Exempted Fishery Permit Application for Night Deep-set Buoy Gear (NDSBG) and Night Linked Buoy Gear (NLBG)

1. Application Date: February 21, 2025

2. Applicant: Shearwater Fishing, LLC., 210 Village Run West, Encinitas, CA 92024.

Owners: Markus Medak, Brian Sims, and Daniel Fuller

EFP Management: Daniel Fuller, Capt.D.W.Fuller@gmail.com; (858) 349-1614

3. Introduction and Statement of Purpose:

During the past decade effective management measures implemented by both the Inter-American Tropical Tuna Commission (IATTC) and the Western and Central Pacific Fisheries Commission (WCPFC) for Pacific Bluefin Tuna (PBF) resources has led to an increase in abundance throughout its historical range. In fact, the most recent (2022[1]) stock assessments for PBF indicates stock recovery is exceeding rebuilding targets set forth by IATTC and WCPFC[2]. Due to the management successes and the optimism of the benchmark stock assessment in 2020, IATTC increased the biennial catch limits for both Mexico and the US, for the 2021 – 2022 and 2023 – 2024 management cycles, with the US allocation for the latter two-year period being 1,017 metric tons (mt), not to exceed 720 mt in any one year. Considering the apparent continued stock recovery, IATTC once again increased the catch limits for both Mexico and the US for the 2025-2026 management cycle, with the US allocation increasing to 1,822 metric tons (mt), not to exceed 1,285 mt in any one year.

Due to a multitude of factors, PBF landings in 2023 were only 186 mt, a fraction of the US allocation (landings data not yet available for 2024). Because of the limited landings in 2023 the US catch limit for PBF was 720 metric tons for 2024, and it's likely the actual catch was substantially lower. Restrictive vessel trip limits may inhibit purse-seine fishing effort, contributing to the possibility of much of the 2025 catch allocation going unharvested. With most hook-and-line commercial landings by small vessels with limited autonomy and, fish hold and refrigeration capacity, there appears there may be a niche for other gear types, such as deep-set buoy gear (DSBG) and linked buoy gear (LBG), and slightly modified versions such as nighttime deep—set buoy gear (NDSBG) and night linked buoy gear (NLBG), to harvest PBF resources more effectively.

Additionally, with the passing of the "Driftnet Modernization and Bycatch Reduction Act" in 2022, prioritizing the phasing out of the drift gillnet (DGN) fishery by 2027, loss of fishing opportunities and revenue in California are expected. The loss of this fishery will create a lack of fresh, domestically landed PBF, swordfish, and other marketable non-target species (opah, oilfish, escolar, and Mako and Thresher sharks).

Understanding the behavioral ecology and habitat preferences of the target species (PBF and swordfish), non-target species (opah, oilfish, escolar, mako, and common thresher sharks), and potential undesirable catches (blue and bigeye thresher sharks) can offer valuable insights into

[1] https://isc.fra.go.jp/pdf/ISC22/ISC22_ANNEX13_Stock_Assessment_for_Pacific_Bluefin_Tuna.pdf

[2] https://www.fisheries.noaa.gov/feature-story/international-actions-pay-pacific-bluefin-tuna-species-rebounds-accelerating-rate

[3] https://www.pcouncil.org/documents/2019/09/agenda-item-i-3-attachment-1-3.pdf/

the depths which fishers may target or avoid interactions, both during the day and night. This knowledge aims to enhance success rates for the target species while minimizing catches of non-target and undesirable species. For instance, a study conducted by Nosal et al. (2019) suggests that young of the year (<100 cm) blue sharks are found at depths shallower than 40m for 96.4% of the day and night, with an average of ~12m at night. A more in-depth analysis by Sepulveda and Aalbers (2018) observed a significant overlap in nighttime depths between blue sharks and swordfish. However, the mean nighttime depths differed notably, with blue sharks averaging ~15.5m and swordfish ~33m. For fishers wanting to minimize interactions with blue sharks, avoiding hooks at depths less than 50m would likely have a reasonable probability of accomplishing this, while also having a reasonable probability to interact with the target species. Furthermore, during recent years, both nighttime commercial and recreational rod-and-reel fishing effort has successfully targeted PBF at depths ranging from 50 to 120m, using electronic fish-finding equipment.

Having extensive experience in the hook-and-line PBF commercial fishery, as well as the recently implemented limited entry (LE) DSBG swordfish fishery, the crew of F/V Shearwater has the experience to design and implement alternative fishing strategies and gears for sustainable harvest of these commercially valuable resources (PBF and Swordfish) in the US EEZ. The following text describes our request for an EFP for NDSBG and NLBG, implemented in the similar manner as described in a previous EFP3 proposal by Nathan Perez and Thomas Carson, except for the addition of Blue Ocean Gear Smart Buoys (GPS, Temp, depth [if pulled under], 3D-aceeleration). Utilizing smart buoys will eliminate the potential for gear loss, and as more data is collected, may allow for gear specific behaviors to identify what species (target/non-target) may have been hooked. Preliminary data suggests that hooked swordfish are easily identified using the parameters sampled, and with adequate data, we should expect to identify species specific behavior when hooked.

To maintain complicity with the authorized LE DSBG/LBG fishery, our proposal is to fish hooks at a depth of 90m, during hours not currently authorized (night-time hours). Our proposed float configuration will be constructed in the same manner except for the bite indicator being rigged in such a way as to be visible at night (described below). Hooks and weights will comply with the current regulations for the LE DSBG/LBG fishery.

Objectives with this EFP proposal are to supplement data collection for a night-time component of a DSBG fishery; the hypothesis being that both PBF and swordfish can be targeted at night while having minimal interaction with non-target and undesirable species. We also wish to continue collecting species specific bite behavior, detected with BOG smart buoys so that algorithms can be developed to reliably determine which species is hooked. The hypothesis being that if the identity of the hooked animal is known in near real-time, live release of non-target or undesirable species can be executed with minimal impact on the animal.

Disposition of the catch: Catch of the target and some non-target species will be retained and landed for sale, and everything not retained will be released alive.

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4. Valid justification explaining why issuance of an EFP is warranted.

This proposed EFP will advance the data collection for the potential implementation of a night-time fishery. There is currently one approved night-time EFP but due to various circumstances, night-time fishing effort has been limited. While implementation of the daytime DSBG has proven an effective way to harvest marketable species while having a limited impact on undesirable and sensitive species, there are some challenging economic aspects. Having sufficient data to evaluate whether a night-time fishery can similarly target marketable species, while having limited interactions with undesirable species can help improve the overall viability of the DSBG fishery.

We propose that with this EFP we will add to the collection of data which will inform managers interested promoting the development low impact, sustainable, and economically viable fisheries in CA. Application of the proposed EFP will provide the council with data necessary to evaluate the following:

a) Will NDSBG or NLBG be effective in landing the target species (catch rate/CPUE) while having limited interaction with non-target and non-marketable species.
b) Are lighted strike indicators sufficient for gear tending.
c) Are there interactions with other fisheries (other DSBG or CPFV).
d) Con-current gear use (hook-and-line).
e) Can BOG smart buoys improve fisher efficiency and mitigate gear loss.

Additionally, we wish to continue to collect data from bites/hooked fish on DSBG/LBG and NDSBG/NLBG with BOG smart buoys. This data will provide us the opportunity to develop algorithms which can detect which species may have been hooked in real-time. By testing different sampling rates (2 – 15 minutes), and using data sampled onboard the smart buoys, it is likely enough behavioral data will be collected during the proposed 2-year period to identify species specific characters when hooked. For example, its known that swordfish tend to swim to the surface, continuing to swim in a specific direction at a reasonably high rate of speed when hooked, where bigeye thresher sharks will commonly submerge the bite indicators. Knowing these general characteristics, we can determine with some degree of certainty what has been hooked, as in, if a smart buoy reports back that it's been submerged, it can be assumed its likely not a swordfish and the fisher can prioritize tending that gear to release the shark alive. With a sufficient dataset we plan to use general additive mixed models to identify which sampling rate, parameters, and behavioral characteristics describe the species hooked.

5. A statement of whether the proposed experimental fishing has broader significance than the applicant's individual goals.

The broader goal of the proposed EFP is to collect data which can be used to evaluate the viability of adding a night-time authorization to the limited entry DSBG fishery. Data derived from the use of BOG smart buoys will benefit fishers using the technology by speeding up bite detection, and potentially identifying species at the time of hooking.

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6. An expected total duration of the EFP (i.e., number of years proposed to conduct exempted fishing activities).

Our request is for two years, starting in July 2025. Should more data be required to assess viability, an extension of an additional two years.

7. Number of vessels and expected number days fishing covered under the EFP.

Under the purview of this EFP proposal there will be only one vessel, *F/V* Shearwater.

Area	Number of Vessels/Vessel name	Estimated fishing effort in number of days or sets
Southern CA Bight (Pt. Conception to the Mexican Border)	1 - Shearwater	Up to 180 days
Central California (Pt. Reyes to Pt. Conception)	1 - Shearwater	Up to 60 days

8. A description of the species (target and incidental) to be harvested under the EFP and the amount(s) of such harvest necessary to conduct the experiment, including harvest estimates of overfished species and protected species.

Based on our experience with DSBG and commercial hook-and-line fishing for HMS species, and the fishing strategies we expect to employ, anticipated species composition for night fishing should be approximately 70% PBF, 25% swordfish, 3% opah, 2% various shark species.

Targeted Species: PBF (*Thunnus orientalis)* and Swordfish (*Xiphias gladius*)

Non-target Species: Opah (*Lampris guttatus*), Mako Shark (*Isurus oxyrinchus*), Escolar (*Lepidocybium spp.*), and Oilfish (*Ruvettus spp.*).

Undesirable Species: Blue shark (*Prionace glauca*) and Bigeye Thresher shark (*Alopias superciliosus*).

It is our belief that fishing NDSBG/NLBG will have no interaction with sensitive species or species which are of special management concern. As has been shown with the LE DSBG/LBG fishery, if these species are hooked, or do interact with the gear in some way, they can be detected and released in alive condition.

Potential Harvest: Assuming the gear is fished between 40 and 80 days (nights), landings could likely be up to 120 individual PBF and 25 individual swordfish per season, although this is based on assumed performance and some limited insight shared by a current NDSBG EFP participant. It is also likely there will be a learning curve and there will be improved catch rates as strategies are refined.

9. A description of a mechanism, such as at-sea fishery monitoring, to ensure that the harvest limits for targeted and incidental species are not exceeded and are accurately accounted for.

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The proposed EFP will use a combination of physical observation (up to 100%) at a rate the council deems reasonable, fishery logbooks, vessel logbooks (detailed), BOG smart buoy records, and landing receipts. These mechanisms will provide insight into the performance of the methods, including the performance of the BOG smart buoys.

10. A description of the proposed data collection

The vessel logbook data fields will include date/time/lat/lon of set, date/time/lat/lon of recovery, target and non-target catch, size, disposition, hook depth, bait type, soak time, sea surface temperature, drift, light/color used, leader diameter, and any additional observations. All data will be maintained in Microsoft Excel spreadsheet and all associated metadata will be available to the PFMC HMS advisory bodies, the California Department of Fish and Wildlife (CDFW), and other researchers interested in analyzing or publishing the data.

Drift distance, drift speed, bite detection, and other metrics recorded and transmitted by the BOG will be shared with the buoy manufacturer to build the bite detection algorithms and will be made available to oceanographers and other researchers for various collaborations.

11. For the vessel covered by the EFP, the approximate time(s) and place(s) fishing will take place, and the type, size, and amount of gear to be used.

Time and Place: Our expectation is to target PBF and swordfish when seasonally abundant in the southern California bight from June to December. However, with climate variability from El Nino events, it is possible to have fishing opportunities throughout the entire year. For this reason, we are requesting that there be no seasonal restrictions.

Considering that the current limited entry DSBG/LBG fishery authorizes fishers to set the gear at sunrise and have all gear recovered "no later than 3 hours after local sunset", our request is to have gear deployed at night during the hours not currently specified in the effected regulation. To accurately represent how we envision fishing night sets, we'd request authorization to fish from one hour prior to local sunset until two hours after local sunrise. However, the council may wish to reduce the overlap of time outlined in the LE DSBG/LBG description considering the Shearwater possess a LE permit.

Our intention is to comply with the current tending regulations outlined in LE DSBG/LBG fishery, where the vessel is required to be within 5 nautical miles of all the gear, and no more than 3 miles from the nearest gear. However, it's quite likely the vessel will be in much closer proximity due to the likely fishing strategies. BOG smart buoys will also provide the crew with a real-time means to monitor the location and performance of the gear.

Notification requirements will follow the same procedures as those established during previous EFP participation. Where the operator or an agent thereof will notify National Marine Fisheries Service (NMFS), CA Department of Fish and Wildlife Law Enforcement, and the agency responsible for observer placement a minimum of 48 hours prior to anticipated departure. Information provided should include the following:

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a) Captain
b) Departure date/time
c) Departure port
d) Expected return date/time
e) Expected Unloading port

Gear Description: We intend to configure the gear in the way described in the LE DSBG/LBG permit with two modifications, 1) a BOG smart buoy will be attached, and 2) bite indicators will be modified to be visible at night. The gear description is summarized below.

NDSBG

a) No more than 10-pieces fished at any time.
b) Mainline will be a minimum of 2.4 mm (500# breaking strength).
c) Branch line/ Leader will be a minimum of 1.5 mm (200# breaking strength).
d) Leader length up to 15m.
e) Weight at the terminal end will be a minimum of 3.6 Kg.
f) Circle hooks will be exclusively used, with a minimum size of 16/0 with not more than a 10 deg offset.
g) Float line will be constructed of 3/8" poly-propylene rope and will include a lighted strike detector, whereby a standard 10# lobster float will have a piece of 2-foot piece of PVC inserted. A light (green or white) will be affixed to the top of the PVC. When fishing, the light will stick into the air, when a swordfish is hooked the light will lay over, when a PBF is hooked, the light will either lay over, or it will become submerged. This is the same design described in the Perez/Carson EFP. The next buoy in the float line configuration will be the BOG smary buoy, then a secondary 10# float, then a minimum 45-pound (20.41 kilogram) buoyancy non-compressible hard ball, and finally the hi-flyer which will include a strobe and a radar reflector.
h) Minimum hook depth will be 90m.
i) An illumination source will be affixed to the mainline, near the weight.
j) In addition to dead, and possibly live baits, artificial baits will be evaluated.

NLBG

a) Mainline will be no more than 2.8mm.
b) Horizontal footprint not to exceed 5 miles and 10 links.
c) Mainline suspenders a minimum of 15m.
d) Bite indicator/suspender floats will be configured as described above and may or may not include the addition of the hi-flyer.
e) Up to 30 total hooks.
f) Branch line/ Leader will be a minimum of 1.5 mm (200# breaking strength).
g) Leader length up to 15m.
h) Minimum hook depth will be 90m.
i) Weights will be a minimum of 3.6 Kg.

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j) Circle hooks will be exclusively used, with a minimum size of 16/0 with not more than a 10 deg offset.
k) An illumination source will be affixed to the mainline, near the weight.
l) In addition to dead, and possibly live baits, artificial baits will be evaluated.

12. Undesirable Species (Bycatch) Mitigation

The low impact of the DSBG/LBG is well described in Sepulveda and Aalbers (2018), whereby hooks fished below the thermocline tend to have a relatively low interaction with non-target and undesirable species with little marketability. It has also been shown that interactions with marine mammals, turtles, and other sensitive species is extremely rare, and likely will not result in mortalities. Furthermore, because of the gear configuration, including the configuration proposed herein, it is possible for fishers to identify these interactions and take measures necessary to ensure the impact is minimized. From our experience (5-8 years with DSBG) we anticipate no unintentional mortality these or other non-marketable species.

13. Applicant experience

Markus Medak

	Years of Experience	Gear/Type of Participation
DSBG	5	2 years crew, 2 years captain
Other Swordfish gear		
Other Gear	12/20	CA spiny Lobster Operator, CPFV Owner/Operator for 20 years

Daniel Fuller

	Years of Experience	Gear/Type of Participation
DSBG	8	EFP and LE DSBG operator
Other Swordfish gear	5	Harpoon
Other Gear	12	Hook-and-line tuna, yellowtail, white seabass, halibut

Brian Sims

	Years of Experience	Gear/Type of Participation
DSBG	4	3 years crew
Other Swordfish gear	5	Harpoon
Other Gear	12/25	CA spiny Lobster crew, CPFV Owner/Operator for 25 years

14. References

Nosal, A. P., D. P. Cartamil, N. C. Wegner, C. H. Lam, and P. A. Hastings. "Movement ecology of young-of-the-year blue sharks *Prionace glauca* and shortfin makos *Isurus oxyrinchus* within a putative binational nursery area." Marine Ecology Progress Series 623 (2019): 99-115.

[1] https://isc.fra.go.jp/pdf/ISC22/ISC22_ANNEX13_Stock_Assessment_for_Pacific_Bluefin_Tuna.pdf

[2] https://www.fisheries.noaa.gov/feature-story/international-actions-pay-pacific-bluefin-tuna-species-rebounds-accelerating-rate

[3] https://www.pcouncil.org/documents/2019/09/agenda-item-i-3-attachment-1-3.pdf/

Sepulveda, Chugey A., and Scott A. Aalbers. "Exempted testing of deep-set buoy gear and concurrent research trials on swordfish, *Xiphias gladius*, in the Southern California Bight." Marine Fisheries Review 80, no. 2 (2018): 17-29.

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