



**FISH CONTAMINATION EDUCATION COLLABORATIVE
ENFORCEMENT REPORT**

August 2021 – June 2022

Palos Verdes Shelf Superfund Site

Los Angeles County, California

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ACRONYMS AND ABBREVIATIONS

CDFW	California Department of Fish and Wildlife
City of Long Beach	City of Long Beach Department of Health and Human Services, Bureau of Environmental Health
DNC	Do Not Consume
EA	EA Engineering, Science, and Technology, Inc.
EPA	United States Environmental Protection Agency
FCEC	Fish Contamination Education Collaborative
LACDPH	Los Angeles County Department of Public Health
Site	Palos Verdes Shelf Superfund Site

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1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) created the Fish Contamination Education Collaborative (FCEC) with representatives of federal, state, and local agencies, as well as community-based organizations that carry out various outreach and education activities. Enforcement represents one of the four Institutional Controls implemented to address the sediment contamination at the Palos Verdes Shelf Superfund Site (the Site). Enforcement consists of enforcing existing white croaker regulations for commercial and recreational anglers, along with inspections of retail food facilities and enforcement of market protocol under the California Health and Safety Code. Efforts also include monitoring and enforcing the daily catch limit and the commercial no-take zone for white croaker.

EPA, Los Angeles County Department of Public Health (LACDPH), and Orange County started collecting market data in 2004 to determine whether white croaker caught in and around the Site were reaching local markets. Over time, anecdotal reports began to suggest that white croaker was no longer being found in the markets. In the past, the Orange County Health Care Agency, Environmental Health Division conducted the inspections of markets and restaurants in Orange County. Based on the data collected, Orange County determined that white croaker was not being sold in markets and discontinued involvement in the FCEC program.

In February 2015, EPA contracted EA Engineering, Science, and Technology, Inc. (EA) to coordinate with enforcement agencies/inspectors to support enforcement activities, provide outreach materials as needed, and prepare annual reports summarizing enforcement data collected by California Department of Fish and Wildlife (CDFW), LACDPH, and City of Long Beach Department of Health and Human Services, Bureau of Environmental Health (City of Long Beach). EA also conducted annual fish identification training for LACDPH and City of Long Beach inspectors.

In March 2020, the World Health Organization classified the COVID-19 outbreak as a pandemic. To reduce the impact of the outbreak, closures of non-essential businesses and restrictions on public gatherings were issued by the U.S. Department of Health and Human Services' Centers for Disease Control and Prevention, the State of California, and Los Angeles County. Although many of these restrictions were lifted before this reporting period, COVID-19 related changes to operations continued to affect enforcement activities in this period. Enforcement inspection data collected from markets and restaurants was previously collected by the City of Long Beach and LACDPH. However, both agencies were involved in COVID-19 public health activities and neither conducted enforcement inspections since the pandemic began. The grants for enforcement inspections expired for City of Long Beach in 2019 and LACDPH in 2022. EPA and FCEC partners are evaluating continuation of the market and restaurant enforcement activities. The CDFW continued enforcement inspections and the data is summarized in this report for the reporting period.

2.0 ENFORCEMENT INSPECTIONS

CDFW staff conducts inspections of in-water commercial and recreational anglers, wholesale (fish market or restaurant) commercial, and shoreline recreational anglers. CDFW reported recreational fishing inspections between August 2021 and June 2022, and commercial fishing inspections in April 2022 and May 2022. The inspections consisted of the following:

- Recreational (shoreline and in-water) fishermen
- Commercial (in-water and wholesale) fishing operations

CDFW performed four commercial fishing inspections including two fish markets and one restaurant in April 2022 and one fishing vessel in May 2022. As part of the commercial inspections, CDFW asks anglers where the fish is from, and the invoice (if applicable) is checked. Retailers are required to purchase fish from licensed vendors. The fish businesses targeted sell seafood and/or have sold white croaker illegally in the past. CDFW has focused inspections of commercial vessels in the red zone, in particular the areas surrounding the white croaker catch ban off the coast at Palos Verdes and Fish Harbor, where many anglers dock their boats.

CDFW also conducted 133 recreational fishing inspections along the Palos Verdes Peninsula shoreline (including areas between Malaga Cove and Long Point, Abalone Cove and Inspiration Point, and Royal Palms and Cabrillo Beach Jetty). Recreational fishing inspections include inspecting piers, jetties, boats, and beaches. During recreational inspections, the wardens check bags for illegal fish and size limits and conduct outreach about the dangers of white croaker and other relevant topics. The bag limit for recreational and sport fishing is 10 white croakers. There is no commercial catch limit for white croaker.

3.0 ENFORCEMENT INSPECTION RESULTS

An analysis of the enforcement inspections was performed to summarize major findings from the inspections. The analysis focused on providing a general descriptive summary (or descriptive statistics) of the inspections. In some cases, there were repeat inspections done at the same sites during the year. As a result, some observations were correlated, and thus inferential statistics could not be calculated.

3.1 RECREATIONAL FISHING

CDFW wardens usually fill out one inspection form per fishing mode a day. However, during this reporting period, 14 of 119 recreation inspection forms recorded multiple fishing modes on the same day. Based on communication with CDFW, EA considered these to be 14 additional inspections with a total of 133 recreational inspections. Because no differentiation was made in terms of which information applied to which fishing mode, EA assumed all information (e.g., number of white croakers observed, number of trifold information pamphlets distributed, etc.) to be split 50/50 between the fishing modes. CDFW agreed to continue providing separate inspection forms for separate fishing modes in future reporting periods.

Recreational inspection modes included piers and jetties, boat patrol, and beach and intertidal areas. The recreational inspection data was collected between August 2021 and June 2022. There were 133 recreational fishing inspections conducted in this reporting period. Out of those, 57 percent were pier and jetties inspections, 17 percent were boat patrols, and 26 percent were beach and intertidal inspections. A total of 2,294 anglers were reached during the pier and jetties (1,364), boat patrols (503), and beach and intertidal (427) recreational inspections. On average, 17 anglers were interviewed per inspection. An average of 18 anglers were interviewed during pier and jetty inspections, 22 were interviewed during boat inspections, and 13 were interviewed during beach and intertidal inspections.

3.1.1 Awareness of Fish Contamination Issues

At least one angler interviewed reported being aware of the fish contamination issues during 68 out of 133 inspections (51 percent). This includes 39 out of 76 pier and jetties inspections, 20 out of 34 beach inspections, and 9 out of 23 boat inspections. Additional information is included in the following table.

Table 1. Reported Awareness of Fish Contamination by Fishing Mode

Fishing Mode	Reported Awareness					
	Yes	% Yes by Mode	% of Yes All Modes	No	% No by Mode	% of No All Modes
Piers and Jetties	39	51%	57.4%	37	49%	56.9%
Boat Patrol	9	39%	13.2%	14	61%	21.5%
Beach and Intertidal	20	59%	29.4%	14	41%	21.5%
Total	68	51%	-	65	49%	-

3.1.2 Intentions to Keep White Croaker

When asked about intentions to keep white croaker if they caught it, at least one angler responded “yes” on 23 of the 133 inspections (17 percent). Of inspections where at least one angler reported that they were aware of the fish contamination (n=68), 28 percent (n=19) had at least one angler who intended to keep white croaker. Inspections where at least one angler expressed an intention to keep white croaker occurred during 14 of 76 pier and jetty inspections, 3 of 23 boat inspections, and 6 of 34 beach inspections. Additional information is included in the following table.

Table 2. Intentions to Keep White Croaker

Fishing Mode	Would fishermen keep White Croaker if they caught it?					
	Yes	% Yes by Mode	% of Yes All Modes	No	% No by Mode	% of No All Modes
Piers and Jetties	14	18.4%	60.9%	62	81.6%	56.4%
Boat Patrol	3	13%	13%	20	87%	18.2%
Beach and Intertidal	6	17.7%	26.1%	28	82.3%	25.4%
Total	23	17%	-	110	83%	-

3.1.3 Do Not Consume Fish Observed and Seized

Approximately 44 white croaker were observed in 13 inspections (9.8 percent). There were no white croaker seizures reported in recreational inspections. Multiple areas were patrolled during each inspection, and the specific location of white croaker was not recorded. However, Long Beach and Belmont Pier appeared in multiple inspections with larger quantities of white croaker recorded. Other locations where white croaker observations were recorded included Alamitos Bay, Seal Beach, San Pedro, Davies Boat Ramp, Mother's Beach, Toledo, Cherry Beach, 72nd Place Jetty, Huntington Beach, Sunset Beach, the mouth of the San Gabriel River, Redondo Beach, King Harbor, Shoreline Village, Pier Point Landing, Cabrillo Beach, and Marina del Rey.

Approximately 164 topsmelt were observed in 10 inspections (7.5 percent). There were no topsmelt seizures reported. Multiple areas were patrolled during each inspection and the specific location of topsmelt was not specified. Topsmelt was noted most frequently, and/or in larger quantities during patrols of Long Beach, Belmont Pier, Cherry Beach, 72nd Place Jetty, and the mouth of the San Gabriel River. Other recorded locations included Seal Beach, Marina Drive Bridge, Alamitos Bay, Claremont Launch Ramp, Raise Dog Beach, Junipero Beach, McGurk Beach, White Point, Mother's Beach, 60th Street Jetty, South Shore, Cabrillo Beach, San Pedro, Redondo Beach, King Harbor, and the Federal Break Wall.

Approximately 30 barred sand bass were observed in 15 inspections (11 percent). A total of 8 undersized barred sand bass were seized during inspections. Multiple areas were patrolled during each inspection and the specific location of barred sand bass was not specified. Barred sand bass was noted most frequently, and/or in larger quantities during patrol of Long Beach, Santa Monica Pier, and Marina Del Rey. Other recorded locations included Alamitos Bay, Davies Launch Ramp, Redondo Beach, Palos Verdes, South Shore, Cabrillo Beach, San Pedro, Belmont Pier, Cherry Beach, 72nd Place Jetty, San Gabriel River, and Seal Beach.

One black croaker was observed in 1 inspection (0.8 percent). There were no black croaker seizures reported. This inspection occurred on Long Beach.

Approximately 3 barracuda were observed in 1 inspection (0.8 percent). Multiple areas were patrolled during this inspection and the specific location of barracuda was not recorded. This inspection occurred along Long Beach and the South Shore Launch Ramp.

3.1.4 Citations, Warning, and Violations

There was one bag limit violation reported among the 133 inspections. While the violation did not specify which fish species was found to over the limit, CDFW indicated they were not Do Not Consume (DNC) fish. There were a total of 48 warnings and 55 citations for fish violations issued. Most citations and violations were not related to the DNC fish. Common violations included fishing without a license, catching undersized fish, and fishing out of season lobster.

3.1.5 Information Provision

A total of 345 enforcement trifold information pamphlets were distributed during 68 of 133 inspections (51 percent). During the inspections, the outreach materials were sometimes

provided in multiple languages. An English language pamphlet was provided for approximately 47 percent of inspections (n=63). In addition, a Spanish pamphlet was provided 11 percent of the time (n=15), and Chinese and Vietnamese pamphlets were each provided 3 percent of the time (n=4).

3.1.6 Contamination Awareness Source

In response to recommendations made by EA in previous reporting periods, CDFW added a question to its inspection forms asking anglers that were aware of fish contamination issues to indicate their source of their awareness including DNC pier signage, outreach materials, outreach workers, internet, community events, media, friend/family, and/or another source. In most inspection forms in which at least one angler reported awareness of fish contamination issues (n=68), multiple sources of awareness were recorded for a single group of anglers in a single fishing mode. Therefore, 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 issues for each fishing mode.

The most influential fish contamination awareness sources for all fishing modes was 48.5 percent from the outreach materials (trifold information pamphlets) followed by 19.1 percent from DNC fish pier signs, 14.7 percent from outreach workers, 13.2 percent from friends or family members, and 4.4 percent from community event outreach. The recreational anglers were most aware during piers and jetties, and beach and intertidal inspections. The boat patrol inspections were least aware. The most popular sources of awareness for piers and jetties inspections were outreach materials and DNC fish pier signs, followed by friends and family members, outreach workers, and community event outreach. Boat patrol inspection awareness sources were primarily from outreach materials, DNC fish pier signs, and outreach workers. For beach and intertidal inspections, the outreach materials and friends and family were most popular awareness sources, followed by DNC fish pier signs, outreach workers, and community events. The percent breakdown of awareness source by fishing mode and total of all fishing modes is included in the table below.

Table 3. Fish Contamination Awareness Source

Fishing Mode	Source of Awareness (%)							
	DNC Signs	Outreach Material	Outreach Team	Internet	Community Events	Media	Friends/Family	Other
Piers and Jetties (n=52)	21.2	44.2	13.5	0	5.8	0	15.4	0
Boat Patrol (n=18)	5.8	23.1	5.8	0	0	0	0	0
Beach and Intertidal (n=32)	13.5	15.4	9.6	0	7.7	0	15.4	0
All fishing modes (n=68)	19.1	48.5	14.7	0	4.4	0	13.2	0

3.2 COMMERCIAL FISHING

Commercial fishing inspection data was collected by CDFW in April 2022 and May 2022. Two fish markets and one restaurant in Redondo Beach were inspected in April and one commercial fishing vessel in San Pedro was inspected in May.

3.2.1 Awareness of Fish Contamination Issues

Among the four commercial fishing inspections, one fish restaurant, and one commercial vessel (50 percent) reported that they were unaware of the fish contamination. The two remaining fish markets were aware of fish contamination and reported that outreach materials and the health department were their sources of awareness.

3.2.2 White Croaker Identified

White croaker was identified and seized during 1 commercial vessel inspection. Approximately 35 white croakers were identified and seized during this inspection.

3.2.3 Do Not Consume Fish Observed and For Sale

During commercial inspections, there were no other DNC fish observed or intended for sale.

3.2.4 Violations

As mentioned above, during 1 commercial inspection, CDFW issued a violation to a commercial fishing vessel for exceeding the white croaker bag limit under a sport fishing license.

3.2.5 Information Provision

English enforcement trifold information pamphlets (75 percent) were distributed to the fish markets and restaurants and to the commercial vessel in Vietnamese (25 percent).

4.0 ENFORCEMENT INSPECTION RESULTS DISCUSSION

4.1 RECREATIONAL FISHING

A summary of the CDFW recreational fishing inspections between August 2021 and June 2022 is presented in the table below.

Table 4. CDFW Recreational Inspections Summary

# of inspections	133
# of pier and jetty inspections	76
# of boat patrol inspections	23
# of beach and intertidal inspections	34
# of inspections where at least one fisherman reported awareness of contamination	68
# inspections where at least one fisherman reported that they would keep white croaker if caught	23

# of inspections with white croaker observed	13
# of white croakers seized	0
# of inspections with barracuda observed	1
# of barracudas seized	0
# of inspections with topsmelt observed	10
# of topsmelt seized	0
# of inspections with barred sand bass observed	15
# of barred sand bass seized	8
# of inspections: black croaker observed	1
# of black croaker seized	0

Recreational fishing inspections (133) were somewhat decreased compared to the previous reporting period (177 inspections), despite inspections having remained paused at the beginning of that reporting period due to the COVID-19 pandemic. However, recreational fishing inspections increased significantly relative to the 2019-2020 reporting period, during which inspections were first paused. On average, 3.9 inspections were performed each month during the 2019-2020 reporting period, and an average of 11.1 inspections were performed each month during this reporting period.

Inspections reported white croaker in 9.8 percent of inspections, barracuda in 0.75 percent, topsmelt in 7.5 percent, barred sand bass in 11 percent, and black croaker in 0.75 percent. At least one angler interviewed stated that they were aware of the fish contamination issues in 51 percent of the recreational inspections. This is down from 67 percent during the previous reporting period, but up from 38 percent during the reporting period prior to that. Anglers reported awareness during more piers and beach and intertidal inspections (59 percent) and piers and jetties inspections (51 percent) compared to boat inspections (39 percent). These results indicate that awareness has decreased among anglers relative to the last reporting period, but that a longer-term trend of increasing awareness has continued.

In response to recommendations made by EA in previous reports, CDFW began using a new inspection form with an additional question asking the source of anglers' awareness of fish contamination issues. This information is useful to evaluate how to better improve what modes of outreach can be performed to increase recreational fishing awareness. The new form was used in 119 of 133 inspections; however, starting in the first quarter of 2022, the new form was used in 105 of 106 inspections, indicating that CDFW has almost entirely moved to the new inspection forms. During this reporting period, the most influential sources of awareness were the outreach materials, DNC fish pier signage, and outreach workers. Community event outreach and friends and family were also awareness sources, particularly in the piers and jetties and beach and intertidal inspections. As more awareness source data is collected by CDFW, the trends will be evaluated in the next reporting periods.

Inspections where at least one angler expressed an intention to keep white croaker if they caught it occurred during 17 percent of the total inspections (23 of 133). The intention to keep white croaker was found 18 percent of the time during piers and jetties and beach and intertidal inspections, and 13 percent during boat inspections. Although anglers were more aware of contamination at piers and jetties and beaches, they reported intention to keep white croaker at a

higher rate than boat inspections. The results suggest there may be need for more outreach about the health effects of consuming contaminated fish among pier and beach anglers.

Data from multiple anglers are included for each inspection which presents potential limitations on the data evaluation. The inspections did not collect information on each of the anglers interviewed, therefore it could not be determined whether there is a bias in the data due to repeat anglers being interviewed. Alternatively, because the statistics are being generated for each inspection event rather than for each angler interviewed, without a better understanding of the variability in responses per inspection event, there is no way to develop and apply a weighting factor to the response counts for the different fishing modes. With multiple locations per form, it is unclear where, precisely, DNC fish are being identified most frequently. Additionally, given this reporting format, the actual percent of anglers who are aware of contamination is dramatically skewed upward; if even one angler is aware of contamination (average of 17 anglers interviewed per inspection), data will indicate that all interviewed anglers were aware. Additionally, a selection bias could have occurred if the subset of fishermen were selected for repeated inspections due to a specific reason, which could limit the broader applicability of the results. Another limitation to the datasets is the small sample size. Due to limited sample size, findings generated from the dataset may only apply for the specific sample population and may not be applicable to the entire population. To address some of these issues, an improvement to the Recreational Fishing inspections form may include collection of this more detailed data. EA also recommends that CDFW wardens use only one form per fishing mode.

Outreach materials in English, Spanish, Vietnamese and/or Chinese were distributed during 51 percent of the recreation inspections. This is up from the last inspection period in which materials were distributed in 40 percent of inspections, but down from the prior two inspections periods when materials were distributed in over 85 percent of inspections. It is recommended to increase distribution of materials during the inspections since it is the most influential awareness source and particularly when inspections find white croaker and/or angler intent to keep white croaker.

Following EA recommendations in the last reporting period, CDFW added a new question to the inspection forms asking how many materials were distributed and in which languages. A total of 345 trifold pamphlets were reported to be distributed. In 12 of 133 inspections, trifold pamphlets were distributed but actual numbers of pamphlets handed out were not reported, indicating that the total number of pamphlets distributed is somewhat higher than 345. In some inspection forms, specific numbers were reported for outreach materials distributed in specific languages, however in most forms a total number was given without specifying the amount in each language. EA recommends that CDFW wardens consistently record the amount of outreach materials distributed in each language to aid in analysis of community outreach.

4.2 COMMERCIAL FISHING

A summary of the CDFW commercial fishing inspections between April and May 2022 is presented in the table below.

Table 5. CDFW Commercial Inspections Summary

# of inspections	4
# aware of white croaker catch ban area	2
# with intent to catch/buy/sell white croaker	1
# of white croaker observed	35
# of white croaker seized	35
# of violations reported	1
# of informational sheets provided	4

CDFW performed three fish market/restaurant and one commercial fishing vessel inspection during the reporting period. White croaker were observed and seized on the commercial fishing vessel, and a sport fishing bag limit violation was issued. This vessel indicated a lack of awareness of fish contamination issues and stated an intent to catch but not buy or sell white croaker. Fifty percent of the commercial angler respondents reported that they were unaware of the fish contamination. This is a 30 percent decrease compared to responses recorded by CDFW in the last reporting period. The commercial fishing operations are largely in compliance with white croaker regulations, but violations due to lack of awareness do still occur. However, due to a limited sample size, findings generated from the dataset may only apply for the specific sample population and may not be applicable to the entire population. The commercial fishing inspection frequency could be increased to better address awareness. Additionally, the commercial fishing inspection form could benefit from better tracking of the specific location as well as tracking of the amount of outreach materials provided in each language (like the Recreational Fishing form), to better track demographics.

5.0 CONCLUSIONS

Enforcement is a key Institutional Control as part of FCEC program. Based on the inspection data, DNC fish, specifically the white croaker, was observed during 1 commercial inspection (25 percent) and 44 white croaker were found among fishermen in 9.8 percent of recreational fishing inspections. This is down from the last reporting period, in which white croaker were found in 14 percent of inspections, and significantly down from previous reporting periods (2016-2020) in which white croaker was found in approximately 30 percent of inspections, and 58 percent during the 2015-2016 reporting period. The total number of white croakers found was also significantly lower than in prior years. A much larger number of topsmelt were observed during this reporting period relative to both previous reporting periods and to numbers of other DNC fish observed. Other than white croaker and topsmelt, DNC fish were less frequently observed which is consistent with the previous reporting periods.

During this reporting period, awareness of fish contamination decreased for recreational fishing inspections conducted by CDFW compared to the last reporting period but remains higher than the previous reporting periods. More anglers reported awareness during piers and jetties inspections and beach and intertidal inspections compared to boat inspections. However, intentions to keep white croaker were lower among boat inspections. In addition, there were significantly more pier and jetty inspections (n=76) compared to beach inspections (n=34) and boat (n=23) inspections. In 17 percent of recreational inspections, fishermen reported they would keep white croaker if they caught it. This is slightly higher than the last reporting period

(15 percent), which had been significantly lower than previous reporting periods (approximately 30 percent). These results indicate that outreach concerning the health effects of consuming contaminated fish has been successful, but that there is a need for outreach to continue. Commercial inspections were limited during this reporting period. Among four commercial inspections, 50 percent were aware of the fish contamination.