Ocean Conservancy®

Protecting The Ocean And Supporting Communities Through RESPONSIBLE OFFSHORE WIND

While the ocean faces many threats, none are as urgent and existential to its health as climate change. Already climate change impacts are increasing in frequency and severity, and if climate change is not addressed, it could lead to a planet that is uninhabitable for people and wildlife.

The greatest opportunity to help protect the ocean, its ecosystems, and coastal communities is to transition to a clean energy economy based on wind, solar, and other renewable power sources that will eliminate society's reliance on, and use of, fossil fuels that drive climate change.[1]

Offshore wind energy is a vital part of the mix, able to provide clean and reliable power to major coastal population centers.[2] The Biden Administration, in 2021, announced a goal to deploy 30 gigawatts of offshore wind by 2030, followed in 2022 with a commitment to deploy 15 gigawatts of floating offshore wind by 2035.

Ocean Conservancy supports a transition to 100% clean ocean energy by 2050.[3] The future should not be dependent on the destructive methods of past ocean energy development. By phasing out offshore oil and gas drilling, and replacing it with clean, responsibly developed renewable energy such as offshore wind, the ocean and its ecosystems can be protected from the future impacts of climate change. Ocean Conservancy is boldly leading efforts towards this complete sea change in ocean energy. Through science-based research and targeted policy changes, responsible offshore wind can be advanced to meet clean energy transition benchmarks while protecting the ocean ecosystems, wildlife, and communities.

KEY TAKEAWAYS

- Climate change is the greatest threat to the health and resilience of the ocean and the ecosystems, wildlife, and communities that rely on it.
- Offshore wind is a critical component of the clean energy transition, necessary to avoid a climate catastrophe.
- Generating electricity from clean, renewable sources such as offshore wind will help communities become less reliant on harmful offshore oil and gas extraction, paving the way for the phase-out of fossil fuels that cause climate change.
- As with all ocean-based industries, offshore wind will have an impact on the ocean, marine life, and other ocean users.
- Offshore wind should be developed responsibly, avoiding, minimizing, and mitigating risk to the environment and marine biodiversity.
- Responsible offshore wind involves careful and collaborative planning—including consultation with Tribes and Indigenous groups, and other ocean users—and the incorporation of mitigation measures during development and operation.

OCEAN CONSERVANCY SUPPORTS THE FOLLOWING PRINCIPLES FOR OFFSHORE WIND DEVELOPMENT:

- **Conserve marine biodiversity and ecosystem functions** by avoiding, minimizing, and mitigating environmental impacts; require long-term monitoring and, if needed, adaptive management of impacts (including cumulative) on marine and coastal ecosystems, wildlife and habitats.
- **Employ best management practices and proven measures or technologies** to reduce impacts to wildlife and habitats, and where needed, support the development of new technologies and practices.
- **Commit to transparency and data sharing**, making data publicly available in understandable formats, including data collected by developers before and during construction and during operations and decommissioning.
- **Include robust engagement** with state and local governments, scientists, conservation groups, affected industries, communities and others from the outset of planning and throughout operation.
- **Respect Tribal sovereignty** and include meaningful engagement with Native American Tribal governments and Indigenous people and organizations, including free, prior and informed consent.
- **Undertake comprehensive efforts with underserved and vulnerable communities** to understand, avoid and mitigate impacts, and ensure financial, workforce or other benefits of development are equitably distributed.
- **Consider other ocean users and uses**, and avoid, minimize and mitigate conflicts with and impacts to them.

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The Rising Impacts of Climate Change on the Ocean and Coastal Communities Demand a Solution

Centuries of burning fossil fuels for heat, electricity, and industrial activity have polluted the world with greenhouse gases, causing the climate to change and affecting all life on earth. Some of the most severe impacts are happening in the ocean and along coasts.

NATURE AND WILDLIFE

Since the Industrial Revolution, the ocean has absorbed 90% of the heat trapped by greenhouse gas emissions and 30% of carbon dioxide emissions. As a result, the ocean is warmer, has less oxygen, and is more acidic. These changes are leading to more frequent marine heatwaves, stronger storms, and habitat degradation and loss, including coral bleaching.

The changes in ocean water composition have spurred species decline and shifts in migration patterns[4] which cascade through the ocean's complex food webs and ecosystems. For example, to find food, whales and other marine mammals that rely on zooplankton and other lower trophic prey species have shifted calving grounds, migration routes, and foraging patterns into unusual and more dangerous locations such as busy shipping lanes, common commercial fishing grounds, and noisier areas.[5]

FISHERIES AND COASTAL ECONOMIES

Climate-induced changes in marine ecosystems affect the people and communities who rely on the ocean for their livelihoods. The productivity of fisheries is already declining due to ocean warming.[6] Shifts in the location and range of fish species, and any associated shifts in fishing practices, management, or jurisdiction can greatly disrupt businesses and the communities that engage in and rely upon these fisheries.[7] Marine heatwaves and other extreme events have caused fish stock collapses and fishery closures with serious economic consequences for local communities.[8] Commercial, recreational, and subsistence fishermen are experiencing shifting and new fish migration patterns, loss of traditional target species, new bycatch interactions, and increasing extreme weather events, which can result in lower catches and less financial stability.[9]

Coastal communities are also affected by extreme weather, including more frequent and stronger storms, and by sea level rise, causing costly flooding and coastal habitat erosion, and destruction to homes and buildings.[10]

PEOPLE, COMMUNITIES, AND ENVIRONMENTAL JUSTICE

Offshore fossil fuel extraction, coastal refining, and petrochemicals facilities are powerful accelerants of environmental injustices affecting low-income and minority communities along the coastline. Polluting industrial activity is commonly located near or adjacent to historically marginalized communities, due to years of discriminatory zoning and housing practices.[11] The situation is most acute along the Gulf of Mexico coast, where underserved communities experience increased rates of asthma, cancer, and premature births due to their proximity to fossil fuel facilities and activities.[12]

Climate-induced impacts to the ocean and coastal communities are increasing rapidly as the world continues to burn fossil fuels. While ocean-dependent industries and communities must adapt to some of the new realities presented by a changing climate, it is essential to avoid more serious and potentially irreversible damage by transitioning to clean energy.

The Opportunity with Offshore Wind

The greatest opportunity to stabilize the climate and protect the ocean and all that depends on it, is to move away from fossil fuels and towards clean energy sources.

Offshore wind is essential to the clean energy transition. America's coastlines offer abundant and strong winds. In fact, according to the Department of Energy, the total potential power from offshore wind in U.S. waters (13,500 terawatt-hours) is more than three times U.S. annual electricity consumption (4,050 terawatt-hours).[13] While all U.S. waters are not appropriate for offshore wind, the vast potential[14] underscores its value and importance among the suite of available renewable energy options.

With 40% of the people in the U.S. living on the coast,[15] offshore wind offers an effective option to provide energy for communities that lack suitable space for land-based wind and solar. Additionally, offshore wind development creates jobs in a variety of areas across the supply chain, including research, development, manufacturing, construction, operation, and maintenance. A fully operational domestic offshore wind turbine manufacturing and supply chain industry could provide up to 49,000 jobs.[16] In partnership with federal, state, and local government agencies, the industry can encourage education and training in renewable energy technologies – including retraining fossil fuel workers,[17] and benefitting communities, especially in the Gulf of Mexico.

In addition to the climate benefits, clean alternatives to fossil fuels will also reduce the direct burdens associated with oil and gas drilling and extraction itself. This means less habitat destruction, less chances of oil spills, and less loud underwater seismic surveying[18] that puts stress on marine mammals and other wildlife.[19]


Photo Credit: Wyatt Lauterman

Responsible Offshore Wind Addresses Impacts from Development

All industrial uses of the ocean affect the environment, marine ecosystems, and other ocean users. Offshore wind is no exception. Understanding these impacts, along with ongoing close monitoring, can ensure measures are put in place that will avoid and mitigate anticipated impacts and swiftly minimize unexpected ones. If done thoughtfully, the climate benefits of developing offshore wind will far outweigh any consequences to the ecosystems and coastal communities.

Impacts from offshore wind development can stem from all phases of development, including pre-construction surveys, construction, operations and maintenance, and decommissioning. Below are some of the potential impacts anticipated with offshore wind development and what is being or can be done to address them.

HABITAT CHANGE, DISTURBANCE, AND LOSS

The structures that support offshore wind turbines may create new vertical hard-surface habitat for marine life and could locally increase biodiversity.[20] However, installing new structures can also disturb the seabed and damage habitat, affecting benthic species, increasing sediment in the water column, and possibly facilitating the establishment of non-native species.[21] Smart siting of wind energy areas, as well as careful and localized siting of each piece of project infrastructure, can help reduce disturbances to sensitive benthic habitat. Beyond siting, developers should consider using nature-inclusive designs that enable offshore wind infrastructure to create habitat for species whose natural habitat has been impacted by development. Developers can also mitigate benthic impacts through offsite restoration.

Additionally, the installation of infrastructure can be specifically timed to decrease ecological impacts. For example, developers of the Vineyard Wind 1 wind farm off the shores of Massachusetts committed to burying the project's cables in the Nantucket Sound during times outside of the spawning season for some sensitive and commercially important benthic invertebrate and demersal egg laying fish species.[22] Ongoing monitoring over time, including data sharing among stakeholders, can help ensure that adaptive management can be deployed if needed.

UNDERWATER NOISE

Ocean noise can cause stress, hearing loss, and changes in behavior in a range of marine species, including whales that use sound to navigate, locate prey, avoid predators, and communicate. The construction of offshore wind infrastructure, specifically the hammering of foundations into the seafloor (known as "pile driving"), is the loudest source of noise associated with offshore wind. The National Oceanic and Atmospheric Administration (NOAA) and the Bureau of Ocean Energy Management (BOEM) require offshore wind developers to reduce or avoid this noise to mitigate harm to marine life. Currently, the use of protected species observers and remote detection technologies (i.e. passive acoustic monitoring) to monitor for the presence of protected marine species, and signal noise and activity shutoffs when species are nearby, are among the most common and effective measures being used. Continuous research and innovation in technology should be prioritized, as well as the establishment of a third-party system to verify the efficacy of these technologies. Additionally, there are foundation designs that can avoid pile driving altogether, such as those that rely on hollow cylinders suctioned into soft seafloor or extremely heavy bases which use gravity to anchor the turbines to the seafloor. The use of these "quiet foundations" should be incentivized.[23]

IN-AIR COLLISIONS

A number of bird and bat species traverse the offshore environment and could fly into offshore wind farm areas, running the risk of being hit by spinning turbine blades.[24] There are very little data on documented collisions to date. Developers are currently working to reduce any infrastructure that might attract birds or bats to the turbines, such as by reducing perching opportunities or lighting that could attract birds or bats, offshore wind should be sited outside of major flyways. In addition, developers should be required to pursue and deploy new technologies to monitor collisions and, if needed, develop strategies to minimize impacts to birds and bats from offshore wind turbines.

IMPACTS TO FISHERIES AND FISHERMEN

There are many unknowns about how offshore wind farms will affect U.S. fisheries. The large area needed for offshore wind development could limit fishing in those areas. Furthermore, alterations to fish species' behavior and local distribution and abundance could directly affect coastal communities dependent on fishing, especially if fishermen must also change fishing practices (e.g., through increased fuel costs or time spent getting to fishing locations).[25]

To foster coexistence between offshore wind and fisheries when leasing new areas for offshore wind, BOEM has offered lease auction bidding credits to developers who designate money towards fisheries compensation funds. Additionally, some U.S. projects have independently created funds to compensate the fishing industry for any future impacts. For example, Vineyard Wind 1, which is the first permitted commercial project in the U.S., designated millions in funding[26] to support the creation of measures that reduce conflict, including direct financial compensation as well as fisheries equipment upgrades.[27] A broader U.S. east coast fisheries mitigation fund is also being developed.[28] Additionally, the offshore wind industry should open and maintain direct lines of communication with regulators and fishing communities to address ongoing impacts.

DISRUPTIONS TO FISH SURVEYS AND RESEARCH

The installation of offshore wind farms will affect fisheries surveys that are used to assess fish populations and inform science-based fisheries management decisions. Building new structures may change the behavior of fish stocks, for example by attracting fish species that like underwater structure.[29] These changes can alter how fish are sampled in fisheries surveys, making it harder to assess the health of fish populations.[30] Offshore wind development will limit the ability of surveyors to access sampling areas due to wind project operational and safety limitations, will change the statistical design of long-running fisheries surveys, and will alter habitats in and around wind energy development activities.[31] Offshore wind developers must work with NOAA Fisheries and with subject matter experts to implement new survey methods and ensure these new methods are calibrated with previous ones to improve the consistency of data analysis before and after offshore wind development.

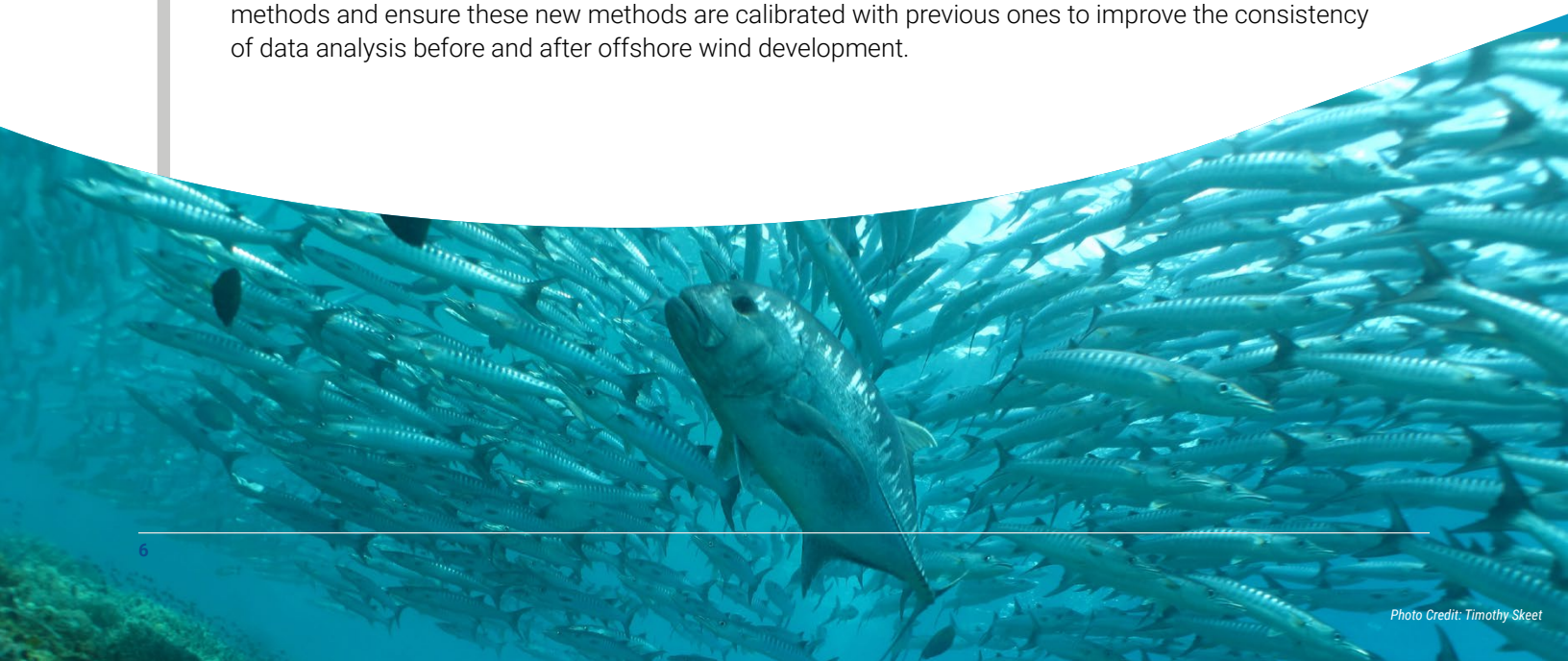


Photo Credit: Timothy Skeet

Solutions to Avoiding, Minimizing, and Mitigating Potential Impacts of Offshore Wind

All industrial uses of the ocean affect the environment, marine life, and other ocean users. Offshore wind is no exception. We can and must ensure offshore wind projects are built and operated responsibly. Through ongoing monitoring and incorporating measures that avoid, minimize, and mitigate risks, we can ensure the successful development of a new clean renewable energy source.

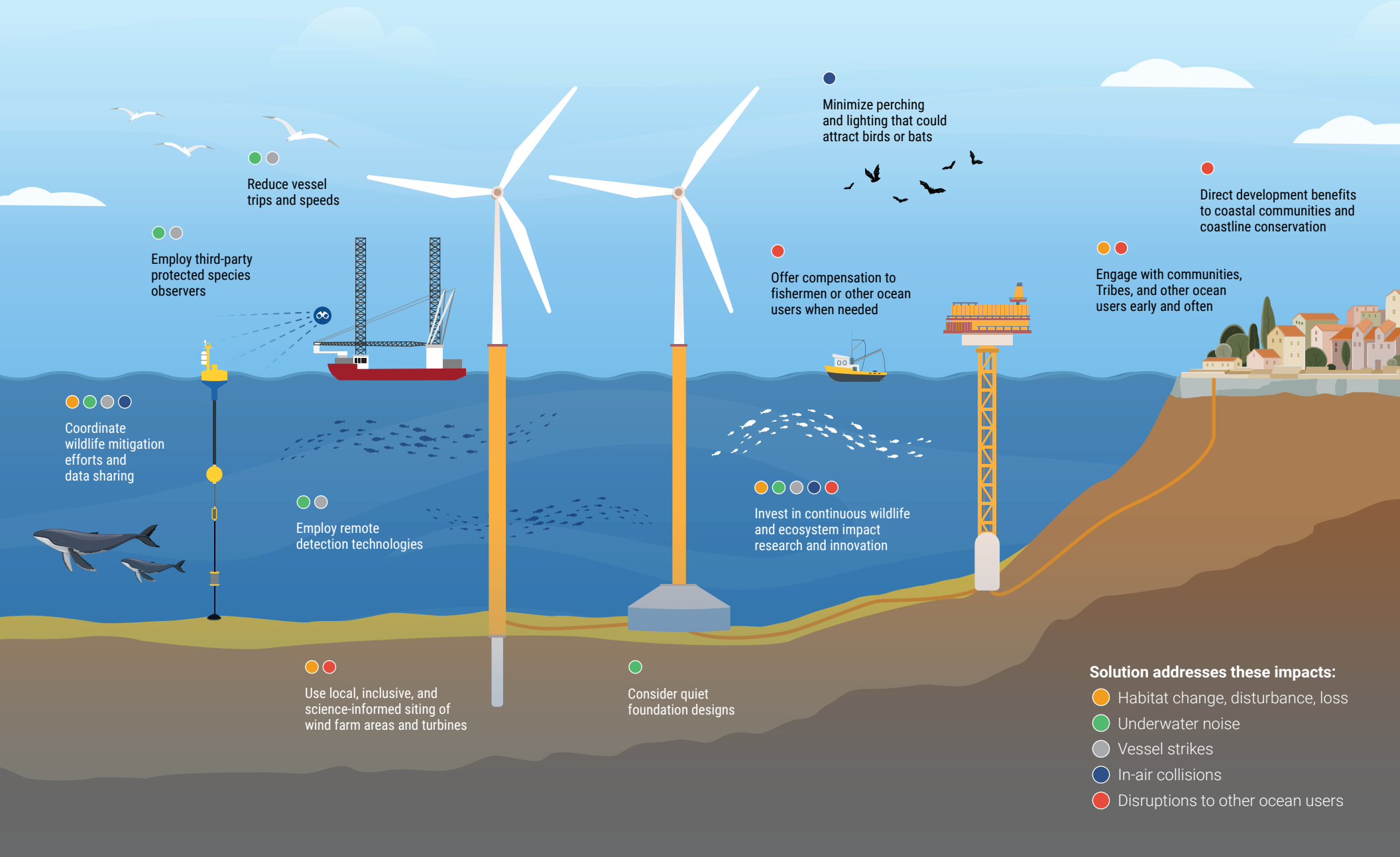



Photo Credit: Judy Thrams

Policy Recommendations for Responsible Offshore Wind Development

With the ocean changing rapidly due to the effects of climate change, leaders must act today to support the responsible development of offshore wind. Ocean Conservancy recommends the following policy actions:

UNCOUPLE THE LEASING OF OFFSHORE WIND AND LEASING OF OIL AND GAS

The Inflation Reduction Act of 2022[32] includes a provision that requires an offshore oil and gas lease sale within one year before any offshore wind lease sales. This ties one of the best tools to fight climate change to the very industry that is driving climate change. Legislators should change the law to uncouple these lease sales and thus ensure the new clean energy economy can work to fully decarbonize the U.S.'s energy grid unimpeded.

COORDINATE SITE SELECTION

BOEM should work to ensure wind energy areas and transmission cables are sited to avoid sensitive areas and minimize impacts to marine ecosystems and other ocean users. Tribes, communities, fisheries managers, ocean users, and other government agencies should be engaged early, with an open two-way dialogue during the entire planning and operation process to access and develop beneficial multiple-use strategies.

PROVIDE FINANCIAL INCENTIVES

Agencies should work to maintain, improve, and widen access to tax credits or other financial incentives that can help wind energy developers initiate their projects,[33] including the Investment Tax Credit and the Renewable Energy Production Tax Credit.[34] These can help reduce development costs, especially where supply chains and infrastructure do not exist, as well as enhance career opportunities through apprenticeship and prevailing wage requirements. Consistent and long-term tax credits for renewable energy investments in generation, transmission, and storage are critical to advance responsible offshore wind energy. Regulators should expand the domestic content tax credit for qualified turbine foundation types to include quieter foundation alternatives that require less, or zero, pile driving, incentivizing noise pollution reduction that can affect marine mammals.[35]

LEVERAGE THE VALUE OF OFFSHORE WIND LEASES

Leasing areas for offshore wind development can generate hundreds of millions to billions of dollars of revenue for the federal government.[36] Currently, revenue goes to the U.S. Treasury and is not required to be used in a manner that benefits the communities or environments impacted by offshore wind development. Congress should pass legislation that would require a proportion of the revenue from offshore wind to be redirected to coastal states—especially those with adjacent offshore wind developments—geared towards affected communities and Tribes, and conservation efforts. Revenue sharing with states could create both state-level buy-in, encouraging state governments to improve their existing offshore wind energy procurement goals, and improve states' ability to engage meaningfully in offshore wind processes and invest in conservation.

Further, BOEM, using its existing authorities, should include conservation bid credits in offshore wind lease auctions. These conservation bid credits should be designed to incentivize developers to invest in conservation efforts beyond those required through lease stipulations or permitting requirements, such as additional habitat restoration or investing in technologies for monitoring bird and bat collisions, near-real time whale detection, and noise reduction.

IMPROVE PERMITTING

Federal agencies and Congress must work together more closely to improve the permitting process for offshore wind farms. This can take a variety of forms, including engaging earlier with potentially impacted ocean users, increasing funding for additional agency staff to facilitate quicker and more robust reviews, and centralizing interagency coordination. Transparency, efficiency, and funding improvements can help to reduce the time and cost involved in permitting projects, as well as provide more certainty to developers, while ensuring that all impacts are considered and properly mitigated.[37]

REQUIRE AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES FOR WILDLIFE

Federal regulators should require, or strongly incentivize, offshore wind developers to use all available proven technologies and measures that avoid, minimize, and mitigate the environmental impacts of their projects. Specifically, federal agencies should encourage developers to incorporate practices that minimize disturbance to marine life during project development and operation. This includes requiring mitigation methods that reduce sound during pile driving, or using quieter foundations that avoid pile driving altogether;[38] and reducing construction vessel speeds in areas where and when marine mammals are present, in line with the requirements of NOAA's 10-knot vessel speed rules.[39] Additionally, federal regulators should encourage developers to monitor for unforeseen environmental impacts and use adaptive management when needed to address impacts.

COORDINATE WILDLIFE MITIGATION

Developers and government agencies can and should leverage new and existing cooperative platforms to drive innovation for responsible offshore wind. For example, the Regional Wildlife Science Collaborative (RWSC)[40] was cooperatively established in the eastern U.S. by federal agencies, states, non-governmental organizations, and the offshore wind industry. RWSC is a neutral forum for ocean users to exchange information about wildlife mitigation technologies and strategies, identify research gaps and needs, standardize data methodologies and transparency goals, and disseminate new information and updates to the public. RWSC has already seen several successes and, with cooperation from all stakeholders, can continue to be closely involved in driving responsible offshore wind by filling knowledge and data gaps.[41] Replicating the successes of the RWSC model in other regions, particularly the Gulf of Mexico and Pacific coasts, will help ensure full domestic coverage for responsible development and research strategies.

INVEST IN RESEARCH AND TECHNOLOGY DEVELOPMENT

Federal and state agencies, including the new Federal-state partnership in the Academic Center for Reliability and Resilience of Offshore Wind,[42] must continue to invest in offshore wind research and development and seek out opportunities for collaboration. Furthermore, encouraging developers to collaborate with the Department of Energy's Wind Energy Technologies Office to fund, advance, and test new technologies can improve the efficiency, cost-effectiveness, and compatibility of technologies that mitigate risks to marine wildlife and other ocean uses.[43] These investments will help offshore wind energy become cheaper for developers and energy consumers while ensuring the safety of marine ecosystems during construction, operation, and decommissioning.

REQUIRE DATA SHARING AND TRANSPARENCY

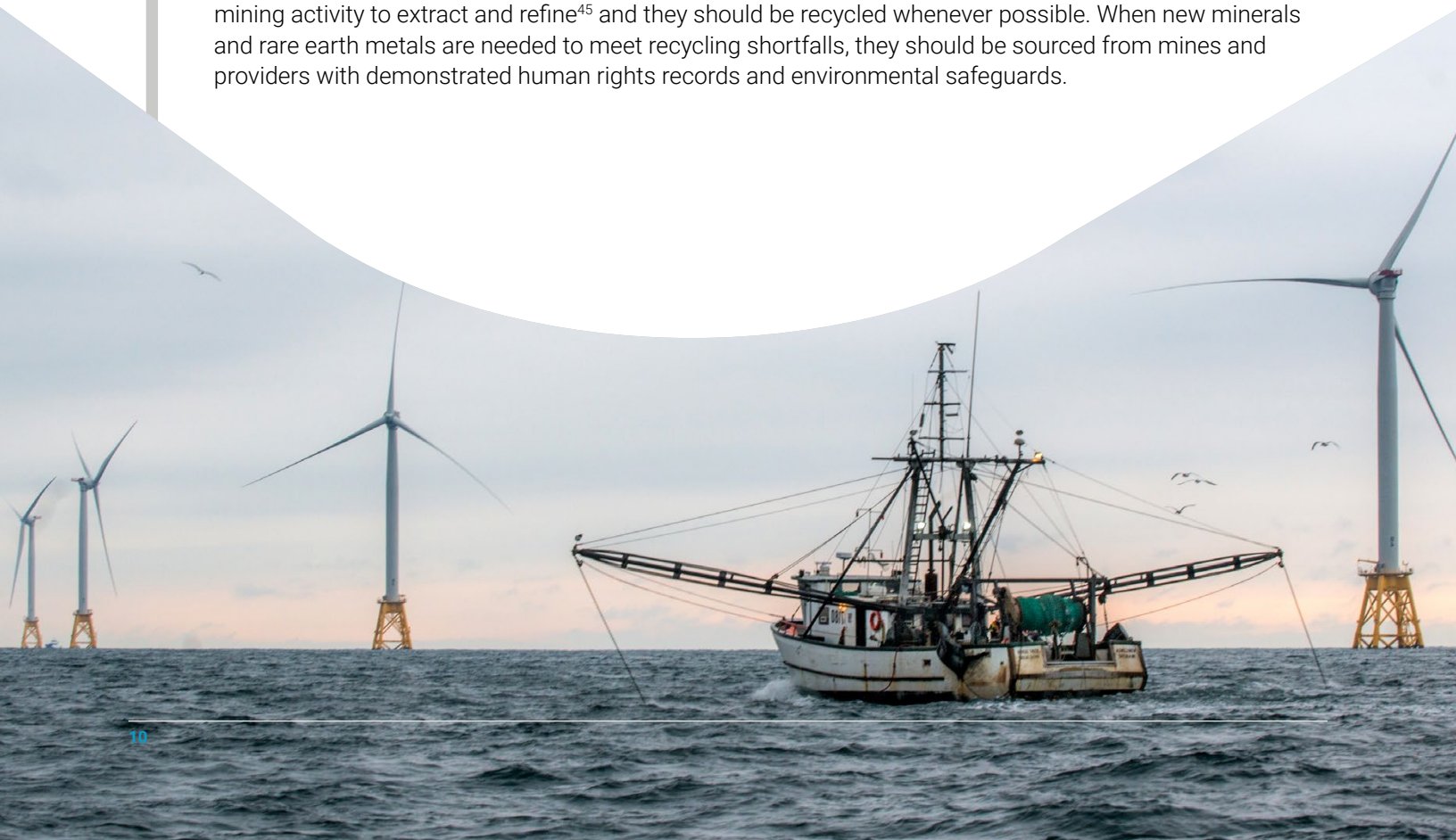
NOAA and BOEM should require all non-proprietary biological and oceanographic data collected by developers to be made publicly available. Institutionalizing ocean data sharing throughout a project's lifetime can help build trust and equity, and advance oceanographic research. Data sharing requirements for offshore wind development should be built on a standardized data sharing system.[44]

MITIGATE DISRUPTIONS TO FISHERIES SURVEYS

Scientific information collected through long-standing and rigorously designed fisheries surveys are of critical importance for sustainable fishery management. Coordinated efforts should be made to avoid and mitigate any impacts on these surveys. Where there is unavoidable disruption, work should be undertaken to develop new or supplemental sources of data that can provide good information to fisheries managers.

ENCOURAGE THE SOURCING AND USE OF GREEN MATERIALS

Offshore wind developers should be encouraged to invest in next-generation recycled parts and materials that minimize waste and reduce the overall need for newly mined raw materials. Rare earth metals, which are a necessary component of the permanent magnets used within offshore wind turbines, require intense mining activity to extract and refine[45] and they should be recycled whenever possible. When new minerals and rare earth metals are needed to meet recycling shortfalls, they should be sourced from mines and providers with demonstrated human rights records and environmental safeguards.



Conclusion

A responsible, rapid, and just build out of offshore wind in the U.S. is critically important to the clean energy transition and meeting the country's climate goals. All industrial-scale uses of the ocean have some level of impact, but the growing threat of climate change presents a much larger threat to the ocean and the wildlife and communities that depend on it. By pursuing responsible offshore wind, we can bring the power of the ocean to help stem the climate crisis.

To learn more about other clean ocean energy solutions, visit **CLEANOCEANENERGY.ORG**

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