PALOS VERDES SHELF

Annual Enforcement Report

August 2024 – July 2025

United States Environmental Protection Agency

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For more information about fish contamination from the Palos Verdes Shelf Superfund Site, please visit: www.pvsfish.org

For more information about California fish advisories, please visit: www.oehha.ca.gov/fish

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LIST OF ACRONYMS AND ABBREVIATIONS

CDFW	California Department of Fish and Wildlife
DDT	dichloro-diphenyl-trichloroethane
DNC	Do Not Consume
EPA	U.S. Environmental Protection Agency
FCEC	Fish Contamination Education Collaborative
IC Program	Institutional Controls Program
PCBs	polychlorinated biphenyls

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SUMMARY

The U.S. Environmental Protection Agency's (EPA's) Palos Verdes Shelf Institutional Controls Program (IC Program) aims to protect Southern California residents from health risks associated with eating fish contaminated with polychlorinated biphenyls (PCBs) and dichloro-diphenyl-trichloroethane (DDT). The Fish Contamination Education Collaborative, comprising federal and state agencies, local organizations, and community members, oversees this program. An important component of the IC Program is enforcement of the white croaker catch ban through inspections conducted by the California Department of Fish and Wildlife (CDFW). White croaker is one of five highly contaminated fish species that are unsafe for human consumption. These fish are referred to as the Do Not Consume (DNC) species and include white croaker, barred sand bass, topsmelt, black croaker, and barracuda. This report presents enforcement data collected from August 2024 to July 2025 to support EPA in IC Program decision making. CDFW conducted inspections of recreational anglers on piers, jetties, beaches, and boats, as well as inspections of commercial fish markets and fishing vessels. These inspections are done to enforce the catch ban and to educate anglers about ways to reduce their exposure to PCBs and DDT by avoiding consumption of the DNC species of fish.

Over this period, CDFW encountered 2,784 anglers during 149 recreational inspections and conducted 5 commercial/business inspections. Inspections resulted in seizures of a total of 125 DNC fish and included two DNC species (white croaker and barred sand bass). The percentage of inspections in which DNC fish were observed remained at a similar level to the previous reporting period; however, the number of DNC fish seized during the inspections increased substantially from previous reporting periods. This large increase from previous reporting periods includes 122 white croaker seized during a recreational enforcement inspection in June 2025.

EPA provides CDFW with standardized forms to use during inspections, and wardens typically complete one inspection form per fishing mode per day. There are three modes used to present data, as follows: Piers and Jetties, Boat Patrol, and Beach and Intertidal Areas. Standardized methods of data collection (one form per fishing mode) are important for the data quality and analysis provided in this report. This report summarizes any usable and unusable data received from CDFW inspections. This is the first reporting period for which data recording methods allow EPA to evaluate awareness and intent data by person instead of by inspection. Anglers who were aware of fish contamination issues most often attributed their awareness to the outreach workers. Inspections where outreach workers were identified as the source of awareness increased from the previous reporting period (9 percent to 39 percent). A total of 44 warnings, 72 citations, and 11 bag limit violations were issued during this period.

Overall, enforcement is a necessary and effective IC Program component. Enforcement inspections are focused on enforcing the white croaker catch ban and providing outreach education to anglers about fish contamination from the Palos Verdes Shelf. It is recommended that these efforts continue because the data indicate the program has been effective in minimizing the number of anglers who intend to keep and consume white croaker.

1. INTRODUCTION

The Palos Verdes Shelf Superfund Site is part of the Montrose Chemical Corporation Superfund Site, located in Los Angeles County, California (Figure 1). The Palos Verdes Shelf became contaminated with polychlorinated biphenyls (PCBs) and dichloro-diphenyl-trichloroethane (DDT) from the inland Montrose Chemical plant and other industries that discharged waste into the ocean through the Los Angeles County sanitation sewer outfall pipes from 1953 to 1971. Today, about 34 square miles (88 square kilometers; about half the size of Catalina Island) of ocean sediment on the Palos Verdes Shelf are contaminated with these legacy pollutants (Figure 1). Although the contaminated sediment is too deep for direct human contact (40 to 200 meters; 130 to 650 feet), contaminants can build up in the food web, including in certain fish that are consumed by the public.

Figure 1. Map of the Palos Verdes Shelf Study Area

The U.S. Environmental Protection Agency (EPA) initiated institutional controls at the Palos Verdes Shelf Superfund Site in September 2001. Institutional controls refer to non-engineered measures, such as outreach and signage, which aim to prevent or reduce exposure to contaminants at a site. The purpose of the Institutional Control Program (IC Program) enforcement component is to minimize human exposure to contaminated fish by enforcing white croaker catch and sale bans and educating anglers about the risks of consuming contaminated fish. Enforcement activities help to minimize human exposure to PCBs and DDT by reducing consumption of contaminated fish, particularly white croaker. The IC Program includes public education and outreach, fish monitoring, and enforcement of white croaker

catch bans. In 2003, EPA established the Fish Contamination Education Collaborative (FCEC) with representatives from federal, state, and local agencies; non-government organizations; and community-based organizations to implement public outreach and education activities. In September 2009, EPA selected an interim remedy for the Palos Verdes Shelf Superfund Site that included the continuation and strengthening of the IC Program.

The IC Program aims to reduce human consumption of contaminated fish by increasing awareness and understanding of local contamination and fish advisories. The program has three main components: angler outreach, community outreach, and enforcement. The California Department of Fish and Wildlife (CDFW) wardens enforce the catch ban on white croaker and educate anglers most likely to catch and consume contaminated fish on the health risks associated with the consumption of white croaker and other Do Not Consume (DNC) species. More information on angler and community outreach is discussed in a separate document; please visit www.pvsfish.org/partner-documents.

In 2014, EPA conducted the Palos Verdes Seafood Consumption Study. The study identified local demographic and subsistence angler subgroups within the general fishing population of the Palos Verdes Shelf area that may be disproportionately exposed to contaminants based on the types and quantity of fish species consumed, including consideration of cooking methods.

PCBs and DDT pose a risk to public health and are listed on the EPA Integrated Risk Information System as probable human carcinogens and on the State of California's Proposition 65 list of pollutants known to cause cancer. Additionally, exposure to elevated levels of PCBs can result in skin irritation, liver disease, and endocrine dysfunction. Exposure to elevated levels of DDT can negatively impact the nervous and endocrine systems, liver function, and child development. EPA monitors PCBs and DDT concentrations in white croaker and barred sand bass on the Palos Verdes Shelf to evaluate the effectiveness of natural recovery processes and improve modeling of contaminant fate and transport. While PCBs and DDT concentrations in fish tissues have generally declined since the 1990s, concentrations in white croaker remain above the risk-based cleanup levels.

This Annual Enforcement Report summarizes enforcement activities conducted by CDFW agents between August 2024 and July 2025, including inspections of recreational anglers and commercial fish markets. Additionally, this report presents select results from previous years to evaluate overall trends in the IC Program's effectiveness and enforcement efforts.

2. ENFORCEMENT INSPECTIONS

Enforcement inspections are conducted along the Palos Verdes shoreline and landing locations within the California Office of Environmental Health Hazard Assessment's coastal area designated as the Red Zone (Figure 2). The Red Zone identifies the area in which some fish species are more likely to have higher concentrations of PCBs and DDT that pose a health risk to humans. Fish advisories for some fish extend to the north and south of this zone (Yellow Zones shown on Figure 2). CDFW aims to conduct a minimum of 20 in-ocean boat patrol inspections and 60 onshore inspections per reporting period. Recreational fishing inspections are conducted monthly, and commercial inspections are conducted every quarter as staffing allows.

Figure 2. Map of Red and Yellow Fish Advisory Areas and CDFW Enforcement Patrol Area (Red Zone)

CDFW wardens may perform inspections of in-ocean commercial and recreational anglers, onshore recreational anglers, and wholesale commercial operations (markets and restaurants). There is no specific goal for the number of inspections, and inspection numbers depend on staff availability. Recreational fishing inspections include onshore inspections of piers, jetties, and beaches and of in-ocean inspections of recreational boats. During recreational inspections, the wardens check bags for illegal species of fish and size limits, ask anglers about their awareness of local fish contamination, and educate anglers about the risks of eating contaminated fish, especially the white croaker. Wardens attempt to contact all anglers present at an inspected location and move on if no violations are discovered to prevent the possibility of violations being concealed by other anglers in the area. If a violation is discovered, wardens stay with the angler in question until all issues are addressed.

Commercial fishing inspections include onshore inspections of fish businesses and in-ocean inspections of commercial fishing vessels. During the market inspections, wardens check for illegal sale of white croaker. Wardens ask retailers where the fish were caught and verify the

invoice (if applicable). Retailers are required to purchase fish from licensed vendors. The primary goal of commercial inspections is to ensure that all fish sold at a given business are commercial in origin and that no sport fish have been brought in for sale. The fish businesses targeted for inspection sell seafood and/or have sold white croaker illegally in the past. During commercial vessel inspections, wardens check for illegal catch of white croaker, as commercial vessels are prohibited from fishing for white croaker off the coast at Palos Verdes and Fish Harbor (Figure 3).

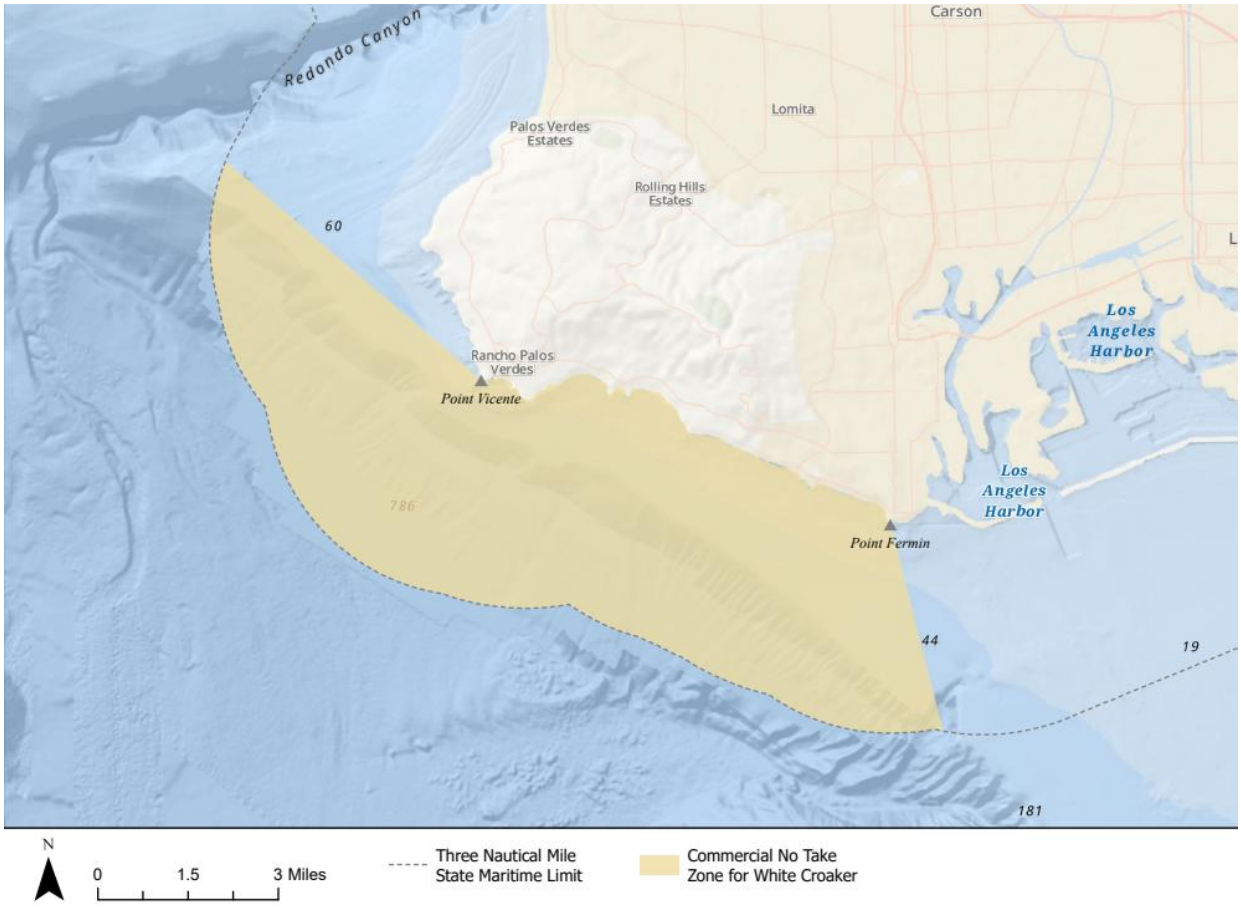

Figure 3. Map of the White Croaker Commercial Fishery Closure Area

Wardens focus inspections of commercial vessels fishing in the white croaker catch ban area. The California Code of Regulations Title 14, Section 104 states:

> *It is unlawful to take white croaker under a commercial fishing license issued pursuant to Section 7850 of the Fish and Game Code, in waters from 0 to 3 nautical miles from shore extending oceanward between a line extending 312 degrees magnetic from Point Vicente in Los Angeles County, and a line extending 166 degrees magnetic from Point Fermin in Los Angeles County. Pursuant to Section 7715 of the Fish and Game Code, the provisions of this section shall become inoperative when the Director of the Department of Health Services determines that a health risk no longer exists and the Director of the Department of Fish and Game*

has been so notified. The Department shall fully notify the public of the reopening of these waters.

The bag limit for recreational and sport fish-caught white croaker is 10 fish.

Data collected during enforcement activities are recorded on inspection forms completed by CDFW wardens (Appendix A). Using this form, CDFW wardens record the area patrolled, fishing mode (piers and jetties, boat patrols, or beach and intertidal), number of anglers who are and are not aware of fish contamination issues, anglers' source of awareness, the language or languages spoken by the anglers, the number of tip cards that wardens distributed, the species and number of any DNC fish that were caught, the number of anglers who expressed an intent to keep white croaker if they caught them, and any warnings or citations issued to anglers by the wardens. Wardens must fill out only one form per fishing mode for the data to be standardized and included in this report.

If anglers indicate that they are aware of fish contamination, the warden asks how they first became aware of fish contamination. Multiple sources of awareness were often recorded for a single group of anglers within the same inspection. As a result, there is a greater number of awareness sources than the number of inspections in which at least one angler reported being aware of fish contamination for each fishing mode.

Intent data are not collected on individual anglers, though awareness data are; thus, it is not possible to relate individual awareness to intent to keep white croaker. Angler awareness is tracked as part of the FCEC Angler Outreach Program (AOP), wherein outreach staff conduct outreach at nine piers along the Red Zone. More information about the AOP is provided in the Annual Angler Outreach Report and can be found at www.pvsfish.org/partner-documents.

In July 2024, EPA revised the inspection form to address data gaps mentioned in prior annual enforcement reports, such as the number of anglers reporting individual awareness sources or the specific location where white croaker was observed. Use of the new form was implemented during this reporting period. An example of the new form is presented in Appendix A.

During previous reporting periods, discussion of enforcement data was limited to the inspection count (i.e., 120 out of 149 inspections with *at least one* angler reporting awareness). Changes in data analysis methods now allow for a discussion of individual anglers (i.e., 1,760 out of 2,784 anglers reported awareness). Awareness data presented in this report should, therefore, not be directly compared to past years' awareness calculations. Understanding angler behavior and intent for each of the three fishing modes helps decision makers at EPA and the FCEC decide what changes are needed for the IC Program. Use of these new standardized forms, requiring one fishing mode for each form, is an ongoing recommendation for the enforcement inspections methodology and has greatly improved the understanding of the data needed for decision-making.

3. ENFORCEMENT INSPECTION RESULTS

The following sections summarize the major findings from recreational and commercial fishing inspections performed by CDFW.

Between August 2024 and July 2025, CDFW conducted 151 recreational fishing inspections and 5 commercial fishing inspections. CDFW wardens typically completed one inspection form per fishing mode per day, allowing for almost all collected data to be analyzed herein. Of the 151 total inspections, 149 inspections included data from only one fishing mode. Two forms were completed incorrectly as they list multiple fishing modes on the same form, making the data not able to be analyzed by fishing mode. These forms represent a small number of anglers (less than 1 percent of anglers) and excluding these forms from reporting improves data quality. Therefore, these two inspection forms are omitted from the data analysis and reporting information and the total number of inspections analyzed in this report is 149.

Data collected during this reporting period were recorded using improved methods, providing a new understanding of the enforcement program's data for certain metrics. Specifically, new data recording methods have enabled EPA to view data by number of anglers instead of number of inspections. This allows more accurate interpretation of reported awareness and intent to consume white croaker generally, and for each fishing mode.

3.1 RECREATIONAL FISHING

Data from 149 recreational fishing inspections conducted between August 2024 and July 2025 report inspections for the following three fishing modes: piers and jetties, boat patrol, beach and intertidal areas. The number of inspections has fluctuated over the last several years based on the availability of CDFW wardens, who largely conduct this work as overtime. Between 2020 and the present reporting period (2024 to 2025), the maximum number of inspections completed in a single reporting period was 177 (in 2020 to 2021), and the minimum number was 43 (in 2022 to 2023). The number of recreational fishing inspections for 2024 to 2025 (149) was greater than in the previous reporting period (86). A summary of these inspections is presented in Figure 4.

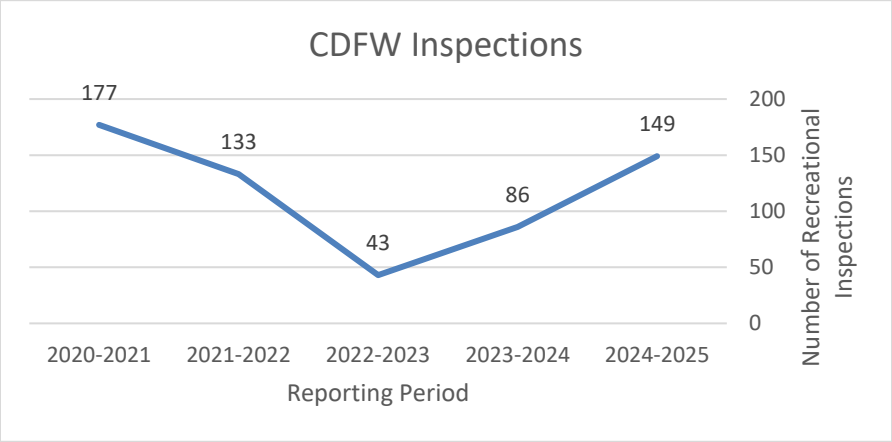

Figure 4. CDFW Recreational Inspections by Reporting Period

A summary of the CDFW recreational fishing inspection data collected between August 2024, and July 2025 is presented in Table 1.

Table 1. CDFW Recreational Inspections Summary

Inspection Activity and Fish Seized	Number
Total inspections[1]	**149 (2,784 anglers)**
Pier and jetty inspections	33 (817 anglers)
Boat patrol inspections	70 (1,379 anglers)
Beach and intertidal area inspections	46 (588 anglers)
Anglers reporting awareness	**1,760**
Anglers stating they would keep white croaker	**25**
Inspections with white croaker observed	**6**
White croaker observed	165
White croaker seized	122
Inspections with barred sand bass observed	**33**
Barred sand bass observed	129
Barred sand bass seized	3
Inspections with topsmelt observed	**9**
Topsmelt observed	12
Topsmelt seized	0
Inspections with black croaker observed	**2**
Black croaker observed	4
Black croaker seized	0
Inspections with barracuda observed	**2**
Barracuda observed	9
Barracuda seized	0

Note:
[1]CDFW wardens completed a total of 151 inspections; however, Table 1 includes only the 149 inspections completed using standardized data collection methods (single fishing mode per inspection form).

CDFW reached an average of 19 anglers per inspection effort (2,784 anglers, 149 inspections). In terms of which mode reached the most and least anglers per inspection on average, the data show that between August 2024 and July 2025:

- Per inspection for piers and jetties, CDFW reached an average of 25 anglers (817 anglers, 33 inspections).
- Per inspection for boat patrols, CDFW reached an average of 20 anglers (1,379 anglers, 70 inspections).
- Per inspection for beach and intertidal areas, CDFW reached an average of 13 anglers (588 anglers, 46 inspections).

3.1.1 Awareness of Fish Contamination Issues

During 120 of the 149 inspections (81 percent) conducted throughout the current reporting period, at least one angler interviewed stated that they were aware of the fish contamination issues. This is consistent with the 82 percent calculated for the previous reporting period (2023 to 2024). However, the improved data recording methods available this period allow EPA to report data for people instead of for inspections, as follows:

- During 149 total inspections, data was collected for a total of 2,784 anglers
- During 120 inspections a total of 1,760 anglers reported awareness (63.2 percent of anglers).

Further, EPA can now review the above data as it relates to awareness reported under each fishing mode. Inspections conducted at the beach and intertidal areas had the highest percentage of reported awareness, while boat patrols and piers and jetties had lower reported awareness percentages. Table 2 presents reported awareness for anglers encountered overall and during the three fishing modes.

Table 2. Reported Awareness of Fish Contamination During Recreational Inspections

Fishing Mode	Number of Inspections	Reported Awareness	
		Number of Anglers	Number of Anglers Reporting Awareness
Piers and Jetties	33	817	522 (63.9%)
Boat Patrol	70	1,379	858 (62.2%)
Beach and Intertidal	46	588	380 (64.6%)
Total	**149**	**2,784**	**1,760 (63.2%)**

3.1.2 Intent to Keep White Croaker

Intent to keep white croaker was consistently low across the three fishing modes. Out of 2,784 anglers, 25 stated that they would keep white croaker if they caught them (0.9 percent).

Table 3 presents the reported angler intent for anglers encountered during inspections for the three fishing modes.

Table 3. Recreational Inspections with Reported Intent to Keep White Croaker and Related Violations

	Number of Inspections	Number of Anglers	Number of Anglers Reporting Intent	Number of White Croaker Warnings Issued	Number of White Croaker Violations Issued
Piers and Jetties	33	817	6 (0.7%)	0	0
Boat Patrol	70	1,379	13 (0.9%)	1	0
Beach and Intertidal	46	588	6 (1.0%)	0	1
Total	**149**	**2,784**	**25 (0.9%)**	**1**	**1**

3.1.3 Do Not Consume Fish Observed and Seized

CDFW wardens patrolled multiple locations during each inspection and reported data from that day's inspections on a single form. The CDFW inspection forms include a list of areas patrolled during the inspection and do not necessarily include information on the specific location or locations where each DNC fish were observed. Tables 4 and 5 present inspection results for each fishing mode and DNC species observed.

Table 4. Recreational Inspections with Observed DNC Species

Fishing Mode	Number of Barracuda Observed	Number of Barred Sand Bass Observed	Number of Black Croaker Observed	Number of Top Smelt Observed	Number of White Croaker Observed
Piers and Jetties	6	11	0	11	12
Boat Patrol	3	110	4	1	1
Beach and Intertidal	0	8	0	0	152
Total	**9**	**129**	**4**	**12**	**165**

Table 5. Recreational Inspections with Seized DNC Species

Fishing Mode	Number of Barracuda Observed	Number of Barred Sand Bass Observed	Number of Black Croaker Observed	Number of Top Smelt Observed	Number of White Croaker Observed
Piers and Jetties	0	2	0	0	0
Boat Patrol	0	1	0	0	0
Beach and Intertidal	0	0	0	0	122
Total	**0**	**3**	**0**	**0**	**122**

3.1.4 Warnings, Citations, and Violations

Common violations that may result in warnings or citations include fishing without a license or with an expired license, catching undersized fish, exceeding bag limits, using restricted gear/harvest materials, and fishing out of season.

A total of 44 warnings were issued by CDFW during this reporting period, which included one white croaker warning. Warnings refer to violations that are not at the level at which a citation is issued. This white croaker warning was issued at Long Beach.

A total of 72 citations were issued by CDFW during this reporting period. This included one white croaker citation associated with the seizure of 122 white croaker shown in Table 5. This white croaker citation was issued at Long Beach.

3.1.5 Outreach Material Distribution

CDFW wardens distributed a total of 1,092 FCEC tip cards during 132 of 149 inspections (89 percent). During the inspections, outreach materials were sometimes provided in multiple languages. English and Spanish materials continue to be the most common languages distributed. English-language tip cards were provided during 129 inspections (98 percent of the 132 inspections). Spanish tip cards were provided during 36 inspections (27 percent of the 132 inspections). No Chinese or Vietnamese tip cards were distributed.

3.1.6 Contamination Awareness Source

During this reporting period, the most frequently reported sources of awareness in CDFW inspections were outreach workers, DNC signs, friends and family. During previous periods, no anglers listed the internet or other media such as radio and newspapers as their sources of

awareness. This reporting period, media and internet were a combined 6 percent of awareness sources.

Table 6 shows the source of angler awareness reported during inspections for each of the three fishing modes. Inspection forms allow CDFW wardens to note multiple awareness sources per form.

Table 6. Reported Awareness Source During Recreational Inspections

Fishing Mode	Number of Anglers	Source of Awareness							
		Outreach Worker	Friends/ Family	FCEC Tip Card	DNC Signs	Internet	Media	Community Events	Other
Piers and Jetties	817	16%	38%	19%	21%	3%	0%	0%	4%
Boat Patrol	1,379	49%	28%	6%	6%	2%	3%	0%	5%
Beach and Intertidal	588	34%	26%	17%	15%	4%	3%	0%	1%
Total	2,784	39%	29%	11%	11%	3%	3%	0%	3%

Note: Percentages in this table do not always add to 100% due to rounding and multiple awareness sources being cited per angler. In some cases, no awareness source was identified.

3.2 COMMERCIAL FISHING

The CDFW enforcement inspections conducted during this reporting period for commercial fishing included a total of five inspections at fish markets and no inspections of commercial fishing vessels. Fish markets were inspected as follows, where all inspections were conducted at fish markets in Los Angeles.

- One inspection in December 2024
- One inspection in February 2025
- One inspection in May 2025
- Two inspections in July 2025

DNC fish species were not observed during any commercial inspections. Of the fish market vendor representatives who responded, 80 percent (4 out of 5) reported they were unaware of fish contamination. This is an increase compared to responses recorded by CDFW in the last reporting period (57 percent). No fish market owners reported the intent to buy or sell white croaker. This is reflective of an ongoing trend of commercial compliance with the white croaker catch and market bans, indicating that enforcement has been successful in minimizing public exposure to contaminated white croaker.

The commercial inspections are further summarized in Table 7.

Table 7. CDFW Commercial Inspections Summary

Inspections and Inspection Outcomes	Number
Total inspections	5
Aware of white croaker catch ban area	1
Intent to catch/buy/sell white croaker	0
White croaker observed	0
White croaker seized	0
Violations reported	0
Informational sheets provided	2

The results suggest that commercial fishing operations are largely in compliance with white croaker regulations; however, awareness of fish contamination at commercial businesses remains low. Compared to the last reporting period, CDFW conducted two fewer commercial inspections during this reporting period.

3.2.1 Awareness of Fish Contamination Issues

Among the five commercial fish market inspections, four fish markets (80 percent) reported that they were unaware of the fish contamination. Despite this, no DNC fish were observed during inspections, and no fish markets said that they would catch, buy, or sell white croaker.

3.2.2 White Croaker Identified

No white croaker were identified during commercial inspections during this reporting period.

3.2.3 Do Not Consume Fish Observed and For Sale

No DNC fish were observed or intended for sale during commercial inspections during this reporting period.

3.2.4 Violations

No violations were issued during commercial inspections. One follow up inspection, unrelated to DNC fish, was conducted at one fish market. The CDFW warden conducting the inspection followed up to investigate the sale of skate fins at the fish market.

3.2.5 Outreach Material Distribution

Two English tip cards were distributed during commercial inspections.

4. ENFORCEMENT-BASED IC PROGRAM RECOMMENDATIONS

4.1 IMPROVE RECREATIONAL ANGLER AWARENESS

Reviewing the data reported using new methods (e.g., using data for number of anglers instead of number of inspections) shows that for this period, intent to keep white croaker was (approximately 1 percent) across all fishing modes. There was one white croaker warning and one white croaker violation issued during this reporting period. Though 126 white croaker were seized, 122 of these were seized during one event. Note that angler intent is focused on white croaker, and the intent to keep other DNC species is not a metric collected by CDFW during their enforcement activities.

Angler awareness of contamination factors into the intent to consume any DNC species. The 2024 to 2025 data support that overall recreational angler awareness levels are consistent across the three fishing modes, with some variation in how many anglers CDFW encounter during their inspections:

- Inspections at piers and jetties have a reported awareness level of 64 percent and encounter an average 25 anglers per inspection. On average, CDFW reaches the most anglers per inspection during efforts at piers and jetties.
- Inspections during boat patrols have a reported awareness level of 62 percent and encounter an average 20 anglers per inspection. On average, CDFW reaches the second the greatest number of anglers per inspection during boat patrol efforts.
- Inspections at beach and intertidal areas have a reported awareness level of 65 percent and encounter an average 13 anglers per inspection. On average, CDFW reaches the fewest anglers per inspection during beach and intertidal efforts.

With awareness levels ranging from 62 to 65 percent, improving overall awareness across all mode groups is recommended. Based on enforcement awareness source data reporting, improving overall awareness can be accomplished through continuing at least the following three FCEC IC Program outreach components:

- Angler outreach through face-to-face engagement (AOP and enforcement programs)
- Posting and maintenance of FCEC DNC signs
- Public distribution of outreach materials, especially FCEC tip cards

During this reporting period, EPA began installing new DNC signs at the nine fishing piers where FCEC angler outreach occurs. As part of the planned installations, the FCEC and EPA are considering new areas where DNC signs would be beneficial to increasing angler awareness of fish contamination.

The majority of CDFW enforcement inspections visited 19 locations within the Red Zone (Figure 2). For the purposes of DNC sign recommendations, boat patrol inspection locations were assumed to be the launch location (the first location listed on the form). Though there is some overlap with the nine FCEC angler outreach piers during enforcement activities, recreational anglers frequent additional locations. As an example, the significant white croaker seizure (122

fish) occurred in a beach and intertidal mode inspection area (South Shore Launch Ramp in Long Beach), which is not associated with any of the nine AOP outreach pier areas but does have two self-launch boat ramps, piers and jetties at a nearby marina, and an intertidal fishing area on the rocky shoreline (providing access for three modes of enforcement inspections).

Recommendations include that DNC signs should be placed in areas that could reach at least one of the modes covered by enforcement activities. Placing DNC signs at marinas with piers and jetties and at self-launch boat ramps is a strategic and efficient way to improve passive educational forms of outreach to these anglers. Additionally, these areas are frequently associated with beaches and intertidal access and have suitable recreational fishing areas. To aid in priority area selection, enforcement data support considering the following general areas for new or expanded DNC signage under the IC Program:

- Port of Long Beach/Long Beach Harbor (numerous areas available):
    - South Shore Launch Ramp, Davies Boat Launch
    - Alamitos Bay (e.g., Maurice "Mossy" Kent Park)
    - Others: www.longbeach.gov/park/marine/marinas/launch-ramps/
- Los Angeles Harbor/Port of Los Angeles (numerous marinas)
- Marina del Rey (various boat launch ramps, intertidal shorelines, piers/jetties)
- San Pedro (e.g., Cabrillo self-launch boat ramp)
- Point Fermin (e.g., beaches and intertidal areas between Point Fermin Park and Cabrillo area)
- Rancho Palos Verdes (e.g., shoreline access park, Pelican Cove Park, Montrose outfall areas)

EPA will review the above areas in terms of suitability for DNC signs, and which areas might be the most effective at reaching recreational anglers across one or more modes.

4.2 IMPROVE COMMERCIAL FISH MARKET AWARENESS

No DNC species were observed at the fish markets, which indicates that the white croaker sale ban has effectively prevented the sale (and thus consumption) of white croaker through commercial sources. However, despite adhering to the legal sale bans, notably, only 20 percent of fish markets where enforcement occurred were aware of fish contamination (only one out of five locations reported awareness).

There is no legal local commercial market for white croaker. However, the low awareness level presents a potential opportunity for outreach to commercial vendors to better share information about specific types of contamination. Only five commercial inspections occurred during this period. Increasing outreach (performed by enforcement or other FCEC outreach team members) may help increase commercial and customer awareness and improve these entities' understanding of the ban.

APPENDIX A

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