



WILDLIFE LAW CALL



SUMMER 2020 & 2021

ENERGY & IMPACTS TO WILDLIFE

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I. THE NORTH AMERICAN MODEL OF WILDLIFE CONSERVATION

By the mid-1880s, settlers in the American West saw elk, bison, bighorn sheep, black bears, and whitetail deer nearly vanish from the frontier. With the leadership of famed outdoorsman Theodore Roosevelt, the North American Model for Wildlife Conservation developed. The Model consists of seven principles, often called the Seven Sisters, that jointly preserve wildlife for generations to come:

1. **Public Trust Doctrine:** Legal debate over ownership of wildlife dates back to the Roman Republic. An 1842 U.S. Supreme Court opinion established that government must hold wild nature in trust for all citizens, and that it cannot be “owned”.
2. **Prohibition on Commerce in Dead Wildlife:** Responding to the profitable yet destructive market for commerce in dead wildlife in the late 1800s and early 1900s, hunters and anglers led the effort to end commerce in dead animal parts to ensure the sustainability of wildlife populations.
3. **Democratic Rule of Law:** Wildlife is allocated for use by citizens via legislative processes. These processes protect wildlife from being appropriated by elites, as was common in Europe. All citizens can participate through courts, if necessary, in developing systems of wildlife conservation.
4. **Opportunity for All:** In the United States and Canada, every person has an equal opportunity under the law to participate in hunting and fishing. Neither hunters nor non-hunters may exclude others from access to game.
5. **Non-Frivolous Use:** Although laws govern access to wildlife and provide for citizen participation, guidelines for appropriate use govern killing for food and fur, self-defense, and property protection. Such laws enjoin killing of wildlife merely for antlers, horns, feathers, etc.

6. **International Resource:** The borders of states and nations are of little relevance to fish and wildlife. The Migratory Bird Treaty of 1916 and the Migratory Bird Treaty Act of 1918 exemplify international cooperation in conservation.
7. **Scientific Management:** Science is a crucial requisite of wildlife management. Interest in science and natural history is deeply ingrained in North American society, a trend attributed by wildlife ecologist Aldo Leopold to the work of President Roosevelt.¹



The North American Model of Wildlife Conservation: Project WILD, Association of Fish & Wildlife Agencies.²

II. INDIRECT TAKE & THE MIGRATORY BIRD TREATY ACT

Steven Mudel

The Migratory Bird Treaty Act (MBTA) is a statute enacted in 1918 criminalizing the taking of listed and protected migratory birds. In the early 20th century, demand for feathers was high to decorate women’s hats; thus, hunting and poaching increased throughout the United States.³ Just over a century later, the MBTA protects 1,093 different bird species.⁴ As defined in part by the MBTA, “take” is to “by any means or in any manner...pursue, hunt, take, capture, kill, attempt to take, capture, or kill...”⁵ “any migratory bird, any part, nest, or egg of any such bird.”⁵ However, the acquisition of certain permits allows for the taking of certain migratory birds. After a series of legal battles in the early 20th century, the MBTA became the tool with

¹ This introduction draws on AFWA’s factsheet, *The North American Model of Wildlife Conservation*, available upon request.

² www.fishwildlife.org/application/files/1315/6898/9062/North_American_Model_of_Wildlife_Conservation.pdf.

³ Kristina Rozan, *Brief Summary of the Migratory Bird Treaty Act (MBTA)*, ANIMAL LEGAL & HISTORICAL CENTER,

www.animallaw.info/intro/migratory-bird-treaty-act-mbta (last visited April 23, 2020).

⁴ *Migratory Bird Treaty Act Protected Species (10.13 List)*, U.S. Fish & Wildlife Service, www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php.

⁵ 16 U.S.C. §1532(19).

which the federal government regulates conduct relating to migratory birds. Before the MBTA, courts throughout the United States served as the primary avenue for protection as Congress had no powers to regulate migratory birds.⁶ Congress was only able to enact regulations for migratory birds through international treaties. Throughout the rest of the 20th century, the United States expanded its cooperation through the MBTA with the then-Soviet Union, Canada, Mexico, and Japan.⁷



Model wearing hat of bird feathers.
By George Grantham Bain (1912).

While many issues arose over the years to tweak the MBTA, federal courts have split on the issue of defining indirect take.⁸ The U.S. Court of Appeals for the Second and Tenth Circuit have ruled that the MBTA bars incidental take while the Fifth and Eighth Circuits have ruled otherwise.⁹

Courts interpreting the MBTA's prohibition of take to include incidental take have held that the Act does not explicitly mention a requisite mental state.¹⁰ Because the MBTA does not explicitly include a mental state,

these courts have reasoned that the taking of protected bird species is a strict liability offense.¹¹ Courts that do not interpret the MBTA to include incidental take, on the other hand, suggest that many of the actions stipulated in defining "take" may only be achieved with knowing intent.¹²



Migratory Bird Joint Ventures, U.S. FISH & WILDLIFE SERVICE (last updated Feb. 7, 2018), www.fws.gov/.

In December 2017, the U.S. Department of the Interior (DOI) published solicitor's Opinion M-37050, interpreting the MBTA to not prohibit the incidental take of migratory birds.¹³ This opinion reversed a prior solicitor's opinion released by DOI in January 2017 prohibiting incidental take, which was itself rescinded just after President Trump was sworn into office.¹⁴ The U.S. Fish and Wildlife Service (FWS) recently proposed a rule implementing M-37050.¹⁵ Two lawsuits, one by a coalition of states, and another by a group of non-governmental organizations, challenged M-37050.¹⁶ Both complaints argue that M-37050 and FWS's new rule are contrary to the plain language and meaning of the MBTA statute, and also that M-37050 was issued without undergoing adequate process under the National Environmental Policy Act (NEPA).¹⁷ The U.S. Department of Justice, representing DOI, has advised the court to dismiss both cases on a "threshold basis."¹⁸ As it stands, incidental take is still permitted. However, according to an article published by the National Audubon Society in August 2019, it intends to continue to fight this rule.¹⁹ Moreover, the Biden

⁶ *United States v. Shauver*, 214 F. 154, 160 (E.D. Ark. 1914).

⁷ See Rozan, *supra* note 3.

⁸ See also, 16 U.S.C. 707(a)-(d), for criminal penalties for take of protected birds.

⁹ E. Carter Chandler Clements & Eric J. Murdock, *De-Criminalizing the Inevitable: Some Hope for Rationalizing the MBTA?*, THE NICKEL REPORT (Dec. 14, 2017), www.huntonnickelreportblog.com/2017/12/de-criminalizing-the-inevitable-some-hope-for-rationalizing-the-mtba/.

¹⁰ See, *United States v. FMC Corp.*, 572 F.2d 902, 908 (2d Cir. 1978); *United States v. Apollo Energies, Inc.*, 611 F.3d 679, 681 (10th Cir. 2010).

¹¹ *Id.*

¹² See *United States v. CITGO Petroleum Corp.*, 801 F.3d 477, 492-93 (5th Cir. 2015); *Newton County Wildlife Ass'n v. U.S. Dep't of Agriculture*, 113 F.3d 110, 115 (8th Cir 1997).

¹³ See Memo: Solicitor's Opinions Paper M-37050 (Dec. 22, 2017).

¹⁴ E. Carter Chandler Clements et al., *U.S. Fish & Wildlife Service to Seek Dismissal of Suits Challenging MBTA Legal Opinion*, THE NICKEL REPORT (July 23, 2018), www.huntonnickelreportblog.com/2018/07/us-fish-wildlife-service-to-seek-dismissal-of-suits-challenging-mbta-legal-opinion/.

¹⁵ Regulations Governing Take of Migratory Birds, 85 Fed. Reg. 5915 (Feb. 3, 2020).

¹⁶ See *National Audubon Soc'y et al. v. U.S. Dep't of the Interior et al.*, Case 1:18-cv-04601 (filed May 24, 2018) (S.D.N.Y.); *Natural Resources Def. Council et al. v. U.S. Dep't of the Interior et al.*, Case No. 1:18-cv-04596 (filed May 24, 2018) (S.D.N.Y.).

¹⁷ See Clements et al., *supra* note 14.

¹⁸ *Id.*

¹⁹ National Audubon Society, *Audubon, Other Groups Can Continue Lawsuit against the Federal Government to Protect Birds, Federal Judge Rules*, Audubon (Aug. 1, 2019),

Administration has indicated it will roll back certain rule changes and policies relating to the Act.



Association of Fish & Wildlife Agencies, www.fishwildlife.org/.

While this issue has supporters on both sides, it is one that evokes several tenets of the North American Model of Wildlife Conservation. The three tenets this issue seems to speak to the most, however, are wildlife being held in a public trust, the allocation of wildlife by law, and legitimate purpose. First, wildlife being held in a public trust is where this split comes from. The parties protesting the new rule take a textual approach to protecting migratory birds, and argue that by allowing for incidental take, wildlife may not be adequately protected. The tenet of allocation of wildlife by law also brings in the issue of where the line is drawn with incidental take of wildlife; one side advocates for strict liability with the exception of a potential framework for incidental take permits under the MBTA²⁰; while the other feels that take should be more narrowly applied to knowing actions and the federal reach of the Act should be limited.²¹

While the future of the litigation relating to this issue is uncertain as of this writing, the controversy has wide reach and is sure to continue.

www.audubon.org/news/audubon-other-groups-can-continue-lawsuit-against-federal-government-protect.

²⁰ Migratory Bird Permits; Programmatic Environmental Impact Statement, 80 Fed. Reg. 30,032 (May 26, 2015) (evaluating the potential environmental impacts of a proposal to authorize incidental take under the MBTA).

²¹ 16 U.S.C. § 1539(a)(2)(B).

²² Noelle Eckley Selin, *Wind power*, ENCYCLOPAEDIA BRITANNICA, www.britannica.com/science/wind-power (last updated Mar. 21, 2020).

²³ *Id.*

III. WIND ENERGY

Amanda Anderson

Wind energy is defined as a “form of energy conversion in which turbines convert the kinetic energy of wind into mechanical or electrical energy that can be used for power.”²² Wind energy is harnessed by wind turbines that spin to create power.²³ (Click [here](#) for a video about how wind energy works.²⁴)

Like any source of energy, there are a variety of benefits and drawbacks to utilizing wind energy. Proponents of wind energy note that it is a renewable, sustainable, and clean source of energy.²⁵ Wind energy can be produced as long as the wind blows and it is not dependent on ever-depleting sources of fossil fuels.²⁶ It does not produce the pollution and negative externalities associated with traditional energy sources.²⁷ Further, wind energy can be produced domestically,²⁸ which reduces the United States’ dependence on foreign sources of energy. The more dependent the nation becomes on domestically produced energy sources, the less it will be affected by foreign affairs that make energy sources, especially oil, more difficult and expensive to obtain. Additionally, wind energy is cost effective and is one of the cheapest sources of renewable energy, and wind farms can be constructed on existing farms and ranches, which is beneficial to rural economies.²⁹ Because wind energy equipment generally uses only a small percentage of the land on which it is constructed, this land can continue to be farmed agriculturally as well.³⁰

Critics of wind energy note several drawbacks compared to other energy sources. Although wind energy is generally considered cost effective, it is still not always cost-competitive with conventional energy sources,³¹ providing little incentive for consumers to support making the switch. It also often requires transmission over long distances from the rural windfarms where it is captured to the energy-consuming cities where most of it is used, which leads to infrastructure and cost concerns associated with

²⁴ U.S. Department of Energy, *Energy 101: Wind Power*, YOUTUBE (May 6, 2014), www.youtube.com/watch?v=EYYHfMCw-FI.

²⁵ *201: Wind Energy Benefits & Challenges*, KOHILO UNIVERSITY, kohilowind.com/kohilo-university/201-wind-energy-benefits-challenges/ (last visited Apr. 5, 2020).

²⁶ *See id.*

²⁷ *Id.*

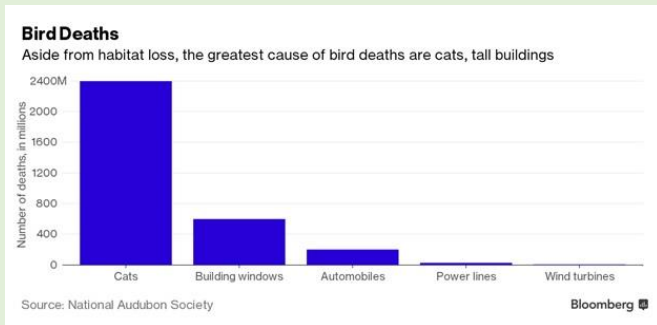
²⁸ *Id.*

²⁹ *Id.*

³⁰ *Id.*

³¹ *Id.*

transmission.³² Further, wind farms may not be the most economically-efficient use of land in all cases.³³ Wind farms cause complaints about noise pollution and aesthetic concerns produced from the giant turbines.³⁴ Wind energy may also be harmful to wildlife,³⁵ which leads to questions regarding whether it is consistent with the North American Model of Wildlife Conservation.³⁶



Wildlife, AMERICAN WIND ENERGY ASSOCIATION, www.awea.org/policy-and-issues/project-development/wildlife.

Wind energy leads to concerns regarding its impact on birds, bats, eagles, and habitat modification generally.³⁷ There are four distinct ways in which wind energy can negatively impact birds, bats, and eagles, as follows:

*collision with wind turbines, collision with associated meteorological towers, collision with, or electrocution by, associated electrical power facilities, and nest abandonment or behavior avoidance from habitat modification.*³⁸

However, studies show that this impact may be minimal compared with other sources of damage to wildlife.³⁹ For example, the chart below represents causes of bird deaths, excluding those from habitat loss.⁴⁰ According to the studies, wind energy accounts for only a tiny fraction of these bird deaths.⁴¹

In addition to apprehensions about wind energy’s threat to birds, bats, and eagles, there are also concerns regarding the possibility that wind farms may cause habitat fragmentation and/or loss.⁴² This means that when wind farms are built, habitats will become divided or will be altered so much as to be considered a total loss.⁴³ However, typically only 5-10% of the land of wind farms is actually occupied by turbines and other equipment.⁴⁴ Because of this, wind farms may actually lead to the preservation of land that would otherwise be converted to another use or developed.⁴⁵

There are three major statutes that affect the development of wind energy, including the Migratory Bird Treaty Act,⁴⁶ the Endangered Species Act,⁴⁷ and the Bald and Golden Eagle Protection Act.⁴⁸ The relevant take prohibitions of each statute follow:

- **Migratory Bird Treaty Act (MBTA):** “it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill . . . any migratory bird.”⁴⁹
- **Endangered Species Act (ESA):** “with respect to any endangered species of fish or wildlife . . . it is unlawful for any person subject to the jurisdiction of the United States to . . . take any such species,”⁵⁰ where “[t]he term ‘take’ means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”⁵¹
- **Bald and Golden Eagle Protection Act (BGEPA):** it is unlawful to “take, . . . at any time or in any manner, any bald eagle [...] or any golden eagle,”⁵² where “‘take’ includes also pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.”⁵³

³² *Id.*

³³ *Id.*

³⁴ *Id.*

³⁵ *Id.*

³⁶ *North American Model of Wildlife Conservation*, U.S. FISH & WILDLIFE SERVICE, www.fws.gov/hunting/north-american-model-of-wildlife-conservation.html (last updated Sept. 19, 2018).

³⁷ *Wildlife*, AMERICAN WIND ENERGY ASSOCIATION, www.awea.org/policy-and-issues/project-development/wildlife (last visited Apr. 5, 2020).

³⁸ *Utility Company Sentenced in Wyoming for Killing Protected Birds at Wind Projects*, THE UNITED STATES DEPARTMENT OF JUSTICE (Nov. 22, 2013), www.justice.gov/opa/pr/utility-company-sentenced-wyoming-killing-protected-birds-wind-projects.

³⁹ *Wildlife*, *supra* note 37.

⁴⁰ *Id.*

⁴¹ *See id.*

⁴² *Frequently Asked Questions about Wind Energy and Wildlife in the U.S.*, AMERICAN WIND WILDLIFE INSTITUTE (Sept. 23, 2019), awwi.org/wind-wildlife-faq/.

⁴³ *See id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ Migratory Bird Treaty Act, 16 U.S.C. §§ 703-712 (1918).

⁴⁷ Endangered Species Act, 16 U.S.C. §§ 1531-1544 (1973).

⁴⁸ Bald and Golden Eagle Protection Act, 16 U.S.C. § 668 (1940).

⁴⁹ 16 U.S.C. § 703(a).

⁵⁰ 16 U.S.C. § 1538(a)(1)(B).

⁵¹ 16 U.S.C. § 1532(19).

⁵² 16 U.S.C. § 668(a).

⁵³ 16 U.S.C. § 668(c).

These statutes have come into play in a few notable judicial decisions.

In one case, Duke Energy Renewables, Inc. owned four wind energy projects in Wyoming.⁵⁴ Two of the projects, consisting of 176 turbines, were causing the deaths of golden eagles and other protected birds.⁵⁵ The bird deaths were violations of the MBTA⁵⁶ to which Duke Energy pled guilty and was sentenced to fines totaling \$400,000; restitution totaling \$100,000; community service consisting of a \$160,000 payment to the National Fish and Wildlife Foundation; and five years of probation, during which time it had to implement a compliance plan to prevent future damage to the birds.⁵⁷ It is estimated that Duke Energy will spend around \$600,000 per year to comply with these terms.⁵⁸ The settlement also required the company to apply for a “take” permit for both sites from the U.S. Fish and Wildlife Service (FWS) within two years.⁵⁹ Before the issuance of M-37050 in December 2017 and subsequent rulemaking, the important takeaway from this case was that a company should take efforts to minimize damage to wildlife and comply with the FWS’s guidelines before opening a wind farm. Doing so will be much less costly and time-consuming in the long run and will help companies comply with the non-frivolous use of wildlife requirement in the North American Model of Wildlife Conservation.⁶⁰

In another case, *Friends of the Boundary Mountains v. U.S. Army Corps of Engineers*⁶¹, TransCanada Maine Wind Development, Inc. filed an application with the Army Corps of Engineers’ seeking authorization to “disturb wetlands and vernal pools in the Kibby Stream watershed” of the Kibby Mountain Range.⁶² The disturbances would be a result of the construction of the Kibby Expansion Wind Power Project, consisting of fifteen turbines.⁶³ In response to this application, FWS expressed concern regarding the impact the project would have on golden eagles that used the area for

nesting and as a migration corridor.⁶⁴ It requested “an Avian and Bat Protection Plan and/or Eagle Conservation Plan” and suggested TransCanada follow its Wind Energy Guidelines.⁶⁵ TransCanada modified its proposal twice, taking these concerns into consideration.⁶⁶ The Corps then issued the permit under its Clean Water Act (CWA) authority, but included several conditions designed to minimize harm to the eagles.⁶⁷



Infrastructure, Energy, Natural Resources, ADDISON BRIGHT SLOANE.

Friends of Boundary Mountains brought suit, alleging violations of the CWA (not discussed for the purposes of this publication), the MBTA, and the BGEPA.⁶⁸ The issue under both the MBTA and the BGEPA was whether a private citizen can bring suit for enforcement.⁶⁹ Neither act contains a citizen suit provision.⁷⁰ Under the MBTA, such suits have been allowed where the program in question purposely or directly caused harm to migratory birds.⁷¹ However, here the court found the relationship between wind farm activity and harm to migratory birds was too attenuated for a private citizen to seek enforcement.⁷² It further held that an individual may not bring a claim for violation of the BGEPA against the Corps when acting under its CWA authority.⁷³ Because of this, the court granted summary judgment in favor of the Corps.⁷⁴ The court’s deference to the Corps’ authority and scientific judgment of these issues is reflective of the North American Model of Wildlife Conservation’s principle of scientific management of wildlife.⁷⁵

⁵⁴ U.S. Dep’t of Justice, *Utility Company Sentenced in Wyoming for Killing Protected Birds at Wind Projects* (Nov. 22, 2013), www.justice.gov/opa/pr/utility-company-sentenced-wyoming-killing-protected-birds-wind-projects.

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ *North American Model of Wildlife Conservation*, U.S. FISH & WILDLIFE SERVICE, www.fws.gov/hunting/north-american-model-of-wildlife-conservation.html (last updated Sept. 19, 2018).

⁶¹ 24 F. Supp. 3d 105 (D. Me. 2014).

⁶² *Id.* at 108.

⁶³ *Id.*

⁶⁴ *Id.* at 109.

⁶⁵ *Id.*

⁶⁶ *Id.* at 110.

⁶⁷ *Id.*

⁶⁸ *Id.* at 111.

⁶⁹ *See id.*

⁷⁰ *Id.*

⁷¹ *Id.* at 113.

⁷² *Id.* at 114-15.

⁷³ *Id.* at 116.

⁷⁴ *Id.* at 121.

⁷⁵ *North American Model of Wildlife Conservation*, U.S. FISH & WILDLIFE SERVICE, www.fws.gov/hunting/north-american-model-of-wildlife-conservation.html.

Wind farm operators should be aware of the obligations imposed by the MBTA, ESA, and BGEPA. Wind energy may be a viable source of renewable energy for the future, but it must fit within the North American Model of Wildlife Conservation and our responsibilities to the environment.



Matt Mace, *UK wind energy generation smashes record again*, EDIE (Feb. 12, 2019).

IV. OFFSHORE WIND ENERGY

Mitchell King

Humans have been using wind power to generate mechanical energy for nearly 2500 years.⁷⁶ It was not until the late 1800s however that wind energy was first used to generate electricity.⁷⁷ Over the past decade, wind power has matured into an extraordinarily promising source of renewable energy. Since 2005, some 3,000 new turbines are built each year in the United States.⁷⁸ Along with solar energy, wind generation stands out as a truly clean utility scale energy source. Of particular importance to this growing industry is the development of offshore wind farms. These production sites are capable of far greater energy output due to stronger, more consistent winds, and proximity to large population centers as compared with onshore wind farms.⁷⁹ Additionally, siting these developments offshore means minimal visual

[model-of-wildlife-conservation.html](#) (last updated Sept. 19, 2018).

⁷⁶ U.S. Energy Information Administration - EIA - Independent Statistics and Analysis, History of wind power - U.S. Energy Information Administration (EIA) (2021), www.eia.gov/energyexplained/wind/history-of-wind-power (last visited Apr 19, 2021).

⁷⁷ *Id.*

⁷⁸ *How many wind turbines are installed in the U.S. each year?*, UNITED STATES GEOLOGICAL SURVEY, www.usgs.gov/faqs/how-many-wind-turbines-are-installed-us-each-year/ (last visited May 1, 2021).

⁷⁹ *What are the advantages and disadvantages of offshore wind farms?*, AMERICAN GEOSCIENCES INSTITUTE (2019), www.americangeosciences.org/critical-issues/faq/what-are-

disruption, little to no noise pollution, and reduced need for use of valuable land.⁸⁰

While modern wind turbines have become extraordinarily sophisticated pieces of technology, the fundamental mechanics behind turning wind power into electricity are fairly straight forward. However, offshore wind power presents further engineering challenges, including the need for more robust towers to withstand rough seas, laying miles-long transmission lines, and building deep foundations or floating platforms on which to build the turbines.

Wind energy production exists in a highly complex regulatory network. Its position as a utility provider means intense regulatory oversight by local, state, and federal government. Wind energy developers must contend with utility law, zoning and construction ordinances, and strict compliance regimes. Perhaps the most important and intense body of regulatory law governing the development of wind energy are statutes which address development's impact on wildlife. Among the most important federal statutes governing these projects are the Migratory Bird Treaty Act; the Bald and Golden Eagle Protection Act; and the Endangered Species Act.⁸¹ Taken together, these statutes offer a broad range of protections for wildlife and have serious implications for energy development.

The **Migratory Bird Treaty Act** (MBTA) is a statute which formally enacts numerous treaties signed between the U.S. (1916), Canada (1916), Japan (1972), Mexico (1976), and Russia (1976).⁸² The statute states that it shall be:

[U]nlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill...any migratory bird, any part, nest, or egg of any such bird.... included in the terms of the conventions...⁸³

[advantages-and-disadvantages-offshore-wind-farms](#) (last visited Apr 19, 2021).

⁸⁰ *Onshore Vs Offshore Wind Power: Need to Know for 2020*, THEENERGYFIX (2020), www.theenergyfix.com/onshore-vs-offshore-wind-power (last visited Apr 19, 2021).

⁸¹ Hadassah M. Reimer, Sandra A. Snodgrass, *Tortoises, Bats, and Birds, Oh My: Protected-Species Implications for Renewable Energy Projects*, 46 Idaho L. Rev. 545 (2010).

⁸² *Migratory Bird Treaty Act*, U.S. FISH & WILDLIFE SERVICE - DEPARTMENT OF THE INTERIOR (2020), www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php (last visited Apr 19, 2021).

⁸³ 16 U.S.C.A. § 703(a) (West).

The statute protects over 1000 species of migratory birds and installs stiff penalties for violations.⁸⁴ Because of their height and fast-moving rotors, wind turbines can pose risks to avian and bat wildlife, including bird species protected under the MBTA.

Similar to the MBTA is the Bald and Golden Eagle Protection Act. This legislation was signed into law in 1973 and provides specific protections for the Bald and Golden Eagles. The statute adopts language that is nearly identical to the MBTA, stating that it shall be unlawful to “take...any bald eagle... or any golden eagle, alive or dead”.⁸⁵ Because it is constrained to just two species, this statute comes up less frequently than other protective acts. However, it is still a critical law impacting wind energy developments in the United States because of the enormous range of Bald and Golden Eagles.⁸⁶

Another important statute governing wind energy production is the Endangered Species Act that installs penalties and protections for species classified as endangered by government agencies.⁸⁷ Upon classification of species as endangered, the statute renders unlawful the taking and possessing of such classified animals.⁸⁸ In some ways, this Act serves as a catch-all statute for species which do not have individualized legal protections in place.⁸⁹

While wind energy is extraordinarily clean, resulting in zero direct emissions and limited potential for environmental pollution, it is not without wildlife impacts. The Sierra Club, a conservation network, estimates that some 140,000-500,000 birds are killed

each year by wind turbines.⁹⁰ Estimates of annual bat mortality related to wind turbines are even more concerning, with one study putting the number between 600,000 and 949,000.⁹¹ Flying animals are not the only species affected- there are serious concerns of habitat destruction for both onshore and offshore developments. When undertaking the development of wind energy production projects, there are thus a number of critical wildlife-preservation statutes which developers must carefully comply with.

Icebreaker | Offshore Wind Energy Project

One such development that exemplifies the regulatory and legal challenges faced by wind energy projects is “Icebreaker”, a proposed offshore wind farm in Lake Erie. If successfully built, Icebreaker would be the first freshwater wind turbine development in the United States proposed approximately 8-10 miles off the coast of Cleveland.⁹² Advocates of the project claim the construction and maintenance of the turbines would create some 500 jobs in the region and generate \$250 million in economic benefits to surrounding communities.⁹³ With that claim has come intense opposition and several lawsuits.⁹⁴ The Icebreaker project was initiated in 2009 with the formation of the Lake Erie Energy Development Corporation (LEEDCo).⁹⁵ At this stage of the project, LEEDCo and its partners are seeking to construct just six turbines to test the efficacy of the project.⁹⁶ The project has already faced substantial legal and regulatory challenges. Two major hurdles remain before construction of the turbines can begin.⁹⁷ First, the Ohio Power Siting Board must approve LEEDCo’s wildlife impact

⁸⁴ 50 C.F.R. § 10.13.

⁸⁵ 16 U.S.C.A. § 668(a) (West).

⁸⁶ Bald Eagle Range Map, All About Birds, Cornell Lab of Ornithology, All About Birds, Cornell Lab of Ornithology (2019), www.allaboutbirds.org/guide/Bald_Eagle/maps-range (last visited Apr 19, 2021).

⁸⁷ 16 U.S.C.A. § 1538 (West).

⁸⁸ *Id.*

⁸⁹ *Id.*

⁹⁰ *Wind turbines and birds and bats*, SIERRA CLUB (2020), www.sierraclub.org/michigan/wind-turbines-and-birds-and-bats (last visited Apr 19, 2021).

⁹¹ Daniel Y Choi, Thomas W Wittig, & Bryan M Kluever, An Evaluation of Bird and Bat Mortality at Wind Turbines in the Northeastern United States, 15 PLoS One (2020), <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0238034> (last visited Apr 19, 2021).

⁹² The Project: Icebreaker Wind, LEEDCo, www.leedco.org/index.php/about-icebreaker (last visited Apr 19, 2021).

⁹³ Dave DeNatale, Future of Lake Erie wind turbine project may be decided this week, WKYC.COM (2020),

www.wkyc.com/article/tech/science/environment/future-of-lake-erie-wind-turbines-to-be-decided-this-week/95-92e1b1f2-38dd-4a16-a2f4-df04d1cc5c49# (last visited Apr 19, 2021).

⁹⁴ *Lake Erie groups rev up opposition to Cleveland wind turbine project, as developers negotiate with state*, CLEVELAND (2019), www.cleveland.com/news/2019/04/lake-erie-groups-rev-up-opposition-to-cleveland-wind-turbine-project-as-developers-negotiate-with-state (last visited Apr 19, 2021); Kathiann M. Kowalski, *Ohio regulators OK Lake Erie wind farm with 'poison pill' that may kill project*, ENERGY NEWS NETWORK (2020), energynews.us/2020/05/21/ohio-regulators-ok-lake-erie-wind-farm-with-poison-pill-that-may-kill-project (last visited Apr 19, 2021).

⁹⁵ The Project: Icebreaker Wind, LEEDCo, www.leedco.org/index.php/about-icebreaker (last visited Apr 19, 2021).

⁹⁶ *Id.*

⁹⁷ Nicole Pollack, An Offshore Wind Farm on Lake Erie Moves Closer to Reality, but Will It Ever Be Built?, Inside Climate News (2020), insideclimatenews.org/news/26102020/icebreaker-project-lake-erie-cleveland-wind-energy (last visited Apr 19, 2021).

studies.⁹⁸ Second, the agencies responsible for permitting of the construction site must contend with a lawsuit brought by the American Bird Conservancy (ABC) and the Black Swamp Bird Observatory (BSBO). In August 2020, these parties filed a motion for summary judgment against the Department of Energy (DOE), U.S. Army Corps of Engineers (ACE), and The Department of Defense (DOD) to force the DOE to carry out a more rigorous environmental study known as an Environmental Impact Study in addition to the Environmental Assessment already completed.⁹⁹



Proposed site for the six turbines and their connection to onshore substations.¹⁰⁰

The ABC/BSBO lawsuit takes particular aim at initial environmental reports that were created by DOD, DOE, and ACE concerning the proposed project.¹⁰¹ In short, the conservation groups contend that the Environmental Assessment drafted by DOE was insufficient, incomplete, and misleading.¹⁰² More particularly, the motion for summary judgment holds that the DOE and other parties “ha[ve] instead willfully ignored objections from expert agencies and shirked [their] most fundamental duties under the National Environmental Policy Act (NEPA).”¹⁰³ ABC and BSBO argue that the DOE failed to comply with the Clean Water Act and NEPA by disregarding, downplaying, or failing to adequately investigate potential bird and bat deaths related to the construction of the Icebreaker turbines.¹⁰⁴ The ABC and BSBO memorandum in support of summary judgment alleges significant misrepresentations or flaws in research with regards to impacts on bird and bat wildlife in the project

area.¹⁰⁵ Specifically, the conservation groups state that the DOE Environmental Assessment failed as follows:

- (1) its discussion of the environmental baseline misrepresented the importance of the Project area to birds and bats;
- (2) its reliance on collision and mortality data from land-based wind turbines underestimated the number of birds that will be affected by the Project;
- and (3) DOE's failure to condition funding on a concrete plan to assess the first two concerns meant the Project will fail to satisfy its stated aim as a demonstration project that can meaningfully inform future offshore wind development.¹⁰⁶

The suit goes on to allege that the DOE not only failed to adequately and transparently assess possible impacts on bird and bat populations, but that it also did not heed significant criticism by expert stakeholders.¹⁰⁷ Ultimately, ABC and BSBO argue that because of these significant shortcomings in the DOE's Environmental Assessment, that there is need for a more rigorous environmental review in the form of a full Environmental Impact Study.¹⁰⁸ The lawsuit also points to the novelty of the project as a further reason for the court to require an Environmental Impact Study.¹⁰⁹ As the first freshwater wind development in the United States, ABC and BSBO point to concerns that allowing the project to proceed without an Environmental Impact Study would set an overly lax precedent for the environmental concerns surrounding such projects.¹¹⁰ Thus far, the court has yet to rule on the Motion for Summary Judgment. The lawsuit is yet another roadblock in the long process to install the Icebreaker project. With that said, the ABC and BSBO claims involve important issues and will surely be carefully considered by the court.

The defendants in this suit, including the DOE, offered their own Memorandum opposing the motion for Summary judgment.¹¹¹ In it, the defendants hold that they were entitled to use an Environmental Assessment rather than Environmental Impact Study under

⁹⁸ Kowalski, *supra* note 94.

⁹⁹ *American Bird Conservancy v. Broulette*, 2020 WL 5103123 (Aug. 2020).

¹⁰⁰ The Project: Icebreaker Wind, *supra* note 95.

¹⁰¹ *Broulette*, *supra* note 99.

¹⁰² *Id.*

¹⁰³ *Id.*

¹⁰⁴ U.S. Dept. Energy, DOE/EA-2045, *Final Environmental Assessment LEEDCo Project Icebreaker Lake Erie, City of*

Cleveland, Cuyahoga County, Ohio p. 3-89 (2018); *Broulette*, *supra* note 101.

¹⁰⁵ *Broulette*, *supra* note 99.

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

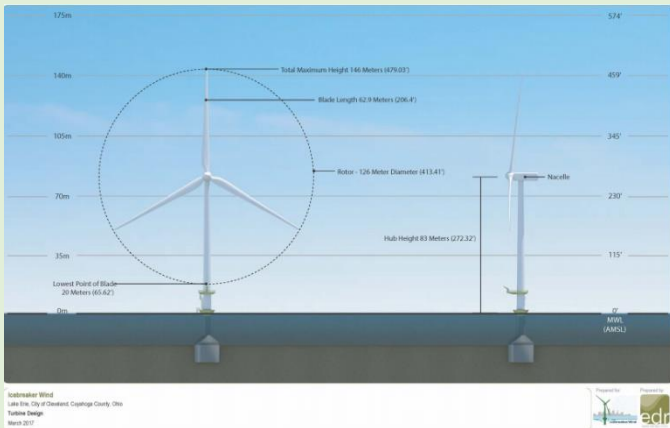
¹⁰⁸ *Id.*

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

¹¹¹ *Id.*

NEPA.¹¹² The defendants' filing also states that where necessary, the Environmental Assessment deferred to expert agencies, though it was not required to do so in the context of findings made by the Fish & Wildlife Services.¹¹³



*Proposed size and construction of turbines.*¹¹⁴

On the whole, this suit has important implications not just for Icebreaker, but for future freshwater offshore wind energy developments.¹¹⁵ Regardless of the legal precedent set, it is probable that similar projects in the future will use the Icebreaker experience as a playbook of sorts for developing new wind farms.¹¹⁶ Critics and proponents alike see that there is enormous potential for energy generation on the Great Lakes, and both sides understand that the process unfolding around Icebreaker will have substantial impacts on future developments.¹¹⁷ Even if ABC and BSBO succeed in forcing the DOE to issue a full Environmental Impact Study, this may not mean doom for the Icebreaker project. A full study may still support the findings of the Environmental Assessment and may not sway the opinion of regulators or stakeholders who have worked tirelessly to progress the project. However, if the court does rule in favor of ABC and BSBO, it will raise the scrutiny under which future developments are subjected. Such a result could be both beneficial and harmful. On one hand, the requirement for full Environmental Impact Studies might lead to more sustainable projects with minimal impact on wildlife. On the other hand, requiring such studies may raise the

¹¹² *Id.*

¹¹³ *Id.*

¹¹⁴ *Final Environmental Assessment, supra* note 104.

¹¹⁵ Jeff St. Clair, *The Future of Lake Erie's Icebreaker Windfarm Remains Up in the Air* WKSU (2021), www.wksu.org/environment-energy/2020-09-30/the-future-of-lake-eris-icebreaker-windfarm-remains-up-in-the-air (last visited Apr 19, 2021).

¹¹⁶ Theresa Carroll, *Let Project Icebreaker break the ice* Utility Dive (2020), www.utilitydive.com/news/let-project-icebreaker-break-the-ice/582832/ (last visited Apr 19, 2021).

cost of entry into the market and stymie a nascent industry. This could mean slower adoption of important emission-reducing energy projects along with long term environmental degradation caused by current energy production methods. The coming decision on this matter will inevitably shape the future of energy development in the upper Midwest and will surely have longstanding ramifications for wind energy as an industry.

V. SOLAR ENERGY

Shelby DeVuyst

Fun fact- the energy that the sun provides to the Earth for one hour could meet global energy needs on Earth for one year.¹¹⁸ Lesser fun fact- we are unable to harness all of that energy with current technology.

Solar energy has been on the rise for several years now, most commonly seen as panels on residential and business rooftops or as large-scale solar farms (also known as solar parks) across the United States. Solar energy is the most abundant energy resource on Earth, using energy from sunlight to fuel our planet.¹¹⁹ As a renewable energy source, utilizing solar power is crucial in our clean energy future.



GME Marketing, *Do Solar Panels Increase Home Value?*, GREEN MOUNTAIN ENERGY (Feb. 21, 2019).

Solar energy, simply, is capturing the energy from the Sun (solar radiation) and converting it into electricity. The Sun is a massive nuclear reactor, nuclear fusion reactions at the core produce energy that radiates into

¹¹⁷ *Id.*

¹¹⁸ *Pros and Cons of Solar Energy*, GREENMATCH.CO.UK (last updated Mar. 10, 2020),

www.greenmatch.co.uk/blog/2014/08/5-advantages-and-5-disadvantages-of-solar-energy/; *What is solar energy?*,

ENERGYSAGE (last accessed on April 4, 2020),

news.energysage.com/what-is-solar-energy/.

¹¹⁹ *What is solar energy?*, *supra* note 118.

space in the form of light and heat.¹²⁰ This solar power can be harnessed by a variety of panels or collectors and converted into usable energy.¹²¹ This may look like a handful of solar panels on your neighbor's roof or a large solar farm employing various techniques to concentrate the sun's energy. (Check out this [Solar 101 YouTube video](#).¹²²)



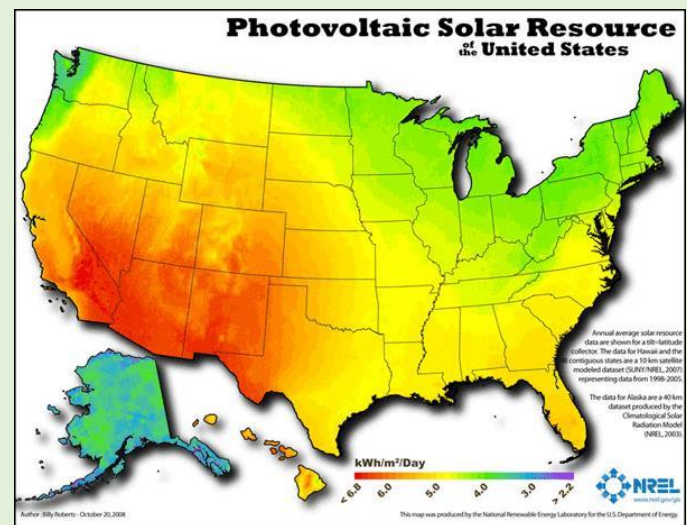
Ben Lovejoy, *Apple the largest U.S. user of solar power, ahead of Amazon, Target, & Walmart, 9to5Mac* (July 25, 2019).

Pros & Cons

Solar energy has several benefits and incentives. Positive aspects of solar energy and the industry include the fact that “solar electricity is now economically-competitive with conventional energy sources in several states.”¹²³ Not only is solar energy a renewable and clean energy source, other benefits include reduced energy bills, diverse application methods, low maintenance costs, continued technology development to increase the efficiency, domestic production, and limited land use impacts.¹²⁴ Solar energy, which is likely to continue to spread rapidly for years to come, is one of the “fastest growing and cheapest sources of power in the world.”¹²⁵ Because solar panel technology continues to improve each year, the economic benefits of solar energy continue to improve.¹²⁶

Though solar energy has many incentives, a significant drawback remains that it is costly to implement.¹²⁷ However, Congress approved a five-year solar tax

credit extension back in 2016 to make solar energy more affordable to homeowners and solar companies alike.¹²⁸ This was a huge benefit for increasing solar energy production in the last several years and, following the year 2022, owners of new commercial solar energy systems can still deduct ten percent of the cost of the system from their taxes, but without further action there will not be a federal credit for residential solar energy systems.¹²⁹ Notably, however, several states offer state incentives for solar energy production.¹³⁰ This incentive is largely tied to the fact that only certain states are able to capitalize on the industry because of differences in land management and solar potential across the country.¹³¹ Additionally, at best, most solar panels have a 20% efficiency rate at converting sunlight to electricity.¹³²



Wildlife Concerns

Economic concerns are generally at the forefront of considerations, including energy options, often resulting in wildlife impacts escaping from the rationale. However, there are several concerns regarding wildlife that are caused by the infrastructure from solar energy. The most common issues with wildlife are most frequently from solar farms and their

¹²⁰ *Id.*

¹²¹ *Id.*

¹²² Student Energy, *Solar Thermal 101*, YOUTUBE (May 17, 2015), www.youtube.com/watch?v=FgjfJGfusdE.

¹²³ *Solar Energy in the United States*, OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY (last accessed April 4, 2020), www.energy.gov/eere/solarpoweringamerica/solar-energy-united-states.

¹²⁴ *Id.*; *Pros and Cons of Solar Energy*, *supra* note 118.

¹²⁵ *What is solar energy?*, *supra* note 118.

¹²⁶ *Id.*

¹²⁷ *Solar Energy*, NATIONAL GEOGRAPHIC (last accessed April 4, 2020), www.nationalgeographic.com/environment/global-warming/solar-power/.

¹²⁸ *Solar tax credit- everything you need to know about the federal ITC for 2020*, ENERGY SAGE (last accessed April 9, 2020), news.energysage.com/congress-extends-the-solar-tax-credit/.

¹²⁹ *Id.*

¹³⁰ *Solar panel incentives, rebates & tax breaks*, ENERGY SAGE (last updated Jan. 7, 2020), www.energysage.com/solar/cost-benefit/solar-incentives-and-rebates/.

¹³¹ *Solar Energy in the United States*, *supra* note 123.

¹³² David Newland, *Solar Power 101: Advantages & Disadvantages*, ENVIRONMENTALSCIENCE.ORG (last accessed Apr. 24, 2020), www.environmentalscience.org/solar-power-101.

land use, the brightness and intensity of light they can cause, and resulting heat streamers.

- Solar farms require ground space, making habitat destruction and migratory path interferences a concern when building new farms.¹³³
- From a distance, solar farms can look like a body of water, confusing birds into landing on or near the farms. If a bird happens to safely land without being harmed in another way, certain species may struggle to take off from the non-water surfaces or ultimately become stranded without food, water, or shelter – helpless to predators.¹³⁴
- The brightness and intensity of the light, usually from larger scaled solar farms, has been known to attract an increased number of insects to that centralized location. Studies have shown that with an increase of insects, there is ultimately an increase in the number of their predators, such as birds and bats. An increase in birds and bats surrounding these solar farms is a concern because solar farms use mirrors to focus the light and heat from the sun toward one central collector.¹³⁵
- This concentrated heat can result in a solar beam as hot as 800°F - 1,000°F. Sometimes referred to as *streamers*¹³⁶, this concentrated heat can instantly kill or stun birds and bats, causing them to fall to the ground where the heat remains elevated and habitat and water sources are almost guaranteed to be compromised amid the mirrors and solar panels of the farm. This means that birds and bats may be killed instantly by the heat, by the force of falling to the ground, or by a waiting predator after being stranded near the adverse conditions of the solar farm.¹³⁷

These wildlife issues highlight the importance of the North American Model of Wildlife Conservation (North American Model)¹³⁸, because claims under Acts

¹³³ *I.e., Defenders of Wildlife v. Zinke*, 856 F.3d 1248 (9th Cir. 2017).

¹³⁴ *Impact of Solar Energy on Wildlife Is an Emerging Environmental Issue*, BLACK & VEATCH (Jan. 1, 2017), www.bv.com/perspectives/impact-solar-energy-wildlife-emerging-environmental-issue.

¹³⁵ *Id.*

¹³⁶ Workers at a solar plant in the Mojave Desert refer to the birds that fly through the plant’s concentrated rays as “streamers” for the smoke plume that they cause from when the birds ignite in midair. ‘*Streamers*’: *Birds Fried in Midair by Solar Plant, Feds Say*, NBCNEWS.COM (Aug. 18, 2014), www.nbcnews.com/science/environment/streamers-birds-fried-midair-solar-plant-feds-say-n183336.

¹³⁷ *Impact of Solar Energy on Wildlife*, *supra* note 134.

such as the Migratory Bird Treaty Act (MBTA) and Endangered Species Act (ESA) are likely to arise. The MBTA states “[u]nless and except as permitted by regulations made as hereinafter provided, it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, [...]” any migratory bird.¹³⁹ Similarly, the ESA states that it is unlawful for any person to take any threatened or endangered species- “take” defined as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect.”¹⁴⁰ Consequently, the threatened, endangered, and migratory species that are *taken* as a result of the land use, brightness/intensity of light, and resulting heat streamers from solar farms is illegal, even though unintentional, according to the MBTA and ESA.



‘*Streamers*’: *Birds Fried in Midair by Solar Plant, Feds Say*, NBCNEWS.COM (Aug. 18, 2014).

North American Model of Wildlife Conservation

The North American Model is “a set of principles that, collectively applied, has led to the form, function, and successes of wildlife conservation and management in the United States.”¹⁴¹ You can find all seven of the interdependent principles [here](#) or in Section I of this publication.¹⁴²

Relevant to the solar energy concerns mentioned above are two key North American Model principles: (1) Wildlife Resources are a Public Trust and (2)

¹³⁸ “The North American Model of Wildlife Conservation is the world’s most successful system of policies and laws to restore and safeguard fish and wildlife and their habitats through sound science and active management.” *North American Model of Wildlife Conservation*, ASSOCIATION OF FISH & WILDLIFE AGENCIES (last accessed April 9, 2020), www.fishwildlife.org/landing/north-american-model-wildlife-conservation.

¹³⁹ 16 USC § 703(a).

¹⁴⁰ 16 USC § 1532(19); 16 USCS § 1538(a)(1)(B).

¹⁴¹ Organ et. al, *The North American Model of Wildlife Conservation. The Wildlife Society Technical Review 12-04*, THE WILDLIFE SOCIETY, vii (Dec. 2012).

¹⁴² ASSOCIATION OF FISH & WILDLIFE AGENCIES, *supra* note 138.

Allocation of Wildlife is by Law. The key concept of the Model is that wildlife is owned by no one and held in trust for the benefit of present and future generations.¹⁴³ Habitat destruction, migratory path interference, the taking of a variety of species, and so on present issues of access to wildlife, and consequently equality in ownership of the species.

Defenders of Wildlife v. Zinke

A 2017 case out of the U.S. Court of Appeals for the Ninth Circuit, *Defenders of Wildlife v. Zinke*¹⁴⁴, demonstrates just how wildlife and solar farm land use concerns overlap with environmental statutes. This case involved the desert tortoise, a reptile listed as a threatened species and native to the Mojave and Sonoran deserts in areas of California, Nevada, Arizona, and Utah.¹⁴⁵ The tortoise's habitat was divided into recovery units to "conserve the genetic, behavioral, morphological, and ecological diversity necessary for long-term sustainability of the entire [desert tortoise] population," and over six million acres were designated as critical habitat.¹⁴⁶



Desert Tortoise, National Park Service,
www.nps.gov/jotr/learn/nature/tortoise.htm.

Defenders of Wildlife (Defenders) contended that the federal defendants in this case¹⁴⁷ violated requirements of the Endangered Species Act (ESA) and Administrative Procedures Act (APA) by issuing a Biological Opinion (BiOp) that was arbitrary, capricious, and an abuse of discretion.¹⁴⁸ Subsequently, Defenders contended that the agencies relied on the inadequate BiOp to grant a right-of-way for NextLight Renewable Power, a company that sought approval for the construction of a solar project

within a designated recovery unit, but outside of the designated critical habitat.¹⁴⁹

The ESA "affirmatively commands each federal agency to 'insure that any action authorized, funded, or carried out' by the agency 'is not likely to jeopardize the continued existence of any endangered species . . . or result in the destruction or adverse modification of habitat of such species.'"¹⁵⁰ Consequently, the Bureau of Land Management deferred the approval of the application due to a higher density of desert tortoise residing in certain areas of the proposed project and sought out consultation with the U.S. Fish and Wildlife Service (FWS).¹⁵¹

The FWS issued the BiOp, which concluded that the project was unlikely to "adversely affect the critical habitat of the desert tortoise" or to "appreciably diminish the reproduction, numbers, or distribution of the desert tortoise in the action area."¹⁵² Additionally, it concluded that the project would not "appreciably impede the long-term recovery of the desert tortoise," but did acknowledge that the project was likely to reduce connectivity between the areas of habitat.¹⁵³

The alternative plan approved for the solar farm construction project reduced the size of the project from 3,881 acres to 2,427 acres and left a 3.65-mile corridor between the project space and the nearby mountains that was considered to be "the geographical linkage that provides 'the most reliable potential for continued population connectivity [of the desert tortoise].'"¹⁵⁴ The alternative also incorporated measures such as the translocation of tortoises found within the project site and the company funding the BLM's conservation activities, such as a monitoring program to track desert tortoise population changes.¹⁵⁵

The appellate court ultimately affirmed the district court's conclusion that the BiOp fully complied with the ESA, as well as the ASA.¹⁵⁶ While this is a relevant case regarding land use and solar farms, there are few cases today that help theorize court interpretation regarding accidental bird death. However, though only a few relevant cases have emerged, the media has

¹⁴³ *Organ et al.*, *supra* note 141 at 11.

¹⁴⁴ *Defenders of Wildlife v. Zinke*, 856 F.3d 1248 (9th Cir. 2017).

¹⁴⁵ *Id.* at 1253-54; 55 Fed. Reg. 12178-01, 12179-80.

¹⁴⁶ *Zinke*, *supra* note 144 at 1254; 59 Fed. Reg. 5280-01, 5287.

¹⁴⁷ The defendants were comprised of the Department of Interior, the U.S. Fish and Wildlife Service, and the Bureau of Land Management.

¹⁴⁸ *Zinke*, *supra* note 144 at 1251.

¹⁴⁹ *Id.* at 1251, 1254.

¹⁵⁰ *Id.* at 1252 (*citing Or. Nat. Res. Council v. Allen*, 476 F.3d 1031, 1033 (9th Cir. 2007) (*quoting* 16 USC § 1536(a)(2)).

¹⁵¹ *Id.* at 1254.

¹⁵² *Id.* at 1255 (internal citations omitted).

¹⁵³ *Id.* at 1255.

¹⁵⁴ *Id.* at 1254-55.

¹⁵⁵ *Id.* at 1255.

¹⁵⁶ *Id.* at 1251-52.

picked up on a variety of PR issues for solar companies.¹⁵⁷

Conclusion

As a renewable source of energy that can be gathered practically anywhere in the world, and considering the leaps and bounds the industry has seen in applicable technology and efficiency, solar energy has been and will continue to be on the rise in the United States. Because solar doesn't produce any air, water, or noise pollution and doesn't emit any greenhouse gases, this energy source is arguably one of the *greenest* choices for power and has a minimal environmental footprint. But important considerations remain when planning for the construction of large-scale solar plants, as well as maintaining them in a wildlife-considerate fashion so that the North American Model of Wildlife Conservation is consistently followed.

VI. BIOFUELS

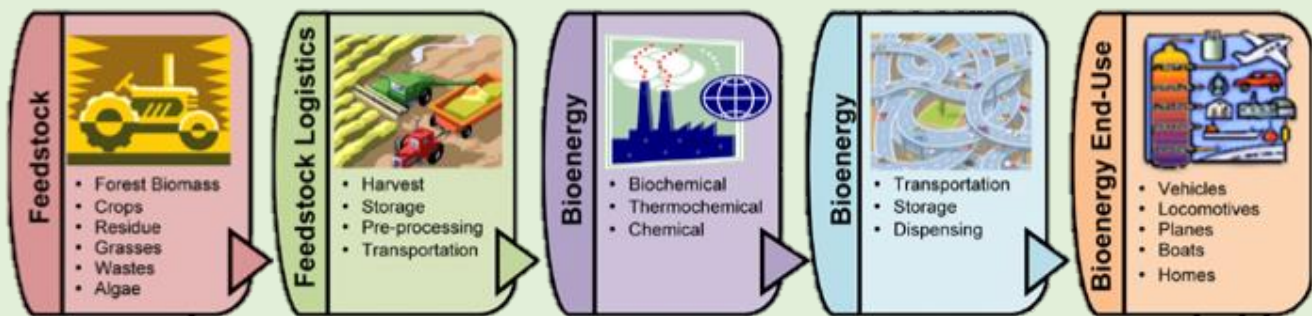
Allisyn Mattice-Eskau

Biofuels have influenced the development of alternative energy sources in America. Today, the majority of gasoline fuel sold in the United States contains at least ten percent of ethanol.¹⁵⁸ Biofuel is a transportation fuel made from biomass material and usually blended with petroleum fuels, but also usable

on their own.¹⁵⁹ Biomass materials may consist of wood, garbage, landfill waste, or crops such as corn.¹⁶⁰ (To understand the process of creating energy from biomass, [click here](#).¹⁶¹)

There are numerous types of biofuels that can be created from biomass. Ethanol and biodiesel are the two most common, but emerging areas such as cellulosic ethanol and algae-based ethanol are evolving.¹⁶² Ethanol is made from a variety of plant starches such as corn, sugar cane, yard clippings, and sugar beets.¹⁶³ (To understand the process of creating ethanol, [click here](#).) Biodiesel is also a renewable biofuel that can be made from vegetable oils, animal fats, or restaurant grease.¹⁶⁴ (The process of creating biodiesel is different than ethanol and therefore, [click here](#) to learn more.)

In addition to the chemical processes that occur when creating biofuels, each biofuel has a standard supply chain network. First, there must be the biomass in order to make the biofuel, which means plants must be planted or forests must be harvested in order to obtain the biomass.¹⁶⁵ The biomass must then be converted into bioenergy and after that it must be transported or stored at a facility in order to be dispensed.¹⁶⁶ Lastly, the biofuel or bioenergy reaches the consumer.¹⁶⁷



¹⁵⁷ Josh Hrala, *This Solar Plant Accidentally Incinerates Up to 6,000 Birds a Year*, SCIENCEALERT (Sep. 15, 2016), www.sciencealert.com/this-solar-plant-accidentally-incinerates-up-to-6-000-birds-a-year; 'Streamers': Birds Fried in Midair by Solar Plant, Feds Say, NBC NEWS (Aug. 18, 2014), www.nbcnews.com/science/environment/streamers-birds-fried-midair-solar-plant-feds-say-n183336; Phil Taylor, *Sharp rise in estimated bird deaths at Calif. 'power tower'*, E&E NEWS (July 29, 2016), www.eenews.net/stories/1060040984.

¹⁵⁸ U.S. Energy Info. Admin., *Biofuels Explained*, (2019), www.eia.gov/energyexplained/biofuels/.

¹⁵⁹ See *id.*

¹⁶⁰ U.S. Energy Info. Admin., *Biomass-Renewable Energy from Plants & Animals*, (2019), www.eia.gov/energyexplained/biomass/.

¹⁶¹ Student Energy, *Biomass 101*, YOUTUBE (June 26, 2015), www.youtube.com/watch?v=yHWcddUZ35s.

¹⁶² Office of Energy Efficiency & Renewable Energy, *Biofuels Basics*, www.energy.gov/eere/bioenergy/biofuels-basics.

¹⁶³ See *Biofuels Explained*, *supra* note 158.

¹⁶⁴ See *id.*

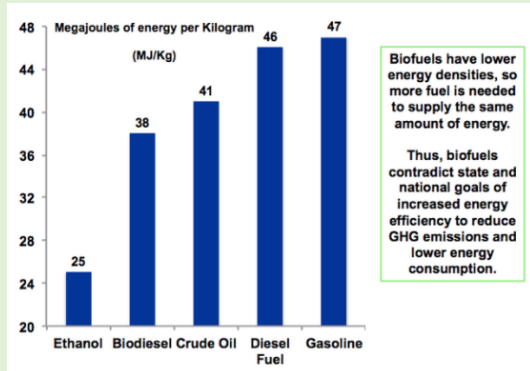
¹⁶⁵ Susan P. Rupp et al., *Effects of Bioenergy Production on Wildlife & Wildlife Habitat*, 12-03 THE WILDLIFE SOC'Y TECH. REVIEW, I, X (2012), wildlife.org/wp-content/uploads/2014/05/Effects-of-Bioenergy-on-Wildlife.pdf.

¹⁶⁶ See *id.*

¹⁶⁷ See *id.*

Benefits of Biofuels

There are numerous reasons why biofuels were an enticement for legislators in 2005 and 2008. With respect to becoming more secure in our gasoline and energy consumption, ethanol is a renewable source of energy that can be produced in America.¹⁶⁸ Further, corn-based ethanol has been shown to reduce greenhouse gas emissions by 35 percent on average and 108 percent for cellulosic feedstock.¹⁶⁹ Ethanol has also become a vital piece of rural America's job market.¹⁷⁰ In 2018, ethanol produced 71,300 direct jobs and contributed "\$46 billion to the gross domestic product, and \$25 billion in household income."¹⁷¹ Lastly, fuels that contain E10 or less may be utilized in "any conventional gasoline vehicle," which allows the majority of transportation to take advantage of this renewable fuel source.¹⁷² Biofuel has similar benefits as it is a safer product for the environment than diesel, but also, it is easier and safer to transport.¹⁷³



See Forbes:
JTC; DOE.

Concerns of Biofuels

While the benefits of biofuels sound promising, there are numerous consequences and concerns that biofuels also raise. First, "[a] gallon of ethanol contains less energy than a gallon of gasoline", which means that vehicles will get fewer miles per gallon when utilizing ethanol than traditional petroleum fuel.¹⁷⁴ Second, biofuel has a lower energy density than other types of

renewable energy sources, which can also make biofuel more expensive.¹⁷⁵ Additionally, more than 40 percent of corn in the United States is used to produce ethanol.¹⁷⁶ This raises a few ethical questions about whether resources that could be utilized to feed people should be allocated to energy sources instead.¹⁷⁷ Lastly, ethanol is difficult to transport because it has been found to crack steel and therefore, the cost to transport ethanol is higher than other sources of fuels.¹⁷⁸

North American Model of Wildlife Conservation

There have been arguments that while biofuels may emit fewer greenhouse gases than gasoline, the production chain's emission of greenhouse gases may outweigh the benefits of the biofuel emissions.¹⁷⁹ For instance, the indirect processes to produce fertilizers for crops, fuel for farming equipment, and the transportation and distribution of biofuels all increase greenhouse gas emissions.¹⁸⁰ According to the University of Michigan, "[s]tudies have suggested that increased biofuel production in the United States will increase global GHG emissions, due to higher crop prices motivating farmers in other countries to convert non-cropland to cropland."¹⁸¹ Therefore, by using more biofuels at home, this may also raise GHG due to the impact on other countries.¹⁸² Additionally, resulting land management and use changes raise additional questions on whether biofuel production aligns with the goals under the [North American Model of Wildlife Conservation](#).

- *Wildlife Resources are a Public Trust*

The Model specifies that wildlife cannot be owned and is a public right under the concepts of a public trust.¹⁸³ In the Prairie Pothole region of the United States, the conversion of land into corn for ethanol production has "marked decreases, as large as 30 percent, in both the number of sensitive grassland species and the number of sensitive grassland individuals"

¹⁶⁸ *Ethanol Benefits & Considerations*, ALTERNATIVE FUELS DATA CANTER - U.S. DEPARTMENT OF ENERGY (last visited Apr. 15, 2020), afdc.energy.gov/fuels/ethanol_benefits.html.

¹⁶⁹ See *id.*

¹⁷⁰ See *id.*

¹⁷¹ *Id.*

¹⁷² *Id.*

¹⁷³ *Biodiesel Benefits & Considerations*, ALTERNATIVE FUELS DATA CANTER - U.S. DEPARTMENT OF ENERGY (last visited Apr. 15, 2020), afdc.energy.gov/fuels/biodiesel_benefits.html.

¹⁷⁴ See *Ethanol Benefits & Considerations*, *supra* note 168.

¹⁷⁵ Jude Clemente, *Why Biofuels Can't Replace Oil*, FORBES (June 17, 2015),

www.forbes.com/sites/judeclemente/2015/06/17/why-biofuels-cant-replace-oil/#76938c0cf60f.

¹⁷⁶ See *id.*

¹⁷⁷ See *id.*

¹⁷⁸ See *id.*

¹⁷⁹ Niina Heikkinen, *U.S. Land-use Changes in 4 years matched the Emissions of 34 Coal Plants, Study Says*, E&E NEWS (Apr. 6, 2015), www.eenews.net/climatewire/stories/1060016271.

¹⁸⁰ See *id.*

¹⁸¹ Center for Sustainable Systems Univ. of Mich., *Biofuels Factsheet*, css.umich.edu/factsheets/biofuels-factsheet, (last visited Apr. 15, 2020).

¹⁸² See *id.*

¹⁸³ John F. Organ et al., *The N. Am. Model of Wildlife Conservation*, 12-04 *The Wildlife Soc'y Tech. Review*, 1, 11 (Dec. 2012) wildlife.org/wp-content/uploads/2014/05/North-American-model-of-Wildlife-Conservation.pdf.

including the prairie chicken.¹⁸⁴ According to the National Wildlife Federation, from 2006 to 2007, “total U.S. corn acreage increased by 19 percent.”¹⁸⁵ Thus, while the benefit of gasoline and energy production is necessary for America to gain energy independence, there is a cost to our wildlife and environment.

- *Science is the Proper Tool to Discharge Wildlife Policy*

Additionally, the Model specifies that the Roosevelt Doctrine of Conservation “recognized all these ‘outdoor’ resources as one integral whole” and “their ‘conservation through wise use’ as a public responsibility, and their private ownership as a public trust” and also that this should be reviewed through the lens of science.¹⁸⁶ In the context of biofuels, 7.4 million acres of grassland have been converted to agricultural land for corn and soybeans between 2008 and 2012.¹⁸⁷ This resulted in emissions “equivalent of 34 coal-fired power plants, or the addition of 28 million cars on the road.”¹⁸⁸ However, at the same time, wildlife and animal habitats have been transformed by the expansion of grassland for cropland. For instance, the longleaf pine ecosystem occupies about 3 million acres of Southeastern United States when it used to occupy 93 million acres.¹⁸⁹ Additionally, as wildlife habitat is destroyed, animals may not be able to adapt and “past experience has shown that the majority of wildlife species decline as agriculture expands to the point of replacing large blocks of native habitats.”¹⁹⁰

- *Wildlife is considered an International Resource*

Additionally, wildlife is considered an international resource under the Model.¹⁹¹ Biofuels have an international component because as more land is converted for

agricultural needs, “herbicides ... find their way into water and affect quality.”¹⁹² For instance, the Gulf of Mexico has a portion of water that is a dead zone because of hypoxia.¹⁹³ Fishing in that region is restricted and the hypoxia may have been caused from the “excess fertilizer in runoff from agricultural land” that “leads to depletion of dissolved oxygen to a level that cannot sustain aquatic life.”¹⁹⁴

Governing Laws

In 2005, Congress enacted the Energy Policy Act to target the United States’ energy production and focus on renewable energies, including renewable fuels for motor vehicles.¹⁹⁵ Shortly thereafter in 2007, the Energy Independence and Security Act (EISA) became law to push the United States to rely more on its own clean renewable fuels.¹⁹⁶ This greatly expanded the Renewable Fuel Standard, authorized under the Energy Policy Act and broadened under EISA, by setting a goal of 36 billion gallons of biodiesel, cellulosic biofuel, advanced biofuel, and total renewable fuel.¹⁹⁷ Additionally, each of the four renewable energy categories has specific volume standards set in the legislation.¹⁹⁸ However, the EPA Administrator may annually waive the projected volumes based on a series of factors, including if implementation of the volume would hurt the economy, environment, or if there is an inadequate domestic supply.¹⁹⁹ The chart below shows the GHG emission reduction goals.

¹⁸⁴ Rebecca Brooke et al., *Corn Ethanol & Wildlife*, Nat’l Wildlife Fed’n (Jan. 13, 2010), www.nwf.org/en/Educational-Resources/Reports/2010/01-13-2010-Corn-Ethanol-and-Wildlife.

¹⁸⁵ *Id.*

¹⁸⁶ See *The N. Am. Model of Wildlife Conservation*, *supra* note 183 at 20.

¹⁸⁷ See *Corn Ethanol & Wildlife*, *supra* note 184.

¹⁸⁸ See *id.*

¹⁸⁹ Ass’n of Fish & Wildlife Agencies, *Assessment of the Bioenergy Provisions in the 2008 Farm Bill*, 10, www.fishwildlife.org/application/files/3515/2846/3862/08_22_12_bioenergy_report_web_final_1.pdf.

¹⁹⁰ *Id.* at 20.

¹⁹¹ See *The N. Am. Model of Wildlife Conservation*, *supra* note 183 at 19.

¹⁹² See *Assessment of the Bioenergy Provisions in the 2008 Farm Bill*, *supra* note 189 at 22.

¹⁹³ See *id.*

¹⁹⁴ *Id.*

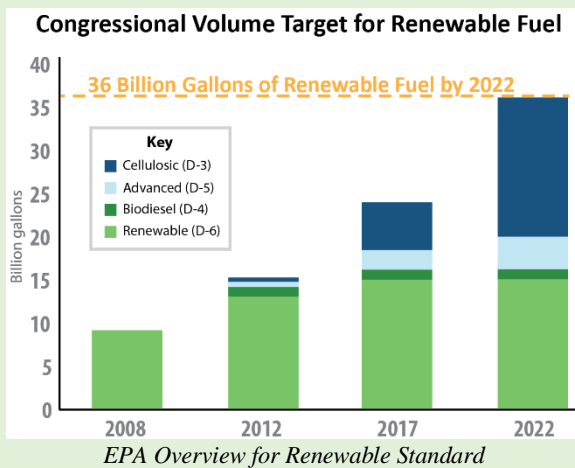
¹⁹⁵ U.S. Env’tl. Prot. Agency, *Statutes for Renewable Fuel Standard Program*, (last visited Apr. 15, 2020), www.epa.gov/renewable-fuel-standard-program/statutes-renewable-fuel-standard-program.

¹⁹⁶ See *id.*

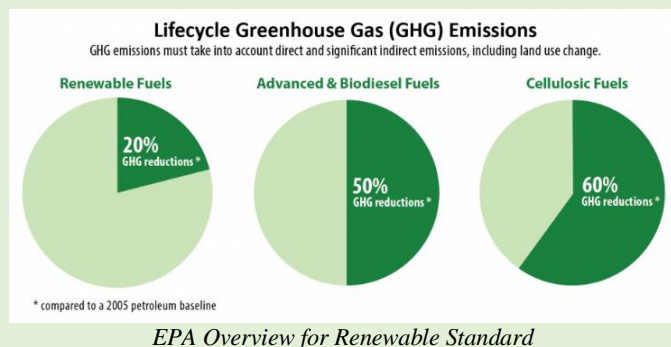
¹⁹⁷ See *id.*

¹⁹⁸ See *id.*

¹⁹⁹ See *id.*



Congress passed the Food, Conservation, & Energy Act, known as the Farm Act of 2008, to provide one billion dollars for renewable energy expansion and protection of conservation and wildlife.²⁰⁰ Additionally, the 2014 Farm Bill reduced certain crop insurance subsidies to help preserve sod, which helps conserve the Prairie Pothole region.²⁰¹ Further, the 2018 Farm Bill created a pilot program within the Prairie Pothole region to promote the Conservation Reserve Program so long as certain conditions are met.²⁰²



American Fuel & Petrochemical Manufacturers v. Environmental Protection Agency

As analyzed above under the North American Model of Wildlife Conservation and in the context of biofuels, at times there are conflicts between the requirements of the Clean Air Act (CAA), which regulates emissions of hazardous air pollutants, and the Endangered Species Act (ESA). In the case of *American Fuel &*

Petrochemical Manufacturers (AFPM) v. Environmental Protection Agency (EPA), AFPM brought suit against EPA in 2018 due to the EPA’s rule setting applicable volumes and standards for cellulosic biofuels.²⁰³

At the same time, two nonprofit environmental groups claimed the EPA “violated the Endangered Species Act, 16 U.S.C. §§ 1531-1544, by failing to consult with the U.S. Fish & Wildlife Service (FWS) and National Marine Fisheries Services (NMFS) regarding whether the Rule would adversely affect threatened or endangered species.”²⁰⁴ While the court held that the Rule under the EPA was reasonable, it concluded that the EPA did violate the ESA when it did not consult with the FWS and NMFS.²⁰⁵

The ESA requires federal agencies to determine “whether certain proposed actions may affect endangered and threatened species . . . and their critical habitat.”²⁰⁶ Each agency must “insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any [listed] species or result in the distribution or adverse modification’ of designated critical habitat by adhering to the consultation process.”²⁰⁷ Thus, as a general principle a federal agency must consult with FWS and NMFS unless it determines there will be no effect on any listed species or critical habitat.²⁰⁸ In this case, the court found that the EPA did not comply with its obligations under the ESA when creating standards under the CAA.²⁰⁹

The EPA argued that under the CAA it was not required to consult with the agency since the CAA required it to establish the volumes for fuels thereby eliminating its discretion.²¹⁰ The court recognized that the EPA’s discretion “does not attach to actions . . . that an agency is *required* by statute to undertake” but nevertheless held that it wasn’t the case here because the EPA could have utilized a waiver specifying it “would severely harm the . . . environment”.²¹¹ Additionally, when it established the standard for biomass-based diesel, it was required to consider factors, including

²⁰⁰ See *Assessment of the Bioenergy Provisions in the 2008 Farm Bill*, *supra* note 189 at 5.

²⁰¹ Cong. Research Service, *Conservation Provisions in the 2014 Farm Bill*, P.L. 113-79, 1, 17 (Apr. 24, 2014), www.nationalaglawcenter.org/wp-content/uploads/assets/crs/R43504.pdf.

²⁰² Cong. Research Service, *Agric. Conservation Provisions in the 2018 Farm Bill*, 1, 5 (Apr. 18, 2019), fas.org/sgp/crs/misc/R45698.pdf.

²⁰³ *Am. Fuel & Petrochemical Mfr. v. Env'tl. Protection Agency*, 937 F.3d 559, 573-74 (2019).

²⁰⁴ *Id.* at 573-74.

²⁰⁵ See *id.* at 568-98.

²⁰⁶ *Id.* at 591.

²⁰⁷ *Id.* at 597.

²⁰⁸ See *id.*

²⁰⁹ See *id.* at 597-98.

²¹⁰ See *id.* at 597.

²¹¹ *Id.* at 597.

environmental factors “such as concerns about wetland conversion, wildlife habitat, and water quality.”²¹²

In its second argument, the EPA argued that it found there was no effect on the environment or habitat and therefore, did not have to consult with FWS and NMFS.²¹³ The EPA stated in a comment that “any harm to threatened or endangered species or their critical habitat that may be associated with crop cultivation in 2018 could not be attributed with reasonable certainty to EPA’s action” to implement the Rule.²¹⁴ Again, the court disagreed specifying that the EPA’s decision of no effect and actually finding that it will have no effect are distinctly different and the EPA made no effort to determine if there was severe environmental harm. “In other words, the EPA concluded that it is impossible to know whether the 2018 Rule will affect listed species or critical habitat. That is not the same as determining that the 2018 Rule ‘will not’ affect them.”²¹⁵ While the goal of the renewable energy standard is admirable and of vital importance, this case helps to ensure the care of our wildlife maintains a priority while trying to achieve those standards.

Conclusion

While biofuels have helped to advance our independence on fuel, it has not been without consequences on our environment and wildlife. As the nation’s push for renewable energy continues, it is vital that Congress and EPA consider the harms to our ecosystem during those legislative and regulatory discussions. Through science and proper state protocols, it is possible to obtain a more secure source for our energy while maintaining wildlife habitats.

VII. HYDROPOWER

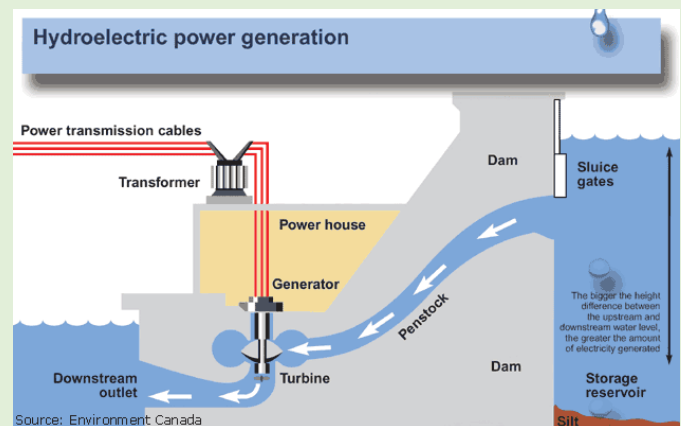
Jamileh Naboulsi

Hydropower is defined as power derived from the energy of falling or fast-running water, which may be harnessed for useful purposes. Hydropower provides 16% of the world’s energy, is present in all but two states as of 2019 and fuels 7% of all energy in the United States.²¹⁶ The United States is the 4th largest

hydropower producer in the world; however, Norway uses 99% hydropower. Dam building peaked in the 1960s, therefore the most suitable locations for hydropower are likely already taken, yet 12,000 MW of hydro-energy is untapped.²¹⁷

Types of Hydropower

There are three main types of hydropower. The first of the three is *impoundment*. The second type of hydropower is *diversion*. Finally, the third type is *pumped-storage*. The main differences between the three are the speed of the water and how efficient the plant will be. The following link is a video produced by the U.S. Department of Energy explaining the three types in depth. (Check out this [YouTube video](#) for more information.)



Historical Uses of Hydropower

Hydropower is believed to have first been used by the Greeks more than 2000 years ago.²¹⁸ Next, the modern version of turbines was created in the 1700s by the French.²¹⁹ In 1880, the state of Michigan had its very own power plant in Grand Rapids, which was used to provide light to local businesses.²²⁰ The next major stage that many people are quite familiar with was the development of the Niagara Falls hydroelectric powerplant that is still in use today.²²¹

Popular Locations of Hydropower Plants²²²

It is necessary to recognize familiar hydropower plants in order to understand the type of landscape necessary for a hydropower plant. First, the powerplant in Grand Coulee, Columbus River, Washington began

²¹² *Id.*

²¹³ *See id.*

²¹⁴ *Id.*

²¹⁵ *Id.*

²¹⁶ *Hydropower explained*, U.S. ENERGY INFORMATION ADMINISTRATION (last updated Mar. 30, 2020), www.eia.gov/energyexplained/hydropower/.

²¹⁷ *Hydropower Program*, BUREAU OF RECLAMATION (last updated Feb. 3, 2016), www.usbr.gov/power/edu/history.html.

²¹⁸ *Id.*

²¹⁹ *Id.*

²²⁰ *Id.*

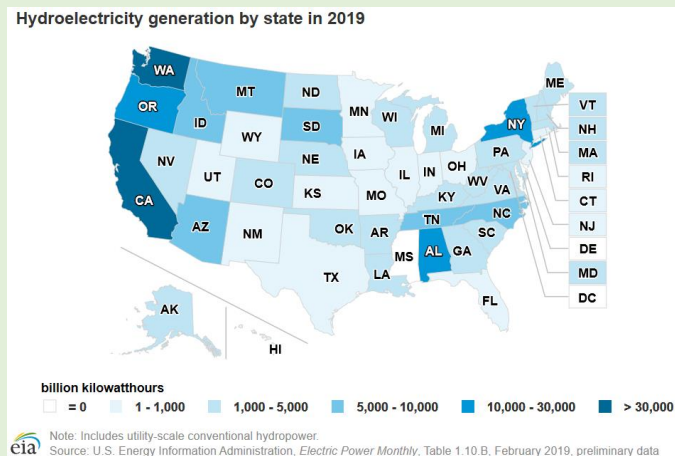
²²¹ *Id.*

²²² *Hydroelectric power in the United States*, WIKIPEDIA, en.wikipedia.org/wiki/Hydroelectric_power_in_the_United_States.

operations in 1941. Additionally, the well-known and previously mentioned Robert Moses plant in Niagara and the Hoover Dam are both reservoir power plants. Finally, there is a fairly large power plant in Ludington, Michigan that is a pumped-storage type plant.

Pros and Cons of Hydropower²²³

Positive aspects of using hydropower expectedly have to do with the environment. First, the plants cause minimal greenhouse gas emissions. The only possible emissions may come from standing water giving off gases common in swamps. However, these do not have a significant impact on the environment. There are also some negative environmental related impacts including the dependency on the amount of precipitation in an area subject to droughts that may have otherwise been used for plants and animals. It may additionally take over areas where there would have otherwise been trees or other vegetation, which could inhibit ecosystems or human populations. Finally, it may change the temperature of existing water sources depending on the type of facility. The best way to counteract the negative impacts would be to use smaller-scaled plants in order to infringe less on natural resources. There is also an issue surrounding fish getting trapped in the power plants, but fish dams have been a common solution to this issue despite the fact that there is still a modification to the habitats of the fish.²²⁴



There are also positive and negative aspects of hydropower relating to the economics of the plants. First, and probably most importantly, the movement of the required water is provided for free by the water cycle. Additionally, there are low operation and maintenance costs and reliable technology being used.

²²³ Arguments derived from Kevin E. McCarthy, *Pros and Cons of Hydropower*, OLR RESEARCH REPORT (Oct. 4, 2010), www.cga.ct.gov/2010/rpt/2010-R-0401.htm.

²²⁴ *Hydropower*, ENERGY DEVELOPMENT – U.S. FISH & WILDLIFE SERVICE (last updated May 2, 2018),

This aspect levels out the high startup costs and effort due to the extensive need of science and customization compared to other forms of renewable and even nonrenewable energy. Finally, due to the boom in dam building in the 1960s, most suitable locations are already taken since there is such a large uninhabited area required.

Regulation of Hydropower

The Federal Energy Regulatory Commission (FERC) has the exclusive jurisdiction to authorize non-federal hydroelectric projects that are: on navigable waters in the United States; on non-navigable waters over which Congress has jurisdiction under the Commerce Clause, were constructed after 1935, and affect interstate or foreign commerce; on U.S. public lands or reservations; or use surplus water or water power from any federal dam.²²⁵

Additionally, Congress passed the following acts regarding the regulation of hydropower plants: the Federal Water Power Act of 1920, Federal Power Act, Public Utility Regulatory Policies Act, Electric Consumers Protection Act of 1986, Energy Policy Act of 1992. Furthermore, Congress passed the Hydropower regulatory Efficiency Act of 2013 which allowed for smaller hydropower stations to combat the barrier to enter the market for those who would like to build new plants, while the Tax Cuts and Jobs Act of 2017 changed rate regulations. Moreover, the America’s Water Infrastructure Act of 2018 made the application process more efficient for facilities.

Of note, the Federal Water Power Act of 1920 sparked the production of hydroelectric power regulation by the Federal Power Commission. Next, the Federal Power Act, Public Utility Regulatory Policies Act, Electric Consumers Protection Act, and Energy Policy Act changed the administrative body that governed the market.

The Commission’s website states the following: “[t]he Commission’s responsibilities include: Issuance of licenses for the construction of a new project; Issuance of licenses for the continuance of an existing project (relicensing); and Oversight of all ongoing project operations, including dam safety inspections and environmental monitoring.”²²⁶

www.fws.gov/ecological-services/energy-development/hydropower.html.

²²⁵ *Id.*

²²⁶ *Hydropower*, FEDERAL ENERGY REGULATORY COMMISSION (last accessed Apr. 24, 2020), www.ferc.gov/industries/hydropower.asp.



L.A. Times

VIII. FOSSIL FUELS

Aaron Fong & Emily Seeling

Energy production in the United States revolves around fossil fuels. A fossil fuel is defined as a “non-renewable resource[] that formed when prehistoric plants and animals died and were gradually buried by layers of rock.”²²⁹ The main sources of fossil fuels are oil, coal, and natural gas. However, several other energy sources, mostly consisting of petroleum products, may be extracted and used from fossil fuels. In 2019, fossil fuels contributed to roughly 62.7% of domestic energy production.²³⁰

However, there are various legal and environmental issues surrounding the fossil fuel industry. One of the main issues pertains to spills that may occur when the resources are extracted. In order to obtain oil, coal, or natural gas, those involved in the fossil fuel industry must go beneath the earth’s surface. The technique used for extraction differs depending on the type of resource that is sought. For example, drilling is used to acquire oil; mining is used to secure coal; and drilling or hydraulic fracturing (fracking) is used to gather natural gas. Therefore, the everyday acquisition and transferring of large quantities of these materials could have a devastating impact on any wildlife living in the area.



Salman Ghouri, *How Will Fossil Fuels Fare in 2040?*, OILPRICE (Dec. 23, 2017).

Case Law

In the case of *Humane Society v. Locke*, the National Marine Fisheries Service was criticized by the U.S. Court of Appeals for the Ninth Circuit for an inconsistent approach to the protection of salmon when it came to regulating populations. There was a previous history of sea lion predation on salmon which was resolved by the killing of the sea lions. The Humane Society challenged this action which led to the criticism of a more serious approach to the sea lion threat compared to the hydropower plant threat.²²⁷

A second case also involves harm to salmon populations.²²⁸ In this case, despite the proof that there was harm to living marine populations, the court did not find that there was enough jeopardy to the continued existence of any endangered species to warrant vacatur of the agency’s decision and an injunction despite the fact that the agency acted arbitrarily. This case emphasized the status that hydropower plant companies enjoy from the high efficiency and low maintenance costs.

Bottom Line

Investment in small hydropower plants to provide energy for communities could be the next policy shift for the United States, given the limited amount of space for large plants, and legislation has reflected this. While it may not be beneficial to completely convert all-natural areas with power plants, the efficiency of these facilities cannot also be ignored.

Advantages & Disadvantages

The use of fossil fuels as an energy source has practical advantages. The use of fossil fuels as an energy source has been around for decades, therefore, the processes and technologies surrounding fossil fuels are well established and continue to improve for the safety of the environment.²³¹ In addition, fossil fuels are a cheap and reliable energy source.²³² Although fossil fuels are

²²⁷ *Humane Soc. of U.S. v. Locke*, 626 F.3d 1040, 1051 (9th Cir. 2010).

²²⁸ *NWF v. NMFS*, 839 F. Supp. 2d (D. Or. 2011).

²²⁹ *Fossil*, U.S. DEP’T OF ENERGY, www.energy.gov/science-innovation/energy-sources/fossil (last visited Apr. 11, 2020).

²³⁰ *What is U.S. electricity generation by energy source?*, U.S. ENERGY INFO. ADMIN.,

www.eia.gov/tools/faqs/faq.php?id=427&t=3 (last updated Feb. 27, 2020).

²³¹ Louise Gaille, *12 Advantages and Disadvantages of Fossil Fuels*, VITTANA, vittana.org/12-advantages-and-disadvantages-of-fossil-fuels, (last visited April 2, 2020).

²³² *Id.*

a non-reusable energy source, there is still a plethora of fossil fuels already discovered to continue as an energy source for several decades to come.²³³ Furthermore, fossil fuels are beneficial to the economy at large.²³⁴

While fossil fuels may have practical benefits, fossil fuels have a severe impact on the environment. One major impact from fossil fuel extraction is land degradation.²³⁵ For instance, surface mining blasts away vegetation, destroying entire ecosystems and polluting near-by valleys and streams with rock and soil.²³⁶ In addition, after extraction is complete, proper management of the land is needed to avoid invasive and exotic growth from preventing the possibility of wildlife to return to the vegetation.²³⁷ Even as technologies advance, the threat to wildlife and the environment remains as new drills sites arise.²³⁸ Another environment risk to consider is offshore drilling for oil and gas because of the consequences associated with potential spills that can harm migratory birds and aquatic wildlife.²³⁹

There are protective measures in place to mitigate the impact of fossil fuels on wildlife. In 1969, Congress enacted the National Environmental Policy Act (NEPA) which requires federal agencies to be responsible for presenting an Environmental Assessment (EA) when proposing actions that could potentially harm the environment.²⁴⁰ Based on the EA, the agency then decides whether an Environmental Impact Statement (EIS) should be prepared.²⁴¹ An EIS should be written whenever there is a “recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment.”²⁴² The EIS must contain:

- (i) the environmental impact of the proposed action,
- (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
- (iii) alternatives to the proposed action,
- (iv) the relationship between local

²³³ *Id.*

²³⁴ *Id.*

²³⁵ *The Hidden Costs of Fossil Fuels – The True Costs of Coal, Natural Gas, and Other Fossil Fuels Aren’t Always Obvious—but Their Impacts can be Disastrous*, UNION OF CONCERNED SCIENTISTS, www.ucsusa.org/resources/hidden-costs-fossil-fuels, (last updated Aug. 30, 2016).

²³⁶ *Id.*

²³⁷ *Id.*

²³⁸ *Id.*

²³⁹ *Id.*

²⁴⁰ 40 C.F.R. §1501.4(b) (2020).

²⁴¹ §1501.4(c)

*short-term uses of man’s environment and the maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.*²⁴³

Two well-known oil spills within the United States were the Exxon Valdez spill of 1989 and the Deepwater Horizon spill of 2010. Following the Exxon Valdez spill, Congress enacted the Oil Pollution Act in 1990 which requires a program for research and development on oil spill prevention and addresses liability for any damages that occur from oil spills including damages to wildlife.²⁴⁴



Jennifer Balmer, *Seabird losses from Deepwater Horizon oil spill estimated at hundreds of thousands*, SCIENCE (Oct. 31, 2014).

Deepwater Horizon Oil Spill

On April 20, 2010, the world witnessed the Deepwater Horizon oil rig explode, resulting in the largest offshore oil spill in history.²⁴⁵ The oil spill released over four million barrels of oil into the Gulf of Mexico over 87 days.²⁴⁶ Based on the extensive investigation of the oil spill, the disaster could have been avoided.²⁴⁷ Investigations concluded that the main reasons for the Deepwater Horizon oil spill were from a lack of management oversight from BP, Halliburton, and

²⁴² National Environmental Policy Act of 1969 § 102, 42 U.S.C. §4332(C) (2020).

²⁴³ *Id.*

²⁴⁴ Oil Pollution Act of 1990, 33 U.S.C. § 2701 (2020).

²⁴⁵ *Deepwater Horizon – BP Gulf of Mexico Oil Spill*, EPA, www.epa.gov/enforcement/deepwater-horizon-bp-gulf-mexico-oil-spill, (last visited April 9, 2020).

²⁴⁶ *Id.*

²⁴⁷ Report to the President, National Commission on BP Deepwater Horizon Oil Spill and Offshore Drilling, *Deep Water the Gulf Oil Disaster and the Future of Offshore Drilling* (January 2011) www.govinfo.gov/content/pkg/GPO-OILCOMMISSION/pdf/GPO-OILCOMMISSION.pdf.

Transocean, as well as the government's lack of regulatory oversight of the industry.²⁴⁸

The Deepwater Horizon Criminal Task Force was created to investigate the criminal wrongdoing associated with the oil spill.²⁴⁹ The Task Force was made up of special agents from the U.S. Fish and Wildlife Service Office of Law Enforcement.²⁵⁰ Upon completion of the investigation the Task Force discovered that BP violated federal laws including the Clean Water Act and the Migratory Bird Treaty Act.²⁵¹ The Clean Water Act protects our nation's water by regulating discharges into surface water and eliminating water pollution.²⁵² Meanwhile, the Migratory Bird Treaty Act states in pertinent part that it is illegal to take, kill, or attempt to kill any migratory birds.²⁵³ The Deepwater Horizon Criminal Task Force gathered information leading to charges that BP violated the Migratory Bird Treaty Act because the oil spill resulted in the death of over 7,000 migratory birds, and violated the Clean Water Act for the amount of oil that polluted the Gulf of Mexico.²⁵⁴

On November 15, 2012, BP entered into a plea agreement with the U.S. Department of Justice in relation to all pending criminal charges against the company because of the Deepwater Horizon disaster.²⁵⁵ BP was charged with eleven felony counts of misconduct or neglect of ship officers, one felony count of misconduct of obstruction of Congress, one misdemeanor account for violation of the Clean Water Act, and one misdemeanor for violating the Migratory Bird Treaty Act.²⁵⁶ BP agreed to pay four billion dollars with a five-year probation for the criminal charges associated with the Deepwater Horizon oil spill.²⁵⁷

The criminal fines went to four different entities including the Oil Spill Liability Trust Fund, North American Wetlands Conservation Fund, National Academy of Sciences, and the National Fish and Wildlife Foundation.²⁵⁸ The Oil Spill Liability Trust

Fund is used to cover the costs of future oil spills.²⁵⁹ The North American Wetlands Conservation Fund is used for wetlands conservation.²⁶⁰ The National Academy of Sciences is a private organization that provides advice to the government about concerns involving science and technology.²⁶¹ The National Fish and Wildlife Foundation is an organization with the purpose of protecting and restoring fish and wildlife habitats.²⁶² All of the entities received funds to protect the environment, restore the Gulf Coast environment, and protect against future oil spills.

Although the disaster was devastating and the impact on the environment was astronomical, the hidden benefit was the improvement of industry oversight. The oversight on offshore drilling has improved with greater regulations and compliance requirements. Companies now have to maintain "Safety and Environmental Management Systems" audits and maintain compliance with all government regulations.²⁶³ Furthermore, oil and gas companies are required to maintain programs on how to handle and respond to future oil spills and implement new safe technologies.²⁶⁴ It seems the oil and gas industry was well overdue for heightened regulations both for the safety of crew members and more importantly for the protection of the environment.

Standing Rock Sioux Tribe v. United States Army Corps of Engineers

The fossil fuel industry is still in the spotlight when it comes to oil spills. Recently, various Native American Tribes brought suit against the U.S. Army Corps of Engineers for the construction of the Dakota Access Pipeline (DAPL) in states within the Great Plains.²⁶⁵ The DAPL is roughly 1,200 miles long and transports over 500,000,000 gallons of crude oil on a daily basis.²⁶⁶ In August of 2016, The Corps prepared a Final EA stating potential impacts to endangered bats, mussels, and small birds from the DAPL's proximity to

²⁴⁸ *Id.*

²⁴⁹ U.S. Fish and Wildlife Service Office of Law Enforcement, *Deepwater Horizon Criminal Task Force*, FSW, www.fws.gov/le/pdf/press-release-fws-role-in-deepwater-horizon-criminal-investigation.pdf (last visited Apr. 9, 2020).

²⁵⁰ *Id.*

²⁵¹ *Id.*

²⁵² Clean Water Act, 32 U.S.C. § 1251 (1972).

²⁵³ Migratory Bird Treaty Act of 1918, 16 U.S.C. § 703.

²⁵⁴ U.S. Fish and Wildlife Service Office of Law Enforcement, *supra* note 249.

²⁵⁵ U.S. v. BP Exploration & Production, Inc., Guilty Plea Agreement.

²⁵⁶ *Id.*

²⁵⁷ *Id.*

²⁵⁸ *BP Oil Disaster: Restoration & Recovery*, ENVTL. L. INST. (Feb. 2013) eli-ocean.org/wp-content/blogs.dir/2/files/BP-Criminal-Plea-Agreement.pdf.

²⁵⁹ *Id.*

²⁶⁰ *Id.*

²⁶¹ *Id.*

²⁶² *Id.*

²⁶³ *Id.*

²⁶⁴ *Id.*

²⁶⁵ *Standing Rock Sioux Tribe v. U.S. Army Corps of Eng'rs*, 205 F. Supp. 3d 4, 7 (D.D.C. 2016).

²⁶⁶ *Id.*

significant water sources located nearby.²⁶⁷ However, the agency decided that it did not need to prepare an EIS based on its findings.²⁶⁸ Following the preparation of the EA, plaintiffs brought suit claiming that defendants were in violation of NEPA by not preparing an EIS; but on June 14, 2017, the district court denied the portion of plaintiffs’ motion for summary judgment involving this issue.²⁶⁹



Source: TransCanada, Energy Transfer Partners THE WASHINGTON POST
 Juliet Eilperin & Brady Dennis, *Trump administration to approve final permit for Dakota Access pipeline*, THE WASHINGTON POST (Feb. 7, 2017).

However, on March 25, 2020, the district court decided that the Corps must prepare an EIS regarding the effects of the DAPL on the Native American Tribes and wildlife living in the area surrounding the pipeline.²⁷⁰ Additionally, the court noted that if any of the ten factors described in 40 C.F.R. § 1508.27 are implicated, then the court may require the agency to develop an EIS.²⁷¹ The factor that the court found relevant in this case was “the degree to which the effects on the quality of the human environment are likely to be highly controversial.”²⁷²

The court analyzed four topics introduced by plaintiffs’ experts to determine whether defendants’ responses adequately resolved any scientific controversy: 1) Leak-Detection System; 2) Operator Safety Record; 3) Winter Conditions; and 4) Worst-Case Discharge.²⁷³ In regards to the four topics, the court found that there were serious concerns about the efficiency of defendants’ leak-detection system to detect and

mitigate damages if an oil spill were to occur.²⁷⁴ The court did not find defendants’ responses adequate especially due to the lack of consideration by defendants on the impact of winter conditions on the project.²⁷⁵ Additionally, the court noted that there was a lack of inquiry into the history of the DAPL operator within defendant’s analysis.²⁷⁶ In the past, the operator had been involved with 276 incidents of spills with 70% of them occurring on the operator’s property.²⁷⁷ There was also uncertainty about the actual damage calculations in the worst-case scenario.²⁷⁸ In conclusion, the court found that there was enough scientific controversy on the effects of the DAPL on “the quality of the human environment,” for it to require defendants to draft an EIS.²⁷⁹

Conclusion

Fossil fuels have been our nation’s primary energy source for several decades, but technological advancements surrounding the fossil fuel industry have not eliminated its environmental impacts. The increased detection and mitigation of spills is a daily concern for those affected by the limited ability of government agencies to control potential damage. Although governments continue to improve the regulations surrounding the extraction of fossil fuels for the protection of habitats and wildlife, the chance of future harm to the environment will always remain.

IX. NUCLEAR ENERGY

Gage Bowman

Few energy sources cause as much controversy, generate as much ethical debate, or draw as much media attention as nuclear power. And yet few energy sources are so little understood among the general public. Although there are no easy answers as to whether this is a safe, reliable, and clean energy source for the future, a better understanding of the processes and the issues surrounding it will hopefully allow for informed policy decisions.

²⁶⁷ U.S. ARMY CORPS OF ENG’RS, FINAL ENVIRONMENTAL ASSESSMENT: DAKOTA ACCESS PIPELINE PROJECT SECTION 408 CONSENT FOR CROSSING FEDERALLY AUTHORIZED PROJECTS AND FEDERAL FLOWAGE EASEMENTS (2016).

²⁶⁸ *Standing Rock Sioux Tribe v. U.S. Army Corps of Eng’rs*, 255 F. Supp. 3d 101, 116 (D.D.C. 2017).

²⁶⁹ *Id.* at 160.

²⁷⁰ *Standing Rock Sioux Tribe v. U.S. Army Corps of Eng’rs*, Civil Action No. 16-1534 (JEB), 2020 U.S. Dist. LEXIS 51540, at *8-9 (D.D.C. Mar. 25, 2020).

²⁷¹ *Id.* at *18.

²⁷² *Id.* at *19.

²⁷³ *Id.* at *27.

²⁷⁴ *Id.* at *32-33.

²⁷⁵ *Id.* at *36.

²⁷⁶ *Id.* at *54.

²⁷⁷ *Id.* at *35.

²⁷⁸ *Id.* at *40.

²⁷⁹ *Id.* at *53-55.



Nuclear Power Basics, GE HITACHI.

The Process²⁸⁰

The process of generating electricity from nuclear power is actually fairly simple. (Check out this YouTube video on [What is Nuclear Energy.](#)²⁸¹) Uranium fuel, made up of hard pellets that are contained in vertical tubes, is inserted into a nuclear reactor. Through the process of fission, the atoms are split inside the reactor. The heat created interacts with the reactor’s cooling agent, usually water, causing it to boil and produce steam. The steam in turn moves turbines to produce electricity. Still, although the process is straightforward, the technology needed to maintain it is sophisticated, and the fission reaction must be maintained at a precise rate to achieve functionality while also being subject to careful adjustments. Also, an elaborate water coolant system is critical to prevent overheating and meltdowns. Nuclear fusion is another potential method of generating power, but because this is, essentially, the power of the stars, it remains in the purely theoretical stage, and some doubt whether it can ever be harnessed. Therefore, when talking about nuclear power, nuclear fission is the assumed method.

Statistics²⁸²

To give a quick overview of the current state of nuclear energy in the world, nuclear power supplies 10-12% of the world’s electricity and 20% of the energy within the United States. 30 countries operate a total of 450 nuclear reactors, with France and Lithuania being two countries that depend almost entirely on this power source. Another 50 or so are under construction. Nuclear reactors are the second largest low-carbon producing power source after hydroelectricity. In the United States, the Nuclear Regulatory Commission, an independent agency of the U.S. government, is

responsible for overseeing public health and safety from the operation of nuclear energy.

History of Nuclear Energy²⁸³

A summary of the history of nuclear power will be useful in establishing the context for the contemporary debate. An understanding of the process of fission began in the 1930s. The first research reactor, the Chicago Pile, was built in the early 1940s, as part of the Manhattan Project. All of this early research was for purposes of building a nuclear weapon, the first test of which was in 1945. The atomic bombings of Japan followed shortly afterwards, which naturally increased public awareness of nuclear energy. This was, however, also when discussion of the peaceful application of nuclear power began. Other countries also began their own development of nuclear power in the 1940s and 1950s.



USA Nuclear Plant Map
Nuclear Power in the USA, WORLD NUCLEAR.

Electricity was generated from a research reactor for the first time in 1951 in Idaho, while a nuclear reactor generated power for a community in 1955, also in Idaho. The Atomic Energy Act of 1954 allowed for greater development of the nuclear industry in the civilian sector, although most nuclear research and development was taken over by the Navy in the following decade. Meanwhile, in Europe, in 1957 EURATOM began, and the International Atomic Energy Agency also came into being around this time. The first commercial station was activated in 1956 in England, while America followed in 1957. Nuclear

²⁸⁰ National Geographic, *What is Nuclear Energy?*, YOUTUBE (Oct. 12, 2017), www.youtube.com/watch?v=Ta3z3pGK0vU; *How a Nuclear Reactor Works*, NEI (last accessed Apr. 24, 2020), www.nei.org/fundamentals/how-a-nuclear-reactor-works.

²⁸¹ *What is Nuclear Energy?*, *supra* note 280.

²⁸² *Nuclear & Uranium*, U.S. ENERGY INFORMATION ADMINISTRATION (last accessed Apr. 24, 2020), www.eia.gov/nuclear/; *Nuclear Power in the USA*, WORLD

NUCLEAR (last updated April 2020), www.world-nuclear.org/information-library/country-profiles/countries-t-z/usa-nuclear-power.aspx.

²⁸³ See *The History of Nuclear Energy*, U.S. DEPARTMENT OF ENERGY, OFFICE OF NUCLEAR ENERGY, SCIENCE, AND TECHNOLOGY (last accessed Apr. 24, 2020), www.energy.gov/sites/prod/files/The%20History%20of%20Nuclear%20Energy_0.pdf.

capacity continued to grow in the 1970s, with the impact of the oil crisis in 1973 being one possible contributing factor, but organized, mass public opposition grew as well during this time. In response, the modern regulatory framework in America expanded and developed more in this period as well. In 1986, the Chernobyl disaster occurred. Arguably, it was the Chernobyl meltdown more than anything else that poisoned the public mind against nuclear energy. This probably also delayed the final completion of the Generation 2 reactor, meant to be the design for all future nuclear reactors. Although reactors of this type were made in the 1990s, far fewer of them were produced than was originally planned. In the early 2000s, despite a prophesied “nuclear renaissance,” nuclear power remained as contentious as it was before, and plans for as many as a hundred new reactors in the U.S. were scrapped or put on indefinite hold. This situation remains the case today.

Pros & Cons²⁸⁴

The feasibility of maintaining nuclear power plants remains a subject of debate. Proponents argue that nuclear power, despite its public perception, is actually a clean source of power. There are no combustion byproducts and the generated steam is recycled into water for coolant or vented harmlessly into the atmosphere. It has also been argued that nuclear plants could be an alternative for developing third world countries. Nuclear plants can be built in urban or rural areas, and, when functioning properly, have minimal impacts on the surrounding area and local wildlife. The nuclear industry also has one of the lowest fatality and accident rates of any industry sector. From an efficiency standpoint, it has been pointed out that uranium is a common element, so there should be plenty of fuel for plants. Further, industry-friendly sources have noted that one uranium pellet contains the same energy as a ton of a coal, 3 barrels of oil, or 17,000 cubic feet of natural gas. When functioning properly, nuclear plants can continually generate energy for months on end without interruption. Finally, proponents of nuclear energy argue additional potential applications, including space exploration, sterilization of medical equipment, possible energy source to power desalination facilities, and radioisotopes.

Still, critics of nuclear power have pointed out that the situation is more complex. For example, uranium is common, and yet also considered “nonrenewable,” because a specific, relatively rare kind of uranium (U-

235) is required to fuel nuclear plants. In the United States it is mined exclusively in the West, while the remainder is imported, largely from Russia, Uzbekistan, and Canada. Only signatories to the Nuclear Non-Proliferation Treaty can get the needed uranium, which naturally limits the number of countries that can build the plants. Further, many of the plants in operation in the United States vary in their condition and are in need of serious upgrades for safety reasons and to promote greater efficiency.



John Wendle, *Animals Rule Chernobyl Three Decades After Nuclear Disaster*, NATIONAL GEOGRAPHIC (Apr. 18, 2016).

Arguably, the single greatest problem with nuclear energy is the byproduct. Highly radioactive, nuclear waste usually consists of the resources used to handle nuclear material or contain it, and can last for thousands of years. Russia and the United States have traditionally stored such waste in massive chambers sealed deep underground, but even today, there is no solution to the problem of long-term disposal. It must also be said that when things do go wrong with nuclear energy, the results can be disastrous. The worst nuclear disaster in history remains Chernobyl, a catastrophic failure during a routine test resulted in a reactor meltdown, explosion at the plant, and contamination of tens of thousands of miles of European farmland. Even today, Chernobyl remains radioactive and under quarantine. The most recent nuclear accident was Fukushima in 2011, which demonstrated that nuclear plants are not invulnerable to natural disasters such as earthquakes and tsunamis. Finally, nuclear plants can be vulnerable to sabotage or terrorism. The nuclear fuel itself can also be weaponized, although this requires significant technical know-how. For these reasons, nuclear energy is likely to remain controversial.

²⁸⁴ *Nuclear Fuel*, NEI (last accessed Apr. 24, 2020), www.nei.org/fundamentals/nuclear-fuel; Christina Nunez, *What is Nuclear Energy and is it a Viable Resource?*,

NATIONAL GEOGRAPHIC (Mar. 26, 2019), www.nationalgeographic.com.au/nature/what-is-nuclear-energy-and-is-it-a-viable-resource.aspx.

*Virginia Uranium, Inc. v. Warren*²⁸⁵

The case of *Virginia Uranium, Inc. v. Warren* is illustrative of the current debate concerning nuclear power. The issue concerned a proposed uranium mine operated by Virginia Uranium Inc., despite Virginia's prohibition on uranium mining. The question before the Court was whether the Supremacy Clause in the U.S. Constitution preempted Virginia's uranium ban by delegating all questions of nuclear power regulation to the Atomic Energy Act (AEA) and its instrument, the Nuclear Regulatory Commission (NRC). After the district and U.S. Court of Appeals for the Fourth Circuit affirmed the ban, the case went before the Supreme Court, which also upheld the ban.

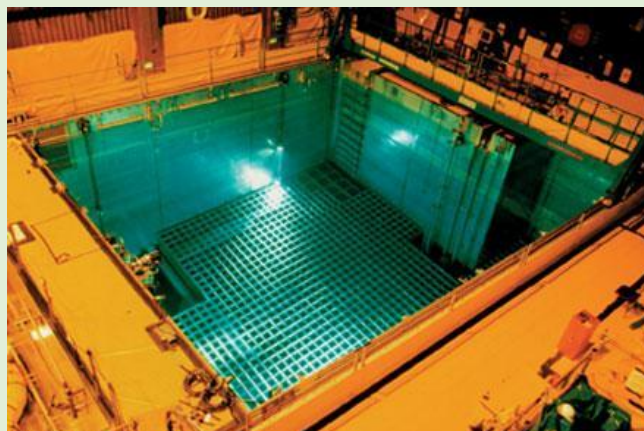
Virginia Uranium had argued that only the NRC regulated the whole process of nuclear power generation, beginning with the mining stage. Nothing in the AEA, however, explicitly states that state law can be preempted by the AEA. Further, the AEA regulates every aspect of nuclear fuel generation except for the mining stage, which can be left to the states. Another indication that such regulations can be left to the state includes a provision of the AEA noting that if the federal government wants to construct a nuclear plant on private land or gain control of an existing plant, it must purchase the land or acquire it through eminent domain, implying that state law remains in effect. Finally, Virginia Uranium argued for the doctrine of conflict preemption, stating that the AEA trumps Virginia's laws since the latter would get in the way of former's smooth operation. However, the Court rejected this argument as well. The Court held that there was nothing in the relevant Virginia laws that conflicted with the AEA, and further the AEA explicitly states that mining on private land is to be regulated by the states, while the NRC steps in once the uranium has been extracted from the earth.

X. NUCLEAR WASTE DISPOSAL & YUCCA MOUNTAIN

Brendan Childress

Nuclear waste is one of the biggest challenges facing nuclear energy production. Every year, the United States generates roughly 2,000 metric tons of nuclear waste, which means that since the 1950s, the United States has produced more than 83,000 metric tons of used fuel.²⁸⁶ (Check out [this video](#)²⁸⁷ explaining the issues and risks associated with storing nuclear waste or this [clip from Last Week Tonight](#)²⁸⁸.)

Nuclear waste presents a serious problem because it can remain radioactive for tens of thousands of years. In fact, depending on the element used for nuclear power, nuclear waste can remain radioactive for anywhere from 1,000 years to as long as 100,000 years.²⁸⁹ Nuclear waste from spent nuclear fuel "consists of uranium, fission products and transuranic elements."²⁹⁰ The uranium and the fission products are typically decayed enough to the point that they are safe within 1,000 years, but "many TRU isotopes take ~100,000 years to decay."²⁹¹



Nuclear Waste Cooling Pool²⁹²

²⁸⁵ See *Virginia Uranium, Inc. v. Warren*, 139 S.Ct. 1894 (2019).

²⁸⁶ *5 Fast Facts about Spent Nuclear Fuel*, OFFICE OF NUCLEAR ENERGY (last accessed April 29, 2021), www.energy.gov/ne/articles/5-fast-facts-about-spent-nuclear-fuel.

²⁸⁷ Wendover Productions, *The Nuclear Waste Problem*, YOUTUBE, (Nov. 21, 2017), www.youtube.com/watch?v=uU3kLBo_ruo.

²⁸⁸ LastWeekTonight, *Nuclear Waste: Last Week Tonight with John Oliver (HBO)*, YOUTUBE, (Aug. 21, 2017), <https://www.youtube.com/watch?v=ZwY2E0hjGuU>.

²⁸⁹ *Radioactive Waste - Myths and Realities*, WORLD NUCLEAR ASSOCIATION (last accessed April 29, 2021), www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/radioactive-wastes-myths-and-realities.aspx.

²⁹⁰ Benjamin A. Lindley, et al., *The Effectiveness of Full Actinide Recycle as a Nuclear Waste Management Strategy when Implemented over a Limited Timeframe - Part I: Uranium Cycle*, 85 *Progress in Nuclear Energy* 498 (2015).

²⁹¹ *Id.*

²⁹² *Safer Storage of Spent Nuclear Fuel*, UNION OF CONCERNED SCIENTISTS, (updated June 27, 2012), www.ucsusa.org/resources/safer-storage-spent-nuclear-fuel.

Currently, spent nuclear fuel is stockpiled at reactor sites either in cooling pools or dry casks.²⁹³ Once the nuclear fuel “has been in a reactor for five years, operators remove the bundles of nuclear fuel, called fuel assemblies.”²⁹⁴ The fuel assemblies “are then transferred to a 40-foot-deep cooling pool, where they will stay for about five years.”²⁹⁵ The purpose of the cooling pool is to both “cool the assemblies and block all radiation from being released.”²⁹⁶ The cooling pool is effective at reducing most of the radiation from the spent nuclear fuel. In fact, “[m]ost of the radioactive decay occurs within the first month after removal from the reactor, with 87 percent of the original radiation decaying off.”²⁹⁷

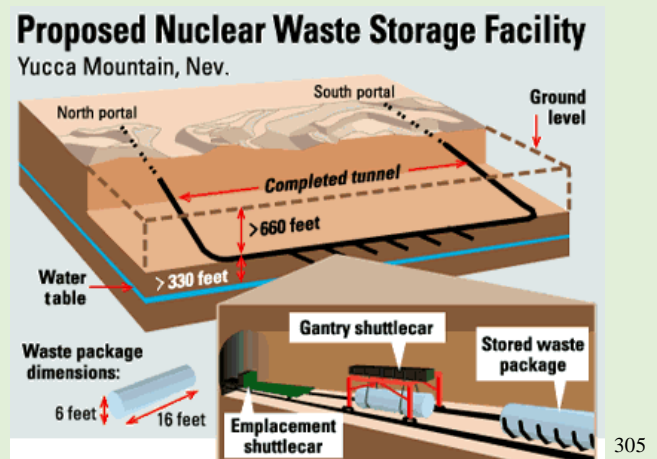
At the five-year mark, operators remove the fuel assemblies from the cooling pools to place them in concrete-and-steel containers called dry casks.²⁹⁸ One benefit of dry cask storage is that they require very little upkeep and are relatively easy to store. These dry casks “have no moving parts, are filled with inert gas, and are built to survive in.”²⁹⁹ For now, all of these dry casks remain on site, but throughout the last few decades, there has been talk of a more permanent storage location. One of the most popular proposed sites has been a deep geological repository at Yucca Mountain in Nevada.



Dry Cask Storage System³⁰⁰

Yucca Mountain History

Since the 1970s, the United States has been searching for a site to dispose of nuclear waste, costing over \$7 billion.³⁰¹ Much of that money was spent on “scientific research on whether Yucca Mountain will be able to contain the waste for at least 10,000 years.”³⁰² The brief history of Yucca Mountain as a potential storage site for spent nuclear fuel begins with the Nuclear Waste Policy Act of 1982, which “codified the U.S. Department of Energy’s responsibility for developing a geologic repository for used nuclear fuel.”³⁰³ After completing an intense search, Yucca Mountain was chosen by the DOE as the most feasible location to store nuclear waste and, in December 1987, “Congress amended the NWPA and designated Yucca Mountain as the sole location for a repository site.”³⁰⁴



Yucca Mountain was chosen as the best site for storing nuclear waste deep underground to protect the public and the environment for a number of reasons. The advantages of Yucca Mountain include a “lack of human population, dry climate, and low precipitation rates.”³⁰⁶ Having a low amount of water in the area is important because “water is the primary mechanism by which radioactive particles may be transported from the repository.”³⁰⁷

²⁹³ Hannah Hickman, *What Happens to Nuclear Waste in the U.S.?*, NUCLEAR ENERGY INSTITUTE (last accessed April 29, 2021), www.nei.org/news/2019/what-happens-nuclear-waste-us.

²⁹⁴ *Id.*

²⁹⁵ *Id.*

²⁹⁶ *Id.*

²⁹⁷ *Id.*

²⁹⁸ *Id.*

²⁹⁹ *Id.*

³⁰⁰ *Dry Cask Storage: An Alternative for Storing Used Fuel*, DUKE ENERGY, (May 5, 2015), <https://nuclear.duke-energy.com/2015/05/05/dry-cask-storage-an-alternative-for-storing-used-fuel>.

³⁰¹ Allison Macfarlane, *Underlying Yucca Mountain: The Interplay of Geology and Policy in Nuclear Waste Disposal*, SOCIAL STUDIES OF SCIENCE 1, (Oct., 2003).

³⁰² *Id.*

³⁰³ Hickman, *supra* note 293.

³⁰⁴ Matthew James Braquet, *Stop Kicking the Can Down the Road: An Urgent Call to Save the United States from Nuclear Disposal*, 7 LSU J. of Energy L. & Resources 245, 250 (2019)

³⁰⁵ *Yucca Mountain*, EARLHAM.EDU, (last accessed Apr. 19, 2021) <http://legacy.earlham.edu/~mendema/Yucca.htm>.

³⁰⁶ *Id.*

³⁰⁷ *Id.*

Following its designation, the NWPA “required the DOE to enter into contracts for the disposal of radioactive waste and to begin accepting fuel at Yucca Mountain by January 31, 1998.”³⁰⁸ However, due to various administrative log jams as well as other difficulties, “[t]wo years before the 1998 deadline, the DOE attempted to default on the contract.”³⁰⁹ This led to a lawsuit in the U.S. Court of Appeals for the D.C. Circuit, which “confirmed the DOE’s unconditional obligation to dispose of the waste beginning January 31, 1998.”³¹⁰ However, due to more administrative failures, the storage site never became active.³¹¹ Instead, presidential administrations would continue to change the U.S.’s policy on Yucca Mountain and its feasibility.

Fast forward to 2008, when “the DOE formally presented a license application for Yucca Mountain to the NRC . . . citing the massive amount of money, research, and time spent securing Yucca Mountain as a repository site.”³¹² At that point, the DOE firmly believed that Yucca Mountain was the best available option to house spent nuclear fuel and radioactive waste. However, soon after, “on March 5, 2009, the Secretary of Energy under newly elected President Obama, Steven Chu, confirmed in a Committee hearing that Yucca Mountain was no longer a candidate for a nuclear repository site.”³¹³ As of that time, the Yucca Mountain repository plan was, and remains, dead.

Yucca Mountain Drawbacks

There are serious drawbacks to storing nuclear waste at Yucca Mountain, including risks to the public, the environment, and to the wildlife around the surrounding valley area. First of all, the land that Yucca Mountain sits on is challenging. For example, the area is “prone to earthquakes and has evidence of recent volcanic activity.”³¹⁴ Contamination to ground water is a very real and potentially catastrophic threat. In addition, the region’s “[g]roundwater moves rapidly through an extensively fractured, highly oxidizing subsurface environment where it becomes highly corrosive and will quickly erode the metal waste containers and move the deadly radioactive material

into the aquifer below.”³¹⁵ Perhaps the biggest issue is that nuclear waste has the potential to outlast the metal containers, causing a problem for future generations. These concerns are somewhat offset by the DOE’s “system of engineering fixes,” but these issues are still cause for concern.³¹⁶

In addition to the structural concerns of Yucca Mountain, “Yucca Mountain is located thousands of miles from most of the accumulating waste.”³¹⁷ This is significant because transporting the waste via highways and railways would present risks “to communities over the thousands of miles the waste would travel during the forty to fifty years such transportation would be required.”³¹⁸

Assuming that all plans went perfectly at Yucca Mountain, the risk to life would not be great. However, should something go wrong, the destruction would likely be devastating. According to some, should storage proceed “it is a matter of when, not if, Yucca Mountain will leak and turn the water beneath into a radioactive river that poisons everything in its path, including the people or animals that drink water out of it.”³¹⁹ Any such leak would prove deadly.

In addition to the risk of poisoning from a leakage, delicate ecosystems and endangered species living near Yucca Mountain might not survive a dramatic increase of activity in the area. The desert tortoise is such an example. An environmental impact report completed in 2002, throughout the construction of Yucca Mountain, concluded that the “DOE anticipates that the deaths of a small number of tortoises from vehicle traffic and activities could occur during the repository construction, operation and monitoring, and closure phases.”³²⁰ Moreover, there are animal species living in the Yucca Mountain area that are considered “sensitive” under government regulations. These sensitive animals include “two bats, a lizard, and a beetle.”³²¹ So, risk exists associated with environmental disruption caused by the operation of Yucca Mountain beyond a possible leakage of waste.

³⁰⁸ Braquet, *supra* note 304 at 251.

³⁰⁹ *Id.* at 252.

³¹⁰ *Id.*, see also *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519 (1978).

³¹¹ For more, see *Id.* at 253.

³¹² *Id.*

³¹³ *Id.* at 254

³¹⁴ Marta Adams, *Yucca Mountain - Nevada's Perspective*, 46 IDAHO L. REV. 423, 425 (2010).

³¹⁵ *Id.* at 425-26.

³¹⁶ *Id.* at 426.

³¹⁷ *Id.*

³¹⁸ *Id.*

³¹⁹ Brian Sandoval, *Yucca Mountain: Nevada Won't Back Down*, 12 NEV. LAW. 14, 16 (2004).

³²⁰ United States Department of Energy, DOE/EIS-0250, *Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* 55 (2002), www.energy.gov/sites/default/files/EIS-0250-FEIS_Summary-2002.pdf. S-55.

³²¹ *Id.*

The Biden Administration

Recently, at Jennifer Granholm’s nomination hearing in front of the Senate Committee on Energy and Natural Resources, the former Michigan Governor spoke on behalf of the Biden Administration and presented its views on the now-dormant Yucca Mountain project. When Granholm, the current U.S. Energy Secretary, was asked for her opinion on Yucca Mountain, she responded that “[t]he administration opposes the use of Yucca Mountain for the storage of nuclear waste.”³²² Instead, Granholm insisted that she was going to “commit the department to working with Congress to develop safe and workable alternatives.”³²³



Former President Trump’s budgets initially included funding for completing the proposed Yucca Mountain repository; however, in 2020 with elections looming, the administration changed its tune and did not include any funding for the project in the 2021 budget.³²⁵ At the time, President Trump also pledged to find more innovative solutions to the nuclear waste issue.

What’s Next for Nuclear Waste?

While Yucca Mountain remains in limbo with each administration, a new piece of legislation was introduced in the U.S. House in late 2019 that seeks to amend the Nuclear Waste Policy Act of 1982. Amongst

other provisions, the bill would require the DOE to “temporarily store nuclear waste at monitored retrievable storage (MRS) facilities,” as well as allow the DOE “to enter into agreements to provide benefits to state, local, and tribal governments that might host or be affected by facilities related to the waste management program.”³²⁶ An additional provision of the proposed amendment included the opening of Yucca Mountain as a repository for spent nuclear fuel.³²⁷ However, the bill never made it out of committee.

XI. CLIMATE CHANGE

Shellie Reid

Climate change is the term used to describe changes in the Earth’s climate that result in the altering of weather patterns for an extended period.³²⁸ Climate change can occur through natural or anthropogenic (human) causes. (The basics of climate change are explained further in [this video](#) by Bill Nye.³²⁹)

Life on our planet depends upon the warmth of the sun. That warmth is captured by the atmosphere- a layer of gases surrounding the earth. Some of the gases that make up the atmosphere include nitrogen, oxygen, and carbon dioxide³³⁰ and the gases function in different ways. Some gases act like a filter to prevent some of the sun’s rays from reaching the planet’s surface. Some deflect rays back into space,³³¹ and some help to trap the warmth from the sun which allows our planet to be hospitable to life. The gases which trap the sun’s warmth are known as greenhouse gases. When the delicate mix of gases is disturbed, the atmosphere’s functions are affected. Global warming is caused by an increase of greenhouse gases in the atmosphere. ([This video](#) by National Geographic explains more.)

³²² *Biden Nominee Confirms Opposition to Yucca Mountain*, WORLD NUCLEAR NEWS, (Jan. 29, 2021), www.world-nuclear-news.org/Articles/Biden-nominee-confirms-opposition-to-Yucca-Mountain (last visited Apr 30, 2021).

³²³ *Id.*

³²⁴ Matthew Daly, *Former Michigan Gov. Granholm Confirmed as Energy Secretary*, AP NEWS, (Feb. 25, 2021).

³²⁵ *Trump Withdraws Support for Yucca Mountain*, NUCLEAR ENGINEERING INTERNATIONAL, (last accessed Apr. 29, 2021), www.neimagazine.com/news/newstrump-withdraws-support-for-yucca-mountain-7764979; James Conca, *Trump Rejects Yucca Mountain Nuke Dump in Bid for Nevada Votes*, FORBES, (Feb. 10, 2020), available at www.forbes.com/sites/jamesconca/2020/02/10/trump-dumps-nevada-nuclear-dump-in-tweet/?sh=54144943492e.

³²⁶ *H.R. 2699, Nuclear Waste Policy Amendments Act of 2019*, CONGRESSIONAL BUDGET OFFICE, (Sep. 22, 2020), available at www.cbo.gov/publication/56624.

³²⁷ *House Subcommittee approves Yucca Mountain Bill*, BEYOND NUCLEAR, (Sep. 26, 2019), available at www.beyondnuclear.org/yucca-mountain/2019/9/26/house-subcommittee-approves-yucca-mountain-bill.html.

³²⁸ *What is climate change?*, DAVID SUZUKI FOUNDATION (last accessed Apr. 27, 2020), davidsuzuki.org/what-you-can-do/what-is-climate-change/.

³²⁹ National Geographic, *Climate Change 101 with Bill Nye*, YOUTUBE (Dec. 2, 2015), <https://youtu.be/EtW2rrLHs08>.

³³⁰ *Atmosphere*, WIKIPEDIA (last updated Apr. 26, 2020), en.wikipedia.org/wiki/Atmosphere.

³³¹ *What is climate change?*, *supra* note 328.

Humans are not the only species affected by global warming. Scientists are finding evidence of the effects that climate change and global warming are having on plants, birds, and animals. According to one source, “[u]nless greenhouse gas emissions are severely reduced, climate change could cause a quarter of land animals, birdlife and plants to become extinct.”³³² As a result, conservation groups are now embracing the need to study the effects of climate change.

The screenshot shows the ECOS website interface. At the top, there is a search bar and the text 'U.S. Fish & Wildlife Service' and 'ECOS Environmental Conservation Online System'. Below this, the page title is 'FWS-Listed U.S. Species by Taxonomic Group'. A table lists four taxonomic groups with their respective species counts:

FWS Taxonomic Grouping	Taxonomic Groups	Number of Species Listings
Flowering Plants	Flowering Plants	893
Invertebrate Animals	Annelid Worms, Arachnids, Clams, Corals, Crustaceans, Flatworms and Roundworms, Hydroids, Insects, Millipedes, Snails, Sponges	303
Non-Flowering Plants	Algae, Conifers and Cycads, Cyanobacteria and Bacteria, Ferns and Allies, Flowering Plants, Lichens	937
Vertebrate Animals	Amphibians, Birds, Fishes, Mammals, Reptiles	399

Below the table, it says 'Showing 1 to 4 of 4 entries'.

Fish & Wildlife chart of listed species in U.S.

In 1973, the United States enacted the Endangered Species Act (ESA) which provides for the conservation of threatened and endangered plants and animals and the habitats in which they are found.³³³ The ESA defines an animal as endangered when it is “in danger of extinction throughout all or a significant portion of its range.”³³⁴ Animals that are “likely to become endangered within the foreseeable future” are defined as threatened.³³⁵ The U.S. Fish and Wildlife Service (FWS) and the U.S. National Oceanic and Atmospheric Administration (NOAA) Fisheries Service are the government agencies tasked with enforcing the ESA and leading the conservation efforts. (To view the FWS list of endangered and threatened species [click here.](#))

Even with the protections of ESA, the process of listing a species can be difficult. The case [In re Polar Bear](#)

(709 F.3d 1) is an example of the legal battle that often occurs over whether and how a species should be listed. In 2005, the Center for Biological Diversity requested that the polar bear be listed as threatened due to the effects of climate change on the bear’s habitat. After the required study, the FWS ruled that the polar bear was a threatened species, but industry groups, environmental groups, and states challenged the ruling. Some argued that the ruling was too restrictive; while others said it was not protective enough. The battle continued until 2013 when the ruling was upheld.³³⁶

The Association of Fish and Wildlife Agencies (AFWA) suggested that the ESA “is not performing as well as it could, and listed species deserve our best recovery efforts. The Act needs to be improved to address today’s complex challenges associated with recovery.”³³⁷ As a result, AFWA has proposed a series of suggestions that include the following:

- enhance the role of state fish and wildlife agencies
- improve implementation consistency of the Act across the country;
- provide legal footing for the current FWS workplan process;
- improve cooperation with the states including when using their data; and
- improve and enhance private landowner conservation tools and incentives under the Act.³³⁸

In 2009, AFWA created Voluntary Guidance for States to Incorporate Climate Change into State Wildlife Action Plans & Other Management Plans in order to provide “voluntary guidance for state fish and wildlife agencies wanting to better incorporate the impacts of climate change on wildlife and their habitats into Wildlife Action Plans.”³³⁹

³³² *Climate Change – effects on animals, birdlife, and plants*, CLIMATE AND WEATHER (last accessed Apr. 27, 2020), www.climateandweather.net/global-warming/climate-change-and-animals.html.

³³³ *Summary of the Endangered Species Act*, U.S. ENVIRONMENTAL PROTECTION AGENCY (last updated July 5, 2020), www.epa.gov/laws-regulations/summary-endangered-species-act.

³³⁴ *Endangered Species Glossary*, UNITED STATES GEOLOGICAL SURVEY (Jan. 16, 2015), my.usgs.gov/confluence/display/FEAH/Endangered+Species+Glossary.

³³⁵ *Id.*

³³⁶ *In re Polar Bear Endangered Species Act Listing*, 709 F.3d 1 (2013), LEAGLE (last accessed Apr. 27, 2020), www.leagle.com/decision/infco20130301132.

³³⁷ *Association’s Legislative Priorities for 2019*, ASSOCIATION OF FISH & WILDLIFE AGENCIES (last accessed Apr. 27, 2020), www.fishwildlife.org/afwa-acts/legislative-priorities.

³³⁸ *Id.*

³³⁹ *Voluntary Guidance for States to Incorporate Climate Change into State Wildlife Action Plans & Other Management Plans*, ASSOCIATION OF FISH & WILDLIFE AGENCIES (Nov. 2019), www.cakex.org/sites/default/files/documents/AFWA-Voluntary_Guidance.pdf.

Building upon those past efforts, the National Fish, Wildlife, and Plants Climate Adaptation Strategy was created in 2012, and later updated in 2021. The strategy outlines steps “to help protect the country’s valuable natural resources—and the communities and economies that depend on them.” The strategy lists seven major goals “which involve practical actions that can be taken—or at least initiated—in the next five to ten years. These goals include:

- *Goal 1.* Conserve habitat to support healthy fish, wildlife, and plant populations and ecosystem functions in a changing climate.
- *Goal 2.* Manage species and habitats to protect ecosystem functions and provide sustainable cultural, subsistence, recreational, and commercial use in a changing climate.
- *Goal 3.* Enhance capacity for effective management in a changing climate.
- *Goal 4.* Support adaptive management in a changing climate through integrated observation and monitoring and use of decision support tools.
- *Goal 5.* Increase knowledge and information on impacts and responses of fish, wildlife, and plants to a changing climate.
- *Goal 6.* Increase awareness and motivate action to safeguard fish, wildlife, and plants in a changing climate.
- *Goal 7.* Reduce non-climate stressors to help fish, wildlife, plants, and ecosystems adapt to a changing climate.”³⁴⁰

The North American Model of Wildlife Conservation has been hailed as “the world’s most successful system of policies and laws to restore and safeguard fish and wildlife and their habitats through sound science and active management.”³⁴¹ The Model operates on seven interdependent principles, outlined above in Section I.³⁴² But countries in North America are not working in isolation. Recently, UN Secretary-General António

Guterres [called for action](#) on climate change.³⁴³ The United Nations also established the Intergovernmental Panel on Climate Change (IPCC) which is likely “the most authoritative voice on the topic.”³⁴⁴

But all of these studies, groups, and panels mean nothing if no action is taken. Of all the things harming the atmosphere, carbon dioxide is the “climate’s worst enemy.”³⁴⁵ This gas is produced by the burning of fossil fuels such as oil and coal to make electricity or power our cars. The [Union of Concerned Scientists](#) urges everyone to: cut emissions by reducing reliance on fossil fuels; remove carbon dioxide from the atmosphere by planting trees; fight disinformation; prepare for the changes and adapt to them; and act to bring about change.³⁴⁶

And some are beginning to act. Recently, a group of young citizens sued the government for violating their constitutional rights by failing to provide a “climate system capable of sustaining human life.” The suit “accuses the government of continuing to ‘permit, authorize, and subsidize’ fossil fuel use despite long being aware of its risks, thereby causing various climate-change related injuries.”³⁴⁷ Although the court dismissed the case upon appeal for lack of standing, the dissent raised issues that could perhaps be used in the future.³⁴⁸

Even cities are seeking solutions. The city of Baltimore filed suit against oil and gas companies to force those companies to share the costs of “climate change-related injuries” such as floods, storms, and droughts.³⁴⁹ The case is working its way through the courts now.

When states take action though, they can come into conflict with national laws and policies. When California entered an agreement with regions in Canada to limit greenhouse gas emissions, the U.S. government sued the state for violations of the Treaty Clause, Compact Clause, and the Foreign Commerce Clause of the U.S. Constitution.³⁵⁰

³⁴⁰ *National Fish, Wildlife, and Plants Climate Adaptation Strategy*, U.S. CLIMATE RESILIENCE TOOLKIT (last updated Aug. 2, 2019), [toolkit.climate.gov/tool/national-fish-wildlife-and-plants-climate-adaptation-strategy](https://www.climate.gov/toolkit/national-fish-wildlife-and-plants-climate-adaptation-strategy).

³⁴¹ *North American Model of Wildlife Conservation*, Association of Fish & Wildlife Agencies (last accessed April 9, 2020), www.fishwildlife.org/landing/north-american-model-wildlife-conservation.

³⁴² *Id.*

³⁴³ United Nations, *Secretary-General António Guterres calls for global action on climate change*, YOUTUBE (Sep. 10, 2018), <https://youtu.be/VNe-jBVij-g>.

³⁴⁴ *What is climate change?*, *supra* note 328.

³⁴⁵ Melissa Denchak, *How You Can Stop Global Warming*, NRDC (July 17, 2017), www.nrdc.org/stories/how-you-can-stop-global-warming.

³⁴⁶ *Climate Solutions*, UNION OF CONCERNED SCIENTISTS (last accessed Apr. 27, 2020), www.ucsusa.org/climate/solutions.

³⁴⁷ *Juliana v. United States*, 947 F.3d 1159 (9th Cir. 2020).

³⁴⁸ *Id.*

³⁴⁹ *BP P.L.C. v. Mayor & City Council of Baltimore*, 593 U.S. ____ (2021).

³⁵⁰ *United States v. California*, No. 20-16789 (9th Cir. 2021).

Even in the midst of a pandemic, climate change stories continue to make news. Concerns over how COVID-19 may harm efforts to reduce emissions and slow the investment in clean energy sources [have been raised](#).³⁵¹

The health of our planet and all that lives on it will depend on the actions that we take now. Although damage has been done, it is not impossible to slow the long-term effects and reverse some of the damage.

XII. COPPER MINES & ENERGY DEVELOPMENT

Molly Paquin

75% of all copper used today is in electrical generation and transmission.³⁵² Copper is used in all renewable energy production as it is highly conductive and cheaper than silver, the next best conductor. Studies have shown that copper can be 20% more efficient than silver in solar panels which also makes the panels cheaper to produce.³⁵³ [Electric vehicles](#) use up to four times as much copper as traditional fuel vehicles and as the electric vehicle market expands the demand for copper will increase.³⁵⁴ Wind energy also relies on copper for important alloys and wiring/grounding

systems.³⁵⁵ Considering how heavily energy production and transmission systems rely on copper, demand for it will increase as energy needs and renewable energy markets expand.

Pebble Mine Controversy

With massive copper, gold, and molybdenum deposits, the Pebble deposit and proposed Pebble Mine in southwest Alaska have been the topic of much deliberation and debate for over a decade. The Pebble deposit is located on state-owned land, and Pebble Limited Partnership³⁵⁶, a conglomerate organization consisting of several mining organizations, hopes to extract copper from the deposit.

Pebble Mine would be located near Lake Iliamna, 200 miles southwest of Anchorage.³⁵⁷ The Pebble deposit is in the Bristol Bay watershed, which includes both the Nushagak and Kvichak river drainage systems, and is home to the world’s largest wild Sockeye Salmon fishery; over half of the Sockeye Salmon population comes from the two river systems where Pebble deposit is located.³⁵⁸ The proposal for Pebble Mine includes four main components: an open pit mine, transportation corridor, port site, and natural gas pipeline corridor.³⁵⁹ (Watch this [video description of the mine site](#) for an overview of the proposed plan.)

Table 1-1. Pebble Deposit Estimated Resource (Measured, Indicated, and Inferred)

	Total Deposit		20-Year Open Pit	
	Weight	Grade	Weight	Grade
Copper	80.6 Blbs	0.35%	6.7 Blbs	0.3%
Molybdenum	5.57 Blbs	235 ppm	353 Mlbs	158 ppm
Gold	107.3 Moz	0.32 g/t	10.7 Moz	0.3 g/t

Blbs: billion pounds
Moz: million ounces
ppm: parts per million
g/t: grams per ton

U.S. Army Corps of Eng’rs, *Pebble Project Department of the Army Application for Permit (POA-2017-271) Attachment D: Project Description*, (2017).

³⁵¹ Emma Newburger, *Coronavirus could weaken climate change action and hit clean energy investment, researchers warn*, CNBC (Mar. 13, 2020), www.cnbc.com/2020/03/13/coronavirus-could-weaken-climate-change-action-hit-clean-energy.html.

³⁵² Nat’l Minerals Info. Ctr., *Copper Statistics and Information*, www.usgs.gov/centers/nmic/copper-statistics-and-information.

³⁵³ J. Bartsch, et al., *Copper as Conducting Layer in Advanced Front Side Metallization Processes for Crystalline Silicon Solar Cells*, 35th IEEE Photovoltaic Specialists Conference, 1299, 1302 (2010).

³⁵⁴ *Electric Vehicles*, COPPER DEV. ASS’N INC. (last accessed Apr. 27, 2020), www.copper.org/environment/sustainable-energy/electric-vehicles/.

³⁵⁵ *Wind Energy Basics*, COPPER DEV. ASS’N INC. (last accessed Apr. 27, 2020),

www.copper.org/environment/green/casestudies/wind_energy/wind_energy.html.

³⁵⁶ The State of Alaska Division of Mining, Land, and Water, *Miscellaneous Land Use Permit for Exploration, Maintenance, & Reclamation Permit #6118*, (March 29, 2019)

³⁵⁷ U.S. Army Corps of Eng’rs, *Pebble Mine Draft Environmental Impact Statement*, 6 (2017) available at: <https://pebbleprojecteis.com/documents/eis>.

³⁵⁸ U.S. Env’tl. Prot. Agency, *Bristol Bay*, www.epa.gov/bristolbay.

³⁵⁹ *The Pebble Project | Project Description*, DEPARTMENT OF THE ARMY APPLICATION FOR PERMIT, 4 (last accessed May 2, 2021) www.poa.usace.army.mil/Portals/34/docs/regulatory/plp/12_2_2017_POA_2017-271_DA_Application_Pebble_Limited_Partnership_Attach_D.pdf?ver=2018-01-05-115828-333.

Those in support of the project argue that protective laws and technologies exist to ensure that mining operations are safe.³⁶⁰ A main driving factor for those in support of mining the deposit are the economic growth that would be brought to the state through jobs³⁶¹ and taxation³⁶², while also meeting market demands for copper. In addition to the economic boom of jobs, Alaska earns tax revenue from mining operations within the state.³⁶³

Those in opposition to the project voice concern that many mines within the U.S. and elsewhere have a poor history of storing toxic mining wastes. Those opposing the project argue that the risks and harms to the watershed and salmon fishery far outweigh any potential benefits of Pebble Mine.³⁶⁴ Nine Bristol Bay Tribes, The Bristol Bay Native Association, Alaska Independent Fishermen's Marketing Association, and Trout Unlimited are some of the groups³⁶⁵ opposing the mining project over concerns for the watershed and Sockeye Salmon fishery, which is used commercially, recreationally, and for subsistence. To hear what some of the arguments are on both sides, check out [these interviews](#).

The complicated management issues of Pebble Mine relate to the potential impacts to the Sockeye Salmon and other wildlife in the area. The North American Model of Wildlife Conservation calls for the use of scientific information to make the best determination and management decisions for the public lands at issue in Alaska. While there is science being used in evaluating the Pebble deposit and potential mine, politics and public opinion have also played key roles in the current status of Pebble Mine.

³⁶⁰ *Pebble Mine Draft Environmental Impact Statement*, *supra* note 358, at 53; see Tom Collier, *Dear Alaskans*, PEBBLE (last accessed Apr. 27, 2020), <https://pebblepartnership.com/letter>.

³⁶¹ 2,000 employed during peak construction and 850 personnel annually during operations. *Pebble Mine Draft Environmental Impact Statement*, *supra* note 358, at 2.

³⁶² Alaska Dept. of Revenue Tax Division, *Annual Report 2019*, AS 43.65, www.tax.alaska.gov/programs/programs/reports/AnnualReport.aspx?Year=2019#program60610.

³⁶³ *Id.*

³⁶⁴ Complaint at 2, *Trout Unlimited v. U.S. Environmental Protection Agency*, (2019) (No. 3:19-cv-00268-JWS)

³⁶⁵ *The Solution*, SAVE BRISTOL BAY (last accessed Apr. 27, 2020), <http://www.savebristolbay.org/about-the-bay>; Jenny Weis, *Time to Weigh in on Pebble Mine – yes, again!*, TROUT UNLIMITED (Apr. 3, 2018), www.tu.org/blog/time-to-weigh-in-on-pebble-mine-yes-again/.



U.S. Environmental Protection Agency³⁶⁶

A Legal Timeline of Pebble Mine

Pebble Limited Partnership (PLP) was formed in 2007³⁶⁷ after preliminary drilling discovered the size of the copper deposit. PLP's initial applications for federal Clean Water Act permits to store mining materials prompted local concerns. Petitions submitted by local groups to the U.S. Environmental Agency (EPA) requesting a scientific study launched the EPA scientific assessment process.³⁶⁸

While the EPA was engaged in its assessment of the area, 65% of votes³⁶⁹ cast in a 2014 election in Alaska were in favor of a state ballot initiative allowing the state legislature to ban certain mining operations in Bristol Bay.³⁷⁰ In 2014, as a result of the study and public pressure, the EPA issued a preliminary determination that the area near the Pebble deposit needed stricter protections under the Clean Water Act and launched the process to add section 404(c)³⁷¹ regulations to the watershed surrounding the deposit.

³⁶⁶ www.flickr.com/photos/usepagov/6990781448/in/album-72157629587154514/.

³⁶⁷ *Pebble Partnership*, NORTHERN DYNASTY MINERALS LTD. (last accessed Apr. 27, 2020), www.northerndynastyminerals.com/about-us/pebble-partnership/.

³⁶⁸ U.S. Env'tl. Prot. Agency, *An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska*, 1 (EPA 910-R-14-001ES 2014).

³⁶⁹ Alaska Division of Elections, *General Election Results November 2014*, www.elections.alaska.gov/results/14GENR/data/results.pdf.

³⁷⁰ *Hughes v. Treadwell*, 341 P.3d 1121, 1123 (Alaska 2015).

³⁷¹ See generally U.S. Env'tl. Prot. Agency, *Proposed Determination of the U.S. Environmental Protection Agency Region 10 Pursuant to Section 404(c) of the Clean Water Act*, (2014), www.epa.gov/bristolbay/2014-proposed-determination-pursuant-section-404c-clean-water-act-pebble-deposit-area.

In response to this determination by the EPA, PLP brought a lawsuit in 2014 against the EPA under the Administrative Procedure Act (APA),³⁷² halting further action until the court reached a determination in the case. After three years, the EPA and PLP reached a settlement agreement under the terms of which the EPA study could remain relevant for future use but that the extra regulations under section 404(c) of the Clean Water Act would not be added to the region.³⁷³

In 2019, the EPA changed course and withdrew the 2014 preliminary determination.³⁷⁴ This move opened the door for Pebble Mine to reapply for permits and begin a new study of the environmental impacts of the potential mining project. Trout Unlimited announced in October 2019 that it was suing the EPA for the actions taken to withdraw the 2014 determination without any science to support the change in agency decision.³⁷⁵ Trout Unlimited sued the agency for violations of the APA as well as the Clean Water Act.³⁷⁶ On April 17, 2020, the district court dismissed this case as well as two others brought in opposition to the EPA move to withdraw the 2014 determination.³⁷⁷

Meanwhile, as required by the National Environmental Protection Act, The U.S. Army Corps of Engineers was expected to complete its Environmental Impact Statement (EIS) about Pebble Mine sometime in 2020.³⁷⁸ Subsequently, the Corps published its final EIS during the summer of 2020, but then reversed course at the end of the year and officially denied a permit for the Pebble Mine project thereby putting its future in considerable doubt.

³⁷² *Pebble Ltd. P'ship & State of Alaska*, (No. 3:14-CV-0097-HRH, 2014 WL 12528655) (D. Alaska Aug. 7, 2014).

³⁷³ U.S. Env'tl. Prot. Agency, *Settlement Agreement Between EPA and Pebble Limited Partnership*, www.epa.gov/bristolbay/2017-settlement-agreement-between-epa-and-pebble-limited-partnership.

³⁷⁴ U.S. Env'tl. Prot. Agency, *EPA Withdraws Outdated, Preemptive Proposed Determination to Restrict Use of the Pebble Deposit Area as a Disposal Site*, www.epa.gov/newsreleases/epa-withdraws-outdated-preemptive-proposed-determination-restrict-use-pebble-deposit.

³⁷⁵ Meghan Barker, *On behalf of Bristol Bay, We're Headed to Court*, TROUT UNLIMITED (Oct. 9, 2019), www.tu.org/blog/on-behalf-of-bristol-bay-were-headed-to-court/.

³⁷⁶ Complaint, *supra* note 364.

³⁷⁷ *Bristol Bay Econ. Dev. Corp. v. Chris Hladick*, U.S. Env'tl. Prot. Agency, No. 3:19-CV-00265-SLG, 2020 WL 1905290 (D. Alaska Apr. 17, 2020).

³⁷⁸ U.S. Army Corps of Eng'rs, *Pebble Project EIS*, <https://pebbleprojecteis.com/schedule>.

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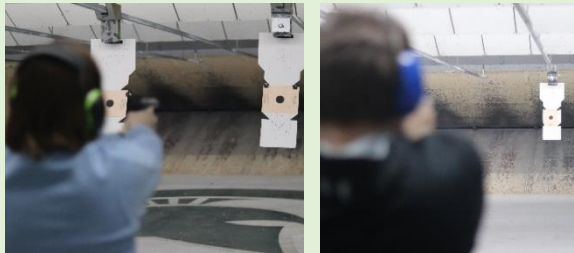
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The students in the Spring 2020 *Legal Issues with Energy Development and Wildlife* class enjoyed a trip to Michigan State University's Demmer Center (just before COVID-19) to have hands on training and/or practice with compound bows and firearms. For some students it was their first opportunity to learn, while for others it was a greatly enjoyed opportunity to practice their skill!



Photos taken by Steffen Mammen

ABOUT THE WILDLIFE LAW CALL

These case and current event briefs were composed by the students in the Spring 2020 and 2021 semesters of Legal Issues with Energy Development and Wildlife at Michigan State University College of Law. The course is taught by Carol Frampton, Chief of Legal Services for the National Wild Turkey Federation (NWTf), assisted by Shelby DeVuyst, Assistant Director of the Center for Conservation Excellence (CCE), housed at the NWTf.

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NWTf is a nonprofit organization dedicated to the enhancement of wild turkey populations and habitat, and recruitment, retention, and reactivation of hunters. AFWA is a professional organization whose members are the fish and wildlife agencies of the 50 U.S. states as well as territories, several Canadian provinces and Mexican states, as well as some U.S. federal agencies.

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