

DRAFT-Exempt Fishery Permit Application

PIER-Hookless Deep-set Ring EFP

Date of application: 10/23/2025

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2. All necessary vessel and captain information will be provided upon request. Participating vessels hold active DSBG and HMS permits and are capable of carrying observers upon request.

Fishing Plan and Methodology

Background: The proposed EFP is focused on improving the performance of the California deep-set fishery for swordfish (i.e., deep-set buoy gear DSBG and Linked Buoy Gear, LBG). This submission requests to test a hookless gear type that has been used to target swordfish in several fisheries around the globe (Ochi et al., 2025). The hookless gear uses an illumination source to attract swordfish which then become ensnared in a ring or loop system. This EFP proposes to deploy hookless gear on both standard DSBG and LBG operations to test hypotheses that hookless gear can: (1) Reduce fishing operation costs, (2) increase catch without incurring additional bycatch and (3) enable deep-set fishermen to operate during periods of increased bait predation, like those conditions experienced in 2025.

Rationale and Need: Off California, bait predation during deep-set fishing for swordfish is common and a major factor affecting catch rates and gear performance (Sepulveda and Aalbers, 2018). The primary source of bait predation in the DSBG fishery is from Humboldt or jumbo squid (*Dosidicus gigas*), a voracious predator that is also an important prey source for swordfish (Pretti et al., 2023). During periods of increased Humboldt squid presence, swordfish baits only last a few minutes at depth before they are consumed entirely. This problem is inevitable when squid are present because deep-set fishing requires illumination to attract swordfish, which also attracts the squid. Unfortunately, excessive bait predation, like what we are seeing in 2025, forces fishermen to move away from productive areas or stop fishing altogether.

Gear to be tested: Off the coast of Japan, a hookless ring fishery was developed in the mid-1990's in an area that also exhibits high numbers of large predatory squid (diamond squid; Bower and Miyahara, 2005). The technique was originally based off a deep-set vertical line design (300-500m) that is very similar to the CA Deep-set Buoy Gear Fishery (Figure 1). Japanese fishery reports suggest that the vertical line fishery was initially focused on diamond squid, a species that was caught using hooks, and later transitioned to include the targeting of swordfish and tuna using a hookless ring system. The premise of the ring fishery is to attract the swordfish to an illuminated series of rings

that the fish then swims into. In the last decade, these techniques have evolved considerably and have been incorporated into several commercial operations around the world (Garibaldi et al., 2024). The use of rings in large-scale commercial operations is now being proposed for future inclusion into management plans (Garibaldi et al., 2024; Ochi et al., 2025).

The original ring fishery off Ogasawara was based on vertical gear that closely resembles DSBG in that it is free-floating, simple in design and targets deep waters below the thermocline (300-500m; Figure 1). When deployed at depth, the rings have been proposed to have very low bycatch, likely due to the positioning at depth and the absence of any olfactory cues emitted by natural baits (Ochi et al., 2025).

In this EFP we propose to test a baitless ring system on standard and linked buoy gear sets to:

- a) Document catch and any bycatch associated with the use of illuminated rings.
- b) Offer fishermen an alternative to bait when predation is excessive.
- c) Continue to improve catch performance and efficiency of deep-set operations.

3. Time/Season restrictions: To be performed during standard and linked DSBG operations. No seasonal limitations/restrictions.

The time of day: We are proposing to test the hookless gear during standard and deep-set fishing operations, which occur at depths below the thermocline during the daylight hours.

4. Location:
Southern California from Point Conception to the US/Mexico border.

5. What type, size, and amount of fishing gear to be used? (i.e., hooks per set, mainline length and diameter).

This EFP proposes to deploy a hookless deep-set ring alongside each baited hook to

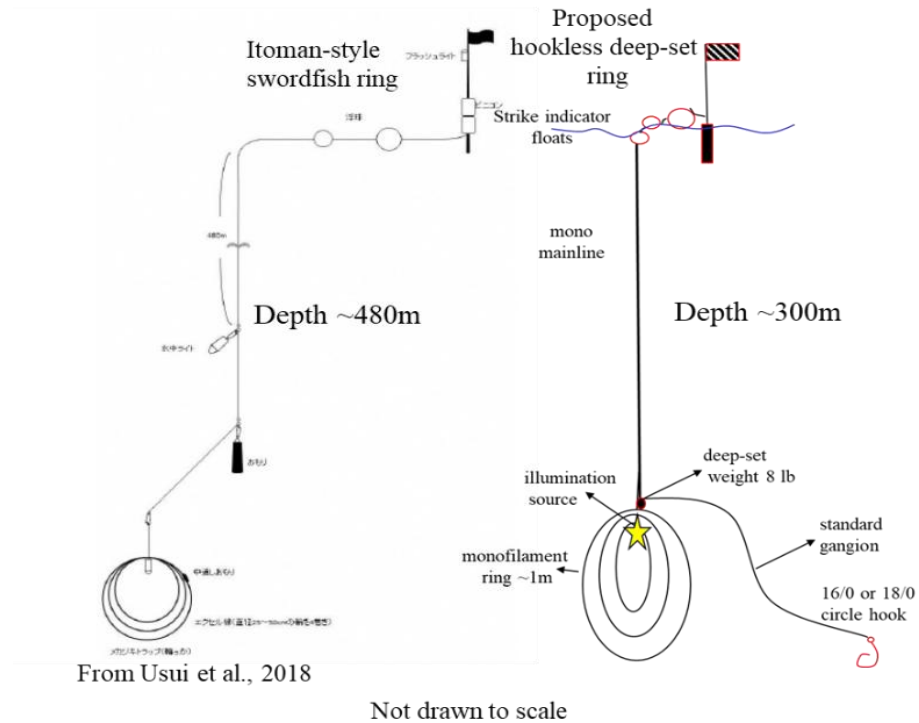


Figure 1. (Left) Image showing Japanese-style Itoman swordfish rings from Usui et al., (2018). (Right) Image of the proposed EFP Deep-set ring design.

assess catch performance during daytime DSBG and LBG operations. EFP deployments will adhere to current DSBG regulations.

Mainline Gear Description: Hookless rings will be positioned proximal to baited hooks near the terminal end of DSBG (Figure 1) or along the deep horizontal mainline of a LBG set. Surface strike detection buoys, monofilament mainline (2.5 to 3.2 mm), and heavy weights (4 kg) will remain consistent with current DSBG regulations.

Terminal Gear Description: The proposed hookless ring system uses an illumination source (i.e., LED or cyalume) bordered by concentric loops of 2.0-2.5 mm monofilament ranging in diameter from ~25 to ~75 cm. The number of concentric loops to be used on each hookless ring may vary from 1 to 8.

Amount of gear to be deployed: This work will be performed in conjunction with standard DSBG and LBG operations which can currently deploy 10 single buoy gear sets or up to 10 linked sections. Both DSBG and LBG can have up to a maximum of 30 hooks deployed at any one time. We are requesting permission to deploy a hookless ring adjacent to each baited hook using a 1 to 1 ratio to allow for straightforward catch and bycatch per unit effort comparisons. Thus for DSBG deployments, one ring would accompany each baited gangion. For LBG, we are requesting permission to deploy four hooks along each horizontal section to also allow for a 1 to 1 comparison.

Gear footprint: This EFP will follow current horizontal footprint regulations for DSBG/LBG (5nm with similar proximity regulations).

Depths to be fished: Deep-set-To remain consistent with existing deep-set regulations.

Description of Bycatch Mitigation Tools: The ring system will be deployed in conjunction with DSBG and LBG. All of the current deep-set bycatch mitigation tools will be maintained on all sets. These include the use of a heavy weighted system, strike detection, gear serviceability and for LBG, the use of a line-setter.

6. How many EFP fishing days are anticipated per vessel per year?

The proposed EFP is requesting a maximum of 80 fishing days/vessel/year for three vessels or a maximum of 240 sets to be performed during the first fishing season.

Proposed Regulatory Exemptions and Goals

(7) What is the purpose and justification for seeking an EFP?

The purpose of this work is to improve performance and profitability of the California deep-set fishery for swordfish. The proposed EFP incorporates novel hookless gear innovations into an existing fishery to counter reduced catch rates and associated reductions in gear performance caused by bait predation.

The ultimate goal is to improve deep-set fishing gear performance and profitability while maintaining low bycatch rates.

(a) Regarding purpose, why are you applying for an EFP?

We are requesting this EFP to improve the performance of current DSBG and LBG fishing operations. Performance metrics to be assessed in this EFP include swordfish targeting efficiency (i.e., catch per unit effort compared to hooks), bycatch avoidance (compared to hooks deployed at the same time and location) and associated operational costs (i.e., bait vs non-bait operations).

(b) Regarding justification, why do you need an EFP to engage in the proposed EFP activities?

This request requires an EFP as it proposes to test a gear type that is not currently included in the West Coast Fishery Management Plan for Highly Migratory Species. This is a test of a novel gear type that has not been used off the US West Coast but is being used by several international fleets (i.e., Japanese, Spain, Italy).

(c) What specific regulations at 50 CFR 660 subpart K, such as those related to authorized gear types, operational requirements, or time/ area closures, are you requesting an exemption from?

The proposed EFP requests to deploy a gear type that is not currently described in the West Coast Fishery Management Plan for HMS or in the CFR's.

Rationale: This request proposes to test a gear type that has been gaining popularity in international swordfishing operations (i.e., Japanese, Spanish; Italian; Garibaldi et al., 2024; Ochi et al., 2025). To date it has been reported to be effective at targeting swordfish and also suggested to result in low bycatch (Usui et al., 2018; Garibaldi et al., 2024).

(8) What are the goals of the EFP? (e.g., how will information gained contribute to the conservation and management of HMS fisheries)

The overarching goal of this work is to expand and improve sustainable domestic fishing opportunities for highly migratory species while minimizing bycatch to the extent possible. More specifically, this EFP will focus on improving the profitability and efficiency of current deep-set operations off the California coast. Improving catch performance and profitability will contribute to management objectives and future fishery success.

Fishing Impacts and Data Collections

(9) What species do you plan to target for harvest under the EFP?

Swordfish *Xiphias gladius*

(a) What amount(s) (i.e., weight or numbers of animals) of harvest are necessary to maintain participation in exempted fishing?

Because this EFP would be performed during standard DSBG and LBG fishing trips, and because there is little extra cost associated with ring construction and deployment, we anticipate EFP participation to be high as long as some level of performance increase is observed.

Swordfish catch numbers will be dependent on animal size, market price and seasonal availability. However, based on the catch dynamics of the current fishery and the low catch rates observed during periods of increased bait predation, the minimum level of harvest would need to be 1-2 swordfish/day to keep operations afloat.

(b) How will the disposition be documented during EFP operations?

All sets will be 100% monitored by either electronic monitoring or NMFS fisheries observers. Additional documentation will include fisher logbooks, check in/out procedures for each trip, observer logbook records and landings receipts (Sepulveda and Aalbers, 2018). Similar to previous EFP efforts, the PIER team will work closely with each applicant to log fishing effort, substantiate log books and manage EFP fishing operations.

(10) What non-target species do you think you might incidentally catch under the EFP?

Bigeye thresher shark (*Alopias superciliosus*)

Bigeye threshers have been shown to be resilient to capture with high post release survival rates (Aalbers et al., 2021). Additionally, bigeye threshers only comprise a small component of the current deep-set fishery catch (Sepulveda and Aalbers, 2018).

(a) What amounts of incidentally caught species are expected?

<10% of total catch. We anticipate very little non-target catch based on the depths fished and past DSBG catch records (Sepulveda and Aalbers, 2018). Additionally, we propose that serviceability will allow any non-target catch to be released promptly.

(b) How will disposition be documented during EFP operations?

All sets will be 100% monitored by electronic monitoring or NMFS fisheries observers. EM records will be reviewed by an independent contractor and provided to NMFS at the end of each fishing season. Additional documentation will include fisher logbooks, check in/out procedures for each trip, observer logbook records and landings receipts (Sepulveda and Aalbers, 2018). Similar to the previous EFP efforts, the PIER team will work closely with each applicant to log fishing effort, substantiate log books and manage EFP fishing operations.

(11) Which protected species might be impacted by EFP fishing and how will disposition of these species be documented during EFP operations (e.g., observer coverage, electronic monitoring, logbook, etc.)?

Attempts to avoid all protected species interactions will be made by using heavy weights and by fishing well below the thermocline during the day (>100 m). The proposed gear will be performed using the DSBG platform which has demonstrated minimal protected species interactions to date. Additionally, the severity of any potential interactions will be mitigated to the extent possible by testing the hookless gear on deep-set configurations that incorporate strike detection and allow for gear serviceability.

Disposition of all catch and bycatch, including protected species, will be 100% monitored on all trips through electronic and or human observation.

(12) What are anticipated impacts of EFP fishing on the environment?

We do not anticipate any negative impacts on the larger environment. Although all extractive activities have some associated environmental impact, we do not anticipate any population-level effects or loss of habitat as a result of the proposed activities.

(a) Do you anticipate gear conflicts with other fishery sectors?

No. Because the proposed gear trials will occur during ongoing deep-set fishing operations (DSBG and LBG), we do not anticipate any gear conflicts with other fishery sectors. The proposed EFP will test hookless gear on standard and linked buoy gear sets and all activities will resemble those of currently permitted deep-set fishing activity. The hookless configuration will not increase the potential for gear conflicts with other fishery sectors.

(b) Please provide a brief description of any potential adverse effects to essential fish habitat.

We do not anticipate any adverse effects to essential fish habitat (EFH).

The proposed EFP uses pelagic gear that does not come into contact with the sediment. All operations occur offshore and pose no direct risk to EFH.

Part II: Determination of whether proposed EFP fishing methods align within the scope of existing analyses.

(1) Will you be using hook and line or net or trap?

Hookless gear- Hookless rings will be comprised of a series (1-8) of concentric monofilament rings tethered to a single monofilament line. The ring systems will be deployed on standard DSBG and LBG sets.

(2) Does the fishing configuration include setting hooks along a horizontal mainline greater than 5 nm?

No. The maximum horizontal footprint will be the same as DSBG with gear maintained inside of a 5nm footprint.

(3) What depths do you plan to target: above or below 100 meters?

Below 100m- All of the proposed testing will be deep-set during standard DSBG and linked buoy gear operations.

(4) Will you use heavy weights ($\geq 4\text{lb}$) and extenders to set the mainline at depth?

Yes, all of the current DSBG/LBG attributes, including heavy ($>4\text{ lb.}$) weights, will be used during the hookless gear trials.

(5) Do you plan to use circle hooks?

No- No hooks are proposed to be used on hookless deep-set rings.

However, DSBG fishers will retain the capacity to set baited circle hooks (16/0 or 18/0) during comparative gear trials as allowed under the current DSBG terms and conditions.

(6) What type(s) of bait do you plan to use (e.g., finfish, squid, artificial baits)?

Hookless rings will only require illumination, no natural bait. The illumination source will be similar to that currently used in the CA deep-set fishery (i.e., battery operated power light or calumet; Sepulveda et al., 2014; Sepulveda and Aalbers, 2018). Hookless rings may include an artificial bait (i.e., plastic or rubber). The DSBG and LBG operations will be fished according to current regulations, which allow the use of either finfish or squid bait types.

(7) Do you think your proposed fishing gear methods and harvest production will be economically viable for you?

Yes, the goal is to expand and improve ongoing deep-set buoy operations off the US West Coast. The proposed gear will have minimal costs and require minimal additional effort, while offering reduced bait costs and potentially improved catch performance, particularly during periods of heavy bait predation.

(8) Do you have space on your vessel to carry an observer?

Yes, all vessels participating in this EFP are currently permitted to carry observers and also willing to carry electronic monitoring equipment.

(9) How might your fishing configuration help avoid or reduce the potential for interactions with, or post-release mortality of protected species?

The proposed gear is baitless and removes all odor from the terminal tackle. By removing scent, the proposed gear has high potential to reduce interactions with elasmobranch species that rely heavily upon olfaction to locate prey (Tester, 1963).

Additionally, the use of DSBG and LBG bycatch mitigation features (i.e., strike indication, heavy weights and serviceability), will reduce the severity of an interaction if one were to occur.

Lastly, by testing the hookless ring system at depth during the day, this EFP reduces potential bycatch by positioning the gear at a depth that has much less interaction potential than surface-based gears.

(10) If available, are you willing to test electronic monitoring? Yes

PIER is currently testing electronic monitoring in an ongoing EFP and would support additional EM testing in the proposed work.

(11) When do you need to start fishing under your EFP? 08/2026

(12) Signature of Applicant



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Director of Research and Education

Oceanside, CA; www.pier.org

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