

No Wind Farms Off Oregon Coast

Fred Yates, Cottage Grove, OR

First, let me acknowledge the world has a tremendous need for clean energy, but that thought must be intertwined with at what cost. Do we simply throw caution to the trash heap and charge full speed ahead or do we pause and look at all of the factors. Indeed, it is one of the defining characteristics of our species to have the ability to reason but to choose consciously not to do so and the BOEM proposal lives up to that observation.

It is my opinion that this proposal has many, many flaws, has had very few real studies by BOEM needed to assess the true pros and cons, it fails to address the possible consequences with respect to human/marine life and habitat, the marine ecosystem along the coast, possible extinction of both marine and land based species and the true cost to the residents of the local area as well as the west coast from Northern California all the way to British Columbia. Lastly, it raises more questions than answers it provides.

We, in Oregon, are blessed in that our hydroelectric power typically provides more than half of Oregon's in-state total electricity net generation. Oregon is one of the four largest hydroelectric power producers in the nation. Yet, at the same time, we are busy tearing down 4 dams in an environmental experiment without any assured guarantees. "Let's see if this works" is the prevailing attitude; the ability to reason is being ignored by a desire to do something.

The Unintended Consequences Are Too Great

1. Cascadia Subduction Zone

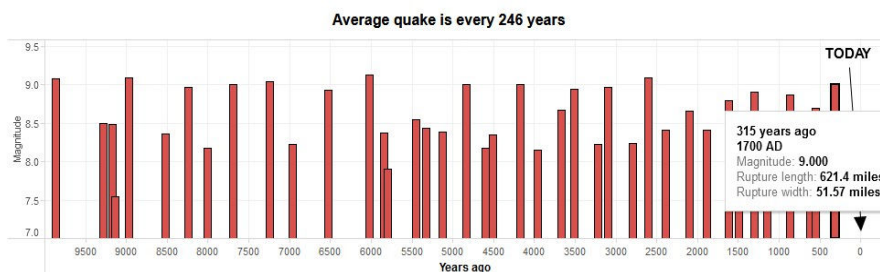


The Cascadia Subduction Zone just offshore from Coos Bay and Brookings is not just a geological fault, it is confluence of 5 tectonic plates all locked together. This 600 mile fault is a very long, sloping subduction zone where the Explorer, Juan de Fuca, and Gorda plates slide below the much larger continental North American Plate. *Note:* The North American Plate is the Earth's second largest tectonic plate, which borders the largest plate to the west the Pacific Plate.

It is impossible to speculate on the vast amounts of potential energy locked into this area that ranges from Northern California up the coast to the northern Vancouver Island, British Columbia. A study commissioned by the Oregon Health Authority

10,000 years of Cascadia earthquakes

The chart shows all 40 major earthquakes in the Cascadia Subduction Zone that geologists estimate have occurred since 9845 B.C. Scientists estimated the magnitude and timing of each quake by examining soil samples at more than 50 undersea sites between Washington, Oregon and California.



concluded that nearly 20,000 people could be killed in a tsunami caused by a quake along the Cascadia Subduction Zone. *Note:* This estimate is for Oregon only and it only addresses the deaths from the effects of the tsunami wave. No mention is made of the deaths caused by the

collapsing infrastructure.

It is well documented that a major earthquake, magnitude 8 to 9+, on the Cascadia Subduction Zone is 300 to 500 years overdue. Not only will there be an earthquake, it will also produce a Tsunami wave that could reach 100'. The Oregon Department of Emergency Management estimates shaking would last 5-7 minutes. To fully grasp the magnitude of the devastation notice that the Rupture length is 621.4 miles long and the Width is 51.57 miles wide.

In the OCS Study BOEM 2020-040 prepared under contract by RPS entitled "Potential Earthquake, Landslide, Tsunami and Geo-Hazards for the U.S. Offshore Pacific Wind Farms" the information below is detailed in the section entitled 5.1.2.1 Cascadia Subduction Zone. Below are three takeaways from that 151 page report.

"The Cascadia subduction zone (CSZ) is a convergent plate boundary of sloping subduction, in which the Explorer, Juan de Fuca, and Gorda plates move to the east and slide below the much larger, and mostly continental, North American Plate off the Pacific Coast."

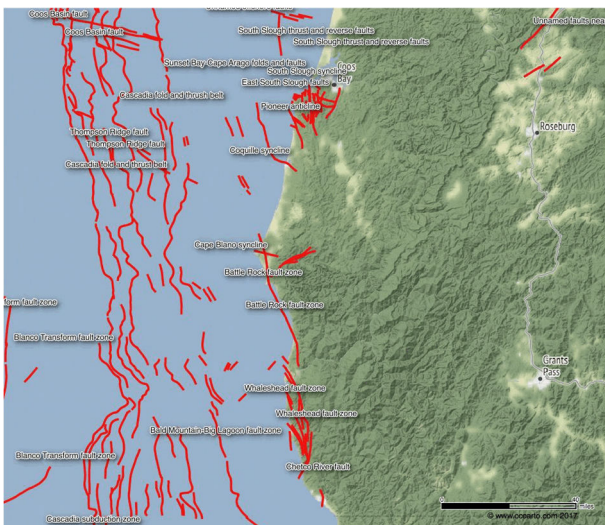
"The CSZ is one of the greatest sources of uncertainty in probabilistic modeling due to its "large epistemic uncertainty and high-dimensional stochastic space". Studies by Goldfinger et al. (2012) show that earthquakes have an average recurrence interval of approximately 500 years for the northern and central side; about 240 years (a minimum of 20-50 years) in the southern segment; and about 300 years for the great earthquakes in full rupture."

"It should be noted this report does not recommend any specific standards to follow; and BOEM approves technical standards proposed by lessee on a project case basis."

STOP, read the last takeaway again.

"..and BOEM approves technical standards proposed by lessee on a project case basis."

The Lessee's primary focus is how much money they will make, they do not care about the Oregon Coast, the possibility of a major earthquake, magnitude 8 to 9+, or a Tsunami wave that could reach 100'. They are held harmless and we the taxpayers will have to pay to have it repaired.



The picture at the left depicts the numerous fault lines that are present from the Cascadia Subduction Zone off the coast.

The Cities of Coos Bay (elevation 148') and Brookings (elevation 220') are adjacent to Cascadia Subduction Zone, which places them at ground zero from both the earthquake(s) and the resulting Tsunami wave(s).

All of the above is relevant because the BOEM plan is to anchor 264 floating platforms, spaced 1 mile apart, for the wind turbines to the ocean floor with a series of cables down to the ocean floor at a depth of ~5000' ft. (See slide 20 from "The BOEM Oregon Intergovernmental Renewable Energy Task Force Meeting" September 18, 2023).

To anchor the platforms, they must either drill into the ocean floor or impact pile drive to set an anchor. It matters not which they use, the result to the tectonic plate is the same, although impact pile driving is by far the more destructive of the two methods. The tectonic plate will be riddled with holes either by drilling or by impact pile driving. Though it is doubtful that any will penetrate all the way through the plate, again it does not matter. What will be accomplished is exactly what is done to remove very large concrete slabs; it will weaken the structure so that it can be broken up easier.

We are back to “..the ability to reason but to choose consciously not to do so..” BOEM is consistently sticking their collective heads in the sand by ignoring the data from the report they commissioned.

Will this set off the predicted magnitude 8 to 9+ earthquake? No telling, but neither procedure of anchoring the platforms is good since it potentially weakens the tectonic plate.

Another factor that cannot be accounted for, but cannot be ignored, and cannot be calculated is the amount of combined force that will be exerted by the wind/wave actions of the entire platform being tossed about during a storm. This will create additional stresses on the tectonic plate as wave after wave rips through the arrays of turbine structures. Enough to cause the predicted magnitude 8 to 9+ earthquake and resulting Tsunami wave?

Not bad enough yet? The plan calls for 20MW Wind turbines of which only a very few have been constructed for evaluation, i.e. none are in production. So they want to install an array of 264 turbines that have not been fully tested in a real world environment i.e. freezing, driving, sometimes with waves up to 50’ or more, salt water.

The Siemens Gamesa SG 14-222 DD turbine will supposedly be available in 2024. It will have a 721’ rotor, with 108’ blades and the nacelle will weigh in at 500 tons. But, that is only for 14GW, not 20GW that BOEM is projecting.

Could this project get worse? Actually the answer is a resounding YES. BOEM states that the deepest floating platform is currently 300 meters (984’) which in itself is a challenge. According to BOEM all of these platforms will be at a depth of 1,300 meters (4265’), almost a mile deep. Again, a scenario that has never been tested in a real world environment and one that is very disturbing.

Where to start:

1. Where are these individual 264 platforms to be constructed?
2. What size vessel will be required for installation?
3. How many millions of gallons of fuel oil will the fleet consume?
4. What is the mitigation plan for a fuel spill?
5. How many sea floor “anchors” are required?
6. How do you place the sea floor anchors at a depth of > 4265’?
7. How do you attach the anchor cable to the anchor and then to the platform at a depth of 4265’.

This an endless list because the BOEM Plan is riddled with “never tried before”, but we don’t really care.

Currently, the floating platform rigs are configured with the structure above and below the water being somewhat equal. Just so we are clear, here is BOEMs grand scheme for our coast.

In the area designated as Draft WEA, or Coos Bay Call Area, ~50 wind turbines with three blades each about 380’ in length, connected to the turbine, with all the electronics in the nacelle (~500 tons) to convert the wind energy into electricity, perched upon a 380’ – 400’ tower, on top of a 4265’ support structure fastened to very large floating platform, with a very large electrical cable that drops down to the ocean floor and runs ~41 miles across the ocean floor to the shore line to be connected to the Oregon electric grid.

In the area designated as Draft WEB, or Brookings Call Area, the area will be over 4 times larger with ~215 platforms and the electrical cables ~24 miles in length since it is closer to shore. The size of the structure above water will be the same as Coos Bay, but the size below water could be less, dependent by offshore placement of the platforms.

A very wise man once said, "Give me a lever long enough and a fulcrum on which to place it, and I shall move the world." — Archimedes

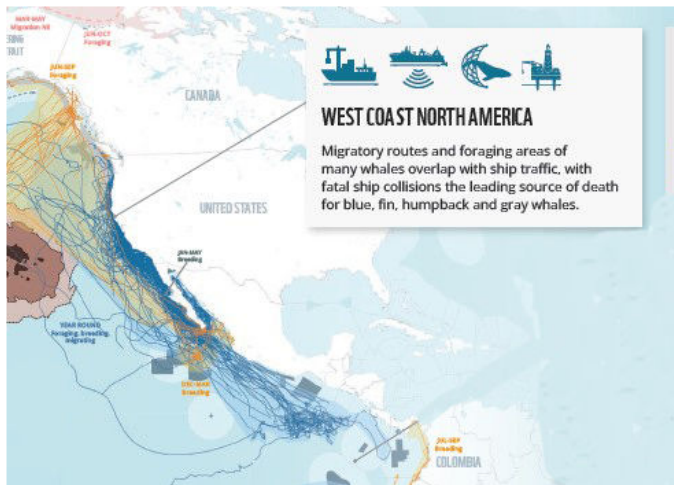
But why did I cite Archimedes and his lever is the question? Quite simply there is a lever arm problem that needs addressing. A 500 ton nacelle, with blades, rotor and turbine is perched 400' in the air tied to a 4265' support structure which is anchored to a floating platform which is then anchored to the tectonic plates by cables that will exert tremendous forces to the newly weakened tectonic plates multiplied by 264 times.

Please understand the above sentence in its entirety – 132,000 tons of stuff will be flailing about tossed by the ocean waves and wind on a long lever arm anchored to the Cascadia Subduction Zone where 2 of the largest tectonic plates in the world, with three smaller ones, are in a constant struggle to reshape the California, Oregon, Washington and British Columbia shoreline along a 621.4 mile long and 51.57 mile wide fault exists, that is capable of generating a magnitude 8 to 9+ earthquake and a 100' Tsunami wave.

Talk about the ability to reason but to choose consciously not to do so. BOEM is inviting disaster to our state and three others. What could possibly go wrong? Everything, is my worry. Will this unleash the predicted magnitude 8 to 9+ earthquake and the 100' Tsunami wave?

2. Whale Migration Routes and Endangered Species

The picture at the left depicts the Whale Migration Routes along the west coast of North America. Compliments of WWF, February 17, 2022, "Protecting Blue Corridors - Challenges and solutions for migratory whales navigating national and international seas".

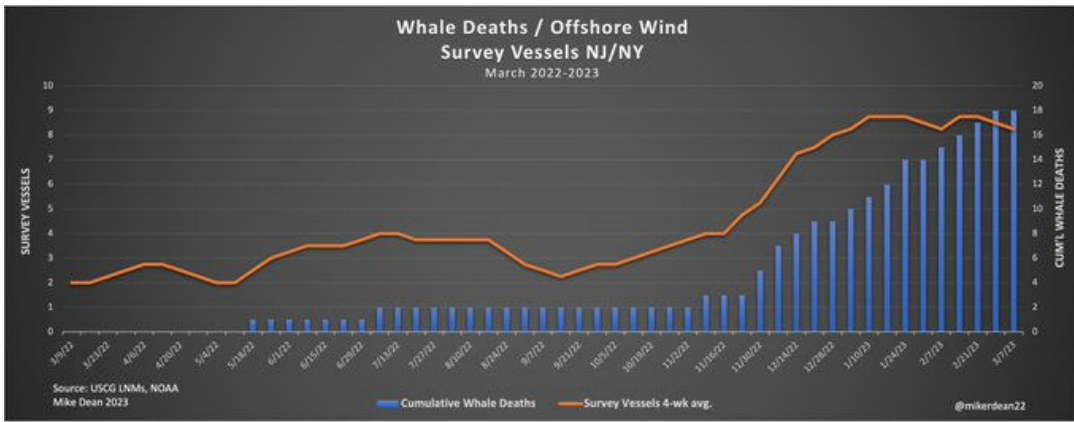


There are hundreds of whale sightings along the coast during peak migration. Notice that along the Oregon Coast they really hug the coast line.

"Case studies highlight hotspots and risks that whales navigate on their migrations, some of which can be thousands of kilometers each year. As a result of these hazards, six out of the 13 great whale species are now classified as endangered or vulnerable by the International Union for Conservation of Nature, even after decades of protection after commercial whaling."

We have no idea of how whales navigate from the Antarctic to the Arctic every year, not a clue. We have lots of guesses, but no facts. We do know that they communicate via whistles, pops, clicks, tail thumps, pectoral fin thumps and songs which will all be distorted by all the additional sound energy being generated by the wind turbines as they rotate. Especially during construction there will be an unusually high level of sound energy during the placement of the sea floor anchors.

There has been some very disturbing data that must be examined before more offshore wind farms are even contemplated. Not only here in Oregon, but along every coastline throughout the entire world.



This graph shows a dramatic rise in whale deaths, closely correlated with the rise in vessels conducting survey operations off the coast of New York and New Jersey, as construction of massive wind farms ramp up. This data does not prove causation, but what it

demonstrates is that an investigation be undertaken before even more whales are killed. It behooves both the Federal and State governments to proceed with extreme caution. We have come a long way in correcting our previous failures in wildlife management. Let's not destroy more species in the name of Green Wind Energy.

Oregon is blessed with a tremendous diversity of wildlife. The table below was extracted from the Oregon Department of Fish and Wildlife and lists only those species that exist off the Oregon coast that might be potentially threatened further by the Wind Farm development.

In contrast BOEM only lists 5 endangered species on page 37 of the "The BOEM Oregon Intergovernmental Renewable Energy Task Force Meeting" September 18, 2023".



Threatened, Endangered, and Candidate Fish and Wildlife Species in Oregon

Common Name	State Status*	Federal Status
Green Sturgeon (Southern DPS)		T
Lower Columbia River Chinook Salmon		T
Lower Columbia River Coho Salmon	E	T
Lower Columbia River Steelhead		T
Middle Columbia River Steelhead		T
Oregon Coast Coho Salmon		T
Pacific Eulachon/Smelt (Southern DPS)		T
Snake River Chinook Salmon(Fall)	T	T
Snake River Chinook Salmon (Spring/Summer)	T	T
Snake River Sockeye Salmon		E
Snake River Steelhead		T
Southern Oregon/Northern California Coast Coho Salmon		T

Upper Columbia River Spring Chinook Salmon		E
Upper Columbia River Steelhead		T
Upper Willamette River Chinook Salmon		T
Upper Willamette River Steelhead		T
Green Sea Turtle	E	T
Leatherback Sea Turtle	E	E
Loggerhead Sea Turtle	T	E
Olive Ridley Sea Turtle	T	T
California Brown Pelican	E	
Marbled Murrelet	E	T
Short-tailed Albatross	E	E
Western Snowy Plover	T	T
Blue Whale	E	E
Fin Whale	E	E
Gray Whale	E	
Humpback Whale	E	E
Killer Whale(Southern Resident DPS)		E
North Pacific Right Whale	E	E
Sea Otter	T	T
Sei Whale	E	E
Sperm Whale	E	E

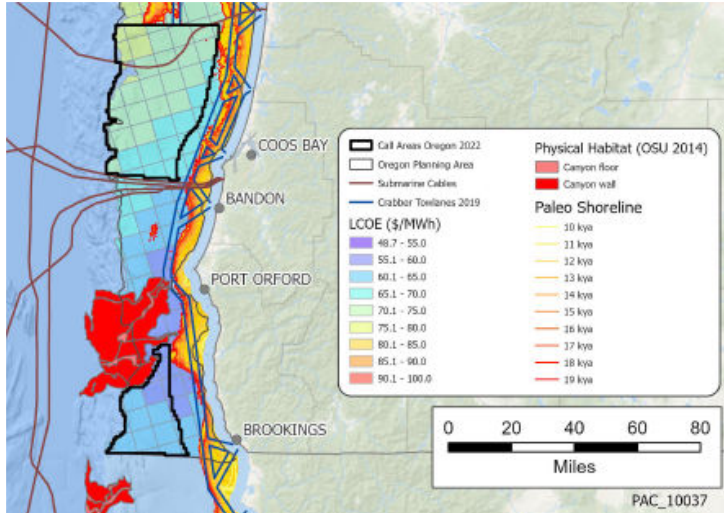
*Listed under the Oregon Endangered Species Act (ORS496.171through496.192) *Revised October 2021*

Whether the Endangered Species Act of 1973 was right and proper or it was totally wrong we, the people of this nation, have invested 5 decades and untold billions of dollars to “Save the ????? from extinction”. BOEM has arrived in our state with a plan to potentially devastate up to 33 species even if the predicted magnitude 8 to 9+ earthquake and the 100’ Tsunami wave do not occur. The BOEM plan clearly demonstrates they have thrown reason out the door and have consciously chosen to do so. All of the warning signs are flashing a brilliant, bright red

The Unintended Consequences Are Too Great.

3. But At What Cost?

One of the topics barely covered in “The BOEM Oregon Intergovernmental Renewable Energy Task Force Meeting” September 18, 2023” is the actual price paid by the consumer.



This snippet slide from page 21 of the report has the caption Levelized Cost of Energy (LCOE) (\$/MWh) which in table on the right ranges from \$48.7 to \$100. Which when converted to KWh gives 4.7¢ to 10¢.

I can only assume this is an additional fee that will be added to the local energy cost.

The other thing I can assume is that this is a projected cost that BOEM has extrapolated from somewhere. The question becomes what are their numbers based upon? Have they assumed the wind farm will operate at 100% of the maximum theoretical output continuously for

the next 20 years? Well, it won't. For that will cause early failure of the most expensive part, the turbine. It will need replacing. Gee, who pays for that?

Did they account for turbine shut down when the winds are outside safe operating range, for routine maintenance, what about unexpected failure, upgrades, ocean conditions that prohibit maintenance from being performed, replacement part availability? This list goes on and on and the price per KWh goes up and up.

Even if those numbers were right, the above LCOE estimate would almost double the rates for Coos County residents. They currently pay an average residential electricity rate of 10.82¢ per kilowatt hour. For Curry County's residents their bill would increase by 55%. They are billed an average residential electricity rate of 12.41¢ per kilowatt hour.

Coos County electrical requirements on average are 33,907MW. These ~50 turbines are predicted to generate ~740MW, about 2% of the average needed amount. But at what cost do we embark on this foolish scheme?

Curry County (Brookings) electrical requirements on average are 12,191MW. These ~215 turbines are predicted to generate ~1,920MW, about 16% of the average needed amount, a slightly better number than the measly 2% for Coos Bay. Again, at what cost do we embark on this foolish scheme?

The above only addresses the end cost to the consumer. Now consider the total end to end cost of the impact on the environment. How much energy will be consumed during extraction of the raw materials, during fabrication of all the pieces, during delivery of all the pieces, during construction of the wind farm, while maintaining the wind farm, replacing a complete structure or finally to removing the entire wind farm when the next great Green Energy gizmo is unleashed upon us.

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Please stop this project in its tracks before it cripples our already fragile economy. Just say NO!