000–OCTOBER 31, 2005 13 (2006), available at <http://www.nrel.gov/wind/pdfs/39572.pdf>.

and bat collision mortality, respectively, have occurred and are ongoing. These sites should serve as valuable lessons, reminding the wind industry of wildlife mortality it should strive fervently against replicating, not only to prevent environmental impacts, but also to avoid any concomitant negative repercussions, including industry stigma, punitive measures (such as burdensome delays, fines, and penalties) and regulatory fallout.²⁷⁹

Yet wind project proposals continue to be proposed in areas that may be similarly inappropriate. The coasts of Louisiana and Texas, for example, are recognized as critical passageways for billions of protected migratory birds²⁸⁰ and it is along the Laguna Madre of Texas's Lower Gulf Coast where two land-based wind projects, totaling 1200 MW, are proposed.²⁸¹ In this area, three migratory flyways converge, effectively funneling tens of millions of birds along the coast annually²⁸² and amounting to more migrating bird and bat species than in any other region of comparable size in the nation.²⁸³ The potential risk to migratory and resident populations of birds and bats is, not surprisingly, enormous.²⁸⁴ A recent comprehensive assessment by EDM International, Inc., on behalf of Coastal Habitat Alliance, concluded that, if developed, these projects "could result in the most significant impacts to birds in the history of North American wind energy. . . . The . . . negative repercussions to the expanding wind industry both in the U.S. and internationally could be significant, as well."²⁸⁵

In addition to the ecological threats bats face along the Lower Texas Coast, bats are also under threat from proposals for ongoing development along the ridgetops of the Mid-Atlantic Highlands. According to the National Research Council, the possibility of population-level effects from continued wind power development in this region is especially significant. This risk is due to the overall decline in several bat species in the eastern United States, as well as previously noted life-history characteristics (e.g., low reproductive rates, long life spans) that increase bats' susceptibility to population declines.²⁸⁶ These concerns are compounded by the hypothesis that bats are attracted to wind turbines.²⁸⁷

Although FWS has not prosecuted the owners and operators of the Altamont Pass wind facility—nor any other wind farm operator—for incidental take under the MBTA, a clear distinction between Altamont and the proposed wind sites along the Texas Gulf Coast can easily be drawn. Scientific knowledge and public

²⁷⁹ EDM INT'L, INC., BIRD AND BAT COLLISION ASSESSMENT PROPOSED KENEDY COUNTY WIND PROJECTS KENEDY COUNTY, TEXAS 4 (2007), *available at* <http://coastalhabitatalliance.org/reports/Collision-Report-Final-12-18-07.pdf> [hereinafter EDM REPORT].

²⁸⁰ *Hearings*, *supra* note 44, at 40 (statement of Donald Michael Fry, Director, Pesticide and Birds Program, American Bird Conservancy).

²⁸¹ EDM REPORT, *supra* note 278, at 51.

²⁸² Kuvlesky et al., *supra* note 241, at 2492.

²⁸³ *Commission Staff's Petition for Designation of Competitive Renewable Energy Zones: Hearing Before the Texas Public Utility Commission*, Docket No. 33672 6 (2007) (statement of John H. Rappole, on behalf of King's Ranch, Inc.), *available at* http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/33672_410_54886.pdf.

²⁸⁴ Kuvlesky et al., *supra* note 241, at 2493–94.

²⁸⁵ EDM REPORT, *supra* note 278, at 51.

²⁸⁶ See NAT'L RESEARCH COUNCIL, *supra* note 2, at 69–70.

²⁸⁷ Kunz et al., *supra* note 53, at 321.

awareness and concern over Altamont's potential avian impacts were considerably lacking when it was first sited and constructed. The same argument cannot be made for the latter case, especially when FWS guidelines equate the proposed wind sites to "a National Wildlife Refuge of significant importance."²⁸⁸ Neither can the same argument be made for the continued Mid-Atlantic Highlands proposals, with their projections of significant bat mortality. FWS, however, currently lacks legislative authority to guard against this latter outcome.

B. Offshore Wind Sites

Whereas high rates of collision mortality have been recorded at poorly sited terrestrial wind facilities in areas with high avian abundance and diversity, studies, although limited, indicate potentially minimal avian impacts from offshore facilities. A study of 1.5 million seabirds migrating at Swedish wind farms reported a 1 in 100,000 mortality risk to passing birds.²⁸⁹ Studies conducted at Danish wind farms provide more relevant comparisons between land and offshore wind farms because they are larger and more comparable in size to land-based wind operations.²⁹⁰ In addition to collision mortality, a study conducted at the Nysted and Horns Rev wind sites uncovered the impacts of habitat loss and movement obstruction on seabirds. Most of the more abundant species demonstrated avoidance responses.²⁹¹ Desholm and Kahlert found that only 1% of migrating ducks and geese migrated close enough to the wind turbines to be at risk of collision.²⁹² This low figure is, in turn, conservative because it does not account for the fact that most birds fly either below or above turbine height.²⁹³ Wind farms therefore might be expected to have lower impacts offshore than onshore,²⁹⁴ as noted previously, although large-scale assessments and continued study at multiple sites are necessary before definitive conclusions can be made.²⁹⁵

Observations of avian interactions with offshore oil and gas platforms in the Gulf of Mexico provide additional insight into the possible effects of marine wind farms on avian migrants. Platforms have three primary effects on migrating bird species. They: 1) provide stopover habitat for rest, 2) induce the nocturnal circulation phenomenon, which results from avian attraction to platform lights, and 3) result in collision mortality.²⁹⁶ Compared to an oil and gas platform, an array of

²⁸⁸ EDM REPORT, *supra* note 278, at 54.

²⁸⁹ MORRISON, *supra* note 277, at 13.

²⁹⁰ See Desholm & Kahlert, *supra* note 27, at 296.

²⁹¹ See Fox et al., *supra* note 173, at 102–03.

²⁹² Desholm & Kahlert, *supra* note 27 at 297.

²⁹³ See *id.* at 298.

²⁹⁴ See DEL. AUDUBON SOC'Y, STATEMENT ON OFFSHORE WIND ENERGY 7–8 (2007), available at <http://www.delawareaudubon.org/action/windenergystatement.pdf> (comparing results of studies on Danish offshore wind farms to Altamont Pass wind energy facility).

²⁹⁵ See Desholm & Kahlert, *supra* note 27, at 297–98 (arguing that before solidifying this conclusion, similar studies must replicate these avian avoidance findings: 1) at other sites, 2) with other focal marine species, and 3) over longer time spans to control for habituation behavior).

²⁹⁶ MINERAL MGMT SERVS., U.S. DEP'T OF THE INTERIOR, INTERACTIONS BETWEEN MIGRATING BIRDS AND OFFSHORE OIL AND GAS PLATFORMS IN THE NORTHERN GULF OF MEXICO 308 (Robert W. Russell ed., 2005), available at <http://www.gomr.mms.gov/PI/PDFImages/ESPIS/2/2955.pdf>.

wind turbines would likely only result in the latter two impacts, with fewer benefits of a stopover and increased collision risk if migrants similarly circle offshore wind turbines. Possible steps to mitigate these impacts could include dimming facility lights (within the bounds of navigational and air flight safety) or curtailing turbine operations during migrant bird passage. Further, the reef effect of both wind turbines and offshore oil and gas platforms might attract migrating species to these structures for food.

Offshore wind facilities have not yet been constructed in United States waters, although a number have been proposed or approved.²⁹⁷ Recognizing the lack of comprehensive data on the potential impacts of offshore wind energy development as well as the need for a long-term solution to a potentially “serious and growing energy crisis,”²⁹⁸ the New Jersey Department of Environmental Protection solicited research proposals to determine the suitability of developing wind facilities offshore. Over eighteen months, the study will assess the spatial and temporal distribution of avian species (both migratory and resident) and other marine wildlife in New Jersey waters beyond exclusion zones (e.g., shipping lanes, air restriction zones, and significant habitats) from 0–20 nautical miles (nm) offshore, an area of approximately 1360 sq. nm.²⁹⁹ The study also seeks to obtain information on the abundance, distribution, and behavior of birds at times when turbines may have elevated impacts (e.g., during poor visibility, foggy, or nighttime conditions).³⁰⁰ Unlike the wind proposals put forward in the Lower Gulf Coast of Texas and in the Mid-Atlantic Highlands, this effort proactively seeks to obtain adequate scientific baseline data before forging ahead with development.

C. Scientific Research Recommendations

Uncertainty and knowledge gaps remain regarding wind power and wildlife. Many domestic wind facilities have not yet been studied, and at those where studies have been undertaken, research methods are inconsistent, with findings of questionable validity.³⁰¹ In this context, scientists have great difficulty determining allowable levels of incidental take at wind sites to ensure that local and cumulative

²⁹⁷ Press Release, Bluewater Wind, Babcock & Brown’s Bluewater Wind Signs First U.S. Contract for Sale of Offshore Wind Power (June 23, 2008), *available at* <http://www.bluewaterwind.com/pdfs/BluewaterWindDelawarerelease23Jun08.pdf>; Bluewater Wind, New York, <http://www.bluewaterwind.com/newyork.htm> (last visited Sept. 3, 2008); Bluewater Wind, New Jersey, <http://www.bluewaterwind.com/newjersey.htm> (last visited Sept. 3, 2008); Bluewater Wind, Rhode Island, <http://www.bluewaterwind.com/rhodeisland.htm> (last visited Sept. 3, 2008); Cape Wind, America’s First Offshore Wind Farm on Nantucket Sound, <http://www.capewind.org/> (last visited Sept. 3, 2008).

²⁹⁸ BLUE RIBBON PANEL ON DEV. OF WIND TURBINE FACILITIES IN COASTAL WATERS, STATE OF N.J., FINAL REPORT v (2006).

²⁹⁹ DIV. OF SCI., RESEARCH & TECH., N.J. DEP’T OF ENVTL. PROT., SOLICITATION FOR RESEARCH PROPOSALS: OCEAN/WIND POWER ECOLOGICAL BASELINE STUDIES 2 (2007), *available at* <http://www.nj.gov/dep/dsr/ocean-wind/srp-wind-ocean.pdf> (pointing out the study area does not include the Delaware Bay, nor the ocean adjacent to the southern-most portion of Cape May County, New Jersey).

³⁰⁰ *Id.* at 3.

³⁰¹ *Hearings*, *supra* note 44, at 21 (statement of H. Dale Hall, Director, Fish and Wildlife Service, U.S. Department of the Interior).

population-level impacts do not occur. Improved scientific analyses are therefore needed to assist scientists in drawing definitive conclusions about the effects of wind power on wildlife.³⁰² Such analyses must include:

- thorough examinations of baseline avian and bat populations, including their size and migratory routes;
- long-term monitoring to examine the impact of terrestrial wind sites on avian and bat populations, as well as the impact of offshore sites on shorebirds, waterbirds, and sea ducks.³⁰³

The standardization of these methods to enable the assessment of any population- and ecosystem-level impacts is discussed in further detail in the next section.

D. MBTA Shortcomings and Legal Recommendations

The need for better guidance on how to comply with the MBTA is clear. The voluntary and temporary nature of the *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* released by FWS in 2003,³⁰⁴ coupled with the lack of any federal prosecution of a wind farm operator thus far, raises the question of whether wind-power companies have a de facto exemption from the MBTA.³⁰⁵ Indeed, the exercise of prosecutorial discretion and lack of enforcement action by FWS and state agencies fails to provide wind farm operators with proper incentives to prevent or minimize wildlife impacts.³⁰⁶

From the wind industry's perspective, the MBTA is problematic because a wind farm operator cannot obtain a permit for incidental take and the industry has received insufficient guidance as to how to avoid MBTA prosecution. For wind developers who are both conscientious and proactively seeking to minimize avian impacts, to have the threat of criminal sanction, including incarceration, looming overhead, given the strict liability nature of the MBTA, is unconscionable and inconsistent with democratic ideals.

Although FWS's voluntary guidelines are a step forward—they are just that, voluntary—and amidst criticisms from both environmental groups and the wind industry as lacking in specificity,³⁰⁷ not viewed as particularly helpful.³⁰⁸ In issuing

³⁰² See generally GAO WIND POWER, *supra* note 12, at 16–19 (discussing gaps in current research on bird and bat fatalities from wind turbines).

³⁰³ See FWS ESTIMATES, *supra* note 29, at 5–6.

³⁰⁴ FWS, U.S. DEP'T OF THE INTERIOR, INTERIM GUIDELINES TO AVOID AND MINIMIZE WILDLIFE IMPACTS FROM WIND TURBINES (2003), available at <http://www.fws.gov/habitatconservation/wind.pdf>.

³⁰⁵ *Hearings*, *supra* note 44, at 8–9 (statement of the Honorable Alan B. Mollohan, a member of Congress from the State of West Virginia).

³⁰⁶ *Hearings*, *supra* note 44, at 2, 48–50 (statement of Eric R. Glitzenstein, Partner, Meyer Glitzenstein and Crystal).

³⁰⁷ See Erin Kimrey, A Regulatory Framework for Wind Energy in North Carolina, Nicholas School of the Environment and Earth Sciences 8 (2006) (unpublished masters degree project, Duke University), available at http://dukespace.lib.duke.edu/dspace/bitstream/10161/72/1/MP_ek15_a_122006.pdf.

³⁰⁸ See McKinsey, *supra* note 61, at 83–84 (noting that ultimately the guidelines were withdrawn due to this perception).

interim guidelines, FWS sought such feedback,³⁰⁹ yet its provision of voluntary guidelines to wind facilities while simultaneously reserving the right to impose criminal sanctions on such facilities for incidental bird take sends conflicting messages to the wind industry. An overarching framework is needed that: 1) provides clear and concrete guidance on how to comply with the MBTA, and 2) establishes necessary standards and criteria for site-specific, scientifically sound evaluations.

Considering that FWS officials have stated their preference for working cooperatively with wind power owners to promote voluntary mitigation steps, rather than seeking prosecution,³¹⁰ the MBTA should be amended to reflect the new realities of incidental take from various land uses, as well as the FWS's staffing and administrative constraints. At a broader level, current federal wildlife laws afford incongruous protections to avian and bat species in the wind power sector, and while some of these differences are understandable (for example, increased protections provided by the ESA for endangered and threatened species) others are nonsensical (for example, the MBTA's widespread coverage of the majority of all migratory bird species that live in or pass through the United States—more than 800 out of 1000—and criminal consequences for their take “by any means or in any manner,” yet the simultaneous failure to protect bats, which, although considered as potentially more vulnerable than birds to impacts from wind facilities, are “generally not protected under federal law”³¹¹).

Some states, including California, Maryland, New Mexico, New York, and Washington, have established voluntary guidelines for reducing wind-power impacts on both birds and bats.³¹² There exists, however, no set of required, overarching guidelines for wind facility permitting, siting, monitoring, or mitigation, resulting in inconsistent protocols and practices from state to state. Comprehensive and uniform legal standards in each of these areas are sorely needed to:

- assist wind developers³¹³ in complying with laws and regulations;
- establish standards for scientifically sound, site-specific biological evaluations, both preconstruction and postconstruction;³¹⁴
- standardize data collection and monitoring methods, to foster cross-site and cross-year comparison of data throughout the country; and

³⁰⁹ Memorandum from the Deputy Dir. of FWS to Reg'l Dirs., Regions 1–7, at 1–2 (April 26, 2004), available at http://www.fws.gov/habitatconservation/wind_guidelines.pdf.

³¹⁰ GAO WIND POWER, *supra* note 12, at 36.

³¹¹ *Id.* at 34–35.

³¹² JODI STEMLER, FWS, WIND POWER SITING REGULATIONS AND WILDLIFE GUIDELINES IN THE UNITED STATES (2007), available at http://www.fws.gov/Midwest/eco_serv/wind/guidance/AFWASitingSummaries.pdf.

³¹³ These mandatory standards could also assist in the development of other structures with incidental wildlife take, such as communication towers.

³¹⁴ *Hearings, supra* note 44, at 27 (statement of Edward B. Arnett, Conservation Scientist, Bat Conservation International).

- ultimately, more accurately assess the ecological effects of wind power projects on avian and bat species, for their improved management and protection.³¹⁵

1. The MBTA Should Be Amended to Allow Incidental-Take Permits

Congress should amend the MBTA to grant incidental-take permits and require FWS to adopt regulations specifying the criteria for issuing such permits and standards for compliance with them. These permits should be subject to periodic renewal. Specifically, the permitting criteria should require the following several elements.

a. Preconstruction Monitoring Protocols.

This step is necessary for providing baseline data and for determining areas with high concentrations of local and migrant bird populations, to ensure that placement of wind turbines avoids bird flight patterns. At Foote Creek Rim, Wyoming, this approach was taken for birds of prey and has minimized raptor collision mortality.³¹⁶ To be most effective, efforts of this type should be carried out early in the planning process, before land is leased and turbines sited.³¹⁷ Reconnaissance surveys should also be of sufficient duration (e.g., all seasons of the year) and intensity to accurately quantify bird and bat use at a potential construction site.³¹⁸

b. Postconstruction Monitoring Protocols.

Even if baseline research indicates that a wind facility is unlikely to significantly affect avian and bat populations, additional studies may be necessary to confirm this assessment. Avian and bat fatality monitoring should be undertaken at wind-energy sites during construction and operation to assist in determining the impacts of a given wind facility on wildlife populations.³¹⁹ In addition to providing a means of validating siting decisions made on the basis of preconstruction wildlife use data, mortality data can assist in pinpointing turbines or other infrastructure with higher than expected fatality impacts and serve as a foundation for adaptive management steps. Additional research into the development of automated technologies, such as photographic, acoustic, or other automatic monitoring systems on turbine rotor blades or hubs should also be conducted. This technology could eliminate the expense and error associated with repeated and sometimes

³¹⁵ DIV. OF ENVTL. PERMITS & DIV. OF FISH, WILDLIFE AND MARINE RESOURCES, N.Y. STATE DEP'T OF ENVTL. CONSERVATION, DRAFT GUIDELINES FOR CONDUCTING BIRD AND BAT STUDIES AT COMMERCIAL WIND ENERGY PROJECTS 1–2 (2007), available at http://www.dec.ny.gov/docs/fish_marine_pdf/drwindguide1207.pdf.

³¹⁶ See *Hearings*, *supra* note 44, at 38 (statement of Donald Michael Fry, Director, Pesticide and Birds Program, American Bird Conservancy).

³¹⁷ *Id.*

³¹⁸ MORRISON, *supra* note 277, at 32.

³¹⁹ Jon G. McGowan & Stephen R. Connors, *Windpower: A Turn of the Century Review*, 25 ANN. REV. ENERGY & ENV'T 147, 167 (2000).

sporadic carcass searches,³²⁰ and would be especially helpful at wind farms offshore where collision detection is extremely difficult.³²¹

c. Field-Tested and Validated Mitigation Measures.

Site-specific, postoperation mitigation measures should be required for incidental-take permitting. When a facility exceeds predicted mortality levels and those levels rise to a level of concern, possible required mitigation measures may include: modifications to turbine operation, burying transmission lines, and reducing the use of guy wires and other equipment that provide roosting opportunities.³²² Furthermore, wind facilities located in areas with high migratory-bird or bat numbers should install real-time radar (which would detect approaching flocks) and be required to implement short-term, operational shutdowns to minimize collision risk. This approach is currently employed in Spain, thereby demonstrating its feasibility.³²³

d. Increased Coordination Between Wind Facilities and the FWS.

For confidentiality reasons, much of the risk assessment data obtained at wind sites is not available for FWS biologist review before projects are permitted and developed. Wind owners and operators should share this information, provide FWS with access to wind sites, and involve FWS in the research and monitoring of sites proposed for development, selected and undergoing preconstruction survey assessment, undergoing development, and currently operating.

These cooperative steps should be taken to determine the most appropriate sites for development, ensure that development abides by federal standards, and elucidate mortality levels and changes in bird and bat behavior following project construction. FWS can only assist in and evaluate the development of environmentally responsible energy generation when industries in the energy sector, including the wind industry, share relevant research and monitoring data and collaborate effectively toward minimizing wildlife impacts.³²⁴ Expanded research

³²⁰ *Hearings*, *supra* note 44, at 40 (statement of Donald Michael Fry, Director, Pesticide and Birds Program, American Bird Conservancy).

³²¹ *Hearings*, *supra* note 44, at 20 (statement of H. Dale Hall, Director, Fish and Wildlife Service, U.S. Department of the Interior).

³²² Timothy L. McMahan & Peter D. Mostow, *Siting and Permitting Wind Projects*, in *THE LAW OF WIND* ch. 2 – 3–4 (2006). For example, wind projects planned and under construction in the Dakotas lie in the migratory path of the whooping crane, an endangered species of which only 377 remain. Renewable Energy News, *Endangered species flightpath cloud over North Dakota farms*, *RENEWSAMERICAS*, July 17, 2008, at 4, 4. Given that power line collisions are the most common cause of death for the whooping crane, and turbine blades may pose a threat as well, the FWS is working with wind developers to develop conservation plans, which the FWS must approve under the ESA. *Id.* Strategies to reduce those threats include improved siting, burying power lines, or increasing their visibility. *Id.*

³²³ *Hearings*, *supra* note 44, at 36 (statement of Donald Michael Fry, Director, Pesticide and Birds Program, American Bird Conservancy).

³²⁴ *Hearings*, *supra* note 44, at 23 (statement of H. Dale Hall, Director, Fish and Wildlife Service, U.S. Department of the Interior).

capacity, with enhanced federal guidance and involvement to that end, will inform wind project siting, design, and adaptive management decisions.³²⁵

2. The MBTA Should Be Amended to Include Opportunity for Public Comment, Civil Sanctions, and Citizen Suit Provisions

In addition to the above amendments to the MBTA, the opportunity for public comment on a wind facility's plans for compliance (required to receive an incidental-take permit) should be provided, as it is with hydroelectric and nuclear plants.³²⁶

Congress should also consider amending the MBTA to administer not only criminal, but also civil sanctions, to allow more flexibility in assessing penalties that more closely correspond with the severity of the transgression at hand. In most cases, we presume that civil sanctions would be the most appropriate remedy.³²⁷ Penalties could apply when facilities fail to comply with siting, monitoring, or mitigation regulations.

Furthermore, the MBTA should be amended to include citizen-suit provisions, which would authorize citizens to take appropriate enforcement actions for MBTA violations. Congress has long recognized the "lax to nonexistent"³²⁸ nature of environmental law enforcement when concerned and vigilant citizens are not enabled to bring suit, and has incorporated such provisions into other major federal laws.³²⁹

E. Additional Recommendations

1. Bats

Bats present a unique policy challenge, given the numerous conservation concerns surrounding them and their overall lack of federal protection, discussed previously. Congress should therefore consider passing a Bat Protection Act, with the same provisions for bats, both migratory and nonmigratory, as those recommended herein for birds³³⁰ under the MBTA, as well as increased scientific research on bat and wind turbine interactions.³³¹

³²⁵ *Id.* at 60 (statement of Mike Daulton, Director of Conservation Policy, National Audubon Society).

³²⁶ *Id.* at 51 (statement of Eric R. Glitzenstein, Partner, Meyer Glitzenstein and Crystal).

³²⁷ See generally Jeremy Firestone, *Enforcement of Pollution Laws and Regulations: An Analysis of Forum Choice*, 27 HARV. ENVTL. L. REV. 105, 105 (2003) (discussing the factors that influence the selection of administrative, civil judicial and criminal sanctions).

³²⁸ *Hearings, supra* note 44, at 49 (statement of Eric R. Glitzenstein, Partner, Meyer Glitzenstein and Crystal).

³²⁹ These laws include the ESA, Federal Water Pollution Control Act, Clean Air Act, and the Toxic Substances Control Act. *Id.*

³³⁰ While the same incidental-take permitting criteria would apply, specific monitoring and mitigation measures would, of course, vary. For example, Barclay et al.'s analysis of fatality data at thirty-three North American wind power sites reveals no effect of turbine tower height on bird fatalities. Barclay, Baerwald & Gruver, *supra* note 52, at 383–84. Conversely, bat deaths grew exponentially with increasing tower height. *Id.* at 384. These results suggest that while repowering efforts (i.e., replacing

2. Increased Federal Funding

Perhaps the most pressing legislative action, without which these recommendations would be impossible to fulfill, is increased federal funding support. Such support is needed for: 1) enhanced federal and state agency review and consultation with wind developers, incidental-take permitting, and the development, oversight, and enforcement of mandatory protocols; and 2) new and strengthened research initiatives to determine baseline conditions, quantify impacts, and develop effective solutions. FWS and other agencies already face serious budget and staffing constraints, which weaken protective measures for wildlife and create costly delays for the wind industry. Furthermore, federal funding for research on wind power and wildlife has been insufficient and erratic. This weak starting point underscores FWS's need for increased funding to carry out the enhanced regulatory responsibility recommended for it herein. Appropriations should be made to all federal agencies with management responsibilities regarding wind energy development, as well as to the National Science Foundation, National Fish and Wildlife Foundation, and other appropriate entities.³³²

3. Improved Analysis

Improved analysis of the cumulative effects nationwide of various energy sources on wildlife is needed.³³³ All forms of energy should be subjected to the same level of scrutiny as wind power. Indeed, FWS "believes that the development of consistent, scientifically valid pre- and post-construction monitoring protocols, capable of being stepped down to regional and local levels would be helpful for all energy generation technologies."³³⁴

Likewise, other anthropogenic sources of avian mortality should be examined more closely and, as in the wind industry, measures developed and implemented to prevent or minimize unnecessary impacts.

several, lower-MW turbines with one larger, higher-MW turbine) may assist in reducing bird fatalities, they will likely increase bat kills per MW of installed wind capacity. *Id.* Additionally, Arnett et al. have uncovered linkages between weather patterns and bat mortality. Arnett et al., *supra* note 19, at 68–69. All of their studies examining the relationship between the two revealed that most bat fatalities occurred "on nights with low wind speed (<6 m/sec) and that fatalities increased immediately before and after passage of storm fronts." *Id.* at 61. Mitigation efforts, such as curtailment of turbine operations, during these periods of high risk could substantially reduce bat fatalities. *Id.* at 73. For example, curtailing operations on nights with a wind speed of less than six meters per second from August 1 to September 13, 2004 would have reduced bat kills at the Meyersdale and Mountaineer wind facilities in West Virginia by 82% and 85%, respectively. *Id.*

³³¹ See *supra* Part VI.C; *Hearings, supra* note 44, at 27 (statement of Edward B. Arnett, Conservation Scientist, Bat Conservation International).

³³² *Hearings, supra* note 44, at 31 (statement of Edward B. Arnett, Conservation Scientist, Bat Conservation International).

³³³ NAT'L RESEARCH COUNCIL, *supra* note 2, at 67, 139.

³³⁴ *Hearings, supra* note 44, at 22 (statement of H. Dale Hall, Director, Fish and Wildlife Service, U.S. Department of the Interior).

F. Conclusion

All of these recommendations are of elevated importance considering: the scientific uncertainty regarding avian and bat migratory routes, behavior, and mortality levels resulting from wind power; the ineffective legal and regulatory system currently in place; and the rapid expansion of the wind power sector, which has the goal of increasing production by seventeen fold by 2030.³³⁵ While wind power is a clean, noncarbon dioxide-emitting source of energy, efforts must nonetheless be made to ensure its continued development minimizes avian and bat impacts—a critical element of environmentally compatible energy.

Until the regulatory regime for wildlife impacts under the MBTA is updated with clear compliance standards and permitting requirements for the wind industry, and a similar, equally effective regulatory system put in place for the protection of migratory bats, suboptimal development decisions will be made with regard to preconstruction surveying, project siting, postconstruction monitoring, and mitigation, with negative implications for avian and bat species, FWS, and the wind industry itself. With enhanced funding and more clearly delineated resource management authority for FWS, unambiguous regulatory standards for the wind industry, commensurate standards for other energy sources and anthropogenic activities with wildlife impacts, and improved coordination and communication between the wind industry and FWS, wind power growth can continue while preventing and minimizing bat and avian impacts to the greatest extent possible. In this manner, the nation can pursue the most ecologically viable energy alternatives and the wind industry can maintain its “green” credibility for decades to come.

³³⁵ For wind to supply 20% of projected domestic electricity demand by 2030—as put forward by the U.S. Department of Energy, in collaboration with AWEA and other entities—U.S. wind capacity would need to reach 300,000 MW, approximately 17 times the 2007 installed capacity of over 16,800 MW. *See* U.S. DEP’T OF ENERGY, DOE/GO-102008-2567, 20% WIND ENERGY BY 2030: INCREASING WIND ENERGY’S CONTRIBUTION TO U.S. ELECTRICITY SUPPLY 1-2 (2008), *available at* http://www.20percentwind.org/20percent_wind_energy_report_revOct08.pdf.