

Impacts from OSW to Fisheries and their Communities

These are impacts that fishermen have identified will be experienced with OSW development, most from the first five leases, others from the full effects of the state's goal of establishing 25 GW of OSW power by 2045. Some impacts are known, others are uncertain, or create uncertainty, in the seafood supply chain and in the environment. Some impacts can readily have their economic impacts assessed, such as documenting historic catch values in the lease areas and/or future areas identified for OSW development. Other impacts will be more difficult to assess, such as long-term erosion of the value of limited entry permits; still others, such as social impacts, can only be described. There are a number of environmental concerns that could have significant impact on fisheries. All of these impacts are real and will affect fishermen and the communities dependent upon the products they provide. Fisheries have more impacts from OSW development when BOEM selects Call Areas with minimal regard for productive fishing areas.

Impacts to Fisheries:

There will be direct job losses. The state's OSW ambitions will result in a massive loss of historically important fishing grounds, which will result in job losses. Small family-owned commercial fishing and commercial passenger-carrying fishing vessel businesses will be challenged to weather this storm – and some will not. Some may have to relocate their operations elsewhere in California, assuming they can, or more likely out of state. In 2019 alone (the last year for which data is publicly available on the California Department of Fish and Wildlife's (CDFW) website) - California's seafood producers landed 20 million pounds of seafood in the Eureka Port Complex alone, with an ex-vessel value of \$38.7 Million¹.

Seafood processors, whose workforce is comprised to a large degree of people of color, are also going to scale back their businesses as a result of reduced seafood products being landed, which will lead to layoffs of workers. In some areas, the reduction in landings could lead to the closure of processing plants. The loss of processing plants will take away a key component to the seafood supply chain – the buyers. Without buyers, many fishermen will not have markets for their products. In addition to the loss of markets, fishermen in many areas rely on the processors for ice; a plant closure will have dire secondary effects.

There will be indirect job losses to vessel crewmembers, fishing gear manufacturers and/or repair workers, etc. This makes up a significant portion of the seafood economy. Vessel crew, fuel pier operators, engine and refrigeration repair businesses, boat repair yards, ship's stores, and fishing gear manufacturers, are among the businesses that rely, at least in part, on commercial fishing activity.

As mentioned above, the commercial fishing industry generated ex-vessel revenues of \$38.7M in the Eureka Port Complex in 2019. Assuming a conservative downstream multiplier of five times, that is roughly \$200 million in economic activity per year in the area(s) surrounding the Eureka

¹ Table 15 - Poundage and Value of Landings of Commercial Fish into California by Area – 2019 - [Table 15 2020 CFLs \(ca.gov\)](#). Last accessed December 27, 2022

Port Complex. The lease term for the five California sites auctioned in December are 33 years once operations commence. This represents an opportunity cost of roughly \$6.5 billion (in today's dollars) to the North Coast area alone over the lease term. It is acknowledged that the WEA will not displace or eliminate all fishery income, but a certain level of landings is needed to support fishing support businesses; without that volume, a cascade of unwanted effects will unfold.

Increased time at sea to avoid wind farms will affect catch quality. Even with the best methods of icing or refrigeration, each day spent at sea diminishes product quality and therefore ex-vessel value.

Lost tax and fees revenue to the state. In addition to lost income taxes, sales and use taxes, property, and other tax revenue from fishing activities, the CDFW will be directly impacted by the loss of landing tax revenues.

The nation's food security will be impacted and reduced. The loss of fresh local products will cause increased reliance on imported seafood.

Future fishermen and fisheries will be impacted. The loss of large areas from fishing opportunity will discourage future generations of fishermen, stressing the long-term sustainability of the industry. Further, with climate change, new species not currently found in abundance in the lease areas and/or future areas identified for OSW development could appear in large numbers. Bluefin tuna is an example of a species that is beginning to be seen in harvestable quantities north of Point Conception. Lost opportunity to fish in the lease areas and/or future areas identified for OSW development will be another future impact.

Community impacts. Above we discussed the need to understand (and quantify) economic consequences of OSW development on California's fishing communities. OSW development will not completely eliminate the fishing industry's contributions to the California economy or employment, but there will be negative impacts to each of those. Impacts such as community identity, dilution of the fishing/tourism industry symbiotic relationship, increased personal and family stress due to increased economic stress, along with the depressing perception that the state and federal governments seem unwilling to value the food-producing role fishermen, will all contribute to harmful community impacts.

There will be impacts to coastal tourism and community identification. The close connection between fresh fish being landed, the visibility of working commercial fishing vessels, and tourism, is a dynamic that the state must appreciate. Taking fishing out of this partnership will have negative economic impacts on tourism.²

Loss of seafood for the public and connections to the sea. For the vast majority of Californians, the only real access they have to the living marine resources off the California coast is via the seafood we harvest for their benefit. Reducing or eliminating our ability to serve our fellow citizens, many of whom choose locally harvested seafood because they can be confident that it is sustainably sourced, will bear an immeasurable cost.

² See - **California Tourism and Fishing Heritage Assessment Part I: Survey of Businesses, Community Leaders, and Tourism Professionals (2008)** available at - <https://static1.squarespace.com/static/5c2a9c42ee175916889d18c4/t/5c2eab58f950b7e3f696a55e/1546562392506/6reports-casus-report-final-2008-professionals.pdf>.

OSW development will make it harder for fishermen to adapt to climate change. With the loss of large areas for fishing, fishermen will have fewer options for adaptation, as the areas which they can fish will be greatly constrained.

Loss of local seafood production will cause a shift to imported and farm-raised seafood with an increase in carbon footprint. It is established that local, wild-capture seafood produces the lowest carbon footprint compared with other domestic and foreign sourced forms of protein.

Increased risk to safety at sea. In late 2022, the National Academy of Science and Medicine published a report that found OSW turbines create distorted radar contacts. This increases the risk of collision, allision and will likely impact the ability of the USCG to perform rescue operations on injured or sick crewmembers as aircraft may not be able to operate near turbines. Perhaps most importantly, avoiding the offshore wind facilities will increase time at sea, which always increases risk. Vessels drifting at night for sleep periods with only a captain aboard will have to be very, very far away from wind farms to not drift into them, or drift through the large vessel shipping lanes which will have necessarily moved outside the wind farms. Additionally, west coast lease areas and/or future areas identified for OSW development located upwind of ports will force fishing much of the fishing effort downwind, which will make returning to port more difficult and less safe when facing prevailing headwinds.

Lost or damaged fishing gear. Potential for interactions with fishing gear and/or loss of gear in the lease areas and/or future areas identified for OSW development and service vessel traffic lanes during survey work and both construction and operational phases.

Electrical Cables to shore becoming un-buried. This has already been an issue on the east coast and in Europe. Exposed high voltage cables can increase EMF issues and create snags for fishing gear.

Impacts from electrical floating substations. It is possible that power generated from the turbines will be consolidated and possibly converted DC/AC at floating substations. This activity will require large amounts of cooling water which will create entrainment of larvae and juvenile sea life. It will also discharge large amounts of hot water, affecting the environment.

Impacts to long-running scientific datasets which inform stock assessments or other aspects of the fisheries management process(es). This impact will create scientific uncertainty about the status of stocks which can only lead fisheries-managers to reduced harvest quotas.

Impacts due to increased navigation time to avoid wind farms. Additional time at sea and fuel costs will result from windfarm avoidance. Fishermen have proposed traffic lanes through wind farms in the two California lease sites; However, we have no information as to whether BOEM or the developers will make this accommodation.

Loss of fishable area to certain gears due to submarine cable routes to shore. Impacted gears include bottom trawls, seines, traps and pots, used for groundfish, squid, and crabs. There will be impacts and disruptions to fishing from the process of burying cables. There is a current lack of information as to how many submarine cables will exist, and even larger questions about whether they will each require their own cable routes.

Uncertainty exists around insurance coverage for commercial fishing vessels which transit or attempt to fish inside a wind farm. Experience on the east coast indicate that

insurers are reassessing premiums and even basic coverage, based on perceived increase risk of losses due to conflicts with OSW turbines.

Impacts and a loss of fishable area due to shipping and barge traffic patterns changing in response to wind farms. Tug and barged coastal traffic are a good example: it is likely that these operations will move closer to shore to avoid the wind farms, placing their traffic into Dungeness crab and other fixed gear fishing grounds.

Loss of fishable area which may incur due to safety/security zones being imposed around wind farms by the USCG. Fishermen have repeatedly requested that BOEM accommodate security/safety zones interior to the lease areas and/or future areas identified for OSW development boundaries; however, BOEM has shown no indication that it will do so. Therefore, any such zones will be placed exterior to the WEA boundary, creating additional area lost to fishermen. On the east coast, a 500 yard security zone around each turbine is being proposed.

There will be distinct impacts from site surveys on fishing activity. Survey work will utilize sonar and other technologies to survey the characteristics of the seafloor. This activity will displace fishermen for periods of time, as well as drive fish “off the bite”. Fishermen know this from past experiences with similar site characterization work done by the oil/gas and telecommunications industry. There is great controversy as to whether or not this site assessment work is causing whale mortalities on the east coast.

OSW impacts will be felt by the regional fleet, as well as by fishermen from ports outside the region who fish in the lease areas and/or future areas identified for OSW development. Even if smaller vessels, such as near-shore fishermen, do not fish in the lease areas and/or future areas identified for OSW development, they will certainly be impacted by OSW development. Disruption from OSW port activities, cable routes running to shore, loss of markets should buyers leave, increased sea time to avoid wind farms...all impacts that will affect all fishermen in nearby ports.

OSW ambitions for coastal waters creates enormous uncertainty within fisheries, creating difficulty in business planning and in attracting future generations of fishermen. While this impact can't be overstated, the economic loss will be hard to quantify.

Stranded Capital. Commercial fishing vessels are typically designed and outfitted to operate in specific fisheries. For example, a vessel permitted to utilize purse seine gear is much different from a vessel permitted to participate in the salmon troll fisheries. Vessels displaced as a result of OSW will have limited markets and the value of that asset will be reduced significantly. Similarly, reduced harvest quotas combined with less area for fishing opportunity will negatively impact the value of limited entry permits.³ This will be a large economic impact for fishermen, as to a great degree, the value of their businesses, and therefore their retirement assets, are largely tied to the value of the permits they hold (along with the value of boats and gear).

Impacts from Port Development:

³ Most fisheries which operate off the California coast are restricted to participants with a permit to prosecute that fishery.

Increased competition for limited harbor/port space could price fishing vessels out of dock space. With increase demand for space, how will transient vessels will be treated? In 2019, 546 U.S. based commercial fishing vessels participated in the west coast fishery for North Pacific albacore. This seasonal fishery normally operates between July and October and draws harvesters from San Diego, to Bellingham, Washington. Schools of albacore can be found anywhere from California up into Canada; and the fishery typically occurs near offshore banks, seamounts, or submarine canyons; however, the fishery also sometimes peaks where sea surface temperature gradients and surface chlorophyll coincide, independent of bottom topography. Vessels homeported a great distance from the fishing grounds, will seek temporary accommodations near the grounds where they can offload product, purchase fuel, bait, and other supplies, etc. Not only is the albacore fishery critical to those businesses, it benefits the ports and harbors who collect fees for transient berthing. Increased vessel traffic causing congestion in ports and gear loss outside ports is of concern. Loss of working waterfront for commercial fishing operations as OSW port activities displace fishermen will exacerbate what is already a recognized problem nationwide.

Upgrading California's ports and harbors to support the nascent OSW industry will result in impacts to commercial fishing. California's ports and harbors are not currently capable of serving the OSW industry. Significant upgrades will be necessary. These upgrades will impact the fishing industry in varying degrees depending on the scale. There will be interruptions to our operations during construction and/or renovation activities associated with upgrades. These may be minor or major depending on the scale of the upgrades and planning activities undertaken by the local port and harbor. Once those upgrades are completed, there is a possibility of displacement of fishing vessels, shoreside infrastructure, and businesses that support our operations. Proper planning to avoid these negative impacts to the fishing industry is necessary. We take comfort in the language of California's Coastal Act which acknowledges the importance of the commercial fishing industry to the State of California⁴ and is protective of facilities serving the commercial fishing and existing commercial fishing harbor space.⁵

OSW operations will interfere with normal port traffic. In the case of OSW development in Humboldt Bay, fishermen have already been advised that towing assembled turbines (including the base which may be 300 feet in length) out of the harbor will likely close the harbor entrance to all other vessel traffic for days and perhaps weeks. There will also be safety zones established in areas within the port where the assembled turbines will be staged awaiting towing and deployment. It is further likely that OSW deployments will require appropriate tide and/or weather windows. This will affect fishermen's transit to and from and utilization of fishing grounds, delivering product to market, and/or tending to their gear. It may also impact the ability for a vessel in distress to seek safe refuge or obtain necessary repairs, or the ability of that vessel to seek medical care for a sick or injured crewmember.

Environmental Impacts or Concerns:

Impacts to special management areas such as habitat closures, spawning closures, and other restricted areas, should wind farms or cable routes be placed in these areas.

Adverse impacts to Essential Fish Habitat (EFH) and upwelling. Adverse impacts to fish stocks, fish stock migratory patterns, and fish distribution, including concerns around any diminishment of ocean upwelling due to reduced wind speeds caused by wind farms, and from

⁴ §30703

⁵ §30234

impacts from the potential for noise pollution. This does not account for the very real possibility of dramatic impacts to the marine ecosystem as shown in a recent study entitled *Offshore wind farms are projected to impact primary production and bottom water deoxygenation in the North Sea*⁶ which could destroy the State's seafood economy, amongst other things.

Large scale wind projects may affect atmospheric flow and ocean mixing. Initial research indicates changes will occur, but it is not yet clear how significant they will affect fisheries and socioeconomics. More research is needed in this area. Should these effects be significant, fishing will be impacted.

There is uncertainty about the level of impacts that will occur from OSW mooring gear's bottom contact. Fishing could be impacted should the anchor line scrape the bottom, creating noise, sediment plumes, and/or denuding the bottom.

Known adverse impacts to migratory patterns and critical habitat of Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) protected species that interact with fisheries. Comments from the National Marine Fisheries Service assess impacts, but not necessarily clear jeopardy, to these animals. Should whales divert closer to shore to avoid the wind farms, this will increase their conflict and jeopardy with commercial crab gear. The "West Coast Crabber-Towboat Agreement" (Pomeroy et al, 2015) will need to be revisited.

Negative economic, social, and environmental impacts from fishery displacement and compaction. When all sea space is available, fishermen will utilize the best habitats, tempered by other factors such as distance from port. Displacement from those areas from OSW development will cause them to seek secondary areas, with corresponding competition and concentration of effort into those less-productive areas. There is a strong likelihood that this will cause localized depletion, with negative environmental consequences.

There is uncertainty about electromagnetic field disturbance to sea life. We understand that each turbine will be connected to another via a submerged—but not buried—electrical cable. Additionally, electricity will be consolidated into large cables routed to shore (buried in this case to an unknown depth.). This will represent hundreds of cables in each WEA.

It is well understood that many species of sea life either use electrical or magnetic fields for hunting or navigation, while others have behavior changes to avoid such fields. Some science has been developed documenting EMF effects on certain species, while other species appear to be unaffected. A recent study showed impacts to brown crabs from EMF. The study found animals freeze near the electromagnetic field with implications for metabolism and migration.⁷ More research needs to be done on this question.

There is also uncertainty as to whether the noise produced by the spinning turbines will also create ungrounded stray current in the water column.

There is uncertainty about the amount of surface and subsurface noise that OSW turbines and blades will produce during site assessment, construction, and operation.

This is a question very much germane to the assessment of cumulative effects, as, with the Morro Bay lease site as an example, there will be approximately 250-300 turbines within a

⁶ Daewel, U., Akhtar, N., Christiansen, N. et al. Offshore wind farms are projected to impact primary production and bottom water deoxygenation in the North Sea. *Commun Earth Environ* 3, 292 (2022). <https://doi.org/10.1038/s43247-022-00625-0>

⁷ See - [Mesmered brown crabs 'attracted to' undersea cables | Marine life | The Guardian](#)

roughly 376 square mile area, all producing some degree of sound. Understanding that sound travels exceptionally well under water, will the subsurface sound produced be sufficient to cause fish, crustaceans, and marine mammals to avoid a large section of the ocean? Should commercially-harvested species avoid a large area in and around the wind farms, the economic impacts to fishermen will be enormous.

General:

Impacts to fishermen from-time consuming public and private processes required to avoid, minimize and mitigate harmful OSW developments which cause a loss of fishing time and production. In many of these meetings, fishermen find themselves repeating their concerns over and over again.

Costs incurred from the necessity of hiring legal counsel and consultants to help represent and articulate fishermen's interests.

Cumulative impacts of individual impacts will likely exceed the simple sum of the parts. This is especially so when considering that many fisheries are coast-wide. Thus, closing other areas of the west coast for large wind farms can affect other regions through fishery displacement, and/or depression of the industry as a whole.

The cumulative impacts that fishermen face also must necessarily include the other existing and likely habitat protections put into place by federal and state agencies. For example, both the President and Governor have declared initiatives to "conserve" 30% of state and federal waters. There remains great uncertainty as to whether this will translate into addition fishery closures, further squeezing fishing opportunity and crowding the remaining open areas.

Fishermen feel impacted by the unjust, unequal, distribution of government efforts to mitigate climate change. The greatest burden from the takeover of productive fishing grounds by OSW development is borne by fishermen and their communities. States goals to increase environmental and economic justice are undermined by the injustice being done to the fishing community.

Unforeseen impacts due to the experimental nature of very deep-water floating turbines. Fishermen implore the state to use all authority and status to force BOEM to halt new leases for a minimum of three years to allow environmental and socioeconomic information from the first five leases to be acquired. The first five California leases should serve as a *demonstration project*. It is only in this manner that adaptive management can be actually practiced and future problems avoided. The State of the Science report, referenced above, demonstrates so clearly that there are significant knowledge gaps in the government's plans for the industrialization of the ocean. This knowledge gap is far greater on the West Coast, with so many additional unknowns about floating, very deep-water wind farms.

This summary of impacts should be viewed as a "living" document and should be amended as more impacts become known, or if scientific research removes other environmental concerns.

May 8, 2023