December 13, 2024

Washington State Department of Fish and Wildlife Commission
600 Capitol Way N
Olympia, WA 98501
Electronically submitted December 13, 2024 to: commission@dfw.wa.gov

RE: Proposed Rosario Strait Tidal Turbine Project | Orcas Power & Light Cooperative (OPALCO)

Dear WDFW Commissioners,

The undersigned represent concerned individuals and environmental organizations working to recover the critically endangered Southern Resident killer whale (SRKW) population. Our concerns are regarding the member owned local utility Co-Op Orcas Power and Light Cooperative (OPALCO) moving ahead with their

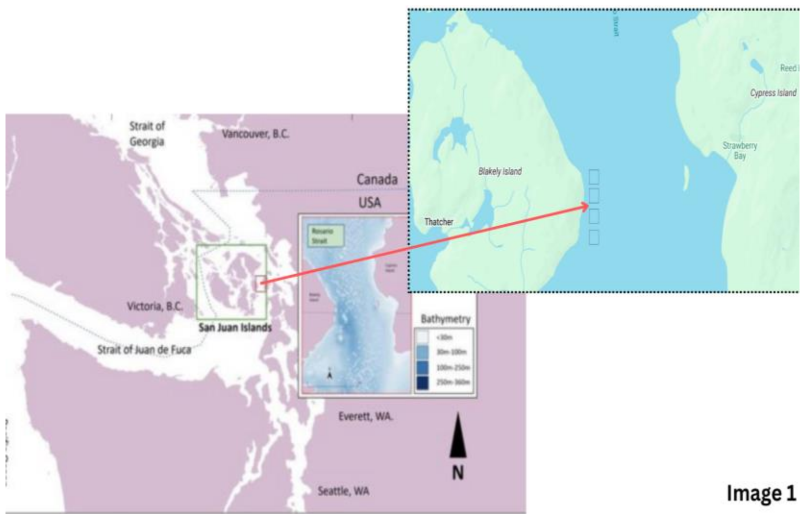

Image 1

taxpayer and co-op funded plan to install up to five floating tidal turbines of the model type "02" from the Scotland-based company Orbital Marine (formerly Scotrenewables) within Rosario Strait between Blakely and Cypress Islands. (Image 1).

The O2 floating tidal turbine has a 242- foot hull with suspended rotors underneath that can be raised for on-site service. The turbine is anchored to the seafloor with mooring lines (Image 2). Floating approximately 5 feet above the waterline and 7.5 feet below, the unit houses two turbines with expected annual generation results at about 29% of its ~2MW nameplate capacity.[1] The device is 197 feet wide including the span of the blades when raised above water. The 20-meter diameter rotors span 600 square meters, the longest blades ever seen on a tidal generator.[2] In feet, the spinning blades of one O2 unit covers a massive area of 6,763 square feet, as large as a 747 jumbo jet. (Image 2).

[1] OPALCO website. Quick Fact. 2024. https://www.opalco.com/quick-fact-opalco-tidal-energy-pilot-project/2022/11/
[2] OPALCO website. Quick Fact: OPALCO Tidal Energy Project. 2024. https://www.opalco.com/quick-fact-opalco-tidal-energy-pilot-project/2022/11/

In August 2024, OPALCO general manager expressed intent to put in five O2 units. This would put an astonishing 33,816 square feet of spinning blade area within SRKW critical habitat. And yet, the OPALCO project is projected to provide only 5GWh of annual generation serving approximately 400 homes based on annual average usage in San Juan County.[3]

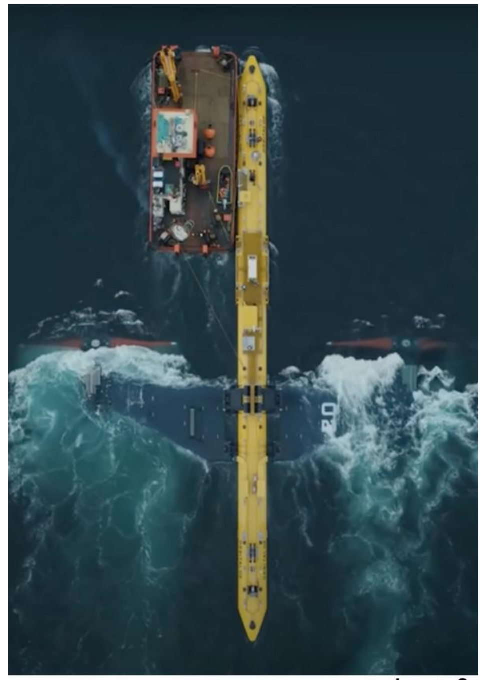

Image 2

SRKW OVERVIEW.

On November 18, 2005, National Marine Fisheries Service (NMFS), a United States (U.S.) federal agency within the U.S. Department of Commerce, listed the Southern Resident killer whale (SRKW) population -- consisting of J-, K-, and L-Pods -- a Distinct Population Segment (DPS) as “Endangered” under the U.S. Endangered Species Act (ESA).[4]

CRITICAL HABITAT.

Critical habitat is defined in Section 3 of the ESA (16 U.S.C. 1532(3)) as:

1. The specific areas within the geographical area occupied by the species at the time it is listed in accordance with the ESA, in which are found those physical or biological features
   a. Essential to the conservation of the species and,
   b. Which may require special management consideration or protections; and
2. Specific areas outside of the geographical area occupied by the species at the time it is listed upon a determination that such areas are essential for the conservation of the listed species.

The ESA defines “conservation” as the use of all methods and procedures needed to bring the species to the point at which listing under the ESA is no longer necessary. Additionally, once critical habitat is designated, Section 7 of the ESA requires federal agencies to ensure they do not fund, authorize, or carry out any actions that are likely to destroy or adversely modify that habitat. This requirement is in addition to the Section 7

[3] OPALCO website 2024. https://www.opalco.com/faq-question/how-much-electricity-does-it-provide-how-many-houses-will-that-serve/

[4] National Oceanic and Atmospheric Administration. 70 FR 69903 - Endangered and Threatened Wildlife and Plants: Endangered Status for Southern Resident Killer Whales. Nov. 18, 2005. 50 CFR Part 224. [Docket No. 041213348-5285-02; I.D. 110904E]. RIN 0648-AS95.

requirement that federal agencies ensure their actions do not jeopardize the continued existence of listed species (NMFS 2006)[5].

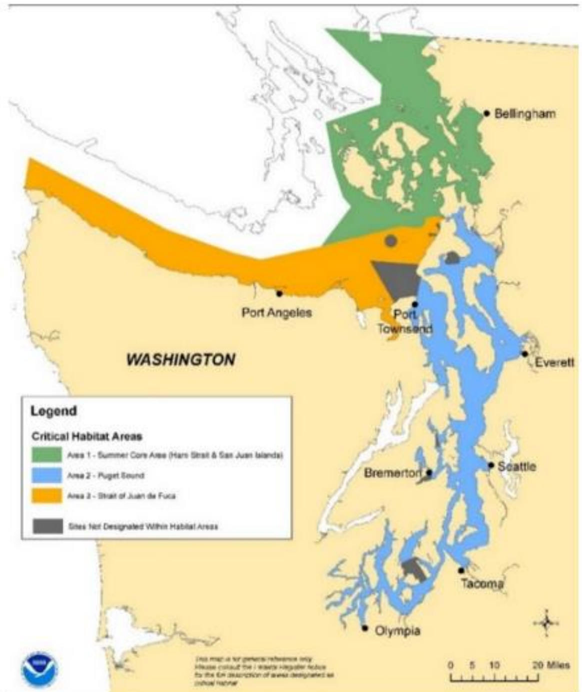

Image 3.

Section 3(5)(A) of the ESA defines Critical Habitat as areas either occupied or not occupied by the species "at the time it is listed."

Section 4(b) determines whether any species is an endangered species or a threatened species because of any of the following factors: the present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; or other natural or manmade factors affecting its continued existence.

Joint National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (FWS) regulations for listing Endangered and Threatened species' and designating Critical Habitat at Section 50 CFR 424.12(b) states the agencies "shall consider those physical and biological features that are essential to the conservation of a given species and that may require special management considerations or protections (hereafter also referred to as 'Essential Features' or 'Primary Constituent Elements (PCEs)'."

Pursuant to the regulations, such requirements include but are not limited to the following:

1. Space for individual and population growth, and for normal behavior;
2. Food, water, air, light, minerals, or other nutritional or physiological requirements;
3. Cover or shelter;
4. Sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal, and;
5. Habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species (NMFS 2006).

The proposal to designate Critical Habitat (Image 3) was published on June 15, 2006, and was designated in November 2006. The three core feeding areas designated as critical habitat for SRKWs are:

1. San Juan Islands: This area includes the waters surrounding the San Juan Islands, where orcas often forage for Chinook salmon.
2. Southern Puget Sound: This region encompasses the waters of southern Puget Sound, which are vital for feeding during certain times of the year.
3. Strait of Juan de Fuca: The waters of the Strait of Juan de Fuca are also critical, especially as they serve as a migratory route for salmon.

[5] National Oceanic and Atmospheric Administration. Endangered and Threatened Species; Designation of Critical Habitat for Southern Resident Killer Whale. November 29, 2006. https://www.federalregister.gov/documents/2006/11/29/06-9453/endangered-and-threatened-species-designation-of-critical-habitat-for-southern-resident-killer-whale

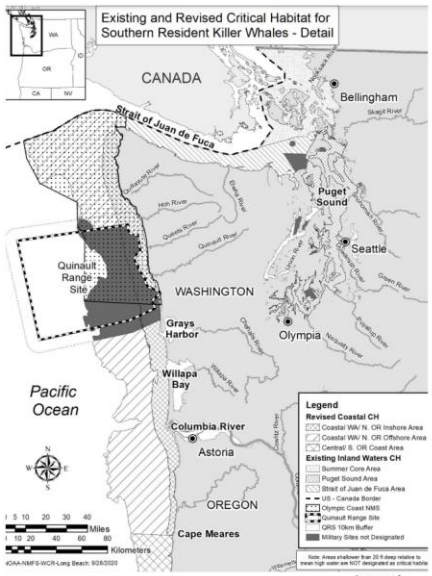

Image 4.

As more was learned about SRKWs, NOAA revised SRKW critical habitat designation (Image 4) on August 2,2021, by adding "15,910 square miles of marine waters between the 6.1-meter and 200-meter depth contours from the U.S.-Canada border to Point Sur, California."[6]

SRKWs frequent a variety of marine habitats that do not appear to be constrained by water depth, temperature, or salinity (Baird 2000). Observations of SRKWs suggest the resident pods (J, K, and L) can be spread over hundreds of kilometers at any given point, require open waterways free from obstruction to move between important habitat areas, find prey, and fulfill other life history requirements. Individual knowledge of productive feeding areas and other special habitats is probably an important determinant in the selection of locations visited and is likely a learned tradition passed from one generation to the next (Ford et al. 1998).

SOUTHERN RESIDENT KILLER WHALE (SRKW).
The most recent population survey establishes just 73 members within the SRKW DPS (CWR, 2024). However, as of November 1, 2024, the population stands at 72 due to the Center for Whale Research (CWR) listing K26 as missing, presumed dead. As a DPS, these long-lived whales are not known to breed outside of their community (Barrett-Lennard 1998), therefore each individual is critical for long-term longevity and success of the population.

A population of 72 whales should be producing an average of 3-4 healthy calves each year. A year when there is low birth success should be followed 2 years later by higher success, however, we find females try again earlier than they would if they had been successfully rearing a calf (Bain 1990, Bigg et al 1990 and Olesiuk et al 1990). With only 24 females of reproductive age, and only 10 of are likely to reproduce within the next year with a median estimate of only 2 new calves born in the next year. Having said all that, even when pregnancies produce a live calf, they do not always grow into healthy breeding adults. The last two calves born (J60 and L128) are now deceased having only lived a few weeks.

In 2011, a paternity study showed older SRKW males are vitally important, as their reproductive success appears to increase with age, and body size. Although SRKW males may be sexually mature from around age 11, SRKW females seem to select the largest—and therefore older—males.[7]

SALMON.
Science tells us this critically endangered population already suffers from lack of available prey specifically, Chinook salmon, which we know is causing nutritional stress leading to stagnant growth of the population. Meaning, low availability of Chinook salmon appears to be an important stressor among these fish-eating whales as well as a significant cause of late pregnancy failure, including unobserved perinatal loss.[8] To date,

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[6] NOAA Fisheries. Critical Habitat for Southern Resident killer whales. August 2, 2021. https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/critical-habitat-southern-resident-killer-whales
[7] Ford MJ, Hanson MB, Hempelmann JA, Ayres KL, Emmons CK, Schorr GS, Baird RW, Balcomb KC, Wasser SK, Parsons KM, Balcomb-Bartok K. Inferred Paternity and Male Reproductive Success in a Killer Whale (Orcinus orca) Population. J Hered. 2011 Sep-Oct;102(5):537-53. doi: 10.1093/jhered/esr067. Epub 2011 Jul 14. PMID: 21757487.
[8] Wasser SK, Lundin JI, Ayres K, Seely E, Giles D, Balcomb K, et al. (2017) Population growth is limited by nutritional impacts on pregnancy success in endangered Southern Resident killer whales (Orcinus orca). PLoS ONE 12(6): e0179824. https://doi.org/10.1371/journal. pone.0179824

there have been few specific studies of how marine energy devices may lead to consequences for, or changes in, salmon early life stage development, competition, food availability, severe injury or death, predator susceptibility, or reproductive failure (e.g.,[9]).

Although salmon and other salmonid species (e.g., trout) are potentially at risk of physical injury or death if struck by blades when swimming around tidal and riverine turbines[10] [11] [12] the severity of the injuries and likely consequences are still uncertain.

Electromagnetic fields (EMFs) from marine energy cables may disrupt salmon foraging and swimming behavior due to their magneto-sensitivity[13] [14] potentially affecting their competitive and reproductive success, but this interaction has not been studied. Adult salmon are unlikely to detect the sound pressure element of underwater sound from tidal turbines[15] [16] [17]. Although no studies have examined the effect of the particle motion component of underwater sound on salmon, their sensitivity to this component may lead to adverse biological consequences, such as increased susceptibility to predators or diminished reproductive success.

Predators using the turbines to their advantage is a concern. Pinnipeds routinely haul out on marine structures as a base of operations for salmon predation, and cormorants also use human structures as places to rest between foraging bouts.

NOISE and DISPLACEMENT.

Whale displacement by acoustic ''pollution'' has been difficult to document, even in cases where it is strongly suspected, because noise effects can rarely be separated from other stimuli.

Two independent studies on the natural history of killer whales (Orcinus orca) monitored frequency of whale occurrence from January 1985 through December 2000 in two adjacent areas: Johnstone Strait and the Broughton Archipelago, British Columbia. Four high-amplitude, acoustic harassment devices (AHDs) were installed throughout 1993 on already existing salmon farms in the Broughton Archipelago, in attempts to deter predation on fish pens by harbor seals (Phoca Vitulina Linnaeus). While whale occurrence was relatively stable in both areas until 1993, it then increased slightly in the Johnstone Strait area and declined significantly in the Broughton Archipelago while AHDs were in use. Both mammal- eating and fish-eating killer whales were similarly impacted. Acoustic harassment ended in the Broughton Archipelago in May 1999 and whale occurrence re-established to baseline levels.

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9 Castro-Santos, T.; Haro, A. Survival and Behavioral Effects of Exposure to a Hydrokinetic Turbine on Juvenile Atlantic Salmon and Adult American Shad. Estuaries Coasts 2015, 38, 203–214. [CrossRef]

10 Copping, A.E.; Hemery, L.G.; Viehman, H.; Seitz, A.C.; Staines, G.J.; Hasselman, D.J. Are fish in danger? A review of environmental effects of marine renewable energy on fishes. Biol. Conserv. 2021, 262, 109297. [CrossRef]

11 Bevelhimer, M.S.; Pracheil, B.M.; Fortner, A.M.; Saylor, R.; Deck, K.L. Mortality and injury assessment for three species of fish exposed to simulated turbine blade strike. Can. J. Fish. Aquat. Sci. 2019, 76, 2350–2363. [CrossRef]

12 Xodus Group. Brims Tidal Array Collision Risk Modelling—Atlantic Salmon; Report No. A-100242-S02-TECH-001; Xodus Group: London, UK, 2016; pp. 1–11.

13 Snyder, D.; Bailey, W.; Palmquist, K.; Cotts, B.; Olsen, K. Evaluation of Potential EMF Effects on Fish Species of Commercial or Recreational Fishing Importance in Southern New England; U.S. Department of the Interior, Bureau of Ocean Energy Management: Sterling, VA, USA, 2019; p. 62.

14 Wyman, M.T.; Klimley, A.P.; Battleson, R.D.; Agosta, T.V.; Chapman, E.D.; Haverkamp, P.J.; Pagel, M.D.; Kavet, R. Behavioral responses by migrating juvenile salmonids to a subsea high-voltage DC power cable. Mar. Biol. 2018, 165, 134. [CrossRef]

15 Haskoning, R. 2012 Environmental Monitoring Report Final Draft; Report for Marine Current Turbines (MCT); Ocean Renewable Power Company (ORPC): Portland, ME, USA, 2013; p. 653.

16 Halvorsen, M.B.; Carlson, T.J.; Copping, A.E. Effects of Tidal Turbine Noise on Fish Hearing and Tissues—Draft Final Report—Environmental Effects of Marine and Hydrokinetic Energy; Pacific Northwest National Lab. (PNNL-20786): Richland, WA, USA, 2011; pp. 1–48.

17 Bevelhimer, M.S.; Deng, Z.D.; Scherelis, C. Characterizing large river sounds: Providing context for understanding the environmental effects of noise produced by hydrokinetic turbines. J. Acoust. Soc. Am. 2016, 139, 85–92. [CrossRef]

Stressor-receptor Interactions	Environmental Effects				Notes
	Dominance	Additive	Antagonistic	Synergistic	
Collision risk		×	×	×	Dependent on array layout, configuration (e.g., 'in parallel' vs. 'in series'), MRE technology type, site location, and species' ability to detect devices and avoid/evade collisions
Underwater noise		×		×	Area over which sound will be elevated will increase with array size; elevation in received levels will increase non-linearly
Electromagnetic fields	×	×	×		Electromagnetic fields increase linearly with additional electrical current; effects may be influenced by spatial arrangement of subsea cables
Changes in habitats		×	×	×	Complex effects that may vary across spatiotemporal scales, with array geometry, and equivalency of effects for individual devices within an array
Changes in oceanographic systems		×	×	×	Effects observed at some threshold number of devices; dependent on MRE technology, number of devices, array configuration, and site-specific hydrodynamics
Entanglement		×	×		Risk increases with number of MRE devices, but dependent on scale and configuration of mooring lines/cables, depth at MRE site, and animal behavior/movement
Displacement		×		×	Effects observed at some threshold number of devices; no single threshold applicable across species or MRE technology type

Image 5.

In comparison, usage of channels inland of the AHDs was reduced for decades. In comparison, usage of channels inland of the AHDs was reduced for decades, and Dall's porpoises were excluded on days the devices were operating but came back the day after they were turned off. This study concludes that whale displacement resulted from the deliberate introduction of noise into their environment.[18]

Understanding how the environment mediates an organism's ability to meet basic survival requirements is a fundamental goal of ecology. Vessel noise is a global threat to marine ecosystems and is increasing in intensity and spatiotemporal extent due to growth in shipping coupled with physical changes to ocean soundscapes from ocean warming and acidification. Odontocetes rely on biosonar to forage, yet determining the consequences of vessel noise on foraging has been limited by the challenges of observing underwater foraging outcomes and measuring noise levels received by individuals.[19] Small cetaceans (dolphins, porpoises, and orca) may show behavioral responses to construction activities and operational noise generated by MRE devices. Impacts would most likely be site specific and result in temporary or longer-term displacement (Gillespie et al. 2021; Palmer et al. 2021; Tollit et al. 2019).

Current knowledge about the environmental effects of stressor-receptor interactions from single MRE devices is relevant and important for developing hypotheses about the potential effects of arrays. For instance, knowledge about how underwater sound propagates over space generated the expectation that the effects of underwater noise would scale in an additive manner with an increasing number of operational devices. This, in turn, led to the hypothesis that the area over which noise would be higher than baseline levels would increase commensurate with array size, but that elevation in received levels would increase in a non-linear fashion. Conversely, comparatively little information is currently available about the environmental effects of some other stressor-receptor interactions (i.e., displacement, entanglement, changes in oceanographic systems) because an unknown threshold number of operational devices is required before such effects can manifest and become detectable.[20] (Image 5).

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[18] Alexandra B. Morton, Helena K. Symonds, Displacement of Orcinus orca (L.) by high amplitude sound in British Columbia, Canada , ICES Journal of Marine Science, Volume 59, Issue 1, 2002, Pages 71–80, https://doi.org/10.1006/jmsc.2001.1136

[19] Tennessen, J. B., Holt, M. M., Wright, B. M., Hanson, M. B., Emmons, C. K., Giles, D. A., Hogan, J. T., Thornton, S. J., & Deecke, V. B. (2024). Males miss and females forgo: Auditory masking from vessel noise impairs foraging efficiency and success in killer whales. Global Change Biology, 30, e17490. https://doi.org/10.1111/gcb.17490

[20] Lenaïg G. Hemery, Daniel J. Hasselman, Marie Le Marchand, Georges Safi, Elizabeth A. Fulton, Andrea E. Copping. OES-Environmental 2024 State of the Science Report: Environmental Effects of Marine Renewable Energy Development Around the World. 2024.

ECONOMICS OF TIDAL ENERGY.

Tidal energy as an industry remains limited by a few significant barriers, cost being its most challenging.

The main disadvantages of tidal power are:

1. that there are limited installation sites, with only 600 MW of installed capacity globally[21],
2. it is expensive,
3. the turbines can impact the surrounding ecosystem,
4. and when the power is produced does not always match up with peak energy demand.[22]

Developing tidal arrays and connecting them to the power grid requires extensive and costly engineering and manufacturing work. The economic assessment released in January 2024 shows a net loss ranging from -$124-million to -$33-million and it is currently not economically competitive when compared with other forms of renewable energy like wind or solar.[23]

According to numbers in the preliminary economic assessment, assuming a twenty-year life span and modest levelized inflation rate (2%), the unit would produce each megawatt hour at $555[24] to be paid by OPALCO owner-members and American taxpayers. Each unit will cost $40 million, with $304,000 annual O&M, and $575,000 to refurbish every ten years.[25] Unforeseen issues and cost overruns would further drive up the cost. A U.K. study that includes the O2 found that broadly, the cost of tidal power could increase to 83% higher than the current estimation of 240 to 817 British pounds per megawatt hour. These amounts are already equal to high price spikes on the market during occasional extreme demand events that OPALCO claims it's trying to avoid.[26]A co-director of the Pacific Regional Institute for Marine Energy Discovery (PRIMED) at the University of Victoria said of tidal turbine projects, "If something goes wrong, you sink the company".[27]

The economic report shows the benefit to cost ranges from 25 to 49 cents on the dollar.[28] The less disadvantageous scenarios add battery storage, while scenarios with more tidal units or a single unit with no battery are the most disadvantageous. Despite these results and reflecting avoidance of a cost-effective power supply, the study did not consider a scenario with only battery storage (and no tidal unit) to store affordable power from the market.[29]

OPALCO documents show county-wide annual electric use at approximately 220,000 MWh, of which only around 5,000 MWh would be produced by the O2–and that is only if expectations are met. As well, ultimately OPALCO's stated reasons for pursuing the project rest on uncertain projections and the unlikely occurrence of an inequitable ferry electrification power account structure.[30]

FEDERAL REGULATION.

Non-federal hydroelectric power projects, including tidal and wave energy projects that are interconnected with the interstate electric transmission grid, are subject to licensing by the Federal Energy Regulatory

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[21] Astute Analytica India Pvt. Ltd. 2024. Wave and Tidal Energy Market Valuation is Projected to Hit USD 14,391.8 Million by 2032 | Astute Analytica. Web: https://www.globenewswire.com/news-release/2024/07/29/2920352/0/en/Wave-and-Tidal-Energy-Market-Valuation-is-Projected-to-Hit-USD-14-391-8-Million-by-2032-Astute-Analytica.html

[22] Argonne National Laboratory. Tidal Energy plus Energy Storage. Preliminary Economic Assessment 2024.

[23] Ibid, (2).

[24] Levelized cost of energy template (LCOE). 2024. Web: https://onedrive.live.com/view.aspx?resid=6CCB9C00B48E4661%2133302&authkey=!AHICmJy9HrDBh6E&wdOrigin=OWA.LINK&wdPreviousSession=cd89e040-9da6-41b3-a75b-21c88d0c7bac

[25] Ibid (3)

[26] Frazer-Nash Consultancy. Review of Technical Assumptions and Generation Costs. May 2023. Web: https://assets.publishing.service.gov.uk/media/655372484ac0e1001277d819/tidal-lcoe-report.pdf

[27] Tidal turbine development ebbs and flows. Physics Today 76 (8), 22–25 (2023); https://doi.org/10.1063/PT.3.5289

[28] Argonne National Laboratory. Rosario Strait Tidal Energy plus Energy Storage — Preliminary Economic Assessment. 2024. https://www.sandia.gov/app/uploads/sites/163/2024/02/Rosario-Strait-Tidal-Energy-plus-Energy-Storage-_Jan-29_Final_ck_mls.pdf

[29] Ibid (4)

[30] OPALCO website. Quick Fact. 2024. https://www.opalco.com/quick-fact-opalco-tidal-energy-pilot-project/2022/11/

Commission (FERC). Traditionally, FERC has only issued 30–50-year licenses for commercial-scale projects. However, in light of the need for developers to be able to deploy projects on a short-term basis to evaluate the economic and technical feasibility and the environmental effects of various technologies, FERC has created a stream-lined pilot project licensing process to allow the licensing of demonstration hydrokinetic projects for testing purposes. Pilot projects must be small; short-term; avoid sensitive locations; subject to modification or shut-down if unforeseen impacts occur, subject to plans for monitoring and safeguarding public safety and environmental resources; and removed, with the site restored, at the end of the license term unless a commercial license is issued (more information on the licensing of hydrokinetic pilot projects is available on the FERC website). As the term 'pilot project' implies, the consequences and outcomes of this project are not established or completely known. It is, in essence, a research and development project, inherently high-risk. OPALCO is proposing placing a pilot marine turbine project in Rosario Strait. Pilot projects are required to avoid sensitive locations. As the proposed project location is critical habitat for ESA listed Southern Resident Killer Whales, Chinook salmon, yelloweye rockfish and bocaccio, it is sensitive. Therefore, the state should deny permits in case federal law is weakened or goes unenforced.

All tidal and wave energy projects, whether interconnected with the electric grid or not, are subject to permitting by the U.S. Army Corps of Engineers (COE) under Section 404 of the Clean Water Act (regulating the discharge of dredged or fill materials into waters of the United States) and/or Section 10 of the Rivers and Harbors Act (regulating construction and other work in navigable waters) (for more information, go to the COE website).

CARBON FOOTPRINT.
In the simplest terms, a carbon footprint is the total amount of greenhouse gases, primarily carbon dioxide, emitted by an activity, product, company, and/or country, and measures its impact on climate change. Reducing a carbon footprint is important because high levels of greenhouse gasses contribute to global warming, leading to severe environmental consequences like rising sea levels, extreme weather events, and biodiversity loss. It is therefore crucial to minimize emissions to mitigate climate change, which includes adding up the emissions from every stage of a product or service's lifetime, including material production, manufacturing, and use, and it is usually reported in tons of emissions per unit of comparison.

1. Tidal generators are largely made out of steel.
    a. Steel requires iron ore, nickel, and coal;
    b. To make steel, you first heat iron ore, limestone and coke, a coal product, to extremely high temperatures. This uses huge amounts of energy and emits huge amounts of $CO2$. Nickel and carbon from coal are then added to steel depending on the type of steel being made;
    c. Mining these materials requires moving huge amounts of earth and rock, mostly done with heavy machinery running on diesel fuel;
    d. The machinery itself is also built using steel;
    e. Ore for nickel and iron is pulverized, and the metals are extracted using chemicals and water, creating toxic tailings that are stored behind large dams in tailings dams. The dams themselves require heavy machinery burning diesel fuel. These reservoirs of tailings emit methane, a powerful greenhouse gas 80x more powerful than $CO2$ over a 20-year time span.

False climate solutions do not address the root causes of climate change but have the potential to worsen the crisis. While said solutions may often provide some climate benefits, they are usually promoted by those whose main agenda is making profits from a particular business model – often sold as a new technology – and providing a future role for the fossil fuel industry.

Such solutions are often expensive, have debatable impacts on reducing emissions, and can divert resources from more climate friendly solutions.[31]

Therefore, to say "green" energy is "carbon free" is simply ignoring the propaganda from corporations wanting to sell us "green" energy machines, like the Orbital Marine O2, and the utilities such as OPALCO desperate to get subsidies to build more infrastructure.

IN CLOSING.

The number of cumulative threats SRKWs face continues to increase, including the possible siting of marine turbine(s) within Rosario Strait, which again, is located within the Summer Core feeding area of established SRKW critical habitat. (Image 3). The invisible loss of biodiversity before species have been identified and described in scientific literature has been termed, memorably, dark extinction. The critically endangered SRKW population illustrates its contrast, which we term bright extinction; namely the noticeable and documented precipitous decline of a data-rich population toward extinction.[32]

Research has shown vessel traffic disrupts the foraging behavior of SRKWs when noise due to vessel presence is too high.[33] Bain et al (2014) addressed masking noise reducing foraging efficiency wherever it is above ambient but low enough that whales attempt to forage and[34] Tennessen et al (2024) confirmed the earlier work that noise levels far below NMFS generic threshold of 120dB preclude successful foraging.[35] Meaning, the percentage of the Salish Sea available for successful foraging is being reduced by increases in vessel traffic and that the turbines would reduce the percentage further by producing noise when other vessels are absent shifting the usual spots salmon frequent.[36]

In addition to cost and geographic limitations, there remains significant concerns about the environmental effects. Constructing and operating tidal energy arrays based on massive underwater structures may change the ambient flow field and water quality, as well as negatively affect sea life and their habitats, potentially threatening collisions by marine animals and fish with rotating turbine blades and affecting marine animal navigation and communication with underwater noise. This may cause some sensitive species to shy away from electromagnetic fields from power cables or cause changes to their habitats.[37]

Reviews of the potential environmental impacts of tidal power technologies have been conducted (e.g., Michel et al 2006, Wilson et al 2007, DOE 2009, Kramer et al 2010), but these assessments are not based on in-situ monitoring of environmental impacts and only are able to describe potential impacts. More recent scientific literature provides some information about several biological consequences of marine energy

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[31] Green Education and Legal Fund. Chapter 7 False Climate Solutions. 2024. Web: https://gelfny.org/putting-out-the-planetary-fire/chapter-7-false-climate-solutions/#offsets

[32] Williams, R., Lacy, R.C., Ashe, E. et al. Warning sign of an accelerating decline in critically endangered killer whales (Orcinus orca). Commun Earth Environ 5, 173 (2024). https://doi.org/10.1038/s43247-024-01327-5

[33] David Lusseau et al. Vessel traffic disrupts the foraging behavior of southern resident killer whales Orcinus orca. 2009. https://www.int-res.com/articles/esr2008/6/n006p211.pdf

[34] Bain DE, Williams R, Trites AW. Energetic linkages between short-term and long-term effects of whale-watching disturbance on cetaceans: An example drawn from northeast Pacific resident killer whales. In: Higham J, Bejder L, Williams R, eds. Whale-Watching: Sustainable Tourism and Ecological Management. Cambridge University Press; 2014:206-228.

[35] Jennifer B. Tennessen, Marla M. Holt, Brianna M. Wright, M. Bradley Hanson, Candice K. Emmons, Deborah A. Giles, Jeffrey T. Hogan, Sheila J. Thornton, Volker B. Deecke. Males miss and females forgo: Auditory masking from vessel noise impairs foraging efficiency and success in killer whales. 2024. https://onlinelibrary.wiley.com/doi/10.1111/gcb.17490

[36] Ibid, (2).

[37] Pacific Northwest National Laboratory (PNNL). Environmental Information for Siting and Operation of Floating Tidal Turbines in U.S. Waters. 2024. Web: https://www.pnnl.gov/explainer-articles/tidal-energy#:~:text=Tidal%20energy%20as%20an%20industry,costly%20engineering%20and%20manufacturing%20work.

devices, but only a handful of studies have focused on orcas[38] and dolphins[39],[40],[41] in high-energy environments, and it remains uncertain how their behavior around marine energy devices may increase their susceptibility to collision risk and underwater noise.

Lastly, preventing extinction is still possible but will require greater sacrifices on regional ocean use, urban development, and land use practices, than would have been the case had threats been mitigated even a decade earlier.[42] It is clear from the best available science there isn't enough data on tidal turbines and their effects and impacts on wildlife, while the science is abundantly clear about serious and potentially irreversible problems if even a single member of the SRKW community is harmed or injured.

Therefore, it is vital when considering a plan of this significance to distinguish between environmental effects and environmental impacts. Environmental effects are the broad range of potential measurable interactions between tidal energy devices and the marine environment. Environmental impacts are effects that, with high certainty, rise to the level of deleterious ecological significance (Boehlert and Gill 2010). Cumulative impacts of tidal turbines primarily relate to the potential for altering marine ecosystems through changes in water flow, sediment dynamics, and disruption of marine life behavior due to the presence of multiple turbine arrays in a given area, potentially impacting fish migration, foraging patterns, and habitat availability.[43]

Further research to determine proof-positive results is crucial before placing tidal generators within established critical habitat already secured for endangered and threatened species, and until those studies can produce favorable and quantitative results, tidal generators must be excluded from all SRKW established critical habitat at least until SRKWs fully recover and are removed from Endangered Species status.

We respectfully request the commission to instruct WDFW to deny the Hydraulic Project Approval (HPA) for the proposed Rosario Strait tidal turbine project.

Sincerely,

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43 International Assessment for Impact Association. Chapter 10 - Tidal - Full draft CLEAN REDACTED (26 Aug 2023).

Legal Rights for the Salish Sea

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