FLOATING POWER PLANTS MITIGATION MEASURES AND BEST PRACTICES

The action agency or project proponent shall implement the following mitigation measures and best practices to minimize risk from construction of support facilities and the deployment of floating power plants and their operation to ESA-listed species under the jurisdiction of NOAA Fisheries Southeast Regional Office (SERO) Protected Resources Division (PRD).

This document is divided into two sections: mitigation measures and best practices. Mitigation measures detail what the action agency will do or will require from the project proponent during the project's construction phase to minimize potential effects to ESA-listed species and critical habitat. Best practices details what the action agency or applicant will do after construction and during the operational phase to minimize potential effects to ESA-listed species and critical habitat.

Mitigation Measures

The following mitigation measures pertain to the design of the vessels, barges, or other components of the floating power plant.

- All seawater intakes shall have safety screens. NMFS recommends using 2 mm wedge wire screens. The configuration of the wedge wire creates turbulence that reduces impingement/entrainment. If a wedge wire screen is not possible, NMFS recommends using a mesh size small enough to prevent entrainment of any ESA-listed fish species, and sized sufficiently so that intake velocities at the screens are always below 0.2 feet per second.

- NMFS strongly recommends setting up a monitoring system for the seawater intake to estimate ESA-listed species of ichthyoplankton and coral planulae entrainment during operations.

- Closed loop cooling systems with radiative cooling, air cooling, or hybrid systems are strongly preferred to evaporative cooling systems.

- All seawater returns shall use diffusers of sufficient size and distribution to ensure that temperature and salinity changes to the surrounding waters are below levels that could potentially harm ESA-listed species or habitats. In the case of seawater returns in small embayments, diffuser discharge may need to be pipelined sufficiently outside of the embayment to reduce the impacts of heated water significantly altering ambient seawater temperatures. There also may need to be seasonal temperature limits depending on ecological indicators such as coral reefs, submerged aquatic vegetation, harmful algal

blooms, reproductive seasonality (e.g., fish spawning, sea turtle nesting), triggers that make adversely impact species and/or the bay ecosystem at large resulting from ambient seawater temperature increases. Monitoring shall be conducted to ensure that the above mentioned conditions are met.

- Please provide contingency plans for emergency scenarios such as tropical storms/hurricanes for each floating power station and all connected pipelines, support vessels, etc. Would the power stations remain in place and provide power during storm activity or go offline? Or would the ships move offshore depending on the severity predicted for a hurricane, for instance? It is important to know that the energy infrastructure would be secured and there would not be LNG line ruptures/spills or vessels grounded in sensitive habitat.

- What mitigation procedures would be in place in the event of ambient seawater temperature spikes and/or pollutant thresholds exceeded or intake levels for ichthyoplankton or ESA-listed species (larvae, eggs, coral planulae) exceeding tolerable levels?

The following is a list of mitigation measures that should be completed before or during the construction phase for any dedicated infrastructure built to support the floating power plant.

- Map sensitive habitats and ESA-listed species likely to be present within the action area. The action area includes all areas to be affected by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). Therefore, mapping should include the footprint of the floating power plants as well as the shipping/refueling routes. NOAA offers the Environmental Sensitivity Index maps and data that can help identify at-risk resources to prioritize deployment of available resources to prevent or minimize impacts to sensitive habitats. NOAA Fisheries also provides an Essential Fish Habitat Mapper and the SERO ESA Section 7 Mapper that can provide additional information.

- During the design phase, avoid impacts to sensitive habitats and designated critical habitat to the extent practicable.

- Facilities shall not be placed in, or near, sensitive habitats (e.g., seagrasses, oyster reefs, hardbottom habitat, corals, mangroves, critical habitat, etc.), this includes spudding and shading of resources such as seagrasses and corals. This also includes the placement of outfall pipes discharging heated water over sensitive habitats.

- If fuel for the power plant will be supplied by vessels, implement NOAA Fisheries *Gas, Oil, and Fuel Handling and Loading Facility Mitigation Measures and Best Practices* for related construction and operational measures, as appropriate. A refueling and support vessel plan (including size and draft for each vessel) should be submitted to NOAA Fisheries, this should include ingress/egress routes, a resource map related to the shipping lanes, and depths and habitat resources underneath the intended location of the floating power plant.

- If pipelines will be constructed to supply fuel to the power plant, implement NOAA Fisheries *Gas, Oil, and Fuel Pipeline Construction Conditions* for the construction of those components.

- Provide an estimate of the year-round and/or seasonal power generation plan including daily hours of operation.

- Prior to starting construction (if applicable) or operation, it is strongly recommended that the project proponent have an approved spill response action plan in place for the operational phase. NOAA's Office of Response and Restoration provides a hub for response tools that can be used for spill response and planning. Existing spill response plans that have been developed in coordination with the USCG, EPA, NMFS, USFWS and other relevant agencies should be initiated immediately upon notification of a spill.

- The project proponent will provide to NMFS and other applicable agencies a treatment and/or handling plans for all ballast and bilge water.

- The project proponent will implement the NOAA Fisheries Protected Species Construction Conditions, Revised: May 2021.

- The project proponent will implement the NOAA Fisheries Vessel Strike Avoidance Measures, Revised: May 2021.

- For projects located in areas where queen conch may be present, NMFS recommends following the NOAA Fisheries Queen Conch Survey, Construction Conditions, Relocation, and Reporting Guidelines (January 2025).

- NMFS recommends that the project proponent take all necessary precautions to avoid spudding or anchoring of project vessels or barges in areas of sensitive habitat.

Best Practices

During the operational phase of the proposed action, the project proponent will implement the following best practices:

- For facilities near sea turtle nesting beaches, if operational activities occur during nighttime, then masking of lighting as much as is practicable is strongly advised on all equipment and vessels. This may include the use of amber, orange, or red lighting, outside the visual spectrum nesting females and hatchlings. In addition, for extended operations (e.g, a year or more), lighting should not extend directly below the waterline as much as practicable because below water lighting will change the trophic distribution of fishes (e.g., modifying nocturnal predator/prey interactions).

- Support and maintenance vessels shall implement NOAA Fisheries Vessel Strike Avoidance Measures, Revised: May 2021.

- For projects located in areas where queen conch may be present, NMFS recommends following the NOAA Fisheries Queen Conch Survey, Construction Conditions, Relocation, and Reporting Guidelines (January 2025).

- The project proponent should implement a ballast water management plan or use a ballast water treatment facility to prevent the introduction of foreign species for all vessels berthing at the facility.

- The project proponent should implement a bilge water handling and treatment plan for the power plant barges and other operational vessels moored for extended periods of time.

- NMFS recommends daily water quality monitoring to ensure that the temperature and salinity of surrounding waters are below levels that could potentially harm ESA-listed species or habitats. A plan should be in place for if and when water temperatures exceed an agreed upon threshold that operations will be refined to reduce the seawater volume intake, this would be especially true in warmer months when ambient seawater temperature is already seasonally high.

- NMFS recommends regular water quality monitoring for oil and chemical leaks.

- NMFS recommends that the proponent comply with the International Maritime Organization's (IMO) Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life (2023).

- NMFS recommends no fishing off platforms, or near or adjacent to platforms, so as to ensure no ESA-listed species are incidentally caught.

- All in-water lines (e.g. rope, chain, cables) must be stiff, taut, and non-looping. Examples of such lines are heavy metal chains or heavy cables that do not readily loop and tangle. Flexible in-water lines, such as nylon rope or any lines that could loop or tangle, must be enclosed in a plastic or rubber sleeve/tube to add rigidity and prevent the line from looping and tangling. In all instances, no excess line is allowed in the water.

- If any injury or death of a protected species is observed, immediately report the take to National Marine Fisheries Service (NMFS) SERO PRD, along with any photos and video of the protected species to the: NMFS SERO Endangered Species Take Report Form and the emergency consultation email: nmfs.ser.emergency.consult@noaa.gov

For additional information, please contact NOAA Fisheries SERO PRD at:

NOAA Fisheries Service Southeast Regional Office 263 13th Avenue South
St. Petersburg, Florida 33701 Tel: (727) 824-5312

Visit us on the web at Protected Marine Life in the Southeast
(https://www.fisheries.noaa.gov/region/southeast#protected-marine-life)