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CD-0001-22 (BOEM)

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APPENDICES

Appendix A: Substantive File Documents

- BOEM Appendix D: Typical Mitigation Measures for Protected Marine Mammal Species
- BOEM Consistency Determination
- BOEM Draft Environmental Assessment
- BOEM Outreach Summary Report Addendum
- CCC Sea Level Rise Policy Guidance
- Final California Commercial Landings
- Fish Business User Guide 2021 (ca.gov) (Block data from CDFW)
- Guidance on the Coast Guard's Roles and Responsibilities for Offshore Renewable Energy Installations (OREI) (pnnl.gov)
- Maxwell et al., 2022
- Meteorological Conditions Report
- Upwelling Modeling Study by Integral Consulting
- US Pacific Coast Seafloor Sediment
- Yurok Tribe Comment Letter on BOEM's Draft Environmental Assessment (attached)

YUROK TRIBE

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February 10, 2022

Assistant Secretary Bryan Newland
Office of the Assistant Secretary – Indian Affairs
Department of the Interior
1849 C Street, N.W.
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Director Amanda Lefton
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RE: *Response to Bureau of Ocean Energy Management Draft Environmental Assessment for the Humboldt Wind Energy Area | Docket No. BOEM-2021-0085*

Aiy ye kwee',

This letter serves as the written portion of the Yurok Tribe's response to Bureau of Ocean Energy Management ("BOEM") Draft Environmental Assessment for the Humboldt Wind Energy Area ("Draft EA"). This letter also provides some information on our concerns related to the overall project and its approval process. As will be discussed in the following sections, the Draft EA does not adequately capture the impacts and the Yurok Tribe requests that BOEM conduct a full EIR instead of just an EA. The Yurok Tribe also requests a formal government-to-government consultation with the Department of the Interior ("DOI") and another government-to-government consultation meeting with BOEM via video conference to further discuss these comments and the issues identified. We reserve the right to modify or amend our comments as new information becomes available.

While the primary purpose of these comments is to respond to the Draft EA, they should also be considered part of the Yurok Tribe's participation in separate, ongoing tribal consultation with BOEM on offshore-wind energy in the Yurok Ancestral Territory. Further, the Yurok Tribe has opted to send this letter to relevant actors within the California government.

I. Introduction to the Yurok Tribe

The Yurok Tribe is the largest Native nation within California with over 6,400 members. The Yurok people have always lived along the Pacific Coast and inland on the Klamath River. As stated in the Yurok Constitution:

> *The Ancestral Lands of the Yurok Tribe extend unbroken along the Pacific Ocean coast (including usual and customary offshore fishing areas and ocean territory) from Damnation Creek, its northern boundary, to the southern boundary of the Little River drainage basin, and unbroken along the*

Klamath River, including both sides and its bed, from its mouth upstream to and including the Bluff Creek drainage basin. Included within these lands are the drainage basin of Wilson Creek, the drainage basins of all streams entering the Klamath River from its mouth upstream to and including the Bluff Creek and Slate Creek drainage basins, including the village site at Big Bar (except for the drainage basin upstream from the junction of Pine Creek and Snow Camp Creek), and the Canyon Creek (also known as Tank Creek) drainage basin of the Trinity River, the drainage basins of streams entering the ocean or lagoons between the Klamath River and Little River (except for the portion of the Redwood Creek drainage basin beyond the McArthur Creek drainage basin, and except for the portion of the Little River drainage basin which lies six miles up from the ocean). Our Ancestral Lands include all submerged lands, and the beds, banks and waters of all the tributaries within the territory just described. Also included within the Ancestral Lands is a shared interest with other tribes in ceremonial high country sites and trails as known by the Tribe, as well as the Tribe's usual and customary hunting, fishing and gathering sites.[1]

The Yurok Reservation, established by Executive Order in 1855, is tethered to the approximately lower forty-five miles of the Klamath River, a mile on either side, from the Yurok village of Req-woi at the mouth of the Klamath River to upstream of the Yurok village of Weych-pues. The Yurok people, the Tribe's inherent sovereignty, and the Yurok Constitution provide the Tribal government authority to create Yurok laws, manage Yurok lands and natural resources, and adjudicate violations of Yurok laws in Yurok Tribal Court. The Yurok Tribe's jurisdiction lies throughout the Yurok Ancestral Territory and "extends to all of its member wherever located, to all persons throughout its territory, and within its territory, over all lands, waters, riverbeds, submerged lands, properties, air space, minerals, fish forests, wildlife, and other resources, and any interest therein now or in the future."[2] Via the adoption of the Yurok Constitution, the Yurok Tribe, in its governing authority, strives to:

1) Preserve forever the survival of our tribe and protect it from forces which may threaten its existence;
2) Uphold and protect our tribal sovereignty which has existed from time immemorial and which remains undiminished;
3) Reclaim the tribal land base within the Yurok Reservation and enlarge the Reservation boundaries to the maximum extent possible within the ancestral lands of our tribe and/or within any compensatory land area;
4) Preserve and promote our culture, language, and religious beliefs and practices, and pass them on to our children, our grandchildren, and to their children and grandchildren on, forever;
5) Provide for the health, education, economy, and social wellbeing of our members and future members;
6) Restore, enhance, and manage the tribal fishery, tribal water rights, tribal forests, and all other natural resources; and
7) Insure peace, harmony, and protection of individual human rights among our members and among others who may come within the jurisdiction of our tribal government.[3]

[1] The Yurok Constitution, Article 1, Section 1.
[2] The Yurok Constitution, Article 1, Section 3.
[3] The Yurok Constitution Preamble.

The Yurok Constitution Preamble provides in part that:

> [i]n times past and now Yurok people bless the deep river, the tall redwood trees, the rocks, the mounds, and the trails. We pray for the health of all the animals, and prudently harvest and manage the great salmon runs and herds of deer and elk. We never waste and use every bit of the salmon, deer, elk, sturgeon, eels, seaweed, mussels, candlefish, otters, sea lions, seals, whales, and other ocean and river animals… This whole land, this Yurok country, stayed in balance, kept that way by our good stewardship, hard work, wise laws, and constant prayers to the Creator.[4]

The Yurok Tribe and Yurok people's health, wellbeing, and cultural resources are intimately connected with the health of the ecosystem and the species within them. Often self-described as salmon, water, forests, and prayer people, the Tribe values management of, and reliance on, a traditional subsistence diet and practices; they are a vital part of Yurok cultural identity. Abundant and thriving salmonid and other anadromous fish populations are essential for the continuation of subsistence, cultural, and economic lifeways of the Yurok people.

Unfortunately, due to climate impacts in the Pacific Ocean, dams along the Klamath River, and other impacts; the Yurok fishery has undergone substantial decline during recent decades, which negatively impact the Yurok Tribe and its people's capacity to access commercial fishing income, pass traditional ceremonial and ecological knowledge to future generations, and ensure tribal food security, health, and wellbeing.

These important connections to the Klamath River make the River a culturally significant riverscape to the Yurok people and therefore, should be treated as a cultural resource. Likewise, our ancestral territory along and within the Pacific Ocean are intimately connected to the health of the Klamath River, subsistence fishing and gathering, and viewsheds for cultural practitioners and is a cultural resource. Accordingly, the Yurok Tribe has significant interests in the water quality and corresponding health of the ecosystem and species that reside within the Tribe's Ancestral Territory and the Klamath River Basin, including the Pacific Ocean.

Meaningful Government-to-Government Consultation and Decision-Making Authority

The Yurok Tribe requests that BOEM adopt meaningful government-to-government policies that adopt the international legal norms of the United Nations Declaration on the Rights of Indigenous Peoples and seek to achieve free, prior, and informed consent from the Yurok Tribe for all actions impacting the Tribe's Ancestral Territory,[5] including that within the Pacific Ocean. Further, the Yurok Tribe Requests that BOEM conduct a full EIR instead of just an EA.

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[4] The Yurok Constitution Preamble.

[5] United Nations Declaration on the Rights of Indigenous Peoples (A/RES/61/295) (Sept. 13, 2007), *available at* https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html; United States State Department, "Announcement of U.S. Support for the United Nations Declaration on the Rights of Indigenous Peoples: Initiatives to Promote the Government-to-Government Relationship & Improve the Lives of Indigenous Peoples," (2012), *available at* https://2009-2017.state.gov/documents/organization/184099.pdf; California Assembly Joint Resolution, Indigenous Peoples: Declaration of Rights, No. 42 (Aug. 14, 2014), *available at* http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201320140AJR42; and Yurok Tribal Council Resolution, Yurok Tribe Support for the United Nations Declaration on the Rights of Indigenous Peoples, No. 12-24 (Aug. 24, 2012).

II. Importance of the Klamath River Ecosystem

Hehlkeek'We-Roy "The River that runs through the Mountains" is the Yurok name for the Klamath River ("River"). It is at the core of the Yurok belief system and is the lifeblood of the Yurok people providing food, transportation, commercial trade, cultural lifeways and numerous other activities essential to Yurok lifeways. The Yurok Tribe's enduring responsibilities and connection with the lower Klamath River is expressed in its very name, which means "Downriver People." The natural resources of the Klamath River, tributaries, watersheds and its surrounding lands, and the unique ecological values with the Pacific Ocean have been central to the lives of the Yurok people since time immemorial, fulfilling subsistence, commercial, cultural, and ceremonial needs.

Throughout history and today, the identity of the Yurok people has been intricately woven into the natural environment, including the Pacific Ocean and Klamath River.

Yurok religious and ceremonial practices, *Woneek'We-legoo* "World Renew Ceremonies," uplift and ensure the health of the world for Yurok and all of humankind. The Brush Dance Ceremonies are to pray for the health of a child and held in several villages along the Klamath River. The baskets used to hold food and ceremonial medicine are made of plant materials collected within Yurok Ancestral Territory and the ceremonial items worn by dancers are made of various riparian plant materials, animal skins, and shells from within and along the Pacific Ocean. The First Salmon Ceremony was conducted at the mouth of the Klamath River, where river meets ocean, during the salmon run and marked the beginning of the fishing season. Lastly, the Boat Dance Ceremony as part of the White Deerskin Dance is held in the Klamath River and requires high steady water flows to allow for the dance to be properly performed and to keep the canoes on course.

Proper attendance to the spiritual values of salmon and steelhead ensure the fish will return from year to year. Wrong actions will cause the fish to not return. The relationship is a symbiotic one where the Yurok people provide spiritual and environmental protections to help the fish and the fish provide spiritual and sustenance resources to the people. The Yurok people continue these ceremonies today.

Prior to Euro-American contact, the bounty provided by the Klamath River Ecosystem was, by today's standards, beyond comprehension. Yurok traditional knowledge describes being able to walk across the River on the backs of salmon, and relatively recent historical data shows the Klamath River was the West Coast's third-largest salmon producer. Fishing, hunting, and gathering food and culturally significant plants are particularly important to Tribal members who have long depended on fish, plants, and wildlife for subsistence. The Yurok people attach traditional and contemporary importance to the fisheries associated with the rivers and ocean and the wildlife reliant on a healthy Klamath River ecosystem.

III. Importance of the Yurok High Country

Though most of Yurok Ancestral Territory lies outside of the Reservation, the Yurok people's responsibility to the lands throughout Yurok traditional territory remains unaltered. The lands surrounding the Klamath River are equally important, and include both critical tributaries that contribute to the health and well-being of the River itself, and the forest, prairie, oak woodland, and wetland ecosystems that support a diversity of plant and wildlife species native and critical to the health and vitality of the Yurok Ancestral Territory and the Yurok people. Further, there are many

significant cultural and ceremonial sites, including ocean viewsheds, scattered throughout the Yurok High Country in the mountains, which Yurok people rely on for their spiritual and cultural vitality.

Yurok Ancestral Territory has been significantly degraded by non-Yurok policies leading to emphasis on poor land stewardship practices designed to support commercial extraction, the Yurok Tribe is gradually reacquiring its capacity to steward these lands and waters again through purchase and co-management agreements. These landscapes continue to struggle under management that is out of sync with the natural rhythms of the forest, such as decades of fire suppression or unsustainable forestry practices that have led to unhealthy forests and open lands.

Traditional ecological knowledge held by the Yurok Tribe provides effective and successful management of natural resources including water, land, plants, and animals. The balanced and innovative approach to management of these resources reflects the priorities of the contemporary Tribal government as well as the responsibilities of the Tribe to maintain this connection to the natural world and resources which are essential to the Tribe's existence. Incorporating this traditional knowledge into land management beyond the scope of Tribal boundaries will help bring about a new and healthier balance.

IV. Yurok Projects and Programs

The Yurok Tribe and its departments do significant work protecting the Yurok Tribe's unique connections to Yurok natural resources. Just within the Tribe's natural resources portfolio, the Tribe has Fisheries, Environmental, Forestry, Carbon, Watershed, Fire, and Wildlife departments. Each department is staffed with technical experts, cultural practitioners, and thought leaders on Yurok natural resources who integrate Yurok traditional knowledge into the many projects they implement to protect and restore the Yurok Tribe's natural resources. These comments provide a quick list of projects the Yurok Tribe is pursuing, demonstrating its continued interests in, and stewardship of, the Yurok Tribe's Ancestral Territory.

The Yurok Tribe is currently undertaking several projects, programs, and laws that protect and increase the biodiversity in Yurok Ancestral Territory, sequester carbon, implement traditional knowledge into resource management, and build the Tribe's resiliency against the changing climate. These efforts include dam removal, river restoration, Klamath River ecosystem restoration, condor reintroduction, food sovereignty, carbon sequestration, cultural burns, and development of Yurok Tribal law and policy.

A. Dam Removal

Since colonialization, the Yurok Tribe has witnessed the destruction of the Klamath River, to which the Klamath Dams have caused some of the most harmful impacts. Built without fish passage, the dams have blocked over 400 miles of historic salmon habitat, contributed to impaired water quality, and have severely harmed the river's ecosystem. Notably, the Klamath dams were found to contribute to the 2002 Klamath River fish kill, the largest in American history, and have been attributed to creating habitat conditions susceptible to widespread fish disease, *Ceratonova shasta*, causing almost yearly juvenile fish kills. This tragic history has devastated salmon and steelhead runs, now only 5-10% of historical abundance, along with many other historic fish runs in the river, destroying the river's ecosystem and greatly impairing the Yurok way of life. This is unacceptable. Yurok traditional knowledge states that historic salmon runs ranged from 500,000 to 1,000,000 annually. Each additional year the Klamath dams remain in the river, salmon, steelhead, sturgeon,

and many other species suffer additional harm. This trajectory could lead to the extirpation of genetically distinct populations, including spring-run Klamath River Chinook and coho salmon.

The Yurok Tribe has partnered with the States of California and Oregon, the Karuk Tribe, PacifiCorp, and the Klamath River Renewal Corporation to execute a Memorandum of Agreement that allows for the continued implementation of the Amended Klamath Hydroelectric Settlement Agreement ("KHSA") by addressing the surrender of the Federal Energy Regulatory Commission's licenses for the Klamath Project and Lower Klamath Project and removal of its associated J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate dams. The Tribe will continue its advocacy efforts for dam removal through the Federal Energy Regulatory Commission's processes and seeks California's continued partnership.

B. Restoration Work

The Yurok Tribe's Fisheries, Forestry, Environmental, Fire, Carbon and Watershed departments have many restoration and environmental abatement projects. These include stream and creek restoration projects in the Lower and Upper Klamath River, the Trinity River, Sacramento River, and many smaller streams and creeks throughout the Yurok Reservation to improve the health of these bodies of water and to enhance salmon habitat. The Tribe's restoration teams are some of the leading experts in the area.

The Yurok Tribe also completes many restoration and enhancement projects in the Tribe's Ancestral forests and prairie lands. These projects include: decommissioning old logging roads; traditional forest management practices like cultural burning; removal of invasive species and replanting of Native species; restoring prairie lands to encourage biodiversity of species relying on open spaces; and the Tribe is about to reintroduce California condors to the Yurok Ancestral Territory. Lastly, the Yurok Tribe completes environmental abatement projects throughout the Reservation. Many of these projects include cleaning up illegal cannabis grow sites, removing illegal dumping and waste, Klamath River cleanup community service days, and properly disposing of hazardous materials. Through these environmental abatements, the Tribe strives to have a cleaner and safer environment for the community.

C. Condor Reintroduction

Prey-go-neesh (also known as the California condor) is a sacred being to the Yurok people and is an integral part of Yurok religion. He flies higher than any other and carries the messages of the Yurok people, *Prey-go-neesh* is critical to the Yurok cultural landscape and a historic property under the National Environmental Policy Act and California Environmental Quality Act. *Prey-go-neesh* feathers are used in Yurok high ceremonial regalia and each feather carries the spirit of *Prey-go-neesh*. *Prey-go-neesh* song was chosen by the Creators to be sung in World Renewal Ceremonies because it embodied the essence of *Prey-go-neesh*'s heart and spirit and is still sung in those ceremonies today. The return of *Prey-go-neesh* to Yurok ancestral territory is necessary to ensure the restoration, wholeness, and balance of the entire world.

The Yurok Tribe along with the National Park Service Redwood National Park are in the process of jointly implementing the Northern California Condor Restoration Program to reintroduce *Prey-go-neesh* in the Yurok Ancestral Territory. The collaborative co-management program includes the monitoring and care of released birds, construction of a release/management facility, lead ammunition contamination monitoring and mitigation, and outreach to Yurok and non-Yurok communities about the importance and benefit of the reintroduction of *Prey-go-neesh*.

D. Food Sovereignty

One of the Tribe's newest programs, the Food Sovereignty Program, has the mission to ensure that every Yurok Tribal member has access to sufficient food to meet their nutritional and cultural needs for them to thrive, provided and procured in culturally and environmentally responsible ways. The Food Sovereignty Program strives to create a Yurok food system that can be entirely independent of outside sources, as was historically accurate and feasible. To achieve this goal, the Tribe will reinstate traditional land and ocean management practices to restore traditional food systems and resiliency to changing climates, create and implement sustainable harvest plans, and produce non-traditional foods in a manner that is mutually beneficial to pollinators, meadow and forest health, ocean health, and the environment as a whole.

The Food Sovereignty Program is working to: develop food villages that will allow for the cultivation of a mix of traditional and non-traditional organic foods; organize planned outings where cultural leaders teach Yurok adults and youth about cultural harvesting practices including fishing, crabbing, shellfish and acorn collection; and drafting policies, educational sources, and regulatory bodies to support these food procurement systems to ensure food safety and pass along traditional ways and beliefs such as reciprocity and stewardship of the environment as essential practices during Yurok procurement and production of food.

As a downstream effect of the outlawing of traditional land management practices, many of the ecosystems within Yurok ancestral territory are out of balance. Traditional food systems, particularly those within forests that co-evolved with the regular application of prescribed and cultural fire, have had a significant decrease in the quality and quantity of food they produce. Combined with land access disputes, reduced salmon populations, and other pressures on traditional food systems, many staples of Yurok diets have become increasingly difficult for tribal members to access.

This scarcity over the last few centuries has necessitated tribal members to rely more heavily on traditional foods sourced from the Pacific Ocean and coastline. Many community members harvest shellfish, seaweed, and other seafood throughout the year for household sustenance and subsistence. The Food Sovereignty Program has been supporting community education events that demonstrate traditional harvesting methods for traditional foods sourced from the Pacific Ocean to help households gain the knowledge needed to access them.

As part of ongoing climate resiliency planning, the Food Sovereignty Program is evaluating the feasibility of implementing seaweed/kelp farms, seeding projects, and other seafood generating initiatives. Dwindling salmon populations and forests being ravaged by catastrophic wildfires and extreme drought indicate that traditional foods sourced from the coast and ocean will be increasingly important for Yurok Tribal members in years to come until we rebalance the world and regain a mutually-beneficial and reciprocal relationship with the environment.

E. Yurok Sovereignty, Natural Resource Management and Enforcement of Yurok Law

The Yurok Tribe, as a sovereign nation and federally recognized tribe, has regulatory and adjudicatory jurisdiction throughout Yurok Ancestral Territory to manage Yurok natural resources and enforce Yurok laws for the protection of those resources.

Under the Yurok Fishing Rights Ordinance, the Yurok Tribe sets seasonal harvest management plans to ensure sustainable fisheries that balances preservation with subsistence, cultural, and commercial fishing needs. The Yurok commercial salmon fishing industry represents a significant segment of the Yurok economy. Authorized only when the fishery can sustainably be harvested, the Yurok Tribe operates a salmon commercial fishery in the estuary of the Klamath River in August and early September.

The fishery is limited to Yurok Tribal members and is heavily regulated by Tribal law; meaning 1) the tribal council sets laws limiting the harvest and specifics of when and how fish can be caught based on recommendations from the tribal Fisheries Department, developed in coordination with Pacific Marine Fisheries Council, 2) tribal law enforcement monitors the fishers, and 3) the tribal attorney and tribal court enforce the regulations. Further, the Yurok Tribe has built a state-of-the-art fish processing plant and dock, which will allow the Yurok Tribe to process the salmon caught during the commercial season and sell it to the wide arrays of markets to realize a greater profit from the fish harvest.

The Tribe's commercial fishery offers a significant economic opportunity to Tribal members—one of the only economic opportunities in a rural area of extremely limited economy. Indeed, almost 80% of tribal members on-Reservation live below the poverty line and have an annual income of just over $11,000. The Tribe's fishery is critical to the local economy.

Yurok law provides additional protections for Yurok natural resources through many resolutions, including the Rights of the Klamath River resolution and protection of cultural data, and many ordinances including the Air Quality, Smoke Management Plan, Genetically Engineered Organisms, Water Pollution Control, Water Quality Control Plan, Mining, Underground Storage Tanks, Illegal Dumping, Pesticide, Environmental Policy Act, and Wetlands Protection ordinances. The Tribe uses these laws to inform the Tribe's advocacy and policies and enforces violations of Yurok law in Yurok Tribal Court to redress harms suffered by the environment and Yurok Tribe. Through successful advocacy and enforcement, the Yurok Tribe has been able to implement traditional knowledge into the management and regulation of Yurok natural resources.

These projects, programs, and laws are just some of the examples of how the Yurok Tribe strives to increase the biodiversity in Yurok Ancestral Territory, sequester carbon, implement traditional knowledge into resource management, and build the Tribe's resiliency against the changing climate.

V. Specific Input on the BOEM Draft EA

BOEM and the DOI must redesign the BOEM Offshore Wind Energy Authorization Process in collaboration with the Yurok Tribe, otherwise it will simply continue a long, tragic history of federal resource extraction at the expense of Native nations who will bear the environmental, cultural, and social costs while others reap the benefit. BOEM cannot rush through another energy infrastructure experiment without free, prior and informed consent from the Yurok Tribe. The Yurok Tribe has reviewed the Draft EA as closely as feasible in such a short time period and has several concerns further detailed in the following subsections. Occasionally, the Yurok Tribe proposes specific recommendations and other times simply identify an issue. It is the Yurok Tribe's request and expectation that BOEM staff find solutions to the issues identified and report back to the Yurok Tribe on how, or whether, our recommendations and concerns have been incorporated into the Draft EA revision process.

A. General Input

Generally, one of the largest concerns relates to the small scope of the assessment area and the lack of reference to the potential impacts of the overall projects BOEM and the Yurok Tribe know will follow. While the Yurok Tribe recognizes BOEM designed the Draft EA to simply assess site surveys and characterization, it is disingenuous to disregard the larger project impacts that will likely arise. As BOEM is likely aware, the state of California has already begun finalizing its 20-year transmission plans with very specific goals and routes for energy distribution from the Humboldt Wind Energy Area. The Yurok Tribe request BOEM and the DOI modify the current process to properly account for the DOI's stated end goal, offshore wind energy development in Yurok Ancestral Territory. Further, the Draft EA does not cover the full marine area that should be covered; does not consider all biologic factors; and provides too little information on potential impact to the Yurok Tribe, cultural resources, marine and coastal animals' life history needs and seasonal restrictions. Because the Draft EA focuses on so limited a scope, it lays a foundation for giving the impression that the overall project will be low impact. The Yurok Tribe finds there will be a substantial, or high, impact.

Further, the Yurok Tribe is concerned BOEM is improperly limiting the scope of its full process (beyond the Draft EA) to largely focus on the proposed turbine area. However, the potential impacts from energy transfer conduits, bringing the energy to shore, and distributing energy inland to its destination are disregarded in the BOEM process. While energy transfer impacts are not within the stated scope of this Draft EA; to not be required or expected to conduct surveys for the full potential scope of the project is untenable. Even if BOEM's focus is primarily coastal and offshore waters, a significant missing component is assessment of those oceanic energy conduit pathways, and their potential impacts of their installation and maintenance on the environment. This evaluation should occur now and not after the lease sale process is complete.

B. Wildlife Concerns

It appears that negative impacts to sea turtles have not been thoroughly evaluated. Further, while there was reference to specific species of concern and the potential impact of proposed activities on them, this Draft EA would be improved by some summary tables of species of concern (threatened, endangered, or under other special species status) with their relevant life history overlap with the project area (e.g. foraging timelines, breeding, migration), particularly if they were to extend the lessee assessment area toward land to encompass those electricity conduits. This would help inform whether the proposed activities would negatively impact the species of concern. This would also inform survey requirements to ensure that they capture seasons of particular concern for each species, in the sense of being able to capture how relevant project implementation would be to that life history need. For example, if they study whale populations outside of whale migration, the lessee assessment team will falsely find that whales are not expected to be impacted. Surveys should really be done several times per year to capture different species life history timelines effectively, and it is unclear if that would be required.

Potential impact assessments would also be informed by migration corridor mapping for marine mammals and sea turtles, as well as migratory birds. Within the Yurok Ancestral Territory and "Humboldt Wind Energy Area" some migratory birds do fly at heights that could result in negative impacts by wind turbines, so assessments need to capture the potential for that possibility. Many birds are also known to be impacted by lights—by being drawn to them on offshore platforms, so assessment is needed for potential light impacts.

Another missing component of the predicted site assessments is assessment of electromagnetic (EM) impacts. This may be relevant to the proposed wind turbine area, but could be particularly important to electricity conduit pathways, as they will extend across marine travel corridors for a variety of species, including anadromous fish, cetaceans (whales), and pinnipeds (seals and sea lions), and phytoplankton and phytoplankton. The ocean is already being impacted by climate change, changes in currents, temperature upwelling, oxygen depletion, carbon saturation, and human trash and contamination which are impacting these species. It is already established that piscivorous marine mammals are impacted in this area by changes in fish migration corridors. For example, La Nina or El Nino effects can change oceanic currents and fish travel corridors, and seem to correlate with increased pinniped deaths along northern California shores.

As to marine mammals, there are studies that have deliberately assessed the potential for EM to disrupt phytoplankton and zooplankton. Of particular note is that EM has been proposed as a tool for reducing phytoplankton prevalence on aquatic machinery, as phytoplankton seem to be impacted by EM at certain frequencies. Phytoplankton are of course foundational to the entire marine ecosystem, feeding zooplankton, which feed small fish, crabs, and baleen whales alike. Impacts to phytoplankton and zooplankton could have dramatic impacts on use of the project area. There is reference to benthic assessments, but they seem to be focused more on habitat, than on biological parameters. Ultimately whether this biological parameter is assessed or not, the lack of recognition of the potential impacts is concerning.

In terms of project implementation impacts, the fact that this is being handled largely by BOEM, and not considering the inland impacts, is, again, a bit disingenuous. There should be inland assessments this early in the process. This Draft EA does not consider what path forward the lessee is likely to take. If they choose a lessee that wants to build all new powerline infrastructure in new places, that could be a problem. For example, if they take powerlines down the coastline, that is a major flight corridor for condors. Or, conversely, if they go inland but do not follow established powerline pathways, forging into new territory, then there could be construction of electricity corridors that path condor (or other large bird or raptor) flight corridors. Electrocution or powerline collision remains a significant concern for condors, especially if this will result in very large transmission lines.

Species of potential concern that would be impacted by the overall project (inclusive of electricity conduits) include but are not limited to: Chinook and coho salmon, various trout species, various whale species, California sea lions and various seal species, marbled murrelet, waterfowl, oceanic birds such as albatross or pelicans, California condors, bald and golden eagles, various hawk and other raptor species, crab, seaweed, and oysters, razor clams, abalone, sea urchins, and soft shell chiton.

Finally, Appendix D does not seem to make any reference to seals or sea lions. The Yurok Tribe recommends monitoring for other marine mammals as well, as mitigation measures seem largely focused on whales. Being aware of potential impacts in the area is the most significant step for making sure species are not negatively impacted, especially if the proposed study area is extended to include potential energy conduit path and/or transmission lines.

C. Marine and Coastal Habitats

The Yurok Tribe recommends that the final EA include a cumulative effects analysis of activities that will occur throughout the multi-year process and should describe measures to

minimize those effects. The Yurok Tribe further recommends that BOEM conduct modeling and scientific analyses to assess potential wind-generated effects on ocean processes in this region of the California Current. Specifically, how wind power generation infrastructure might impact ocean upwelling. Finally, the Yurok Tribe recommends BOEM conduct biological site characterization surveys that stress identifying fragile habitats (deep-sea corals and sponges, seeps, rocky habitats) in the WEA and shoreward in cable corridors and include a map of these habitats in the final EA. Again, BOEM should expand its analysis to include potential impacts that sea to shore power transmission cables could have on benthic habitats and the species that occupy those areas.

D. Commercial Fishing

BOEM should expand its analysis to account for other fishing activities in the area, including fisheries that were active in the area in the past, and may use the area in the future. BOEM should also consider impacts to specific fisheries when analyzing potential impacts and provide a comprehensive analysis, especially for Green Sturgeon, Salmonids, Lamprey, and Eulachon.

The Yurok Tribe believes the proposed activities will negatively impact commercial fishing in the area. BOEM must expand the economic analysis to incorporate potential impacts to fishing, fishing tourism, and seafood-dependent businesses, including how those impacts may negatively affect fisherpeople and fishing based businesses in the area. This should include in-river fisheries and associated businesses. The Yurok Tribe recommends that BOEM work with fisherpeople and NOAA to locate appropriate locations for research buoys to minimize the chance of interactions with fisherpeople. Potential impacts resulting from the interactions between fishermen and research buoys should be analyzed and included in the final EA. Even a temporary disturbance could be catastrophic for subsistence fisherpeople or small fishing businesses.

E. Tribes and Tribal Resources

The Draft EA needs to include more information on the Yurok Tribe who has the ancestral territory along the coast (both land and ocean) from Little River to Damnation Creek. There is the potential for significant effects from the visual aspect of the project including light pollution impacting sacred sites.

The Draft EA must expand on the ocean, fishing and subsistence rights of the Yurok Tribe and the effect this project could have on our resources within Yurok Ancestral Territory is significantly more than other tribes and rancherias listed. As written, the Draft EA may be read as implying that rancherias with Yurok descendants have rights or claims to Yurok cultural resources or Yurok ancestral lands. Yet, under the Hoopa-Yurok Settlement Act of 1988, Congress established the Yurok Tribe as the only federally recognized Tribe to have rights to Yurok ancestral lands, cultural resources, and fishing rights. California Rancherias such as the Trinidad Rancheria, Big Lagoon Rancheria, and Resighini Rancheria do not have rights to Yurok ancestral lands, and thus the final EA should be clear that the Yurok Tribe is the only Tribe with rights to cultural and environmental resources located within Yurok Ancestral Territory. BOEM is only obligated to consult with Resighini Rancheria, Trinidad Rancheria, or Big Lagoon Rancheria where the project pertains to their specific tribal trust lands and reservations. It is important that the final EA distinguish this nuance and it should include language about the Yurok Tribe as THPO Tribe, how the Yurok Tribe has actively engaged in protection of our cultural resources and natural resources. The Yurok Tribe is going to be heavily impacted by this project, and a majority of the call area is within Yurok Ancestral Territory, including ocean territory that has never been ceded.

The Yurok Tribe recommends BOEM expand its analysis to include potential impacts that sea to shore power transmission cables could have on Tribal trust species, especially those that rely on the electromagnetic field for feeding and /or navigation. This analysis should also include potential impacts to marine mammals. The Yurok Tribe recommends BOEM further consider the impacts increased vessel activity could have on nearshore and offshore Tribal fishing activities, as well as other Tribal activities (gathering, religious ceremonies, etc…). The Yurok Tribe strongly recommends BOEM expand its analysis on potential impacts to the coastal viewsheds to include areas at higher elevations than sea level. Many Yurok sacred and ceremonial sites are on mountains and ridgetops that have the ocean as part of the viewshed. The elevation of these areas drastically increases the distance observable out to sea, in many cases well past 20 miles.

In the Noise subsection of the Draft EA, there is a statement that "No fish species are identified as potentially experiencing population-level impacts from HRG survey or vessel noise" but it is unclear which were studied for impacts. The Yurok Tribe would like to see the parameters of the study and is concerned that there may not be observable short-term impacts while in the ocean, but a potential for reduced ability to navigate upstream in rivers after damage caused by the surveying noise. Further, the Yurok Tribe is concerned that describing negative effects of noise on wildlife as "short," "intermittent," and only impacting "individual animals" disguises the potential harm, such as beaching and other fatal effects. Failing to address these concerns is disrespectful considering the historical impacts already suffered by these species, every individual animal is important and the Draft EA should account for these impacts to avoid the preventable death of culturally relevant species.

F. Air Quality

The Draft EA Estimate needs to include NAAQS and Hazardous Air Pollutants (HAPS) emission estimates; especially if cumulative emissions from all combined sources exceed major source thresholds. The Yurok Tribe's Clean Air Act Treatment in the manner of an Affected State (TAS) requires notification of major source permitting of sources within 50 miles of the Yurok Indian Reservation. Additionally, offshore air stagnation episodes could allow these emissions the further impact the Yurok Tribe.

G. Water Quality

Water quality impacts would harm the Yurok Tribe and are well within our jurisdiction, as many of our subsistence species are anadromous and would navigate through the impacted areas as they make their way home to their natal streams on the Klamath River. Other culturally significant, migratory species such as grey whales and orcas would be impacted by degraded water quality as a result of the project. There are portions of the Klamath River in Humboldt County that do not meet CA water quality standards and are considered impaired. Any additional impacts from the project would exacerbate the poor water quality conditions in the ocean as a result of impaired river discharges in the area.

Further analysis of oil and petroleum hydrocarbon spills are needed to map and determine potential fate of a large petroleum/oil spill and how that would impact the Yurok Tribe's Ancestral Territory and interests. Further quantitative analysis of petroleum products is also needed. What is the total amount of petroleum products expected to be present during installation, routine maintenance, regular operation and what is the spill prevention and action plan? The Yurok Tribe

should be consulted on these issues and must be on the call list for entities who that get immediate spill notifications.

The Draft EA discusses potential for vessel discharge, in no circumstance should a vessel be discharging sanitary waste into the ocean. They should have proper sanitation facilities on-board and discharge those materials once they return to land. Further, the Draft EA should provide a list of all equipment that has the potential of being lost, and a detailed recovery plan in the event of an incident, and identify the entity responsible for ensuring compliance with the recovery plan.

H. Environmental Justice

The Draft EA Table 3-12 does not accurately reflect the area demographics, by using "alone" categories, the Draft EA erases people with mixed demographics that may be disproportionally impacted. If a Yurok person is part white and selected both, the disproportionate harms caused would not be reflected correctly by these numbers and the Yurok or American Indian designation is essentially cancelled out. This problem must be addressed in order to accurately reflect the EJ demographics impacted, and should include houseless individuals, and American Indians that travel through for access to traditional food, cultural gathering, and ceremonial sites.

Further, the Draft EA focus on Fields Landing, Schneider Dock, and the city of Arcata only captures residents in those regions, not those who may be traveling in and out of those areas to gather traditional foods and cultural materials, ceremonial spaces, etc. The Yurok Tribe has members in these areas and focusing on just the residential population does not accurately reflect the impact on American Indians travelling in and out of the area. It is unclear if Table 3-13 and Table 3-12 reflect the same data, as the "alone" designation is not present, so it is unclear how useful a comparison may be.

The Draft EA does not properly account for impacts of the proposed actions such as visual disturbance, light pollution, noise pollution, increased pollution from increased traffic, increased traffic and road construction, and the psychological harm of development without free, prior, and informed consent — which is compounded by similar intergenerational trauma of Yurok tribal members (American Indians) caused by the harms of dam construction and the logging industry.

The Drat EA also fails to consider how on-shore activities will impede access to the coast, not only physical access but by creating safety concerns for the Yurok Tribe's members in the area by creating conditions that have led to the current crisis of Missing and Murdered Indigenous Peoples ("MMIP"). Historically, development projects mean an influx of workers from outside the local area, usually single men or men living away from their families during planning and construction activities which leads to an increased risk of sex trafficking and missing person cases. The National Indigenous Women's Resource Center has several resources on this issue and it is the Yurok Tribe's understanding that addressing MMIP is a priority of the Biden Administration and DOI Secretary Haaland. The Yurok Tribe has focused its resources on addressing this MMIP crisis within the Yurok Ancestral Territory, such impacts must be included in the Final EA.

The Draft EA does not properly describe its finding that hydrogen releases from buoy lead-acid batteries will be negligible. By what standards? Will localized acidification ('hydrogen releases') impact species that are attracted to buoys, such as seals, sea lions, gulls/birds, mussels, barnacles, etc.? Harm to some of these species is a cultural harm. Further, it fails to consider the potential

leaching of other chemicals and heavy metals from these buoys, such as lead being consumed by marine animals and bioaccumulating in the food chain.

The Draft EA finding contains an unfortunate conclusion that "In Humboldt County, low income appears to be the most relevant environmental justice criteria." The Yurok Tribe challenges the use of the word "relevant" here. Low-income may be the most wide-spread factor, but not necessarily the most relevant and appears be the most relevant for the population of white residents. Further, it appears that, even in the Environmental Justice section, the Draft EA is full of implicit bias and lacks historical, political, and cultural understanding of tribal sovereignty, tribal citizenship, and environmental justice communities. Indeed, a 6.4% population of American Indians "alone" is a remarkable concentration of American Indians (including many of the Yurok Tribe's members) considering the history of genocide and colonization that has resulted in American Indians being less than 2% of the national population.

If a relevancy ranking is necessary in the Draft EA, BOEM should adjust its finding to demonstrate that impact on American Indians is the most relevant. Low-income is one of the many relevant factors and BOEM must conduct further analysis of other environmental justice criteria, including pollution, traffic, impact on American Indians, and other issues identified throughout this comment. The CalEnviroScreen tool has more EJ information that is not reflected in the Draft EA, broadening evaluation beyond the EPA SCREEN tool will result in a more accurate and comprehensive Environmental Justice section.

The Yurok Tribe recommends making outreach materials accessible to those with limited reading capabilities, to make clear how these materials will be distributed and to make them available to those Yurok tribal members who use the cultural resources in the area.

I. Recommendations for Specific Line Edits

The Yurok Tribe makes the following specific edit suggestions to the Draft EA language:

- On page 70, change to "The largest current and anticipated future contributors to impacts on Tribes and Tribal resources stem from ongoing changes in environmental conditions related to climate change, the effects of centuries-long and ongoing colonization and related land and resource theft by the United States and the State of California, combined with other factors."
- On page 64, change to "A number of Tribes have ancestral and current connections to northern California coasts, offshore areas, and marine species and ecosystems. Tribes' connections to the region include their traditional and ancestral homelands, management of ecosystems and sovereign governance of land and water territories since time immemorial, reliance on migratory marine/anadromous resources for food and cultural connections, and stewardship of marine resources and ecosystems within their ancestral waters (Van Pelt et al. 2017))."
- On page 64, change to "Additionally, as discussed in Section 3.10, Historic Properties, before the last rise in sea levels, the coastline of the region extended beyond the present-day coast to include now-submerged areas that were likely inhabited by ancestors of northern California Tribes. Mountain highlands, from which views to the ocean are often prominent, are of particular spiritual significance to the Yurok Tribe."

- On page 65, change to "The Klamath River and its related streams provide essential cultural, economic, governmental, social, subsistence, and spiritual connections to the land and ocean […]"
- On page 66, change to "Tribal governments provide a variety of services for their members, govern and manage their nations, and consult with other government entities on issues of importance to their Tribes and members."
- On page 66, change to "Tribal enterprises provide revenue for Tribes to support services and economic opportunities for their members;, maintain economic, cultural, and social connections to the coast and ocean; and commercial and business enterprises operated by Tribal members provide important sources of income."
- On page 66, change to "Additionally, some Tribes in the region have expressed interest in potential economic benefits of offshore wind energy for Tribes, including but not limited to, workforce development"
- On page 66, change to "Tribes have identified the importance of tribal involvement and control over offshore wind development as a critical aspect of potential, broader economic benefits (workforce development, regional tribal energy independence, etc.), environmental stewardship, and tribal government benefits of offshore wind development (Ciara et al. 2020)."
- On page 67, change to accurately reflect the importance of the Klamath River and its ecosystem to the Yurok Tribe based on information provided in this comment.
- On page 68, change to "Throughout the leasing and site assessment process, BOEM will provide regular reports to and regularly consult with continue to engage with Tribes interested in HRG surveys, associated noise, and potential effects on marine organisms."
- On page 69, change to "The Yurok Tribe has expressed interest in involvement in climate adaptation planning, and decision making authority in planning processes and potential opportunities in later offshore wind development stages (BOEM and CEC 2018; Ciara et al. 2020)."

VI. General Recommendations:

A. Recognition of Yurok Sovereignty and Yurok Law

As discussed above, the Yurok Tribe has robust laws and policies informed by Yurok traditional knowledge to regulate Yurok natural resources, and maintains and regularly contributes to a long history of developing and implementing the best of modern science to assess a deeply impacted system. The Tribe requests that BOEM recognize the Tribe's regulatory and adjudicatory jurisdiction to manage Yurok natural resources, including the portions BOEM has designated "Humboldt Wind Energy Area" within Yurok Ancestral Territory. Thus, when any agency, such as BOEM, or a developing entity is operating within Yurok Tribe's ancestral territory and jurisdiction—that entity consult and coordinate with the Tribe on the project, comply with Yurok law, and apply for and follow Yurok water quality and cultural permits. In the event of error or violation of laws or permits, the Tribe requests BOEM have a mechanism in place to not only remediate the harm, but to also pay fines and make the Yurok Tribe whole. The Tribe believes through the development of memorandums of understanding, contracts, and agreements, BOEM and the Yurok Tribe can develop a process that is respectful of both tribal and federal laws.

The Tribe also suggests collaboration with the Tribe to ensure federal laws, policies, and management plans regulate natural resources concurrently with the Tribe's authority.

B. Co-Management of Lands, Waters, Coastline, and Resources

The Yurok Tribe requests that the Tribe is included in the management and decision making for all lands, waters, coastlines, aquifers, resources, etc. within the Yurok Ancestral Territory and ancestral coastal waters which have never been ceded. To implement Yurok management and decision making, the Tribe requests BOEM and the DOI develop joint powers agreements, memorandum of understandings and co-management agreements for all lands, waters, coastlines, aquifers, resources, etc. that are not available for transfer to the Yurok Tribe. We are open to a tribal-federal-state collaboration to properly cover the full scope of our concerns.

Conclusion

Thank you for considering our comments. The Yurok Tribe respectfully requests a formal government-to-government consultation with the Department of the Interior and another government-to-government meeting with BOEM. We look forward to meeting with you, please contact Taralyn Ipińa at Tara@yuroktribe.nsn.us to coordinate meeting times and with any questions you may have about this letter.

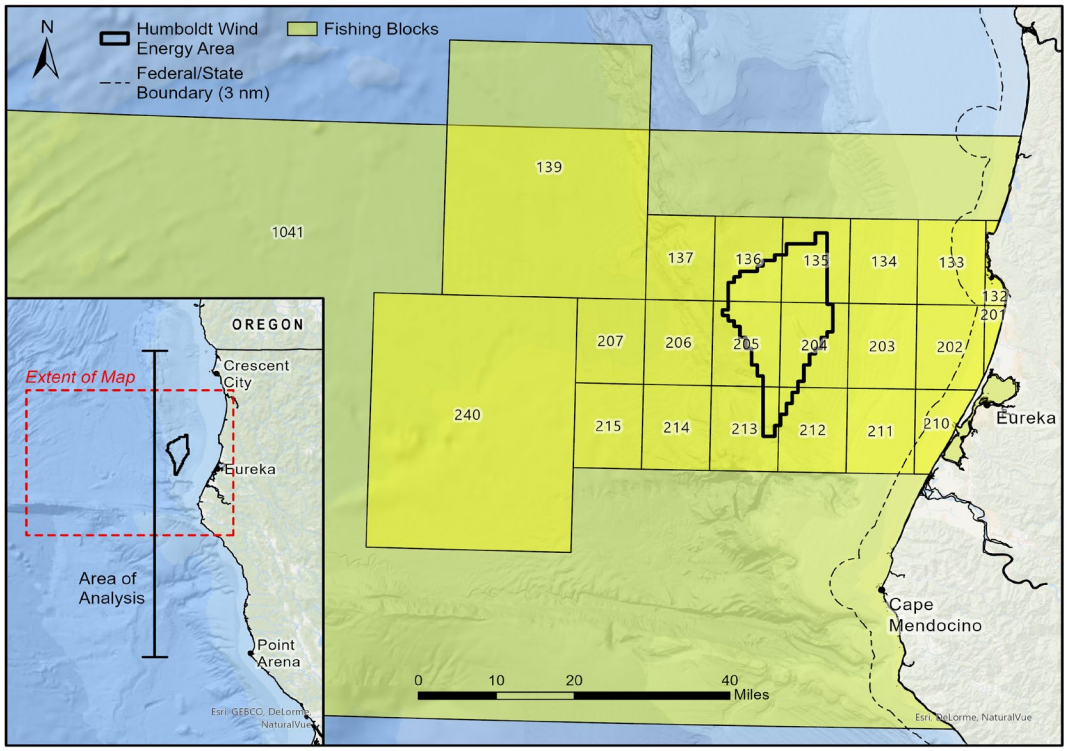
Wok-hlew',

Joseph L. James
Chairperson
Yurok Tribal Council

Appendix B: List of Tables

Appendix C: CDFW Fish Data

Greater WEA as provided by CDFW



Notes and Metadata

1. Vessel Count by year had all the -1 and Zeros removed before the count.
2. Blocks used were for those north of Point Arena (100-299) and included 1040, 1041, 1042
3. Blocks used for the WEA were blocks 132-137; 201-207; 210-215; 240; 1041]
4. All vessels with at least one fish ticket returned are included in the Vessel Summary
5. Landings by Gear is from 1980 to 2020 in NorCal
6. Vessels with catch in NorCal and Landing in NorCal ports was done by the county in which the port was in during the query (Mendocino, Humboldt, Del Norte)
7. Nor Cal is offshore of Mendocino, Humboldt, and Del Norte Counties

Source: CDFW Marine Region, POC: Brian Owens (brian.owens@cdfw.ca.gov)

Year	All Vessels in NorCal	Vessels in WEA*	Vessels Landing NorCalPorts	Percent in WEA*	Number of Vessels Home Port in NorCal	Percent of Vessels Homeport Outside Norcal	Vessels that Fished and Landed at Ports in NorCal	Vessels landing at ports outside of NorCal	Vessels homeported in NorCal but fished in WEA*	Vessels homeported OUTSIDE NorCal but fished in WEA*
1980	2869	136	2809	4.7			98%	2%		
1981	2607	85	2540	3.3			97%	3%		
1982	2516	340	2426	13.5			96%	4%		
1983	1986	542	1924	27.3			97%	3%		
1984	1497	401	1445	26.8			97%	3%		
1985	1448	348	1366	24.0			94%	6%		
1986	1629	428	1564	26.3			96%	4%		
1987	1671	498	1583	29.8			95%	5%		
1988	1680	492	1576	29.3			94%	6%		
1989	1649	443	1571	26.9			95%	5%		
1990	1417	439	1288	31.0			91%	9%		
1991	1212	423	1150	34.9			95%	5%		
1992	916	313	867	34.2			95%	5%		
1993	986	306	958	31.0			97%	3%		
1994	1030	322	884	31.3			86%	14%		
1995	810	271	690	33.5			85%	15%		
1996	901	254	759	28.2			84%	16%		
1997	798	246	716	30.8			90%	10%		
1998	694	230	628	33.1			90%	10%		
1999	673	223	595	33.1			88%	12%		
2000	659	204	575	31.0			87%	13%		
2001	609	180	519	29.6			85%	15%		
2002	588	196	536	33.3			91%	9%		
2003	604	180	542	29.8			90%	10%		
2004	555	172	527	31.0			95%	5%		
2005	498	141	466	28.3			94%	6%		
2006	450	136	426	30.2			95%	5%		
2007	509	218	493	42.8			97%	3%		
2008	350	134	341	38.3			97%	3%		
2009	347	137	338	39.5			97%	3%		
2010	429	139	414	32.4	280	35%	97%	3%	114	18%
2011	448	140	423	31.3	278	38%	94%	6%	105	25%
2012	424	158	400	37.3	278	34%	94%	6%	112	29%
2013	554	187	525	33.8	327	41%	95%	5%	130	30%
2014	558	145	540	26.0	312	44%	97%	3%	107	26%
2015	491	90	476	18.3	308	37%	97%	3%	72	20%
2016	420	99	403	23.6	284	32%	96%	4%	82	17%
2017	388	101	371	26.0	384	1%	96%	4%	85	16%
2018	483	151	459	31.3	305	37%	95%	5%	110	27%
2019	491	131	434	26.7	295	40%	88%	12%	97	26%
2020	397	103	318	25.9	229	42%	80%	20%	80	22%
				average		**average**	**average**	**average**		**average**
				28.8		35%	93%	7%		23%

*Greater WEA per CDFW provided image

Landings by Gear in greater WEA 1980-2020

Gear Complex	Pounds	Value
Trap	106,880,887	$199,467,248
Trawl Nets	372,292,924	$146,088,153
Hook and Line	15,233,817	$13,419,207
Longline	7,461,760	$13,139,908
Troll	6,650,386	$8,999,319
Unknown gears	27,047,615	$6,966,257
Round Haul Nets	6,186,972	$1,790,705
Hand Nets	4,657,569	$1,144,652
Entangling Nets	1,415,886	$1,009,031
Hand	739,042	$267,474
Other Gears	82,485	$29,900
*Spear	Redacted (>1500lbs)	Redacted (>$6,000)

Longline Note-The code for pelagic longline didn't exist until recently, so this longline is a mixture of both pelagic and set longline.

***Due to the low volume of catch, this gear's acual pounds and value were removed to protect confidentiality and an approximate figure was used in its place.**

Species Caught by Gear

Gillnets	Hand	Hand Nets	Hook and Line	Longline	Other Gears
Dungeness Crab	Dungeness Crab	Market squid	Groundfish	Dungeness Crab	Dungeness Crab
Groundfish	Other Invertebrate	Other Fish	Groundfish-Rockfish	Groundfish	Groundfish
Groundfish-Rockfish		Shrimp and Prawn	Groundfish-Sablefish	Groundfish-Rockfish	Groundfish-Rockfish
Groundfish-Sablefish			Halibut	Groundfish-Sablefish	Groundfish-Sablefish
Halibut			Highly Migratory Species	Halibut	Highly Migratory Species
Highly Migratory Species			Other Fish	Highly Migratory Species	Other Fish
Highly Migratory Species-Swordfish			Other Invertebrate	Highly Migratory Species-Swordfish	Other Invertebrate
Other Fish			Salmon	Other Fish	Other Gears
Other Invertebrate				Other Invertebrate	
Salmon				Salmon	

Round Haul Nets	Spear	Trap	Trawl Nets	Troll	Unknown gears
Coastal Pelagic Species	Highly Migratory Species-S	Crab	Coastal Pelagic Species	Coastal Pelagic Species	Coastal Pelagic Species
Market squid		Dungeness Crab	Crab	Highly Migratory Species	Crab
Other Fish		Groundfish	Dungeness Crab	Highly Migratory Species-Swordfish	Dungeness Crab
		Groundfish-Rockfish	Groundfish	Other Fish	Groundfish
		Groundfish-Sablefish	Groundfish-Rockfish	Other Invertebrate	Groundfish-Rockfish
		Other Fish	Groundfish-Sablefish	Salmon	Groundfish-Sablefish
		Other Invertebrate	Halibut		Halibut
		Shrimp and Prawn	Other Fish		Highly Migratory Species
			Other Invertebrate		Highly Migratory Species-Sw
			Salmon		Market squid
			Shrimp and Prawn		Other Fish
					Other Invertebrate
					Salmon
					Shrimp and Prawn

NorcalFishery (1980-2020)	Pounds	Ex-Vessel
Dungeness Crab	349,053,217	$669,836,087
Groundfish	711,121,732	$189,338,701
Salmon	42,363,081	$115,538,570
Groundfish-Sablefish	144,235,459	$112,316,948
Shrimp and Prawn	219,343,322	$107,962,399
Groundfish-Rockfish	296,489,397	$99,344,883
Other Invertebrate	158,514,573	$77,011,669
Highly Migratory Species	49,652,662	$37,961,318
Other Fish	52,651,577	$20,563,756
Highly Migratory Species-Swordfish	3,505,654	$7,488,787
Market squid	8,162,284	$2,533,880
Crab	1,197,498	$1,365,779
Halibut	436,078	$1,124,324
Coastal Pelagic Species	1,705,668	$158,921
All Groundfish Total	**1,151,846,587**	**$401,000,532**

NorcalFishery (2010-2020)	Pounds	Ex-Vessel
Dungeness Crab	98,259,559	$302,482,874
Groundfish	68,994,137	$36,443,804
Groundfish-Sablefish	16,506,879	$35,865,381
Shrimp and Prawn	56,579,413	$33,543,661
Salmon	4,965,253	$27,575,319
Other Invertebrate	17,521,799	$14,552,487
Groundfish-Rockfish	10,458,850	$8,522,453
Other Fish	10,157,308	$6,142,277
Highly Migratory Species	3,421,180	$4,740,618
Market squid	6,070,138	$2,215,966
Highly Migratory Species-Swordfish	126,760	$434,669
Halibut	65,439	$406,620
Coastal Pelagic Species	191,035	$45,621
Crab	17,843	$39,138
All groundfish Total	**95,959,866**	**$80,831,638**

WEA_Fishery (1980-2020)	Pounds	Ex-Vessel
Dungeness Crab	97,315,768	$194,162,270
Groundfish	253,594,395	$81,350,006
Groundfish-Sablefish	41,964,047	$43,717,162
Groundfish-Rockfish	80,674,527	$28,455,003
Shrimp and Prawn	29496457.42	$13,668,890
Highly Migratory Species	15,038,729	$10,589,560
Salmon	3,610,228	$9,961,802
Other Fish	19,303,136	$7,459,259
Market squid	5,514,139	$1,750,869
Highly Migratory Species-Swordfish	307,008	$496,724
Other Invertebrate	825,052	$304,968
Halibut	72,011	$191,665
Crab	179,563	$172,438
Coastal Pelagic Species	755,689	$47,076
All Groundfish Total	**376,232,968**	**$153,522,171**

WEA_Fishery (2010-2020)	Pounds	Ex-Vessel
Dungeness Crab	29,588,443	$90,189,987
Groundfish	48,384,801	$25,992,080
Groundfish-Sablefish	7,903,011	$17,093,207
Shrimp and Prawn	12485483	$6,306,513
Other Fish	4,994,788	$2,927,256
Salmon	315,592	$1,894,584
Market squid	4,992,768	$1,652,651
Groundfish-Rockfish	3,778,822	$1,533,378
Highly Migratory Species	924,340	$1,296,885
Highly Migratory Species-Swordfish	49,228	$152,846
Halibut	12,842	$74,791
Coastal Pelagic Species	158,773	$19,049
Other Invertebrate	21,568	$11,230
Crab	3,804	$2,335
All groundfish total	**60,066,634**	**$44,618,665**

Common Name	Species Group/Fishery
Anchovy, deepbody	Coastal Pelagic Species
Anchovy, northern	Coastal Pelagic Species
Anchovy, slough	Coastal Pelagic Species
Herring, round	Coastal Pelagic Species
Mackerel, bullet	Coastal Pelagic Species
Mackerel, jack	Coastal Pelagic Species
Mackerel, Pacific	Coastal Pelagic Species
Mackerel, unspecified	Coastal Pelagic Species
Sardine, juvenile	Coastal Pelagic Species
Sardine, Pacific	Coastal Pelagic Species
Carp	Crab
Crab, box	Crab
Crab, brown rock	Crab
Crab, claws	Crab
Crab, king	Crab
Crab, pelagic red	Crab
Crab, red rock	Crab
Crab, rock unspecified	Crab
Crab, sand	Crab
Crab, shore	Crab
Crab, spider	Crab
Crab, tanner	Crab
Crab, yellow rock	Crab
Crab, Dungeness	Dungeness Crab
Flounder, arrowtooth	Groundfish
Flounder, starry	Groundfish
Flounder, unspecified	Groundfish
Greenling, kelp	Groundfish
Grenadiers	Groundfish
Lingcod	Groundfish
Sanddab	Groundfish
Sanddab, longfin	Groundfish
Sanddab, Pacific	Groundfish
Sanddab, speckled	Groundfish
Sculpin, staghorn	Groundfish
Skate, big	Groundfish
Skate, California	Groundfish
Skate, unspecified	Groundfish
Sole, bigmouth	Groundfish
Sole, butter	Groundfish
Sole, C-O	Groundfish
Sole, Dover	Groundfish
Sole, English	Groundfish
Sole, petrale	Groundfish
Sole, rex	Groundfish
Sole, rock	Groundfish

Sole, slender	Groundfish
Sole, tongue	Groundfish
Sole, unspecified	Groundfish
Thornyheads	Groundfish
Turbot	Groundfish
Turbot, curlfin	Groundfish
Turbot, diamond	Groundfish
Turbot, hornyhead	Groundfish
Turbot, spotted	Groundfish
Whiting, Pacific	Groundfish
Cabezon	Groundfish-Rockfish
Rockfish, aurora	Groundfish-Rockfish
Rockfish, bank	Groundfish-Rockfish
Rockfish, black	Groundfish-Rockfish
Rockfish, black-and-yellow	Groundfish-Rockfish
Rockfish, blackgill	Groundfish-Rockfish
Rockfish, blue	Groundfish-Rockfish
Rockfish, bocaccio	Groundfish-Rockfish
Rockfish, bronzespotted	Groundfish-Rockfish
Rockfish, brown	Groundfish-Rockfish
Rockfish, calico	Groundfish-Rockfish
Rockfish, canary	Groundfish-Rockfish
Rockfish, chameleon	Groundfish-Rockfish
Rockfish, chilipepper	Groundfish-Rockfish
Rockfish, China	Groundfish-Rockfish
Rockfish, copper	Groundfish-Rockfish
Rockfish, copper (whitebelly)	Groundfish-Rockfish
Rockfish, cowcod	Groundfish-Rockfish
Rockfish, darkblotched	Groundfish-Rockfish
Rockfish, flag	Groundfish-Rockfish
Rockfish, gopher	Groundfish-Rockfish
Rockfish, grass	Groundfish-Rockfish
Rockfish, greenblotched	Groundfish-Rockfish
Rockfish, greenspotted	Groundfish-Rockfish
Rockfish, greenstriped	Groundfish-Rockfish
Rockfish, group black/blue	Groundfish-Rockfish
Rockfish, group bocaccio/chili	Groundfish-Rockfish
Rockfish, group bolina	Groundfish-Rockfish
Rockfish, group canary/vermili	Groundfish-Rockfish
Rockfish, group deeper nearshore	Groundfish-Rockfish
Rockfish, group deepwater reds	Groundfish-Rockfish

Rockfish, group gopher	Groundfish-Rockfish
Rockfish, group nearshore	Groundfish-Rockfish
Rockfish, group red	Groundfish-Rockfish
Rockfish, group rosefish	Groundfish-Rockfish
Rockfish, group shelf	Groundfish-Rockfish
Rockfish, group slope	Groundfish-Rockfish
Rockfish, group small	Groundfish-Rockfish
Rockfish, honeycomb	Groundfish-Rockfish
Rockfish, kelp	Groundfish-Rockfish
Rockfish, olive	Groundfish-Rockfish
Rockfish, Pacific ocean perch	Groundfish-Rockfish
Rockfish, pink	Groundfish-Rockfish
Rockfish, pinkrose	Groundfish-Rockfish
Rockfish, quillback	Groundfish-Rockfish
Rockfish, redbanded	Groundfish-Rockfish
Rockfish, rosethorn	Groundfish-Rockfish
Rockfish, rosy	Groundfish-Rockfish
Rockfish, shortbelly	Groundfish-Rockfish
Rockfish, speckled	Groundfish-Rockfish
Rockfish, splitnose	Groundfish-Rockfish
Rockfish, squarespot	Groundfish-Rockfish
Rockfish, starry	Groundfish-Rockfish
Rockfish, stripetail	Groundfish-Rockfish
Rockfish, swordspine	Groundfish-Rockfish
Rockfish, treefish	Groundfish-Rockfish
Rockfish, unspecified	Groundfish-Rockfish
Rockfish, vermilion	Groundfish-Rockfish
Rockfish, widow	Groundfish-Rockfish
Rockfish, yelloweye	Groundfish-Rockfish
Rockfish, yellowtail	Groundfish-Rockfish
Scorpionfish, California	Groundfish-Rockfish
Thornyhead, longspine	Groundfish-Rockfish
Thornyhead, shortspine	Groundfish-Rockfish
Sablefish	Groundfish-Sablefish
Halibut, California	Halibut
Halibut, Pacific	Halibut
Halibut, unspecified	Halibut
Dolphin (fish)	Highly Migratory Species
Escolar	Highly Migratory Species
Marlin, striped	Highly Migratory Species
Opah	Highly Migratory Species
Sailfish	Highly Migratory Species
Shark, basking	Highly Migratory Species
Shark, bigeye thresher	Highly Migratory Species
Shark, blue	Highly Migratory Species
Shark, pelagic thresher	Highly Migratory Species

Shark, salmon	Highly Migratory Species
Shark, shortfin mako	Highly Migratory Species
Shark, thresher	Highly Migratory Species
Shark, white	Highly Migratory Species
Tuna, albacore	Highly Migratory Species
Tuna, bigeye	Highly Migratory Species
Tuna, blackfin	Highly Migratory Species
Tuna, bluefin	Highly Migratory Species
Tuna, longtail	Highly Migratory Species
Tuna, skipjack	Highly Migratory Species
Tuna, skipjack, black	Highly Migratory Species
Tuna, unspecified	Highly Migratory Species
Tuna, yellowfin	Highly Migratory Species
Wahoo	Highly Migratory Species
Swordfish	Highly Migratory Species-Swordfish
Agar	Kelp
Algae, marine	Kelp
Kelp	Kelp
Lobster, California spiny	Lobster
Squid, market	Market squid
Frog	NA
Frog, bull	NA
Terrapin	NA
Turtle	NA
Barracuda, California	Other Fish
Bass, barred sand	Other Fish
Bass, giant sea	Other Fish
Bass, kelp	Other Fish
Bass, rock	Other Fish
Bass, spotted sand	Other Fish
Bass, striped	Other Fish
Blackfish, Sacramento	Other Fish
Blacksmith	Other Fish
Bonefish	Other Fish
Bonito, Pacific	Other Fish
Bullhead, brown	Other Fish
Butterfish (Pacific pompano)	Other Fish
Cabrilla, spotted	Other Fish
Catfish, unspecified	Other Fish
Cod, Pacific	Other Fish
Corbina, California	Other Fish
Corvina, shortfin	Other Fish
Croaker, black	Other Fish
Croaker, spotfin	Other Fish
Croaker, unspecifed	Other Fish

Croaker, white	Other Fish
Croaker, yellowfin	Other Fish
Eel	Other Fish
Eel, blenny	Other Fish
Eel, California moray	Other Fish
Eel, monkeyface	Other Fish
Eel, spotted cusk-	Other Fish
Eel, wolf (wolf-eel)	Other Fish
Eulachon	Other Fish
Fish, unspecified	Other Fish
Flyingfish	Other Fish
Garibaldi	Other Fish
Goby, bluebanded	Other Fish
Goby, yellowfin	Other Fish
Goby, zebra	Other Fish
Grouper	Other Fish
Grouper, broomtail	Other Fish
Grunion, California	Other Fish
Guitarfish, shovelnose	Other Fish
Hagfishes	Other Fish
Halfmoon	Other Fish
Hardhead (freshwater)	Other Fish
Herring roe on kelp	Other Fish
Herring, Pacific	Other Fish
Herring, Roe	Other Fish
Hitch	Other Fish
Jack, almaco (amberjack)	Other Fish
Jack, Pacific crevalle	Other Fish
Jacks, unspecified	Other Fish
Jacksmelt	Other Fish
Kahawai	Other Fish
Kelpfish, giant	Other Fish
Kelpfishes	Other Fish
Killifish, California	Other Fish
Lamprey, Pacific	Other Fish
Lancelets, amphioxus	Other Fish
Lizardfish, California	Other Fish
Louvar	Other Fish
Midshipman, plainfin	Other Fish
Mudsucker, longjaw	Other Fish
Mullet, striped	Other Fish
Needlefish, California	Other Fish
Oilfish	Other Fish
Opaleye	Other Fish
Queenfish	Other Fish
Ratfish, spotted	Other Fish

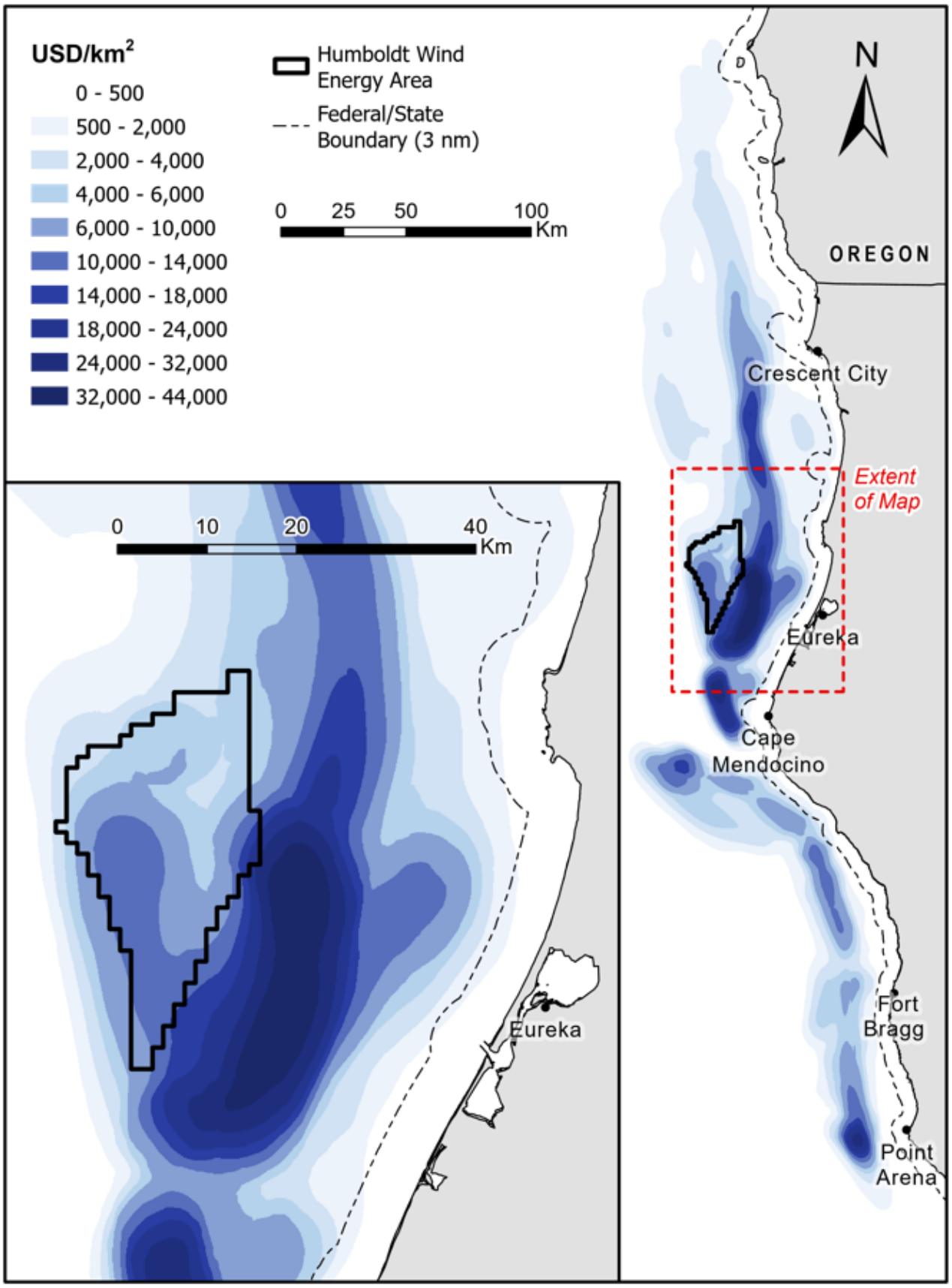
Ray, bat	Other Fish
Ray, Pacific electric	Other Fish
Ray, unspecified	Other Fish
Salema	Other Fish
Sargo	Other Fish
Saury, Pacific	Other Fish
Sculpin, yellowchin	Other Fish
Seabass, totuava	Other Fish
Seabass, white	Other Fish
Senorita	Other Fish
Shad, American	Other Fish
Shad, threadfin	Other Fish
Shark, blacktip	Other Fish
Shark, brown smoothhound	Other Fish
Shark, dusky	Other Fish
Shark, gray smoothhound	Other Fish
Shark, horn	Other Fish
Shark, leopard	Other Fish
Shark, Pacific angel	Other Fish
Shark, sevengill	Other Fish
Shark, sixgill	Other Fish
Shark, smooth hammerhead	Other Fish
Shark, soupfin	Other Fish
Shark, spiny dogfish	Other Fish
Shark, swell	Other Fish
Shark, unspecified	Other Fish
Sharks, cow	Other Fish
Sheephead, California	Other Fish
Sierra, Pacific	Other Fish
Silversides	Other Fish
Skate, thornback	Other Fish
Smelt, night	Other Fish
Smelt, surf	Other Fish
Smelt, whitebait	Other Fish
Smelts, true	Other Fish
Snapper -Mexico-	Other Fish
Sole, fantail	Other Fish
Sole, sand	Other Fish
Splittail	Other Fish
Squawfish	Other Fish
Stickleback, threespine	Other Fish
Stingray	Other Fish
Sturgeons	Other Fish
Sucker	Other Fish

Sunfish, ocean	Other Fish
Surfperch, barred	Other Fish
Surfperch, black	Other Fish
Surfperch, calico	Other Fish
Surfperch, dwarf	Other Fish
Surfperch, pile	Other Fish
Surfperch, pink	Other Fish
Surfperch, rainbow	Other Fish
Surfperch, redtail	Other Fish
Surfperch, rubberlip	Other Fish
Surfperch, shiner	Other Fish
Surfperch, unspecified	Other Fish
Surfperch, walleye	Other Fish
Surfperch, white	Other Fish
Tilapia	Other Fish
Tomcod, Pacific	Other Fish
Topsmelt	Other Fish
Trawled fish for animal food	Other Fish
Trawled fish, unspecified	Other Fish
Triggerfish	Other Fish
Trout, rainbow	Other Fish
Whitefish, ocean	Other Fish
Wrasse, rock	Other Fish
Yellowtail	Other Fish
Zebraperch	Other Fish
Abalone	Other Invertebrate
Abalone, black	Other Invertebrate
Abalone, flat	Other Invertebrate
Abalone, green	Other Invertebrate
Abalone, pink	Other Invertebrate
Abalone, pinto	Other Invertebrate
Abalone, red	Other Invertebrate
Abalone, threaded	Other Invertebrate
Abalone, white	Other Invertebrate
Barnacle	Other Invertebrate
Chiton, unspecified	Other Invertebrate
Clam, California jackknife	Other Invertebrate
Clam, common littleneck	Other Invertebrate
Clam, common Washington	Other Invertebrate
Clam, freshwater	Other Invertebrate
Clam, gaper	Other Invertebrate
Clam, northern quahog	Other Invertebrate
Clam, northern razor	Other Invertebrate
Clam, Pismo	Other Invertebrate
Clam, purple	Other Invertebrate

Clam, rosy razor	Other Invertebrate
Clam, softshell	Other Invertebrate
Clam, unspecified	Other Invertebrate
Crayfish, red swamp	Other Invertebrate
Crayfish, signal	Other Invertebrate
Crayfish, unspecified	Other Invertebrate
Crustacean, unspecified	Other Invertebrate
Cucumber, sea	Other Invertebrate
Echinoderm, unspecified	Other Invertebrate
Invertebrates, colonial	Other Invertebrate
Limpet, unspecified	Other Invertebrate
Mollusk, unspecified	Other Invertebrate
Mussel	Other Invertebrate
Octopus, unspecified	Other Invertebrate
Oyster, California native	Other Invertebrate
Oyster, eastern	Other Invertebrate
Oyster, european flat	Other Invertebrate
Oyster, giant Pacific	Other Invertebrate
Oyster, unspecified	Other Invertebrate
Scallop, rock	Other Invertebrate
Scallop, unspecified	Other Invertebrate
Scallop, weathervane	Other Invertebrate
Sea hare	Other Invertebrate
Sea slug	Other Invertebrate
Sea stars	Other Invertebrate
Snail, bubble	Other Invertebrate
Snail, freshwater	Other Invertebrate
Snail, sea	Other Invertebrate
Snail, top	Other Invertebrate
Snails, moon	Other Invertebrate
Spiders, sea	Other Invertebrate
Sponges	Other Invertebrate
Squid, jumbo	Other Invertebrate
Themiste	Other Invertebrate
Tunicates	Other Invertebrate
Urchin, purple sea	Other Invertebrate
Urchin, red	Other Invertebrate
Urchin, white	Other Invertebrate
Whelk, Kellet's	Other Invertebrate
Worms, marine	Other Invertebrate
Salmon	Salmon
Salmon, chinook	Salmon
Salmon, chum	Salmon
Salmon, coho	Salmon
Salmon, pink	Salmon

Salmon, Roe (Chinook and Coho)	Salmon
Prawn, golden	Shrimp and Prawn
Prawn, ridgeback	Shrimp and Prawn
Prawn, spot	Shrimp and Prawn
Shrimp, bay	Shrimp and Prawn
Shrimp, brine	Shrimp and Prawn
Shrimp, coonstriped	Shrimp and Prawn
Shrimp, ghost	Shrimp and Prawn
Shrimp, mantis	Shrimp and Prawn
Shrimp, Pacific Ocean	Shrimp and Prawn
Shrimp, red rock	Shrimp and Prawn
Shrimp, unspecified	Shrimp and Prawn

CDFW trawl log data 1997-2015

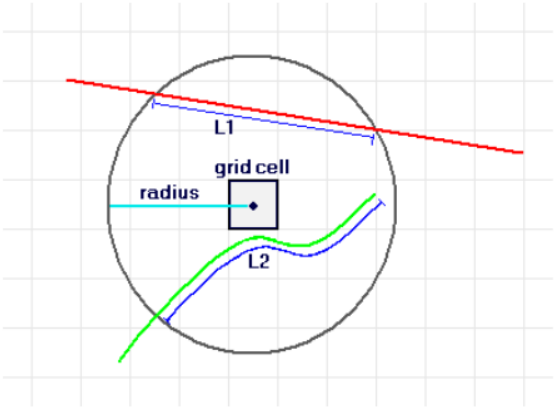


CDFW trawl log data 1997-2015

Workflow summary for Humboldt WEA trawl value map and time series table/chart:

Trawl value map (coordinate system is NAD 83 UTM Zone 10N):

1. Trawl log data (for years 1997-2015) joined to landing data using the landing receipt ID
2. Trawl log coordinates were imported into ArcGIS Pro and converted to line data
3. Any trawl tracks that intersected with land were removed
4. Any trawl tracks that were longer than 55 km were removed
    a. Assuming an average vessel speed of 2.5 knots and a maximum trip duration of 12 hours (12+ hour trips are plausible but unlikely)
5. Any trawl tracks that both started and ended south of Point Arena were removed
6. Dollar values of trawl tracks were normalized by dividing the total dollar value of each track by the length of that track
7. Any remaining outlier tracks were removed
    a. Those with extremely high dollar values
8. A density map of trawl value was created using the Line Density tool in AcrGIS Pro, which calculates the density of lines within a specified search radius (radius = 5000m) of each cell (cell size = 100m). The length of each trawl track within the circle defined by the radius was multiplied by the normalized dollar value of that track, which was then summed and divided by the area of the circle (see illustration and equation below). The tool then repeated this process for every cell within the extent of the trawl data.



A raster cell and the circular neighborhood used to determine the length for the line density

In the illustration above, a raster cell is shown with its circular neighborhood. Lines L1 and L2 represent the length of the portion of each line that falls within the circle. The corresponding population field values are V1 and V2. Thus:

```
Density = ((L1 * V1) + (L2 * V2)) / (area_of_circle)
```

CDFW trawl log data 1997-2015

Trawl value time series table/chart:

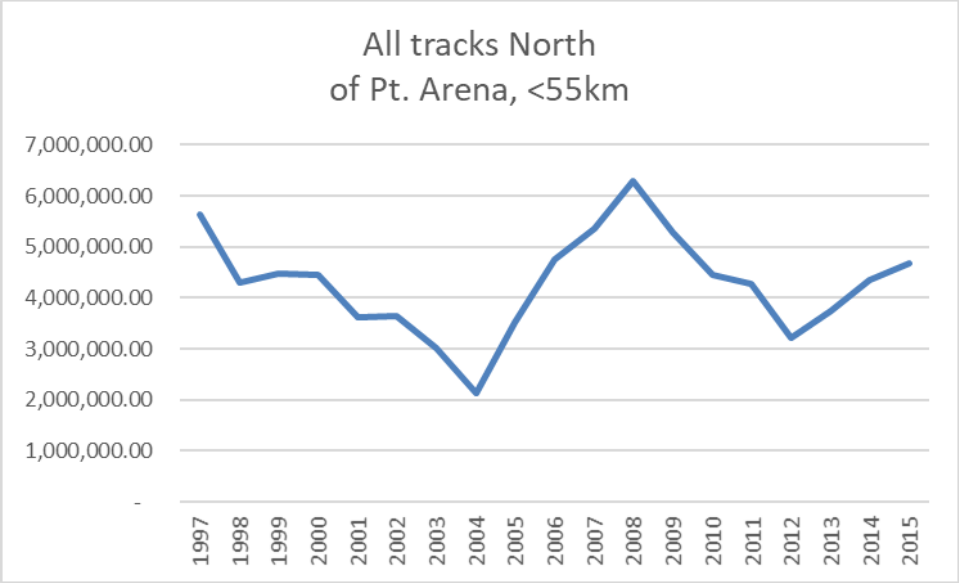
Steps 1-7 above, then:

Year	All tracks North of Pt. Arena, <55km	All tracks intersecting with Humboldt WEA, <55km	Standardized value of tracks clipped inside of the WEA, <55km
1997	6,311,276.01	286,934.51	104,087.28
1998	4,373,120.95	285,813.02	107,185.49
1999	4,504,930.68	387,904.77	171,366.63
2000	4,521,006.94	232,518.50	107,178.78
2001	3,631,964.17	199,818.38	78,683.88
2002	3,662,293.96	193,839.84	71,173.23
2003	3,035,694.92	154,051.87	67,162.57
2004	2,127,262.04	138,951.41	30,289.55
2005	3,525,618.14	149,402.76	38,990.71
2006	5,528,305.64	442,267.93	189,427.34
2007	5,389,657.03	386,686.48	163,925.72
2008	6,297,501.93	651,812.95	281,037.17
2009	5,300,928.58	647,596.64	302,624.84
2010	4,453,741.97	778,049.44	465,773.44
2011	4,256,225.69	896,704.31	545,699.08
2012	3,218,784.84	588,488.62	343,380.51
2013	3,741,162.88	680,772.44	386,547.31
2014	4,298,337.40	750,830.13	402,182.42
2015	4,645,901.23	741,437.79	397,633.49

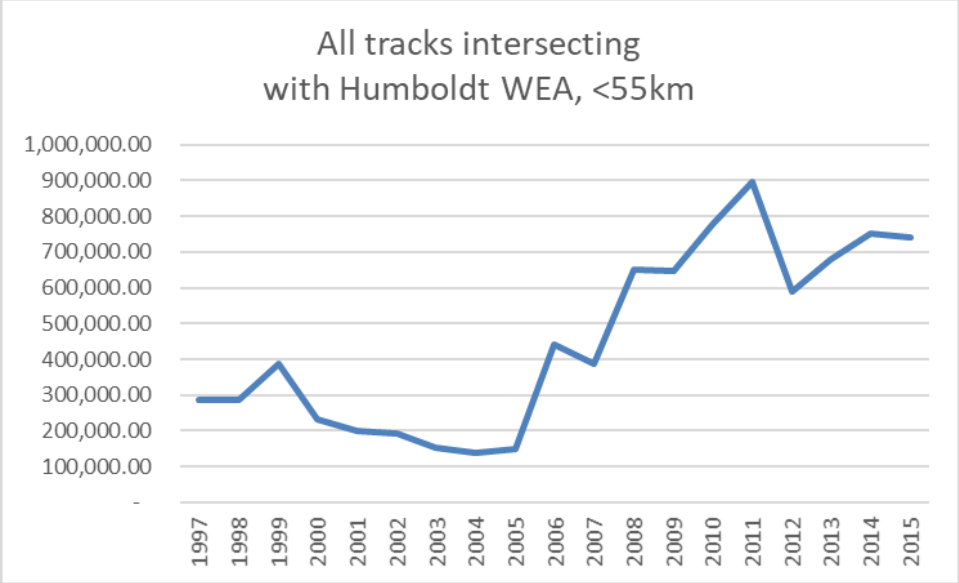
CDFW trawl log data 1997-2015

Grand Total	**82,823,715.00**	**8,593,881.79**	**4,254,349.43**
Annual Average	**4,359,142.89**	**452,309.57**	**223,913.13**

Annual total dollar value of trawl tracks north of Point Arena.



Annual total dollar value of trawl tracks that intersected with the Humboldt Wind Energy Area.



CDFW trawl log data 1997-2015

Annual total dollar value of trawl tracks clipped inside the Humboldt Wind Energy Area. Dollar values for each track were standardized ($/km) and only value inside the WEA was considered.