

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON DEEP-SET BUOY GEAR AUTHORIZATION-FINAL ACTION

At its March 2018 meeting, the Pacific Fishery Management Council (Council) adopted a motion revising the range of alternatives (ROA) for the authorization of deep-set buoy gear (DSBG) and provided guidance to the Highly Migratory Species Management Team (HMSMT) on the scope of the analyses it wished to see at the June 2018 meeting. In its June 2018 reports ([HMSMT Supplemental Report 1](#); [HMSMT Supplemental Report 2](#)), the HMSMT presented preliminary results from its spatial, economic, and biological analyses.

An updated spatial analysis is provided, including additional information on the topic of potential crowding, in which the Council has repeatedly expressed interest. In its [June 2018 Supplemental Report 1](#), the HMSMT provided analysis and discussion on this topic, and ultimately concluded that with regard to crowding within a DSBG fleet with a maximum of 250 permits (maximum number of permits, prior to June 2018), “it is reasonable to suggest that spatial constraints, at least within a DSBG fleet, would not be a limiting factor.” In addition, with regard to crowding and interactions with the recreational fishery, the HMSMT concluded that until actual conflicts arise, these concerns are speculative. Areas of high recreational effort, both private and commercial passenger fishing vessel (CPFV), appear to be largely concentrated near the coast and around the Channel Islands, most likely in state waters (0-3 nm). This confirms that a large proportion of recreational effort is geared toward nearshore species, such as basses and yellowtail. Swordfish, which is DSBG’s main target species, inhabit a very different habitat than these nearshore species. While recreational anglers and CPFVs do sometimes target HMS species which may be found near bathymetric features frequented by swordfish, available data are too sparse to determine at this point whether interactions between DSBG and recreational fisheries will be a concern. While the HMSMT feels that these previous statements are still accurate representations of the situation, we have attempted to provide some additional perspective to potential spatial crowding issues. An updated analysis for both of these components, as well as the HMSMT’s initial discussions, are included below.

Permit and Fishing Activity:

In light of limited DSBG exempted fishing permit (EFP) fishing activity and related data collected to date, the HMSMT summarized permit issuance and fishing activity from the large-mesh drift gillnet (DGN) fishery to provide context for possible activity levels of DSBG permits issued under a fully authorized limited entry program. Although the DGN fishery operates under different parameters, the target species (swordfish) and related productive habitat for fishing, are similar to some extent. The HMSMT reported in its [June 2018 Supplemental Report 1](#) that on the historical day of peak DGN fishing activity, only 26 percent of issued permits were active. Over all seasons since 2001, less than 50 percent of all issued permits were active in any one season. The average percentage of DGN permits which actively fished in the Southern California Bight (SCB) between the 2001/02 and 2016/17 seasons was 34.4 percent. Figure 1 (below) provides a broad overview of DGN permit issuance and fishing activity, while Figure 2 provides a closer look at the landings activity between the SCB and all of California.

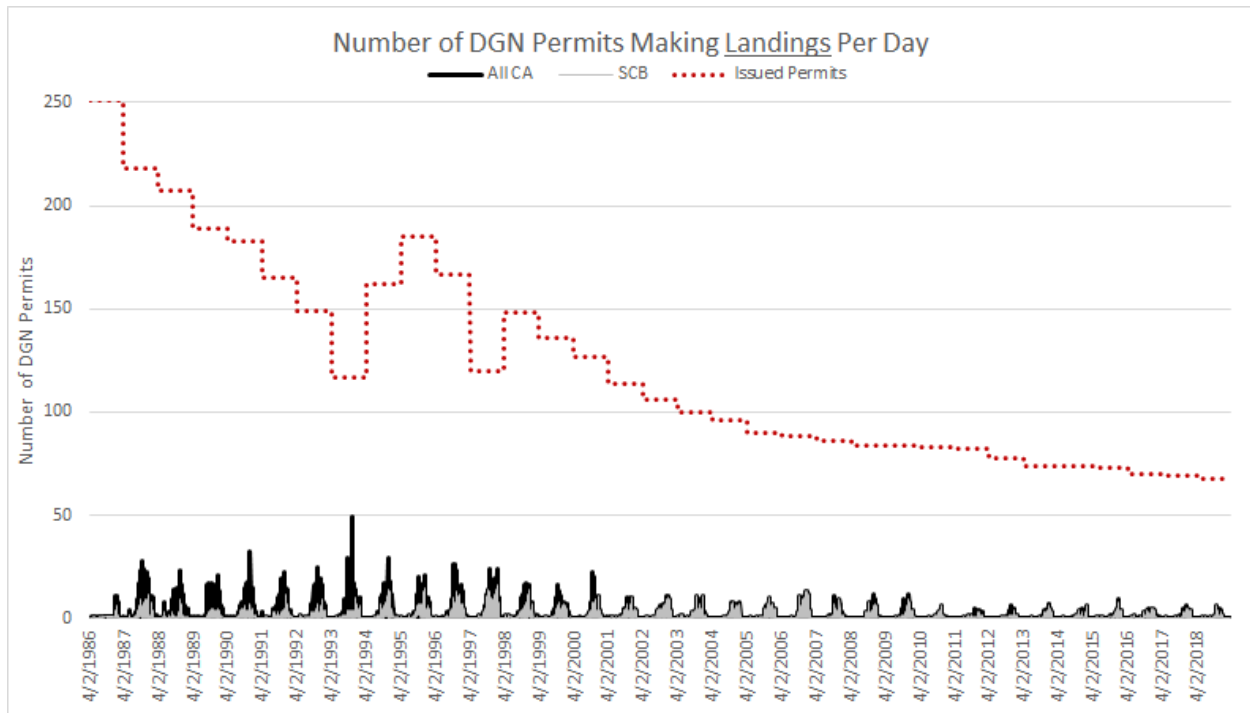


Figure 1. The number of state-issued DGN permits by season, the number of permits making landings by day in all waters off of California and in waters of the Southern California Bight (SCB) as defined in the Council's [motion](#) for DSBG, 1986/87 - 2018/19 seasons.

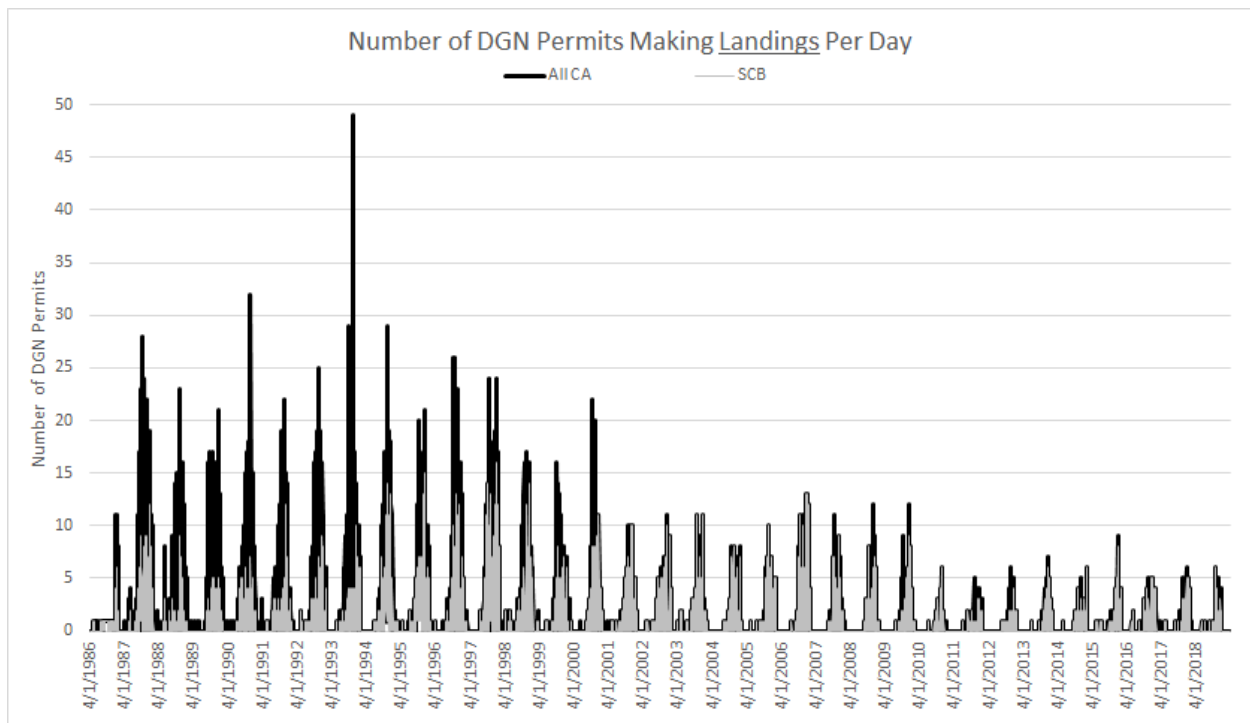


Figure 2. Detail of landings components from Figure 1. The number of DGN permits making landings by day in all waters off California, and in waters of the SCB as defined in the Council's [motion](#) for DSBG, 1986/87 - 2018/19 seasons.

With the issuance of a substantial amount of new DSBG EFPs in 2018, the HMSMT applied a similar permit summary approach to evaluate DSBG EFP activity. While activity has increased in tandem with the increase in issued EFPs, the ratio of active EFPs to Council-recommended EFPs hovers around 43 percent for 2018, as used in the DEIS analyses completed by National Marine Fisheries Service (NMFS, Figures 3 and 4).

These figures display both the number of authorized vessels and the number of authorized operators, which are the same until late 2018, for clarification of the slightly differing EFP numbers provided in various updates, analyses, and reports. Several operators applied to use multiple vessels, and several vessels have multiple applicants designating that vessel on the EFP. While technically NMFS issues one EFP per vessel with potentially multiple authorized operators, the number of authorized operators, not vessels, is what is under consideration for LE permit qualification criteria under the ROA.

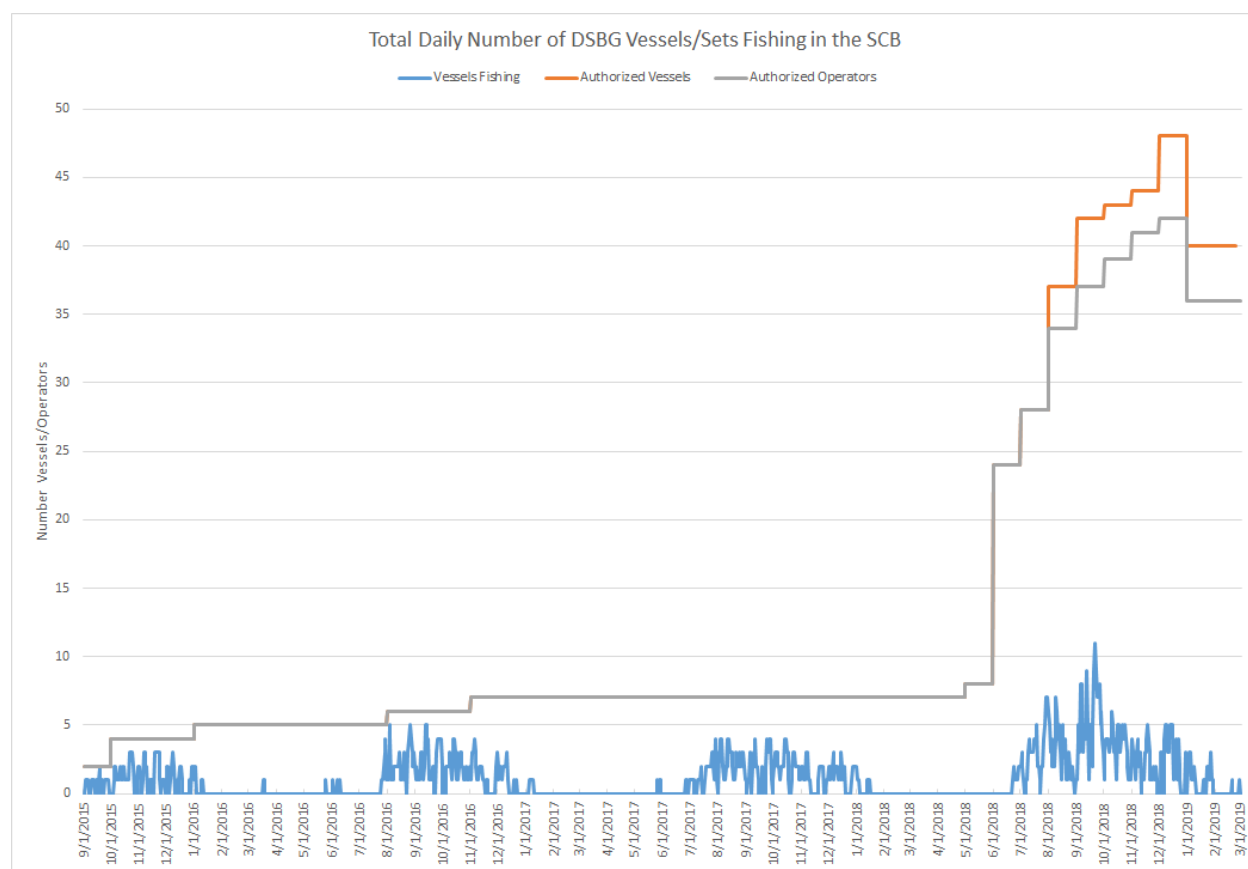


Figure 3. The number of authorized EFP vessels and operators, the number of actively fishing vessels and the total number of DSBG sets by day in the SCB, 9/1/2015 - 2/1/2019.

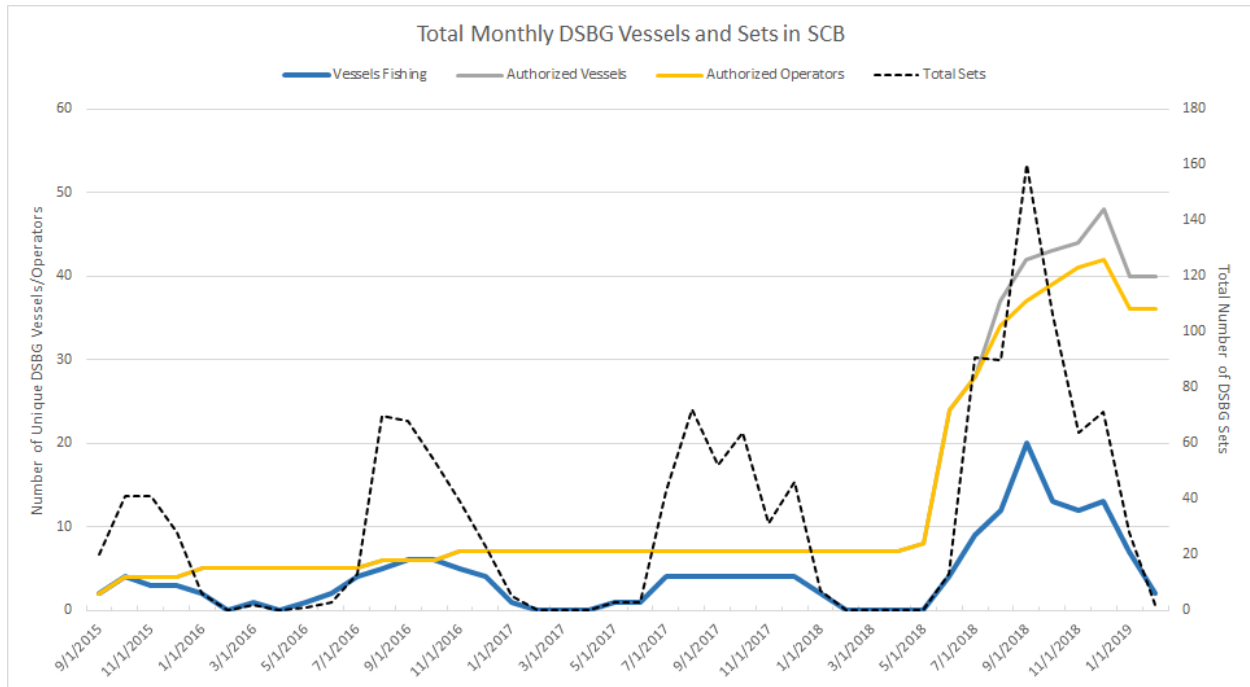


Figure 4. The number of authorized EFP vessels and operators, the number of actively fishing vessels, and the total number of DSBG sets by month in the SCB, 9/1/2015 - 3/1/2019.

The available data suggests the possibility that only a fraction of the permits issued in a swordfish fishery would be used in any given year, and the daily usage varies greatly while staying well below the total number of permits issued. However, results for the EFP fishery may differ from what would occur under a fully-authorized DSBG fishery.

Spatial Analysis:

The HMSMT used the DSBG EFP set-specific data from 2015 through February 2019 to expand upon previous spatial analyses. A total of 39 records were removed from the data set due to inaccurate position information, leaving a dataset consisting of a total of 1,223 sets.

The daily occurrence of multiple vessels fishing together within a single California Department of Fish and Wildlife (CDFW) block was evaluated. The spatial distribution of the DSBG EFP vessels shows that a large proportion of the sets occurred as a single vessel fishing in a single block. There were instances where four or five vessels reported or were observed fishing in a single block on a given day, but these instances made up less than one percent of the overall sets (Table 1).

Table 1: Summary of the number of sets that were conducted by DSBG EFP vessels simultaneously fishing in a given block on a given day.

| Number of Vessels/Block | Number of Instances | Percent of Sets |
|--------------------------------|----------------------------|------------------------|
| 5 | 2 | 0.2 |
| 4 | 3 | 0.2 |
| 3 | 15 | 1.2 |
| 2 | 90 | 7.4 |
| 1 | 1113 | 91 |

Proximity between sets was also examined for the days in which there was the highest concentration of DSBG EFP vessels fishing in a single block (similar to Figure 14). Three of the five instances in which either four or five vessels were fishing within a single block occurred in the same block on three different dates. In instances of four or more vessels fishing simultaneously in the same block, the distance between sets ranged from 0.44 nm to 1.7 nm.

On 10/15/17 (4 vessels in 1 block), the closest sets were 0.76 nm apart, with all 4 vessels in this block all being within 2.4 nm of each other.

On 8/2/18 (4 vessels in 1 block), the closest sets were 1.3 nm apart.

On 9/24/18 (5 vessels in 1 block), the closest sets were 1.7 nm apart.

On 9/25/18 (5 vessels in 1 block), the closest sets were 0.44 nm apart, with 4 of the 5 vessels in this block all being within 2.4 nm of each other.

On 12/15/18 (4 vessels in 1 block), the closest sets were 1.6 nm apart.

To estimate the variation in DSBG EFP set footprints, set and haul-back locations for individual pieces of DSBG from sets observed in 2017 were used to calculate the area of each set using the convex hull method (Figure 15). Set footprint ranged from 0.53 to 19.99 nm², with an average area of 4.18 nm² and median of 3.29 nm².

These footprints included the entire area in which a set was fished during the course of the day and accounted for gear movement resulting from oceanic conditions and any catch interactions. This, coupled with the extremely close proximity DSBG vessels have reported or have been observed fishing to one another, strongly suggests that more than one vessel can successfully fish within the maximum 5 nm diameter footprint specified by the Council and which the HMSMT has used to look at spatial considerations in past analyses. This information suggests that crowding issues, at least within the DSBG fleet itself, likely could be addressed by cooperative fisherman behavior when setting gear.

In further consideration of potential interactions with the recreational fishery in the SCB, both CPFV and private recreational data were examined on a finer scale than in previous HMSMT analyses. The HMSMT examined the spatial extent of the sets conducted by the DSBG EFPs that fished from 2015 through February 2019 compared to CPFV and private recreational vessel distribution of effort (Figures 5-14) by CDFW block for the same period. The private vessel data include only those vessels intercepted at launch ramps by California Recreational Fishing Survey

samplers, and do not include effort from private docks or marinas. Neither of these data sets are expanded for this analysis. Month and day with the highest number of vessels/sets within this timeframe was also mapped to explore interaction potential.

Figures 5, 8, and 11 show the location of all DSBG EFP sets plus the maximum daily number of vessels (CPFV, private, or combined, respectively) by CDFW block, with the value reported in each block being the maximum for that block on any day between 2015 and February 2019. Therefore, the date of the maximum number of vessels in each block varies.

Figures 6, 9, and 12 show the location of the DSBG EFP sets fished during the month of highest DSBG activity, with 20 DSBG vessels making 120 sets, and the cumulative number of CPFVs, private vessels, and combined vessels fishing by block during that same month, respectively.

Lastly, Figures 7, 10, and 13 show the location of the 11 DSBG EFP sets/vessels fished on the day of highest DSBG activity and the total number of CPFVs, private vessels, and combined vessels fishing by block on that same day, respectively. Figure 14 shows the four sets fished in closest proximity to each other on that date, with distances indicated between each reported set location.

As concluded in previous HMSMT reports, the available data show that most recreational fishing, by both CPFV and private vessels, occurs along with coast of the mainland and Channel Islands. The majority of this effort is understood to be within state waters (0-3 nm), where DSBG would not be authorized.

Additionally, these maps all include the 300 m bathymetric contour line, as Dr. Chugey Sepulveda indicated that DSBG is intended to be fished in deeper waters. While no calculations were done to estimate the total available area for fishing, largely due to previous calculations indicating that on a solely spatial scale there would virtually be no limitation to DSBG fishing under the Council's alternatives, the maps show that the necessity to fish in waters deeper than 300 m would not substantially reduce the amount of "fishable" area in the SCB. Additionally, it is apparent that the majority of sets fished to date stay in waters deeper than 300 m.

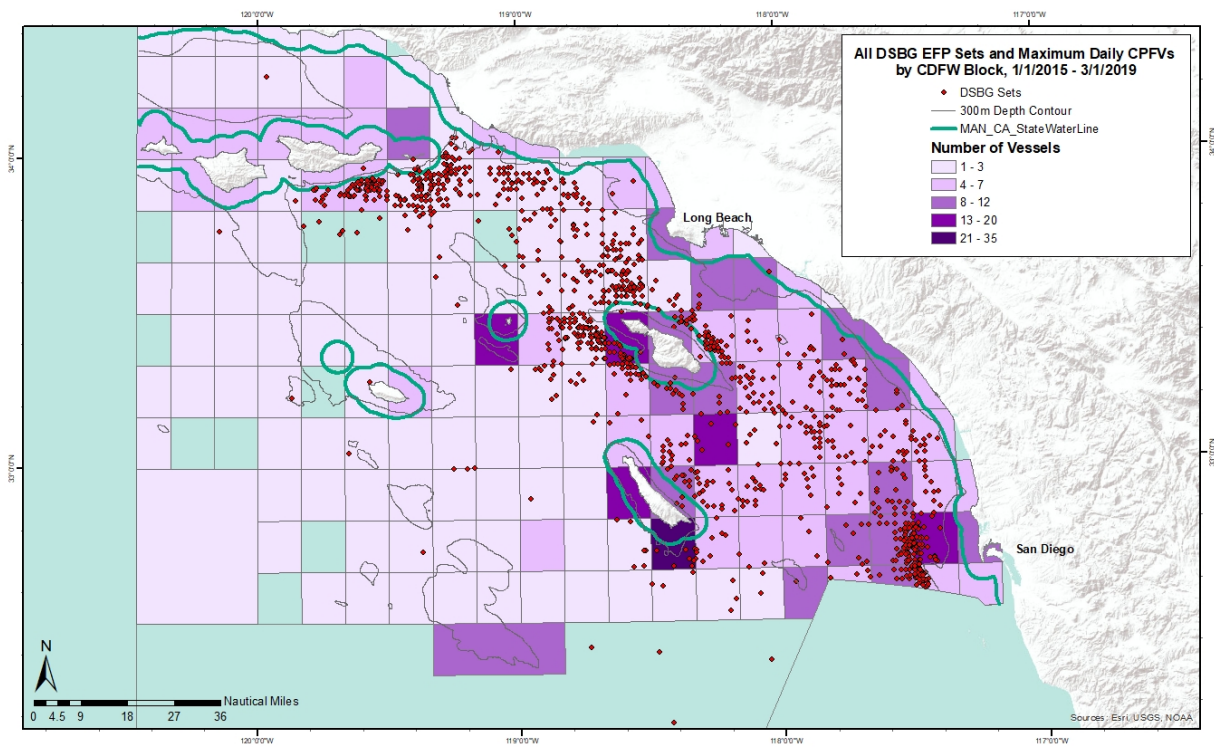


Figure 5. The reported set location of all DSBG EFP sets fished from 2015 through February 2019 and the maximum daily number of CPFVs fishing by CDFW block for 1/1/2015-3/1/2019.

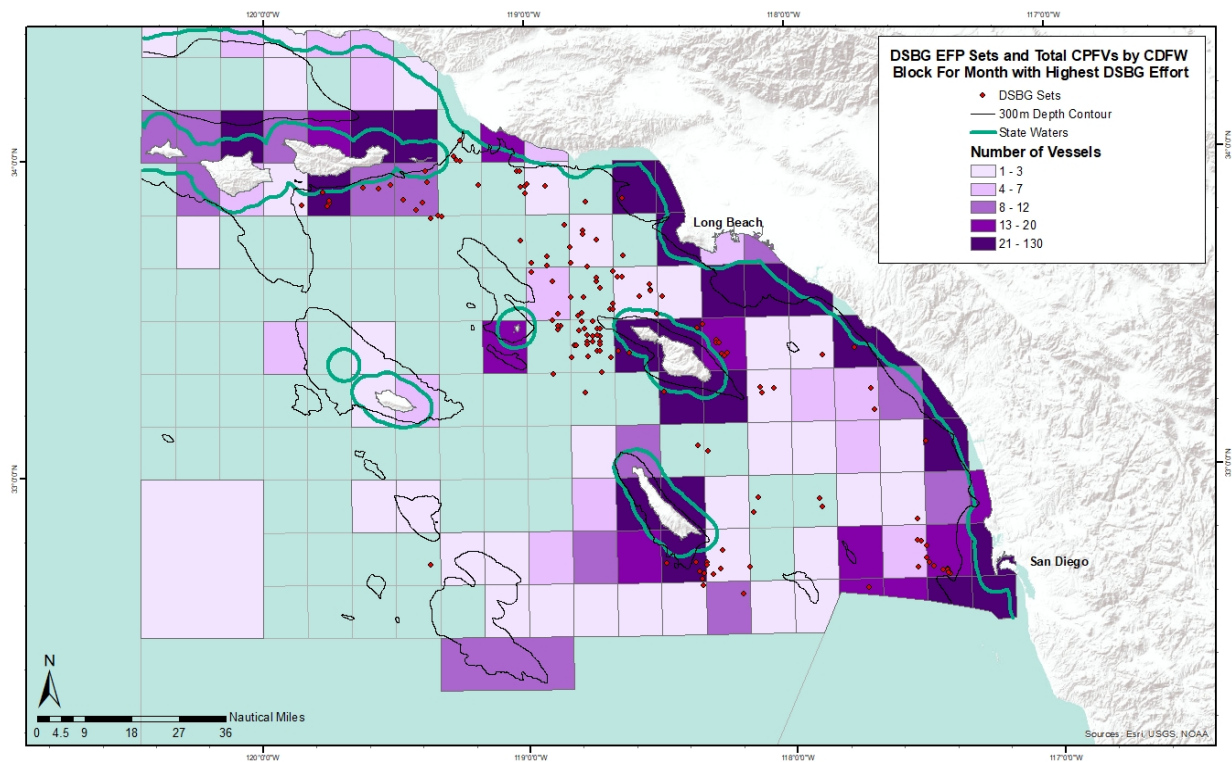


Figure 6. The reported set location for DSBG EFP sets and total number (cumulative) of CPFVs by CDFW block for the month of highest DSBG effort (120 sets, 20 vessels).

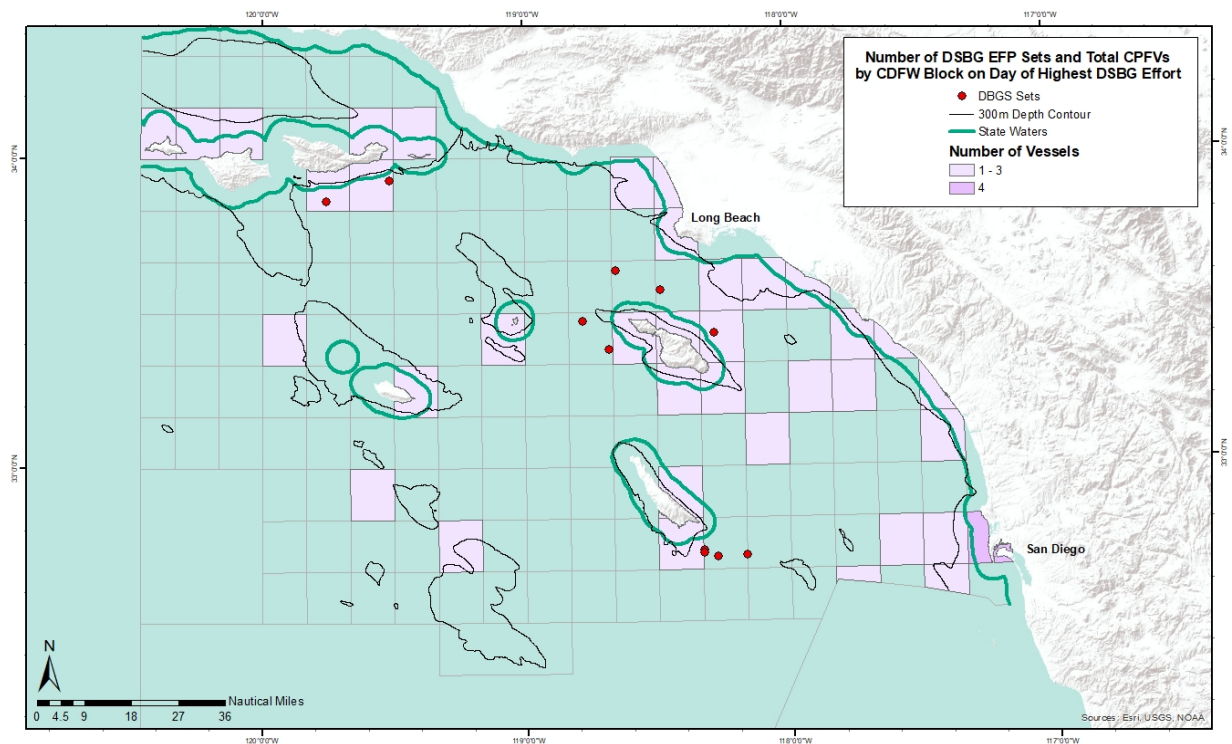


Figure 7. The reported set location for DSBG EFP sets and total number of CPFVs by CDFW block for the day of highest DSBG effort (11 sets/vessels).

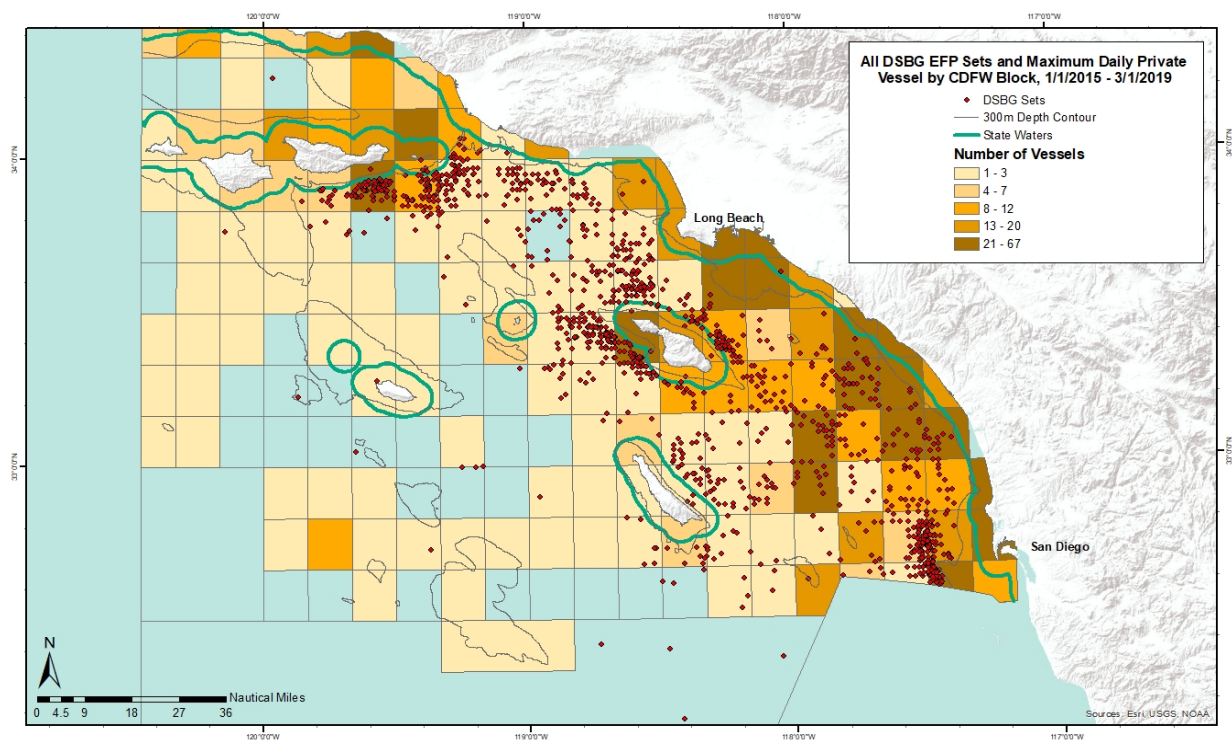


Figure 8. The reported set location of all DSBG EFP sets fished from 2015 through February 2019 and the maximum daily number of intercepted private recreational vessels by CDFW block for 1/1/2015-3/1/2019.

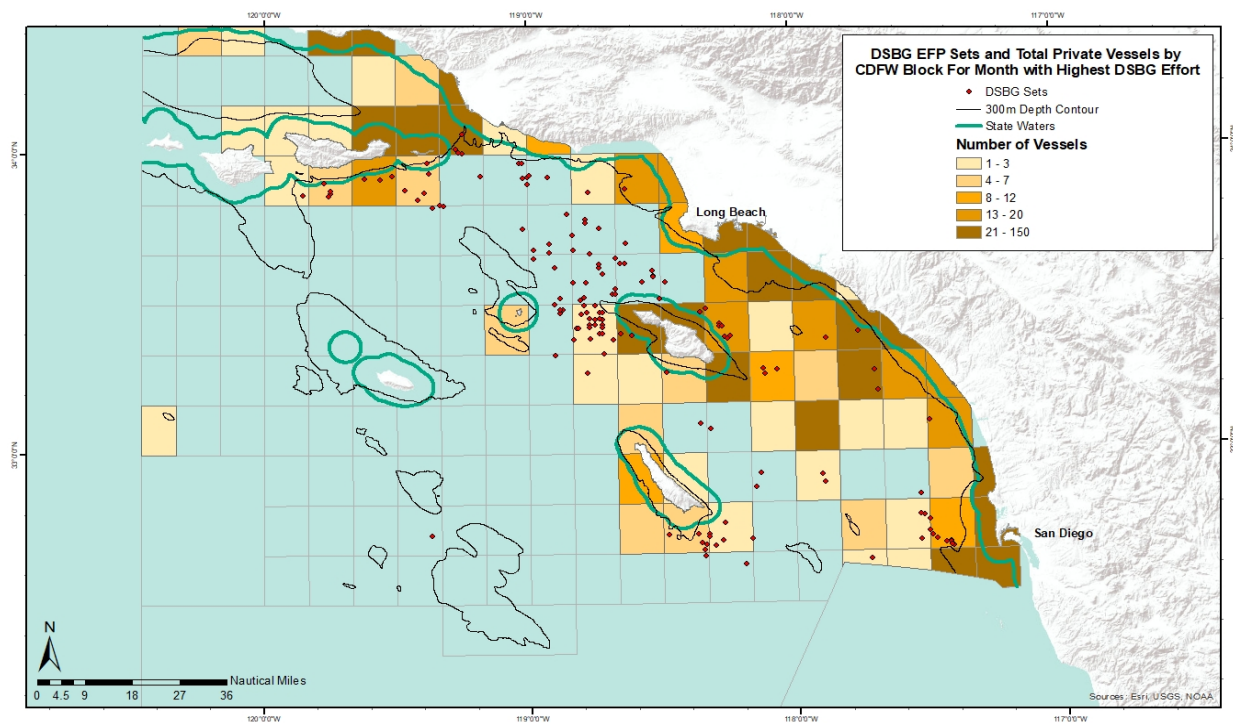


Figure 9. The reported set location for DSBG EFP sets and total number (cumulative) of intercepted private recreational vessels by CDFW block for the month of highest DSBG effort (120 sets, 20 vessels).

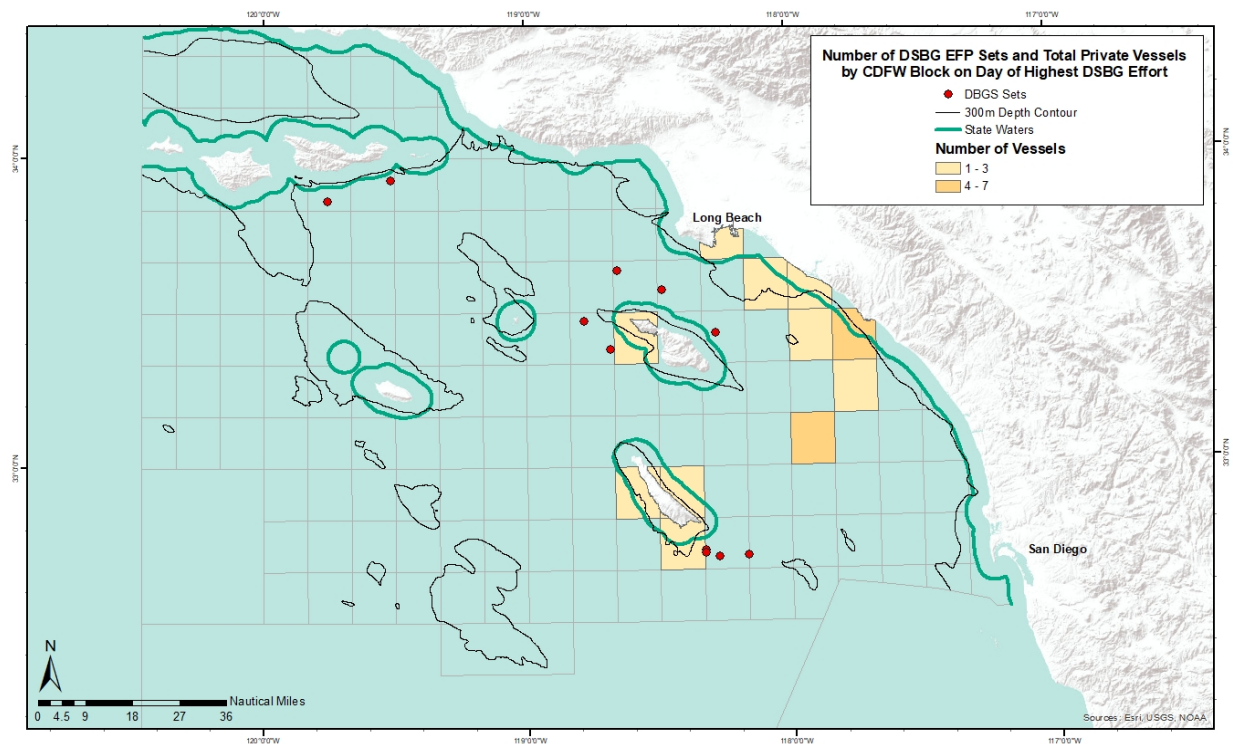


Figure 10. The reported set location for DSBG EFP sets and total number of intercepted private recreational vessels by CDFW block for the day of highest DSBG effort (11 sets/vessels).

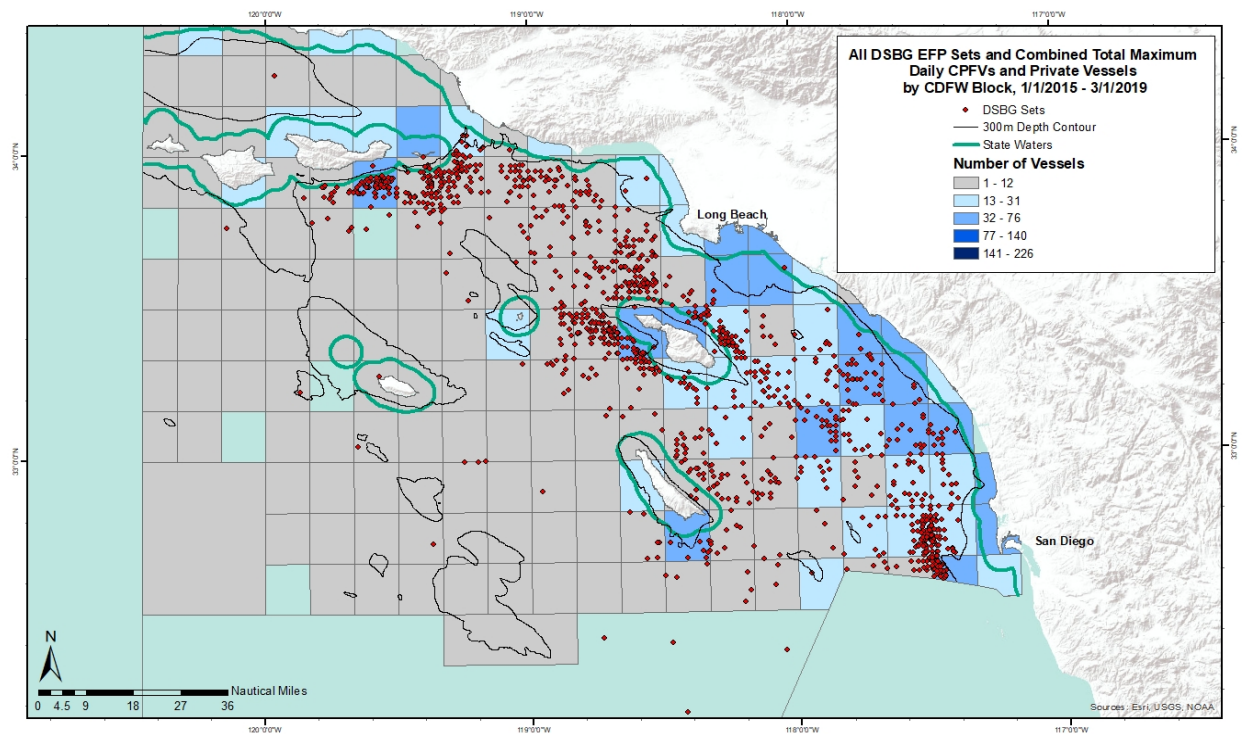


Figure 11. The reported set location of all DSBG EFP sets fished from 2015 through February 2019 and the combined maximum daily number of CPFVs and intercepted private recreational vessels by CDFW block for 1/1/2015-3/1/2019.

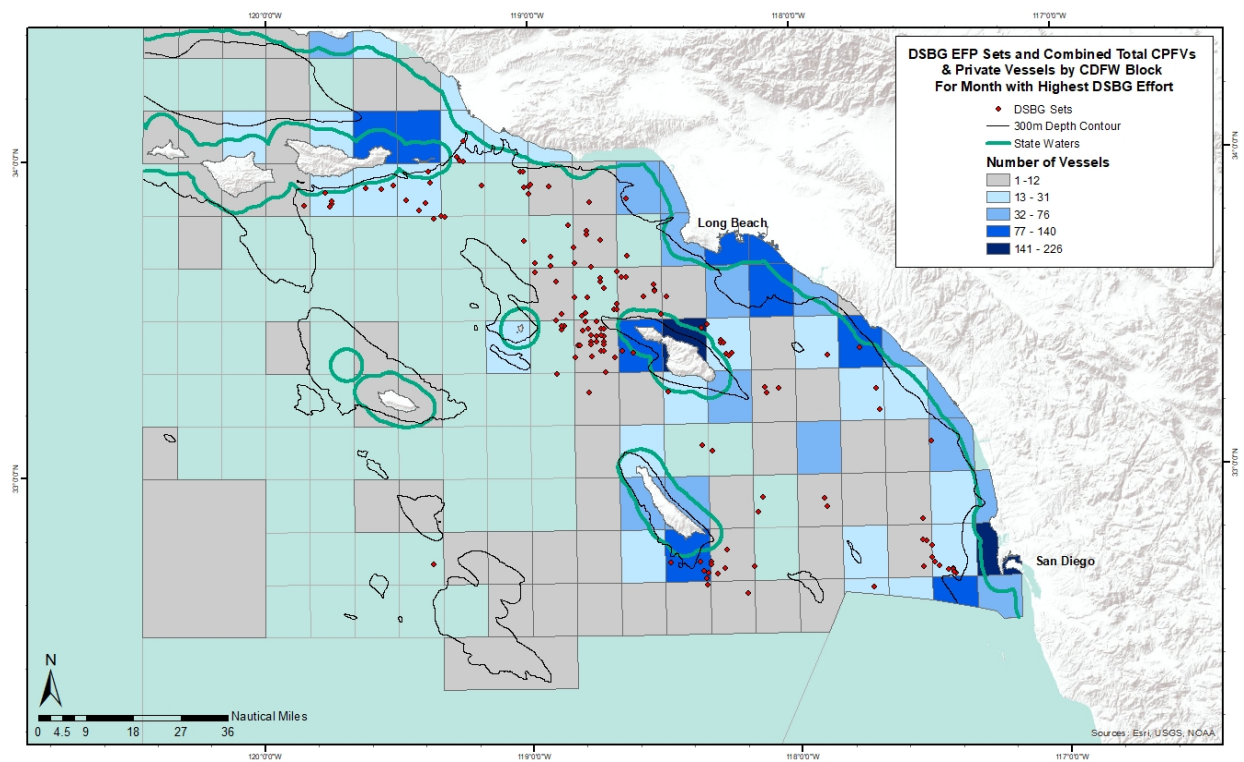


Figure 12. The reported set location for DSBG EFP sets and total number (cumulative) of CPFVs and intercepted private recreational vessels by CDFW block for the month of highest DSBG effort (120 sets, 20 vessels).

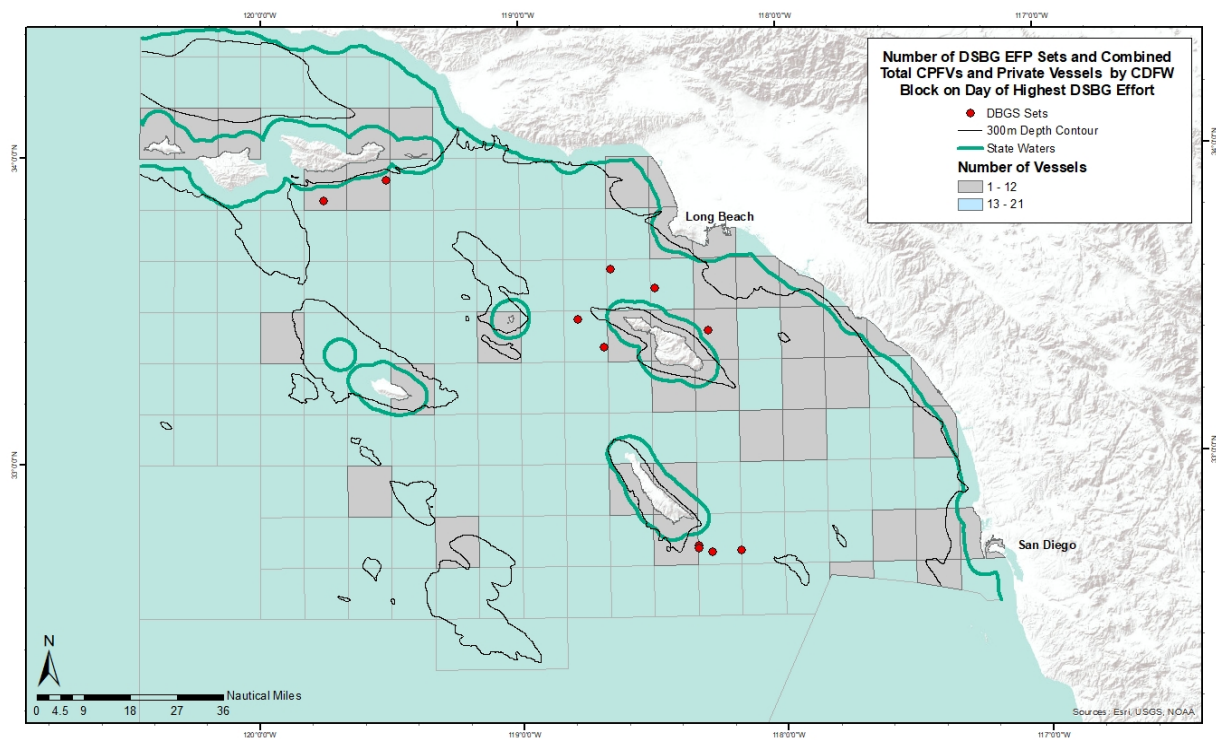


Figure 13. The reported set location for DSBG EFP sets and the combined total of CPFVs and the number of intercepted private recreational trips by CDFW block by CDFW block for the day of highest DSBG effort (11 sets/vessels).

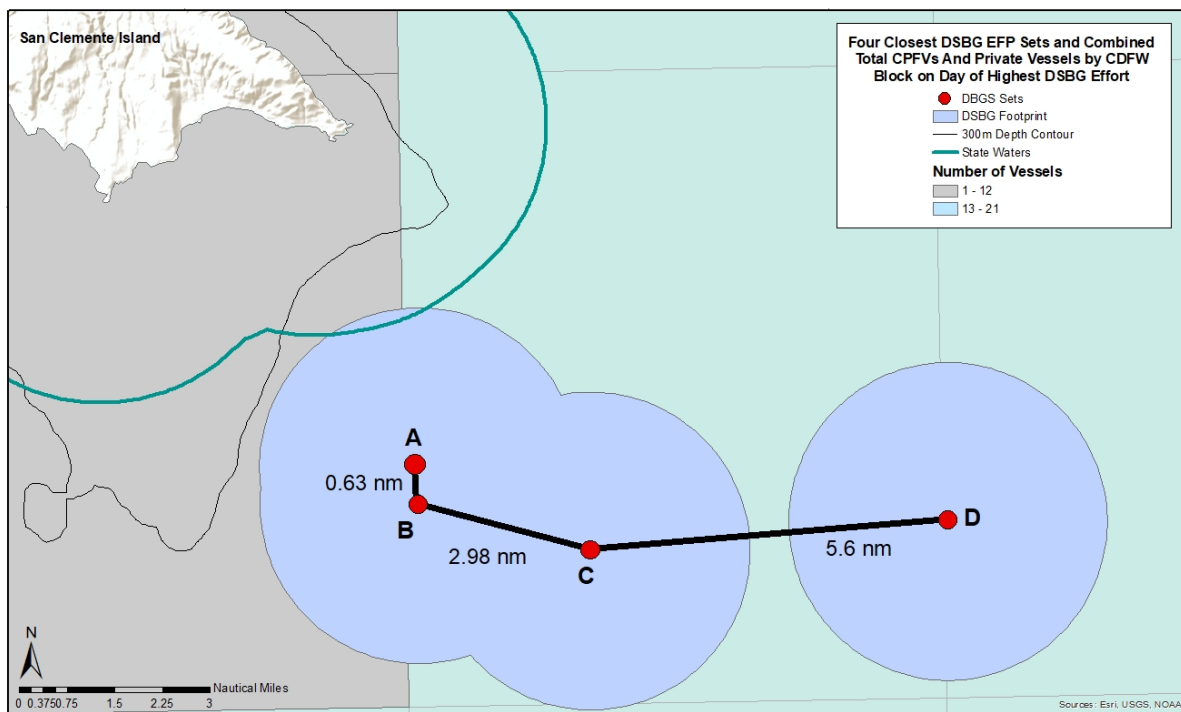


Figure 14. Detail from Figure 13 of the reported set locations for four DSBG EFP sets fished on the day of highest DSBG effort, their 5 nm maximum footprint, and proximity measurements to the other sets.

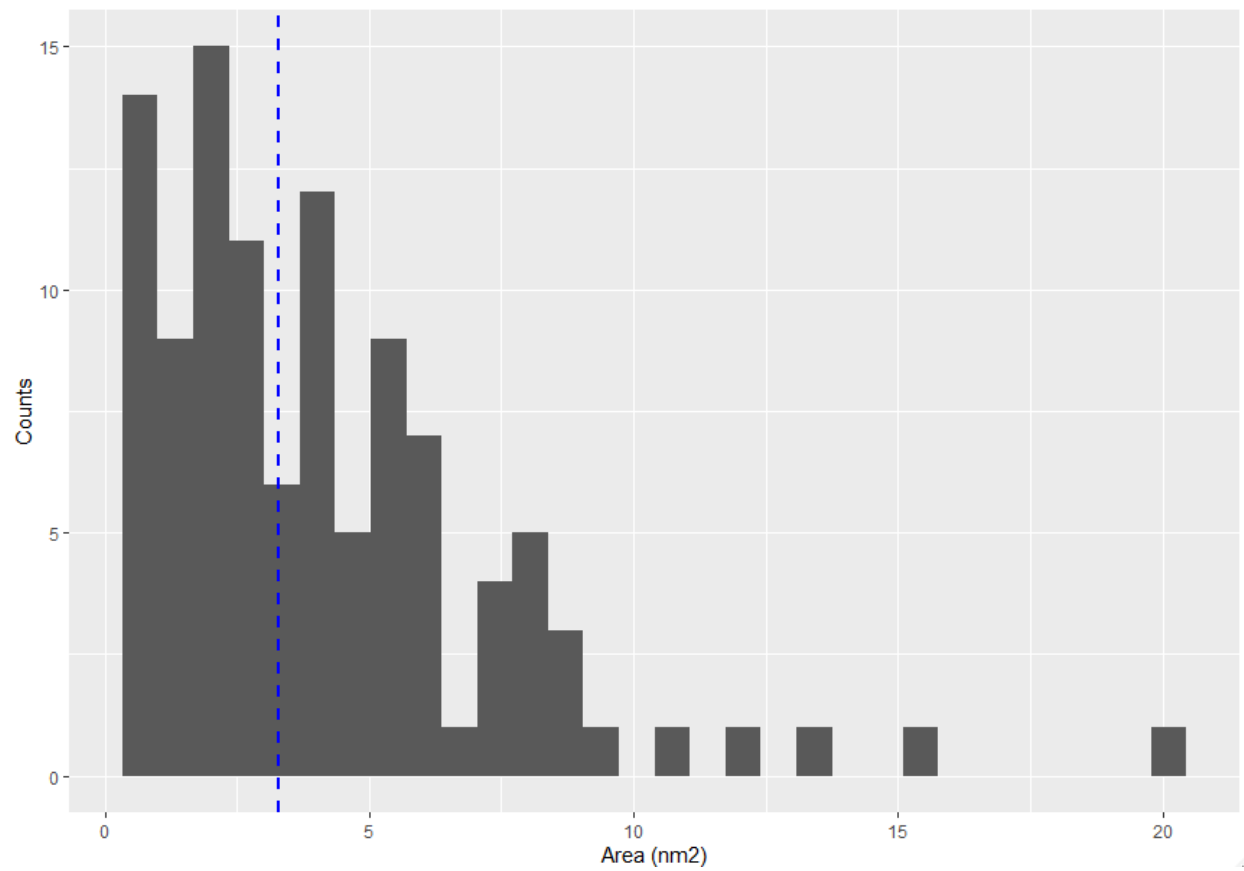


Figure 15. The estimated footprint area (nm²) of the reported set locations of all DSBG EFP sets observed in 2017 with the median denoted by the blue dashed line.

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