

FAB Issue: Landings and Revenue Reduction during Operations

The developer proposes a 5% reduction of commercial fishing landings due to the Sunrise Wind Farm during each of the 30 years of operations. This is based on the estimate of space the wind turbines and the assumption that whatever the fishing fleet's behavioral response to the presence of the windfarms is, that it will only reduce their landings revenue by 5%. While access will not be legally restricted within the Sunrise Wind Farm, the presence of the wind farm leads to loss of access to fishing grounds due to safety concerns and operational constraints, particularly with mobile gears.¹ In Europe, fishers have stated that even with access to fish inside wind farms, most captains choose to avoid them. This includes both mobile and fixed-gear fishers, as safety hazards and gear loss remain a major concern.^{2,3,4} Safety concerns, lack of insurance coverage within wind farms, and limited cooperation and communication with wind developers were identified by fishers in Scotland and the primary reasons for choosing not to fish inside wind farms.^{5,6} In short, there are several valid reasons for captains to choose to not operate in or near a wind farm, and that will lead to long term displacement from the fishing grounds.^{7,8} Redistribution of effort due to displacement is not a simple solution, particularly with the introduction of multiple wind farms in the area. Redistribution can cause increased competition for the remaining productive fishing grounds, increased effort and costs to attempt to maintain harvest amounts, and the associated increased challenges due to gear conflicts and vessel traffic hazards.⁹

However, should fishers choose to operate inside wind farms, there are several aspects to consider far beyond a 100m buffer around wind turbine generators (WTGs). In the Netherlands, studies show that in water depths 40m or more, the approximate safety distance for maneuvering bottom tending mobile gear (i.e., trawl or dredge) within a windfarm is approximately 215 m from a WTG.^{10,11} However, fishers have shown much more reluctance with regards to fishing near WTGs than offshore structures, and several members of the RI FAB have expressed that they will not fish within operational wind farms due to significant safety concerns.¹² Concerns of allision with WTGs, and collisions with other vessels are

¹ Hogan, F. et al. 2023. Fisheries and Offshore Wind Interactions: Synthesis of Science. NOAA Technical Memorandum NMFS-NE-291. <https://doi.org/10.25923/tcjt-3a69>. Section 2.1.2

² Ibid

³ Gray et al, 2016. Changes to fishing practices around the U.K. as a result of the development of offshore windfarms – Phase 1 (Revised). The Crown Estate. Accessible at: <https://www.thecrownestate.co.uk/media/2600/final-published-ow-fishingrevised-aug-2016-clean.pdf>

⁴ Hooper et al. 2015. Perceptions of fishers and developers on the co-location of offshore wind farms and decapod fisheries in the U.K. *Mar Policy*. 61:16-22.

⁵ Hogan et al. 2023. Section 2.1.2

⁶ Gusatu et al. 2020. A spatial analysis of the potentials for offshore wind farm locations in the North Sea Region: challenges and opportunities. *ISPRS Int J Geoinf*. 9(2):96.

⁷ Hogan et al. 2023. Section 2.1.2

⁸ Methrata et al. 2020. Monitoring fisheries resources at offshore wind farms: BACI vs. BAG designs. *ICES J Mar Sci*. 77:890-900.

⁹ Hogan et al. 2023. Section 2.1.3

¹⁰ Ibid. Section 2.1.2 page 113

¹¹ Primo Marine 2019. TRA-1 Consequences of possible sea-bed fishery in future offshore wind farms.

¹² RI FAB members, pers. comm.

certainly a concern; only to be exacerbated by poor weather and sea conditions and wind farm effects on radar.¹³

Equally as concerning to fishers are the export cables and the inter-array cables that run throughout the Sunrise Wind Farm. Subsea cables are a significant hazard for bottom tending fishing operations, as catching or snagging a cable in fishing gear is extremely dangerous, especially under certain sea conditions.^{14,15} According to the Offshore Renewable & Cable Awareness project (KIS-ORCA), based in Europe, “*Loss of gear, fishing time and catch can result if a trawler comes foul of a submarine cable and there is **serious risk of loss of life.***”¹⁶ In European waters, relatively smaller fishing vessels operating crab/lobster pots and gillnets may decide to work within the confines of a wind farm; however, it is advised that extreme caution be taken to avoid snagging of cable and subsea structures associated with wind farms.¹⁷ Yet, other types of gear such as trawls and dredges, especially from larger vessels, are unlikely to take place due to the presence of multiple submarine cables, WTGs, the enhanced risk of snagging gear from the penetrative nature of the gear types, and the restricted maneuverability within the windfarms.¹⁸ While some argue that the 1nm spacing between WTGs in the wind farms along the eastern US OCS will alleviate these problems, the FAB does not believe it will.

The WHOI baseline study suggests that the effective footprint within the WLA is comprised only of the WTGs with a 100 m buffer, which accounts for < 1% of the total Sunrise WLA footprint, and concludes that “conservatively” only 5% of total baseline landings from all stocks within the WLA may be lost



Figure 1 The potential consequences of snagging a subsea cable. Images taken from Primo Marine (2019), originating from KIS-ORCA website.

¹³ See section on vessel safety

¹⁴ Hogan et al. 2023. Section 2.1.2 page

¹⁵ KIS-ORCA. The Risks of Fishing near Cables & Renewable Energy Structures. Accessed at: <https://kis-orca.org/safety/the-risks-of-fishing-near-cables-renewable-energy-structures/>

¹⁶ Ibid

¹⁷ Primo Marine. 2019

¹⁸ Ibid

during operations.¹⁹ First, this underestimates the required buffer around WTGs that fishing vessels must adhere to if they choose to fish within the windfarm, which should be 215 m, based on research conducted in Europe.^{20,21}

More importantly, WHOI's analysis does not take into account the severe safety risks associated with submarine cables that will significantly adjust (and exclude) fishing activities within the Sunrise WLA and along the Export Cable Corridor (ECC). The European Subsea Cables Association (ESCA), in their position statement on vessels operating in the vicinity of subsea cables, states that "*Subsea cables, **buried or otherwise**, can present a potential hazard or entanglement risk to fishermen.*"²² The ESCA goes on to say that while great efforts are made to bury and protect submarine cables, it is possible that sections of charted cables may become exposed over time.²³ The Offshore Renewable and Cables Awareness (KIS-ORCA) Project, of which ESCA is a partner, advises fishers that "*The most serious risk affecting fishermen when fishing in areas where submarine cables exist, is to snag their gear on a cable. **Submarine cables are initially buried on installation, although may become exposed due to current and seabed erosion. It is therefore best to avoid fishing in such areas, if at all possible.***"²⁴ Therefore, because a cable is buried at the time of installation, there is no guarantee that they are safe to fish over, as once-buried cables can be scoured out by tides and currents or moved by anchors or fishing gear; they can also become suspended in places above the seafloor in hollowed areas such as the trough of sand waves (see image).^{25, 26}

¹⁹ WHOI 2023. DRAFT Rhode Island Fisheries Exposure from the Sunrise Wind Lease Area and the Sunrise Export Cable Route. 24 February 2023

²⁰ Primo Marine, 2019.

²¹ Hogan et al. 2023. Section 2.1.2 page 113

²² European Subsea Cables Association (ESCA) 2022. Position Statement on Vessels Operating in the Vicinity of Subsea Cables. February 2023. Accessed at: <https://www.escaeu.org/download/?id=403>

²³ Ibid

²⁴ KIS-ORCA, 2023a. Reducing Risks Whilst Fishing. <https://kis-orca.org/safety/reducing-risks-while-fishing/>

²⁵ KIS-ORCA, 2023b. The Risks of Fishing near Cables & Renewable Energy Structures. <https://kis-orca.org/safety/the-risks-of-fishing-near-cables-renewable-energy-structures/>

²⁶ Drew and Hopper, 2009. Fishing and Submarine Cables Working Together. International Cable Protection Committee. 23 February 2009. Accessed at: <https://www.iscpc.org/documents/?id=142>

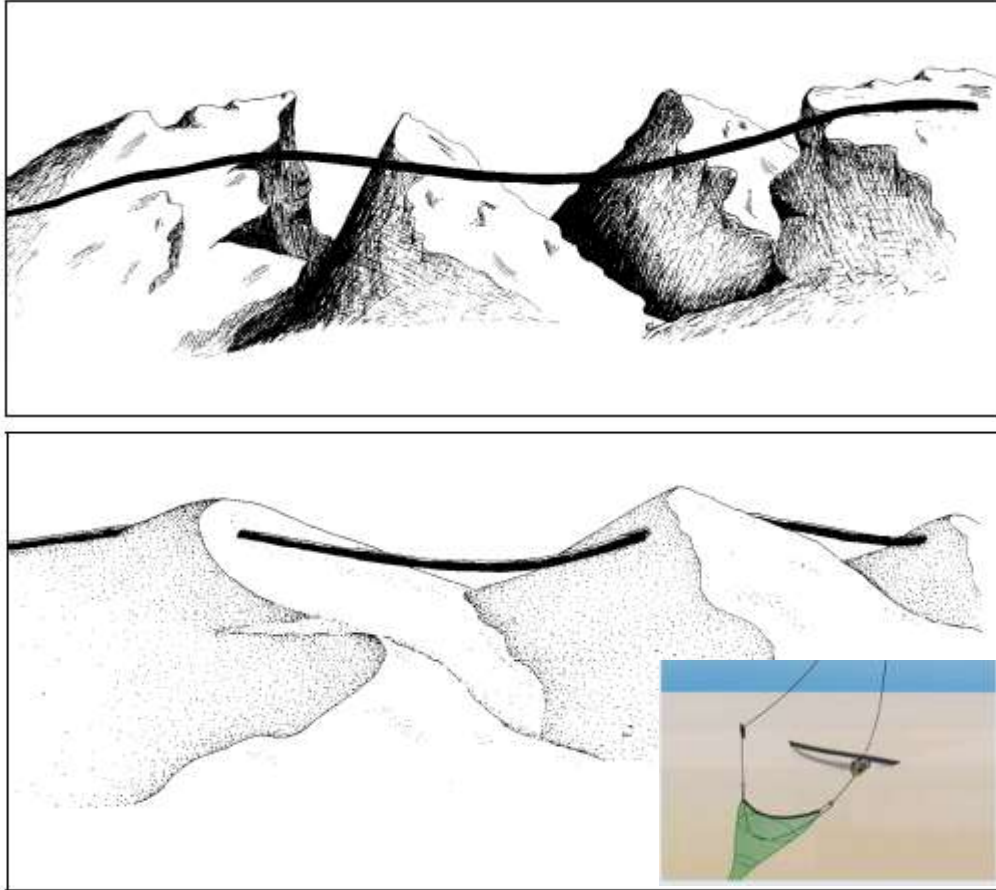


Figure 2. Examples of cable exposure on/above seafloor. Top: cable spanning between rocks. Bottom: cable spanning between sand waves; inset shows example of exposed cable can become snagged by fishing gear. Source: Drew and Hopper 2009 and KIS-ORCA 2023b.

In addition to the potential exposure of buried cables, repairs to cables also introduce hazards to fishing gear. Repairs often include splicing two ends of a damaged cable together on the deck of a cable maintenance vessel, after the “final splice” occurs, the cable is released back to the seabed. Cable burial of these spliced sections are not often successful, and when on the seafloor the spliced portion of the cable is offset from the charted cable route by as much as two times the water depth at that location.^{27,28}

Multiple maritime industry organizations have established what they consider safe distances from submarine cables for any type of bottom tending fishing activity; they include:

- The ESCA highlights the UK Admiralty Mariner’s Handbook (NP100) states: *“In view of the serious consequences resulting from damage to submarine cables, vessel operators should take special care when anchoring, fishing, mining, dredging, or engaging in underwater operations near areas where these cables may exist or have been reported to exist. In order to minimize the risk of such damage as much as possible, vessels should avoid any such activity at a **minimum**”*

²⁷ Ibid

²⁸ KIS-ORCA 2023b

distance of 0.25 nautical mile [463 m], on either side of submarine cables.” A warning that is repeated on UK admiralty charts.^{29,30}

- The International Cable Protection Committee (ICPC) recommends that for safe navigation and to avoid submarine cables, fishing vessels using towed gear maintain a **minimum of 1.0 nautical miles [1,852 m]** from either side of charted cables. The ICPC also has dire warnings about cable snags with fishing gear: *“It is extremely dangerous to bring on board a cable fouled in fishing gear. A cable is under considerable tension; cutting or breaking the cable could cause **serious or even fatal injury** if it whips free. Modern cables can carry very high voltages that can prove lethal if they are cut, or if broken cable ends are brought on board. The weight of cables also affects the stability of smaller vessels. **They risk sinking if they attempt to raise a cable from the seabed. Loss of vessel and lives has resulted under these circumstances. Loss of expensive gear, time and often a valuable catch can occur when fishing gear fouls a submarine cable.”**³¹*
- The Office of Fiber Cable Communications (OFCC) considers a vessel “near” a cable when it is within 4-times the water depth, in water <150 fathoms, and that while near a cable *“Gear should not be set or hauled up.”*³² Within the Sunrise WLA, the water depth ranges from 35 to 62 m,³³ with an average of approximately 45 m.³⁴ Therefore, based on this advisory, “near” would be considered 180 m.

Based on these cautionary guidelines provided by maritime and submarine cable industry experts, including those within areas where wind farms have been operational for several years, we conclude that regardless of the spacing between wind turbines, and the plans for cable burial, the safety concerns associated with fishing inside the Sunrise WLA and along the ECC will significantly impact fishing behavior and cause a reduction in landings during wind farm operation far greater than the 5% proposed by WHOI. The average of the four suggested safety distances listed above is 700 m, and the most recently developed by those experienced in operational wind farms (ESCA and UK Admiralty) suggest the minimum of 463 m. While these documents specifically state that both fixed and mobile gear are of concern, we assume that greater precautions will be taken by trawl and dredge vessels than other gears such as gillnet and pot vessels. Therefore, we apply the 700 m buffer around all inter-array cables and the export cable inside the Sunrise WLA to the mobile bottom tending gear, and the 463 m buffer to pot gear, gillnet gear, and other gears. The FAB believes these safety buffers reflect the minimum real concern that RI fishers have in relation to the safety of their vessel and crew, as it is repeated within the

²⁹ UK Hydrographic Office, 2023. Admiralty Mariner’s Handbook. Accessed at:

<https://www.admiralty.co.uk/publications/publications-and-reference-guides/admiralty-mariners-handbook>

³⁰ ESCA 2022

³¹ International Cable Protection Committee (ICPC) 2001. Catch Fish. Not Cables. The commercial fishing guide to your rights and responsibilities with regard to submarine cables. December 2001. Accessed at:

<https://www.iscpc.org/documents/?id=308>

³² Office of Fiber Cable Communications (OFCC) 2009. Procedures to follow while operating near submarine fiber optic cables. 13 August 2009.

³³ US Fed Reg. NOAA Proposed Rule: Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Sunrise Wind Offshore Wind Farm Project Offshore New York. 10 February 2023.

Accessed at: <https://www.federalregister.gov/documents/2023/02/10/2023-02497/takes-of-marine-mammals-incident-to-specified-activities-taking-marine-mammals-incident-to-the>

³⁴ Sunrise Wind Farm Project. Appendix BB Intake Zone of Influence and Thermal Discharge Modeling Report. 08 April 2022. Accessed at: https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/SRW01_COP_AppBB_HZI_Thermal%20Discharge_2022-04-08_508.pdf

maritime industries that fishing in proximity to submarine cables can be fatal. It should also be noted that regardless of these safety buffers, some captains have said explicitly that they will not fish within the wind farms whatsoever.³⁵

The FAB understands that the fishing effort by gear type and the associated landings and revenues are not uniform throughout the Sunrise WLA. Yet the baseline dataset provided by NOAA Fisheries used for analysis of Sunrise does not reflect the differences in spatial distribution of fishing effort within the Sunrise WLA. Therefore, we proceed with this calculation using a uniform distribution model as was agreed between FAB and WHOI SME, but acknowledging that a more accurate depiction of effort, landings, and revenue distribution, developed with VMS data,³⁶ could be used to develop a more refined estimate.

To estimate the space and associated landing and revenue lost to fishers during the 30-year operational period of the Sunrise Wind Farm, a 700 m and a 463 m buffer were applied to the inter-array cables and the export cable, and the resulting areas were split into two “safety footprints”; one inside the WLA, and one surrounding the export cable route (see RevReductionOperations sheet).

- Mobile bottom tending gear (bottom trawl and dredge): The 700 m safety footprint within the WLA, including a buffer around the inter-array cables and the export cable, covers 66.4% (28,574 hectares) of the total 43,056 hectares in the Sunrise WLA. Baseline data suggests that 50.5% of exposed revenue within the Sunrise WLA is attributed to bottom trawls and dredges. Therefore, we estimate that 50.5% of commercial revenues in Sunrise will be exposed and lost within 66.4% of the WLA. Based on total landings from the RI fishing fleet of \$1,401,338 (2023\$), this equates to \$469,665 in exposed revenue lost annually. With the safety footprint covering so much of the WLA, it is likely that there will not actually be enough safe fishing grounds for many trawlers, and therefore we presume this estimate to be the minimum impact to the bottom tending mobile gear fleet during operations. It is quite possible that these impacts will be closer to or equal to 100% of the trawl and dredge revenues in the Sunrise WLA.
- Static bottom tending gear (gillnet, pot, longline) and others (handline, midwater trawl, other): The 463 m safety footprint within the WLA covers 47.5% (20,440 hectares) of the total Sunrise WLA. These gears account for 49.5% of the total commercial revenues in Sunrise, all of which will be exposed within the 463 m safety footprint. Based on total landings from the RI fishing fleet of \$1,401,338 (2023\$), this equates to \$329,321 in exposed revenue lost annually.
- Combined, the safety footprints within the Sunrise WLA account for **\$798,986 annually lost**, equal to 57% of the total annual RI-based landings inside the Sunrise WLA. **Over the 30 years of Sunrise Wind Farm operations this equates to \$14,757,907; with the economic multipliers this equates to \$31,645,034 (2023\$; with 3% discount rate).**

The same method was applied to account for annual revenue loss along the export cable route, outside the Sunrise WLA, using the 700 m and 463 m safety buffers around the cable as a percent of the total area and associated landings and revenue within the 10 km Sunrise Cable Buffer (ECRA), which is

³⁵ RI FAB members, pers. comm.

³⁶ Livermore 2017 developed a model combining VMS and VTR data to depict spatiotemporal distribution of fishing effort

referred to in the WHOI baseline study.³⁷ Based on the NOAA baseline data, RI accounted for 15.1% of the total revenue within the ECRA, which was applied to the overall revenues in the area; this is consistent with WHOI baseline estimate of the RI share within the ECRA.

- Mobile bottom tending gear (bottom trawl and dredge): The 700 m safety footprint around the Sunrise export cable covers 11.8% (19,456 hectares) of the total 165,550 hectares in the Sunrise ECRA. Baseline data suggests that 81.6% of exposed revenue within the ECRA is attributed to bottom trawls and dredges. Therefore, we estimate that 81.6% of commercial revenues in Sunrise ECRA will be exposed and lost within 11.8% of the ECRA. Based on total landings from the RI fishing fleet of \$1,380,786 (2023\$), this equates to \$133,028 in exposed revenue lost annually.
- Static bottom tending gear (gillnet, pot, longline) and others (handline, midwater trawl, other): The 463 m safety footprint around the Sunrise export cable covers 7.8% (12,909 hectares) of the total Sunrise ECRA. These gears account for 18.4% of the total commercial revenues in the ECRA, all of which will be exposed within the 463 m safety footprint. Based on total landings from the RI fishing fleet of \$1,380,786 (2023\$), this equates to \$19,811 in exposed revenue lost annually.
- Combined, the export cable safety footprints account for **\$152,839 annually lost**, equal to 11.1% of the total annual RI-based landings inside the Sunrise ECRA. **Over the 30 years of Sunrise Wind Farm operations this equates to \$2,863,795; with the economic multipliers this equates to \$6,328,886 (2023\$; with 3% discount rate).**

The calculated combined impacts of the Sunrise WLA and Export Cable during operations equates to **\$37,973,920 (2023\$)**.

³⁷ WHOI baseline study includes landings and revenue from NOAA inside a 10 km buffer around the export cable, referred to as the Export Cable Route Area (ECRA) (shapefile: *sunrise_cable_buffer*).