



**FISH CONTAMINATION EDUCATION COLLABORATIVE
ANNUAL ANGLER OUTREACH REPORT**

August 2018 –July 2019

Palos Verdes Shelf Superfund Site

Los Angeles County, California

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EXECUTIVE SUMMARY

The Palos Verdes Shelf Superfund Site is Operable Unit 5 of the Montrose Chemical Corporation Superfund Site, located in Los Angeles County, California. The Palos Verdes Shelf, a portion of the continental shelf off the coast of Los Angeles, became contaminated with dichloro-diphenyl-trichloroethane (DDT) and polychlorinated biphenyls (PCBs) from the Montrose Chemical plant and other industries that discharged their waste into the Los Angeles County sanitation system. Today, several square miles of sediment on the continental shelf are contaminated with these legacy pollutants. Although the contaminated sediment is too deep for human contact, some fish in the area accumulate these organic pollutants at levels that make them unsafe for consumption. The U.S. Environmental Protection Agency's (EPA) initial response to the site was to focus on limiting consumption of these potentially contaminated fish. In February 2015, EPA contracted EA Engineering, Science, and Technology, Inc. (EA) to continue the community involvement activities. In order to re-establish the activities, EA discussed the outreach previously conducted with EPA and the past contractor, reviewed the Interim Record of Decision and Palos Verdes Shelf Superfund Site Institutional Controls (ICs) Program Implementation Plan, and contracted with past outreach community partners.

SUMMARY OF COMMUNITY INVOLVEMENT PROGRAM

The Community Involvement Program was designed to reduce risk exposure posed by contaminated fish through outreach and education. The program has three main activities: Angler Outreach, Community Outreach, and Enforcement. In support of these activities, EA coordinated meetings with the Fish Contamination Education Collaborative (FCEC). The FCEC is a forum for the agencies, outreach groups, and other entities involved to share ideas, get updates on the project's progress, and maintain momentum for continued outreach work. This report will discuss the outreach activities. The annual enforcement activities are documented in a separate report.

The purpose of the Community Involvement Program is the dissemination of educational material concerning consumption of contaminated fish focusing on specifically vulnerable ethnic communities. This report summarizes the extent of the outreach including:

1. Angler outreach conducted between August 2018 and July 2019.
2. Bait shop outreach conducted in August 2018 and June 2019.
3. Electronic outreach on the FCEC website and Facebook fan page conducted between August 2018 and July 2019.
4. Community events attendance between August 2018 and July 2019.

EA subcontracted Heal the Bay (HTB) and Cabrillo Marine Aquarium (Cabrillo) to perform angler outreach; team subcontractor, HDR, Inc. (HDR), to complete the bait shop outreach and attend community events; and Chinese Christian Herald Crusade (CCHC) and Boat People SOS (BPSOS) to conduct outreach during community events for the Chinese and Vietnamese

communities, respectively. Electronic outreach through the FCEC website and Facebook fan page was maintained by EA. One FCEC partners meeting was held in January 2018, and was coordinated and facilitated by EA. EA also facilitated a fish identification training workshop for Los Angeles County Department of Public Health (LACDPH) and City of Long Beach Department of Health and Human Services, Bureau of Environmental Health (City of Long Beach) on 8 August 2018.

Enforcement and pier sign monitoring activities were also performed as part of the Community Involvement Program. Enforcement activities were performed by the Department of Fish and Wildlife (recreational and commercial fishing), City of Long Beach, and LACDPH during the reporting period. The enforcement activities are further documented in the Annual Enforcement Report, submitted separately. The pier signs were monitored by HTB, Cabrillo, and City of Long Beach during the reporting period to assess the need for replacement or repair. Pier sign status is summarized in a separate report.

PROGRAM EFFECTIVENESS

The Community Involvement Program, through the various outreach activities at multiple locations, has been effective in reaching anglers and community members to increase awareness of the contamination issues associated with the Palos Verdes Shelf Superfund Site. The angler outreach is effectively reaching anglers, more specifically English and Spanish speaking communities, with a smaller minority of Chinese communities.

During the reporting period, HTB and Cabrillo achieved the outreach objectives by reaching 8,008 and 2,191 anglers, respectively. On average, 61 percent of anglers were aware of the contamination of which 93 percent spoke English, 3 percent spoke Spanish, 1 percent spoke Chinese, and 3 percent did not specify a language. On average, 49 percent of anglers were repeat respondents and 51 percent of anglers were new respondents at the piers. HTB and Cabrillo reported anglers source of information on their awareness of the contamination (i.e., pier signs, information tip-cards, pier outreach team, internet, community events, media, friend/family, or other). Based on the results, the pier outreach team (72 percent) and pier signage (19 percent) were reported as the most influential sources of information. Less influential sources of awareness were internet (2.5 percent), tip-cards (0.1 percent), media (1.5 percent), friends/family (2.9 percent), events (0.3 percent) and other sources, such as school (1.6 percent).

Outreach conducted at 40 angler retail and bait shop locations in Huntington Beach, Seal Beach, Long Beach, San Pedro, Redondo Beach, Hermosa Beach, Manhattan Beach, Hawthorne, Marina Del Rey, Venice, and Santa Monica have also shown positive effectiveness in disseminating information. A total of 2,285 tip cards were distributed in August 2018 in English (38 percent), Spanish (33 percent), Chinese (12 percent), and Vietnamese (17 percent). In June 2019, a total of 3,625 tip cards were distributed in English (36 percent), Spanish (32 percent), Chinese (16 percent), and Vietnamese (16 percent).

Thirty community outreach events were performed by HDR (10), City of Long Beach (11), BPSOS (5), and CHCC (4). The outreach reporting indicated that the community events were

effective at reaching the target communities handing out approximately 4,550 total tip cards at events with themes dedicated to Hispanic and Polynesian culture, health, environmental education, and Earth Day celebrations. Of the outreach activities, electronic outreach has had the least effectiveness in reaching the communities based on the minimal traffic observed on the FCEC website and Facebook fan page.

PROGRAM RECOMMENDATIONS

Although outreach has been effective at communicating the issues to the public, several observations and recommendations were made that could improve the program.

Of the data collected for day angler outreach by HTB and Cabrillo, the results of the geographic distribution and demographic variability expose several interesting conclusions about the overall effectiveness of the Angler Outreach Program. Overall, there variability in the languages reported are consistent with the previous reporting periods (2017-2018), which was less variability in language compared to 2015-2016 reporting. While English is the primary language spoken during both the day and evening angler outreach, more Spanish speakers were observed during the day while more Chinese speakers were observed during the night. This is opposite of the results recorded during the pilot night angler program in 2017 which indicated more Spanish than Chinese language speaking anglers. Continued monitoring of the night angler languages over future reporting periods is recommended to get better understanding of this trend. It was also noted that awareness in the Chinese speaking community was the lowest, indicating increased pier angler outreach to this community is warranted.

During the June 2019 bait shop outreach, there were eight shops that still had materials from August 2018. It is recommended to monitor these bait shops to evaluate whether they need replacement by more popular locations in the area. Requests for Korean outreach materials in four areas (San Pedro, Long Beach, Seal Beach, and Huntington Beach) represents a growing trend of Korean speaking anglers in multiple locations. It is recommended in the next reporting period to evaluate printing and distributing bait shop outreach materials in Korean to reach this community. There appears to be less knowledge about safe fishing in the Huntington Beach pier area compared to other piers. This may be attributed to the lack of “Do Not Consume” fish signage like the other piers. Future efforts could include increased outreach to bait shops in this area as well as adding local fish markets to distribute tip cards and expand outreach to this community. Questions about the “Red Zone” distance shown on the sleeve of the tip card were encountered frequently. During the next round of revision to the outreach materials, it is recommended to revise the graphic on the tip card sleeve to show the complete California Office of Environmental Health Hazard Assessment map of yellow and red zones for fish caught from Ventura Harbor to San Mateo Point. This map also includes a scale and Catalina Island for reference.

Electronic outreach results show that it has been the least effective outreach mode. These results are similar to previous reporting periods. For this reason, enhancements to the FCEC website and Facebook fan page content were recommended in the last reporting period to improve effectiveness of electronic outreach. Reorganization of the content and visual layout of the

FCEC website and Facebook fan page is underway to enhance the ability for people to navigate and find specific links or additional pages they would like to visit. FCEC partner organizations were encouraged to participate in the updates by providing content. Updates to the FCEC website and Facebook fan page are ongoing and results will be presented in the next reporting period.

The community outreach events have been effective at distributing informational materials to the target communities. The children's fishing game is a popular tool for outreach to families. Children often lead their parents to the FCEC booth to engage. Currently, there are two fishing games that are shared amongst the partners (HDR, CHCC, BPSOS, City of Long Beach) for use at the events. This has been challenging to event scheduling and increases shipping costs and general wear and tear of the game. During this reporting period, production of two new games was initiated and the completed games will be distributed during the next reporting period. As part of the FCEC booth, the display board features outreach to fish markets and anglers. It would be worthwhile to update technical information during the next reporting period.

Previous attempts have been made to get hold of contacts in the Los Angeles Unified School District (LAUSD) system to expand outreach and education to children and families. The LAUSD contact attempts were unsuccessful during the last two reporting periods. However, HDR has been successful at reaching children and teachers in the LAUSD system through an increase of community events focused on environmental education. It is recommended that HDR continue to research new educational events to reach this group.

BPSOS and CHCC are continuing to collaborate with other organizations in order to diversify the community events to reach more anglers in the Chinese and Vietnamese communities. Based on the pier angler outreach data, the Chinese speaking community appears the least aware of the contamination while the majority of people reached by CHCC were Chinese speaking. It is recommended that BPSOS and CHCC attempt to increase participation in community events during the next reporting period to increase awareness.

During the previous reporting period, sign-in sheets were revised for FCEC booth attendees to indicate whether they are aware of the DDT/PCB fish contamination advisories before the community event and what is the awareness source (signs, tip-card, community event, outreach team, internet, media, friend/family, other). In this reporting period, there was less participation in the sign-in sheets. Many of the community events did not have signatures and of those that did, only a few signatures were present. It is recommended the community outreach partners continue to improve sign-in at the events, particularly focusing on engaging the visitors and educating them on the reason for the data collection.

The distribution of outreach materials during community events continues to be successful in providing education to the community. Based on the percentage of the types of materials distributed, the tip cards and "What's the Catch" comic book are the most popular during community outreach. It is recommended to include these as key materials evaluated during the next round of revision to the outreach materials and printing.

The FCEC Partners Meeting was held on 23 April 2019 for stakeholders to discuss the angler, community, and enforcement outreach activities. The topics included summaries of the angler, community event, enforcement, and electronic outreach updates, pier sign tracking, and the revisions to outreach materials. Key items discussed during the meeting were revisions to the outreach materials to update technical information and translation into Korean language, improvements to the FCEC website content and user interface, and sharing of outreach material inventory until new materials are produced. FCEC partners were encouraged to participate in the FCEC website improvements and provide more frequent updates to the Facebook fan page.

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ACRONYMS AND ABBREVIATIONS

BPSOS	Boat People SOS
Cabrillo	Cabrillo Marine Aquarium
CCHC	Chinese Christian Herald Crusade
City of Long Beach	City of Long Beach Department of Health and Human Services, Bureau of Environmental Health
DDT	Dichlorodiphenyltrichloroethane
EA	EA Engineering, Science, and Technology, Inc.
EPA	U.S. Environmental Protection Agency
FCEC	Fish Contamination Education Collaborative
HDR	HDR, Inc.
HTB	Heal the Bay
IC	Institutional control
LACDPH	Los Angeles County Department of Public Health
LAUSD	Los Angeles Unified School District
PCB	Polychlorinated biphenyl

1.0 INTRODUCTION

The Palos Verdes Shelf Superfund Site is Operable Unit 5 of the Montrose Chemical Corporation Superfund Site, located in Los Angeles County, California. The Palos Verdes Shelf, a portion of the continental shelf off the coast of Los Angeles, became contaminated with dichloro-diphenyl-trichloroethane (DDT) and polychlorinated biphenyls (PCBs) from the Montrose Chemical plant and other industries that discharged their waste into the Los Angeles County sanitation system. Today, several square miles of sediment on the continental shelf are contaminated with these legacy pollutants. Although the contaminated sediment is too deep for human contact, some fish in the area accumulate these organic pollutants at levels that make them unsafe for consumption. The U.S. Environmental Protection Agency's (EPA) initial response to the site was to focus on limiting consumption of these potentially contaminated fish.

EPA signed an Action Memorandum for Institutional Controls (ICs) for the Palos Verdes Shelf in September 2001. "ICs" refers to non-engineered measures, such as site use restrictions, intended to prevent or reduce exposure to contaminants at a site. The Action Memorandum established ICs to reduce exposure to contaminated fish, particularly white croaker, from Palos Verdes Shelf. The program includes: (1) public education and outreach; (2) monitoring; and (3) enforcement. In 2003, EPA created the Fish Contamination Education Collaborative (FCEC) with representatives of federal, state and local agencies, and community-based organizations that carry out various outreach and education activities. Since then, each of these program facets has evolved and a fourth element, strategic planning, has been added to assess and calibrate the ICs program. In September 2009, EPA signed an Interim Record of Decision that selected as an interim remedy continuation and strengthening of the ICs program, monitored natural recovery, and placement of a cap over the area of the Palos Verde Shelf that contains the highest surface contaminant concentrations.

In February 2015, EPA contracted EA Engineering, Science, and Technology, Inc. (EA) to continue the community involvement activities. EA discussed the outreach previously conducted with EPA and the past contractor, reviewed the Interim Record of Decision and Palos Verdes Shelf Superfund Site ICs Program Implementation Plan, and contracted with past outreach community partners.

The Community Involvement Program was designed to reduce risk exposure posed by contaminated fish through outreach and education. The program has three main activities: Angler Outreach, Community Outreach, and Enforcement. In support of these activities, EA coordinated meetings with the FCEC. The FCEC is a forum for the agencies, outreach groups, and other entities involved to share ideas, get updates on the project's progress, and maintain momentum for continued outreach work. This report will discuss the outreach activities. The annual enforcement activities are documented in a separate report.

The purpose of the Community Involvement Program is the dissemination of educational material concerning consumption of contaminated fish focusing on specifically vulnerable ethnic communities.

This report summarizes the extent of the outreach including:

1. Angler outreach conducted between August 2018 and July 2019.
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4. Community events attendance between August 2018 and July 2019.

EA subcontracted Heal the Bay (HTB) and Cabrillo Marine Aquarium (Cabrillo) to perform angler outreach; team subcontractor, HDR, Inc. (HDR), to complete the bait shop outreach and attend community events; and Chinese Christian Herald Crusade (CCHC) and Boat People SOS (BPSOS) to conduct outreach during community events for the Chinese and Vietnamese communities, respectively. Electronic outreach through the FCEC website and Facebook fan page was maintained by EA. EA facilitated a fish identification training workshop for Los Angeles County Department of Public Health (LACDPH) and City of Long Beach on 8 August 2018. One FCEC partners meeting, held in Long Beach on 23 April 2019, was coordinated and facilitated by EA.

Enforcement and pier sign monitoring activities were also performed during the reporting period as part of the Community Involvement Program. Pier sign monitoring activities were performed by LACDPH, City of Long Beach Department of Health and Human Services, Bureau of Environmental Health (City of Long Beach), HTB, and Cabrillo to assess the need for replacement or repair. Enforcement inspections were performed by the Department of Fish and Wildlife for recreational and commercial fishing. Additionally, the City of Long Beach and LACDPH performed enforcement inspections of local markets and restaurants. The pier signs condition and enforcement activities are further documented in the Annual Pier Sign Summary Report and Annual Enforcement Report, submitted separately.

2.0 OVERVIEW OF THE COMMUNITY INVOLVEMENT PROGRAM

The Community Involvement Program is one of three ICs designed to reduce risk exposure posed by the consumption of contaminated fish. The purpose of the Community Involvement Program is the dissemination of educational material concerning consumption of contaminated fish focusing on specifically vulnerable ethnic communities. This report summarizes the extent of the outreach including:

1. Angler Outreach
2. Bait Shop Outreach
3. Electronic Outreach
4. Community Event Outreach
5. FCEC Partners Meeting.

The following sections summarize each of these outreach subprograms.

2.1 ANGLER OUTREACH

HTB and Cabrillo continued the previous Angler Outreach activities. HTB contacted anglers at the following fishing piers located within the Palos Verdes Shelf Superfund Site contaminated sediment area between Santa Monica Pier and Seal Beach Pier (Figure 1): (1) Santa Monica; (2) Venice; (3) Hermosa Beach; (4) Redondo Beach; (5) Rainbow Harbor; (6) Pier J; (7) Belmont Pier; and (8) Seal Beach. Cabrillo contacted anglers at the Cabrillo Pier (Figure 1). HTB and Cabrillo staff educated anglers at the piers discussing the local contamination and distributing program materials 2 to 3 days per week, generally during day times of highest angler population on the piers. Pier angler outreach was conducted on Thursday or Friday, Saturday, and Sunday. HTB expanded the angler outreach program to include evening hours as a pilot program at Venice and Redondo Beach piers between August 2017 and October 2017. These two piers were chosen based on popularity and ease of access for the outreach team during the evening hours. Based on the success of the pilot program, evening outreach at these piers was implemented in October 2018. HTB conducted evening outreach on Saturdays between 4:00 and 8:00 P.M. Face-to-face conversations were held with anglers, in the angler's native tongue when possible. Similar to daytime outreach, HTB staff discussed the contamination in fish, distributed informational materials, and recorded outreach activity results.

As part of the angler outreach program, EA worked with HTB and Cabrillo to monitor pier signs and maintain a record of their condition. EA reported missing or damaged signs to EPA and coordinated with the LACDPH and City of Long Beach to complete sign removal and/or replacement. The summary of pier sign status is summarized in a separate report.

2.2 BAIT SHOP OUTREACH

HDR conducted outreach at 40 angler retail and bait shop locations in Huntington Beach, Seal Beach, Long Beach, San Pedro, Redondo Beach, Hermosa Beach, Manhattan Beach, Hawthorne, Marina Del Rey, Venice, and Santa Monica (Figure 2). HDR staff provided tip cards in English, Spanish, Vietnamese, and Chinese to bait shop managers and recorded the number of tip cards provided. Additionally, the contact email address (info@pvsfish.org) and website (<http://pvsfish.org/>) was left for bait shops to request additional materials or ask questions. HDR also notified bait shops that materials would be replenished every six months.

2.3 ELECTRONIC OUTREACH

Electronic outreach was completed by maintaining the FCEC website (<http://www.pvsfish.org/>), Facebook fan page (<https://www.facebook.com/fcecprogram/>), and disseminating electronic newsletters. EA responded to questions emailed to the FCEC information account, posted eNewsletters, FCEC meeting summaries, and upcoming events. EA also recorded user traffic such as the number of visitors and Facebook fan page "likes" (using Facebook Insights). The data collected (using Google Analytics) on the FCEC website included the number of visitors, page views, number of pages/session, average duration of visitor stay on the website, the bounce

rate (percentage of visitors to a website who navigate away from the website after viewing one page), whether a visitor was new or a repeat, and page views by city.

Based on electronic outreach evaluations from previous reporting periods, it was recommended to improve the FCEC website and Facebook fan page to increase user traffic. In October 2018, EA worked with HDR to begin improvements to the FCEC website and Facebook fan page. The FCEC website will be migrated to a new platform and revised to improve navigability, organization of content, and updates to outreach program information. It will also be updated to increase compliance with Section 508 accessibility requirements and viewable on mobile devices.

2.4 COMMUNITY OUTREACH

A total of 30 community outreach events were attended by HDR, CHCC, BPSOS, and City of Long Beach. HDR attended 10 events with themes dedicated to Hispanic and Polynesian culture, health, environmental education, and Earth Day celebrations. CHCC and BPSOS attended 4 Chinese and 5 Vietnamese community events, respectively. As part of enforcement activities, the City of Long Beach attended 11 events in the Long Beach community. Community outreach is provided to educate these specific communities on the fish contamination and “Do Not Consume” fish. During the events, outreach focused on distributing informational tip cards, comic books, and pamphlets as well as having one-on-one conversations with community members to provide fish contamination and consumption education. A children’s fishing game is provided at the events as a tool for children and families to engage in learning about identification of contaminated fish species. Sign-up sheets are available for visitors to sign-up for the eNewsletter and indicate their awareness of the contamination (i.e., whether they are aware of the DDT/PCB fish contamination advisories before the community event, what is the awareness source (“Do Not Consume” fish signs, tip-card, community event, outreach team, internet, media, friend/family, other).

2.5 FCEC PARTNERS MEETING

The FCEC partners meeting was held on 23 April 2019 in Long Beach, California. The meeting included the angler outreach groups, agencies, and other entities to provide feedback and recommendations for program messaging, report on the condition of posted “Do Not Consume” pier signage, exchange information, and discuss issues related to the program. Further discussion of the key points from the meetings is included in Section 5.5.

3.0 DATA COLLECTION AND ANALYSIS APPROACH

3.1 ANGLER OUTREACH

HTB and Cabrillo staff conducted angler outreach between August 2018 and July 2019. In addition to angler outreach during the day, HTB performed evening outreach between October 2018 and July 2019. For both the daytime and evening outreach programs, the following data were recorded during the angler outreach efforts:

1. Whether an outreach angler was an adult or child.
2. Whether an outreach angler was a repeat or new respondent.
3. The number of information tip cards provided.
4. Whether the outreach angler is aware of the contamination.
5. The awareness source (i.e., pier signage, information tip-cards, outreach, community events, media, internet, friend/family, or other).
6. The language spoken during the angler outreach.
7. The zip code the angler lives in, if provided.
8. Any additional notes about the angler, such as type of fish caught, and other language(s) spoken if outreach was conducted in English.

The outreach data was analyzed to determine the effectiveness of the angler outreach activities. The total number of anglers reached at each pier was tracked on a monthly and annual basis to determine whether the numeric outreach objective was met. The overall outreach effectiveness was based on the percent of anglers aware of the fish contamination of those reached. Another measure of outreach effectiveness was based on the demographic variability of the anglers. The demographics were assessed by the total number of anglers reached in each zip code/county, and the languages spoken (English, Spanish, Chinese) by county. This analysis was possible because each record in the database that had zip code information also contained the language spoken. The demographic variability data was also used to identify potential gaps in outreach within the communities.

3.2 BAIT SHOP OUTREACH

HDR conducted bait shop outreach in August 2018 and June 2019. During each visit, HDR collected qualitative data including turn-over, how many bait shops took outreach materials, and how many of the materials were distributed in each language. One bait shop (7 Eleven in Huntington Beach) was removed because it no longer sold bait. This bait shop was replaced with Tackle Junkies in Gardena. Figure 2 presents the locations of bait shops.

3.3 ELECTRONIC OUTREACH

Data collection for the electronic outreach was performed using Google Analytics, which recorded information such as the various visitor types to the FCEC website, visitor activity on the website, and the method used to reach the website. The Google Analytics data were analyzed to determine the total number of visitors to the website, number of page views, number of pages viewed per session, the bounce rate (the percentage of visitors to a website who navigate away from the site after viewing one page), the number of new or repeat visitors, and page views by

city. The combined information from these datasets enabled a qualitative-quantitative analysis of the outreach effectiveness of the FCEC website. In addition, analytic data from Facebook Insights, such as the number of likes, fans reached, and user engagement provided additional data to assess outreach effectiveness.

As mentioned above, the FCEC website and Facebook fan page will be updated to increase user traffic, achieve compliance with Section 508 accessibility requirements, and be viewable on mobile devices. During the reporting period, EA worked with HDR to begin updates to the website organization, user navigability, and outreach program information. During the FCEC Partners meeting on 23 April 2019, partners were asked to participate in review of the updates and provide graphics, information, and/or recommendations to improve the FCEC website and Facebook fan page.

3.4 COMMUNITY EVENT OUTREACH

HDR, CHCC, BPSOS, and City of Long Beach attended a total of 30 community events. During each community event, the estimated number of attendees and/or tip cards distributed (English, Spanish, Chinese, and/or Vietnamese) were recorded. Similar to the other outreach datasets, the community event outreach data were analyzed to determine and compare the outreach effectiveness within each of the target communities. Based on community outreach evaluations from the previous reporting periods, the children's fishing game is a popular and successful tool to educate families. In the last reporting period, it was recommended to fix and/or create new children's fishing games for the FCEC partners to use during the events.

4.0 RESULTS

4.1 DAY ANGLER OUTREACH

4.1.1 DAY ANGLERS CONTACTED DURING OUTREACH PERIOD

Table 1 summarizes the total number of anglers contacted between August 2018 and July 2019. The table presents the following total values: (1) total per month; (2) total in 2018; (3) total in 2019; (4) total for the outreach period; (5) total for HTB locations; and (6) total for Cabrillo locations. During the reporting period, the numeric objective of the HTB and Cabrillo outreach was to contact a minimum of 11,000 and 1,600 anglers, respectively. Based on the data, Cabrillo achieved the outreach objectives by reaching 2,191 anglers. HTB reached 8,008 anglers, falling short of the 11,000-angler goal. HTB noted less pier anglers due to heavy rain events (November 2018 through March 2019) during the reporting period. Other contributions include temporary closures of Santa Monica and Seal Beach piers for maintenance and Rainbow Harbor during the Grand Prix in April 2019.

Based on the monthly trends in the data, as shown in Figure 3, there appear to be seasonal fluctuations with the numbers of anglers generally decreasing between October 2018 and March 2019, and generally increasing from April 2019 through July 2019. Overall peaks are shown in August 2018 and July 2019. The most popular piers for angler outreach were Cabrillo, Belmont, and Redondo Beach piers, making up approximately 50 percent of the anglers reached. The

Rainbow Harbor pier was the least frequented by anglers. Belmont Pier has the greatest variability, with peak anglers ranging from 40 (February 2019) to 296 (September 2018). Cabrillo Pier and Redondo Beach locations have the next greatest variability, with angler outreach ranging from 53 (February 2019) to 292 (September 2018) and 37 (October 2018) to 253 (June 2019), respectively.

4.1.2 Day Angler Outreach Effectiveness (Contamination Awareness)

Angler awareness of the contamination and “Do Not Consume” warnings was collected during the outreach sessions from August 2018 to July 2019. Anglers were additionally asked about the source that they learned of the information. Table 2 summarizes the percent of anglers who responded that they were aware of the contamination and “Do Not Consume” warnings. On average for all the piers monitored, angler awareness during the reporting period was 61 percent (6,258 of 10,199). The anglers reached at Cabrillo Pier had the most awareness with 77 percent of anglers aware of the contamination issues; although, Cabrillo Pier also had the highest fraction of repeat anglers at 61 percent. Venice Beach (61 percent), Santa Monica (60 percent), and Belmont Pier (60 percent), followed. Angler awareness was lowest at Seal Beach at 45 percent of anglers; however, Seal Beach also had the highest fraction of new anglers at 66 percent.

Of the anglers contacted at the piers who were aware of the contamination, on average, 94.4 percent spoke English, 2.2 percent spoke Spanish, 0.2 percent spoke Chinese, and 3.3 percent did not specify a language. Within each language group, English-speakers were the most aware of contamination (62 percent), followed by Spanish-speakers (50 percent), and Chinese-speakers (1 percent).

Anglers were asked whether they were a new or repeat outreach respondent. Tables 3 and 4 summarize the percent of respondents who were repeat or new respondents for the outreach period. Among all fishing locations, 49 percent of anglers were repeat respondents and 51 percent of anglers were new respondents. As stated, Cabrillo Pier had the highest fraction of repeat respondents (61 percent) while Seal Beach had the lowest repeat respondents (34 percent). The remaining piers averaged between 43 percent (Belmont Pier) and 56 percent (Venice Pier) for repeat respondents.

HTB and Cabrillo asked anglers that reported awareness of the contamination to provide the source of their information (i.e., pier signs, information tip-cards, pier outreach team, internet, community events, media, friend/family, or other). Table 5 summarizes pier angler’s source of awareness. Based on the results, the pier angler outreach teams (71.7 percent) and pier signage (19.4 percent) were reported as the most influential sources of information. Less influential sources of awareness that were reported were friends/family (2.9 percent), internet (2.5 percent), media (1.5 percent), other sources (1.6 percent), local community events (0.3 percent), and FCEC tip-cards (0.1 percent).

4.1.3 Day Angler Outreach Effectiveness (Geographic Distribution/Demographic Variability)

During the angler outreach, anglers were asked to provide the zip code where they live. Of the 10,199 anglers reached between August 2018 and July 2019, 49 percent (4,978 anglers) provided their zip code. Of the anglers who provided their zip code, approximately 83 percent were from Los Angeles County, 6.9 percent from Orange County, 3.9 percent from San Bernardino County, and 2.5 percent from Riverside County. As approximately 97 percent of the angler outreach respondents who provided zip codes were from the four surrounding counties, the analysis focused on these geographic areas.

Figure 4 depicts the distribution and concentration of zip codes for Los Angeles, Orange, San Bernardino, and Riverside counties. The highest zip code concentration occurs within the Cabrillo zip code of 90731 with 423 respondents. The highest concentrations appear to occur within the area bound by Interstate-110 to the west, Interstate-605 to the east, and Interstate-10 to the north.

Demographic variability was determined using the language data collected during the angler outreach. The efficiency of the outreach to various communities actively fishing the Palos Verdes Shelf Superfund Site was assessed by evaluating the different languages spoken geographically. Only responses of English, Spanish, and Chinese were reported in the data provided by HTB and Cabrillo. While the data may indicate that many of the anglers responded in English, bi- or multi-language responses may not have been recorded by the anglers. Additionally, there were instances in the data where the angler did not indicate the language spoken, resulting in missing data.

Table 6 summarizes the language distribution spoken by the anglers. The results indicate that nearly 95.4 percent of the respondents within Los Angeles, Orange, San Bernardino, and Riverside counties spoke English and approximately 4.6 percent were non-English speakers. Of the non-English speakers, 3.0 percent of respondents were Spanish speakers, and 1.6 percent spoke Chinese. These results do not indicate if the English responders speak only English or if they are bi- or multi-lingual. Based on the data provided, the demographic groups that are likely effectively being reached through the Angler Outreach Program include English speaking, Spanish speaking, with a smaller minority of Chinese speaking anglers.

4.2 NIGHT ANGLER OUTREACH

Between October 2018 and July 2019, HTB performed angler outreach on Saturday evenings at Venice and Redondo Beach piers. These piers were chosen based on previous observations of night anglers at these piers and night access for the angler outreach team.

Table 7 summarizes the total number of anglers contacted. The table presents the following total values: (1) total per month; (2) total for the program; and (3) total for each pier location. Based on the data, the evening outreach program reached a total of 1,668 anglers. Highest evening angler outreach occurred in June and July 2019 with 327 and 288 respondents, respectively. The next highest evening outreach was in November 2018 (n=207) while the lowest evening outreach

occurred in October 2018 and January 2019 with 66 and 74 respondents, respectively. Overall, both locations observed a seasonal fluctuation; an increased number of respondents in November 2018, followed by a decline and relatively steady increase in respondents between January and June and July 2019, as shown in Figure 3.

Table 8 summarizes the percent of anglers who responded that they were aware of the contamination and “Do Not Consume” warnings. On average, 46 percent of anglers reached exhibited awareness (53 percent at Venice Beach [n=379] and 41 percent at Redondo Beach [n=390]).

Tables 9 and 10 summarize the percent of respondents who were repeat or new respondents, respectively. An average of 40 percent of anglers were repeat and 60 percent of anglers were new respondents. Venice had 45 percent repeat respondents and Redondo Beach had 36 percent repeat respondents.

Table 11 summarizes the awareness source from the night responders. Pier signage (11 percent) and the pier outreach team (78 percent) are reported as the most influential source of information. Less influential sources of awareness were friends/family (6 percent), internet (3 percent), media (1 percent), and “other” (1 percent).

During the night angler outreach pilot program, anglers were asked to provide the zip code where they live. Of the 1,668 anglers reached, 37 percent (616 anglers) provided their zip code. Of the anglers who provided their zip code, approximately 80 percent were from Los Angeles County, 13 percent from Orange County, 2.1 percent from San Bernardino County, 1.0 percent from Riverside County. Figure 5 depicts the distribution and concentration of zip codes for Los Angeles, Orange, San Bernardino, and Riverside counties. The highest zip code concentration occurs in the inland Los Angeles county zip code of 91748 with 33 respondents. The highest concentrations appear to occur within the area bound by Interstate-110 to the west, Interstate-605 to the east, and Interstate-10 to the north. See Figure 5 for the graphical distribution of where anglers are from.

Table 12 summarizes the language distribution spoken by the anglers reached during the evening outreach. The results indicate that 93 percent of the respondents within Los Angeles, Orange, San Bernardino, and Riverside counties spoke English and approximately 7 percent were non-English speakers. Of the non-English speakers, approximately 6.5 percent of respondents were Chinese speakers and 0.5 percent were Spanish speakers; all non-English speakers who provided zip codes resided in Los Angeles county.

4.3 BAIT SHOP OUTREACH

In August 2018 and June 2019, HDR conducted outreach to 40 bait shops in the California cities of Huntington Beach, Seal Beach, Long Beach, San Pedro, Redondo Beach, Hermosa Beach, Manhattan Beach, Hawthorne, Marina Del Rey, Venice, and Santa Monica (Figure 2). The bait shops were last contacted in May 2018. During the May 2018 bait shop outreach, it was noted that bait shops encountered difficulty with the display of tip cards. In many cases the tip cards had spilled onto the floor, were displayed backwards, languages were mixed together, or the

display was challenging to the eyes. It was recommended to purchase and replace the foldable plastic cardholders for future bait shop outreach.

During the August 2018 bait shop outreach, tip cards were provided in English, Spanish, Vietnamese and Chinese. A total of 2,285 tip cards were distributed with 38 percent English, 33 percent Spanish, 12 percent Chinese, and 17 percent Vietnamese. It was noted that most shop managers asked for English and Spanish tip cards. English and Spanish language “What’s the Catch” comic books were also provided to store managers and clerks to help educate about the program. Most shops had distributed the materials that were previously left. However, the eight shops bulleted below still had materials from the May 2018 outreach.

- West Marine, Marina Del Ray
- Bay Market, Venice Beach
- Dawn to Dusk Liquor, Hermosa Beach
- West Marine, Hermosa Beach
- Manhattan Mart, Manhattan Beach
- Mr. C’s Liquor, San Pedro
- ABC Fine Wine, Long Beach
- Mahi Tackle-Sport Fishing Supplies, Huntington Beach

One bait shop (Let’s Go Fishing) located on the Huntington Beach Pier requested a significant amount of tip cards. Huntington Beach does not post FCEC signage, so bait shops in this area are important to aid distribution of information about the potential health risks. The shop clerk stated that most anglers on the Huntington Beach pier bring their own bait. Some bait shop clerks mentioned that they have noticed a decrease in bait sales because more people are buying online. When asked about changing dynamics and clientele, many shops in Orange County stated that they saw an increase in Vietnamese anglers. The majority of the shop managers remembered FCEC and the tip cards. A few shops even created more accessible and visible displays for the tip cards near the bait. During the outreach, it was noted that a more concerted effort was made by clerks to distribute tip cards. Providing the comic books and additional information so shop clerks could engage more with the FCEC program was helpful in inspiring clerks to pass tip cards out with more enthusiasm.

During the June 2019 outreach, a total of 3,625 tip cards were distributed in English (36 percent), Spanish (32 percent), Chinese (16 percent), and Vietnamese (16 percent). The bait shops, continued to sell bait and/or support the local angler community. During the outreach event, new plastic tip card and brochure holders were implemented at the bait shops to address the previous recommendations for replacement. As a result, the tip cards were placed in more visible areas, near the bait or fishing supplies and in some cases by the register. The majority of shop managers remembered FCEC and the tip cards and most of the materials from the August 2018 outreach had been distributed.

It was noted that four bait shops located in San Pedro, Long Beach, Seal Beach, and Huntington Beach requested materials in Korean. This request represents a growing trend of Korean

speaking anglers in multiple location groups. The most frequently asked question was about the distance of the “Red Zone” from shore as shown on the sleeve of the tip card.

4.4 ELECTRONIC OUTREACH

Figures 6 and 7 and Table 13 summarize the Google Analytics datasets that were collectively used to quantify electronic outreach effectiveness. Based on the data, the website experienced a decrease in visitors, measured by the number of sessions or visits to the webpage, unique users, and page views between August and November 2018 and again between December 2018 and February 2019. During this time, the bounce rate and percent of new users to the website remained fairly constant on average of 80 percent and 99 percent, respectively. Between February 2019 and July 2019, the number of sessions, users, and page views generally increased with peaks in May 2019 (174 users, 208 page views) and July 2019 (211 users, 263 page views). The bounce rate remained fairly constant during this time with an average of 88 percent. The New Users remained at an average of >99 percent during this time period. The pages per session data remained fairly constant but decreased between August 2018 and July 2019 from a high of 1.33 pages per session to a low of 1.14 pages per session. There was no observable trend for average session duration. In addition to overall website usage, Google Analytics tracks demographic data, specifically country, region/state, and city, and metro area. For the purposes of this analysis, the city level data was evaluated. Similar to the angler outreach analysis, visitors to the website were primarily from California (54 percent of users with geographic tracking turned on and 53 percent of all visitors to the website). In California, the top five cities with visitors to the website include Los Angeles, San Diego, Long Beach, San Francisco, and Irvine. Approximately 20 percent of visitors to the website were from Los Angeles (332 users), followed by 4 percent from San Diego (59 users), 2 percent from Long Beach (35 users), 2 percent from San Francisco (28 users), and 1 percent from Irvine (16 users).

The Facebook Insights data are presented in Figures 8 and 9. Figure 8 depicts the number of likes the Facebook fan page received from August 2018 to July 2019. Figure 9 presents the number of fans (users who like the Facebook fan page) reached and percent of users engaged during the outreach period for each post to the Facebook fan page. As of July 2019, the Facebook fan page has 4,596 following the page and 4,563 likes from fans. The Facebook fan page likes had a steady decrease in overall likes throughout the year. The number of likes shows a declining trend of approximately nine likes per month. Figure 8 shows an increase in users reached during December 2018 and February 2019. Figure 9 shows increased engagement during October and December 2018 as well as March and June 2019. These spikes appear to be correlated to postings (e.g., upcoming community events and photographs) on the Facebook fan page.

To evaluate the reach and engagement of posting information on the Facebook fan page, Facebook Insights data provide the total number of fans reached, the total number of fans reached who also liked the Facebook fan page, the percent of engaged users relative to the fans reached, and the percent of engaged users relative to the number of fans reached who also like the Facebook fan page. Between August 2018 and July 2019, there have been approximately 10 posts to the Facebook fan page, with an average total fan reach of 143 and <1 percent

engagement. Of the fans reached, on average 939 (82 percent) also liked the Facebook fan page. Posts received little to no fans engaged.

4.5 COMMUNITY OUTREACH

HDR attended 10 events with themes dedicated to Hispanic and Polynesian culture, health, environmental education, and Earth Day celebrations. Below is the list of community events attended by HDR during the outreach period:

1. Aquarium of the Pacific Baja Splash Cultural Festival (30 September 2018)
2. Charles Drew University Family Health Fair and 5K (27 October 2018)
3. Aquarium of the Pacific Underwater Parks Day (12 January 2019)
4. Aquarium of the Pacific Noche de Estrellas (22 March 2019)
5. L.A. Arboretum Environmental Education Fair (30 March 2019)
6. L.A. Grand Park Earth Day Festival (11 April 2019)
7. L.A. County Department of Public Works Earth Day Celebration (18 April 2019)
8. UCLA Earth Day Celebration (22 April 2019)
9. Heritage of Aloha Festival (18 May 2019)
10. Lummi Day (2 June 2018).

In total, an estimated 11,000 people attended the events with approximately 2,750 attendees visiting the outreach booth. HDR distributed 1,876 informational outreach materials during the events consisting of tip cards (23 percent), “What’s the Catch” comic books (59 percent), “What’s the Catch” curriculum guide (5 percent), informational brochures (11 percent), and fish identification cards (3 percent). Of the 477 tip cards distributed, 59 percent were English, 38 percent were Spanish, and 3 percent were Chinese. The “What’s the Catch” comic books (873) for children were distributed in English (79.5 percent), Spanish 19.8), and Chinese (0.7 percent). Curriculum guides (85) were given to educators during the Environmental Education Fair and the L.A County Earth Day Celebration, when many educators were in attendance. Additional outreach materials distributed included 50 fish identification cards (2.7 percent) and 210 informational brochures in English (8.5 percent) and Spanish (2.7 percent).

CCHC attended four community events during the outreach period, targeted primarily at Chinese community members. Below is the list of community events attended by CCHC during the outreach period:

1. El Monte Health Fair (11 August 2018)
2. Rosemead Moon Festival (15 September 2018)
3. Temple City Lunar New Year (9 February 2019)
4. San Gabriel Walk-a-thon (16 March 2019).

In total, an estimated 19,400 people attended the events. CCHC distributed tip cards to approximately 9 percent of the attendees (1,661 people), of which 94 percent were Chinese and 6 percent were English. The majority of the people reached were Chinese speaking indicating that targeting Chinese focused events is an effective outreach method.

BPSOS attended five community events during the outreach period; the events targeted primarily Vietnamese communities. Below is the list of community events attended by BPSOS during the outreach period:

1. National Night Out (1 August 2018)
2. Back to School Health/Resource Fair (26 August 2018)
3. City of Westminster Spring Festival (13 April 2019)
4. TASK 2nd Annual Family Fun & Resource (27 April 2019)
5. Westminster Annual Safety Day (18 July 2019).

In total, an estimated 825 people attended the events with 87 percent (716 people) of attendees receiving outreach materials from BPSOS staff. Of the 340 tip cards distributed (47 percent), 18 percent were Vietnamese, 15 percent were Spanish, and 14 percent were English. In addition, English language “What’s the Catch” comic books were given to 38 percent of attendees and Vietnamese language informational brochures were given to 15 percent of attendees.

The City of Long Beach attended 11 community events during the outreach period; the events targeted the Long Beach community. A total of 297 tip cards were distributed during the events of which 85 percent were English and 15 percent were Spanish. Below is the list of community events attended by City of Long Beach during the outreach period:

1. 14th Street Park Activation Resource Fair (21 August 2018)
2. California State University Ready Long Beach (15 September 2018)
3. Climate Action and Adaption Plan Long Beach Extreme Health Fair (30 March 2019)
4. Long Beach Grand Prix (14 April 2019)
5. Long Beach Earth Day (20 April 2019)
6. Long Beach Art of Reading (11 May 2019)
7. Climate Action and Adaption Plan Long Beach Climate Festival (1 June 2019)
8. Long Beach PopUptown (2 June 2019)
9. Long Beach Camp Littles (15 June 2019)
10. Long Beach Health Communities Resource Fair (22 June 2019)
11. Light and Life Church Resource Fair and Movie Night (22 June 2019).

During the last reporting period, sign-in sheets were revised for FCEC booth attendees to indicate whether they are aware of the DDT/PCB fish contamination advisories before the community event and what is the awareness source (signs, tip-card, community event, outreach team, internet, media, friend/family, other). During this reporting period, there was less participation from visitors on the sign-in sheets. To address the recommendation from the last reporting period, EA worked with HDR to begin production of two new children’s fishing games for FCEC partners for use during the community outreach events. The new children’s fishing games will be implemented during the next reporting period.

5.0 DISCUSSION AND RECOMMENDATIONS

The Community Involvement Program, through the various outreach activities at multiple locations, has been effective in reaching anglers and community members to increase awareness

of the contamination issues associated with the Palos Verdes Shelf Superfund Site. The following sections discuss conclusions and recommendations for each aspect of the outreach program.

5.1 ANGLER OUTREACH

Through the angler outreach, Cabrillo surpassed the outreach objective to reach 1,600 anglers between August 2018 and July 2019. However, HTB reached 8,008 anglers, falling short of the 11,000-angler goal during day angler outreach. This is the first reporting period (since 2015/2016) that HTB noted the decrease which was attributed to a heavy rainy season and pier closures at Santa Monica, Seal Beach, and Rainbow Harbor piers. Additionally, the awareness data collected indicated that on average were approximately 61 percent aware of the contamination. This is down from approximately 84 percent aware reported in the previous two periods between July 2016 and July 2018. However, it is similar to the percent awareness reported during the October 2015 to July 2016 period which was 65 percent. While the awareness percentage decreased, the percent of new anglers (51 percent) increased slightly from the average of 47 percent new from the last three reporting periods. Additionally, there was an observed increase of anglers at most of the piers except those that were closed. This suggests that anglers may have visited other piers as a result of the closures. Compared to the day angler outreach, the evening angler outreach data show an average of 46 percent aware of the contamination and 60 percent new anglers. These results differ from the pilot night angler program (August 2017 to October 2017) that reported 76 percent aware and 46 percent were new. However, the pilot night angler program was only performed over a 3-month period during the busier months in the year.

Of the data collected for day angler outreach by HTB and Cabrillo, the results of the geographic distribution and demographic variability expose several interesting conclusions about the overall effectiveness of the Angler Outreach Program. Overall, there variability in the languages reported are consistent with the previous reporting periods (2017-2018), which was less variability in language compared to 2015-2016 reporting. While English is the primary language spoken during both the day and evening angler outreach, more Spanish speakers were observed during the day while more Chinese speakers were observed during the night. This is opposite of the results recorded during the pilot night angler program in 2017 which indicated more Spanish than Chinese language speaking anglers. Continued monitoring of the night angler languages over future reporting periods is recommended to get better understanding of this trend. It was also noted that awareness in the Chinese speaking community was the lowest, indicating increased pier angler outreach to this community is warranted.

The geographic distribution of the outreach data shows the program is effectively reaching the local communities in the greater Los Angeles area potentially affected by the consumption of fish from the Palos Verdes Shelf Superfund Site. Similarly, the demographic variability data, as measured through the angler languages spoken, present a more limited variety of ethnicities and cultures being reached through the outreach program, however while responses to languages may have been limited to single answers, and may not accurately reflect the demographics reached through the program. The source of awareness the angler learned of the contamination is

primarily through the pier angler outreach team and “Do Not Consume” fish pier signage. These results are similar to the previous reporting periods which indicate continued successful implementation of the pier angler program outreach.

5.2 BAIT SHOP OUTREACH

Overall the August 2018 and June 2019 bait shop outreach events were successful. The majority of shops remembered the FCEC program and most of the outreach materials were distributed. During the June 2019 event, there were eight shops that still had materials from August 2018. It is recommended to monitor these bait shops to evaluate whether they need replacement by more popular locations in the area. One bait shop that no longer sold bait was replaced during this reporting period. This is less than previous reporting in which an average of five shops were replaced per period. These results suggest that the identification and tracking of bait shop turn-over is effective and improving over the reporting periods.

Requests for Korean outreach materials in four areas (San Pedro, Long Beach, Seal Beach, and Huntington Beach) represents a growing trend of Korean speaking anglers in multiple locations. It is recommended in the next reporting period to evaluate printing and distributing bait shop outreach materials in Korean to reach this community. There appears to be less knowledge about safe fishing in the Huntington Beach pier area compared to other piers. This may be attributed to the lack of “Do Not Consume” fish signage like the other piers. Future efforts could include increased outreach to bait shops in this area as well as adding local fish markets to distribute tip cards and expand outreach to this community.

During the outreach event, new plastic tip card and brochure holders were implemented at the bait shops to address the previous recommendations for replacement. As a result, the tip cards were placed in more visible areas. A frequently asked question was about the “Red Zone” distance shown on the sleeve of the tip card. This is also a frequently encountered question during community outreach events. This should be considered for update during the next round of revision to the outreach materials. The tip card sleeve may be revised by expanding the image to show the complete California Office of Environmental Health Hazard Assessment map of yellow and red zones for fish caught from Ventura Harbor to San Mateo Point. This map also includes a scale and Catalina Island for reference.

5.3 ELECTRONIC OUTREACH

The Google Analytics for the FCEC website and Facebook Insights data present the effectiveness of the two media in reaching the public.

The Google Analytics data indicate that since August 2018, visits to the FCEC website have been relatively minimal, and even when the website receives visitors, there is little to no engagement, as reflected by the bounce rate, page views per session, and average session duration. A deeper look at the top five pages visited after August 2018 showed that the pages visited were not the main pages of the website providing information on the contamination, fishing piers, or fish, but rather to blog posts from 2010. Based on these results, the website is

not effectively reaching the public, but is more likely acting solely as a resource in the event people need additional information.

The Facebook Insights data evaluated suggest similar outreach effectiveness as the FCEC website. Since August 2018, the Facebook fan page has seen a steady drop in the number of users who like the page, which is likely due to the lack of activity on the Facebook fan page, such as posts, comments, and or responses to posts and comments. When posts were published on the FCEC Facebook fan page, the data indicated that the posts did not effectively reach or engage the general Facebook population or users who liked the page. Overall, the Facebook fan page does not appear to be effectively reaching the public.

These results are similar to previous reporting periods. For this reason, enhancements to the FCEC website and Facebook fan page content were recommended to improve effectiveness of electronic outreach. A reorganization of the content and visual layout of the FCEC website and Facebook fan page is underway to enhance the ability for people to navigate and find specific links or additional pages they would like to visit. FCEC partner organizations were encouraged to participate in the updates by providing content.

5.4 COMMUNITY EVENT OUTREACH

The community outreach events have been effective at distributing information materials to the target communities. Although this method of outreach has been highly effective, several observations and potential improvements to the community events and information materials have been identified.

The children's fishing game is a popular tool for outreach to families. Children often lead their parents to the FCEC booth to engage when they see the game. Currently, there are two fishing games that are shared amongst the partners (HDR, CHCC, BPSOS, City of Long Beach) for use at the events. This has been challenging to event scheduling and increases shipping costs and general wear and tear of the game. During this reporting period, production of two new games was initiated and the completed games will be distributed during the next reporting period. As part of the FCEC booth, the display board features outreach to fish markets and anglers. It would be worthwhile to update technical information during the next reporting period.

Previous attempts have been made to get hold of contacts in the Los Angeles Unified School District (LAUSD) system to expand outreach and education to children and families. The LAUSD contact attempts were unsuccessful during the last two reporting periods. However, HDR has been successful at reaching children and teachers in the LAUSD system through an increase of community events focused on environmental education. It is recommended that HDR continue to research new educational events to reach this group.

BPSOS and CHCC are continuing to collaborate with other organizations in order to diversify the community events to reach more anglers in the Chinese and Vietnamese communities. Based on the pier angler outreach data, the Chinese speaking community appears the least aware of the contamination while the majority of people reached by CHCC were Chinese speaking. It is

recommended that BPSOS and CHCC attempt to increase participation in community events during the next reporting period to increase awareness. During the previous reporting period, sign-in sheets were revised for FCEC booth attendees to indicate whether they are aware of the DDT/PCB fish contamination advisories before the community event and what is the awareness source (signs, tip-card, community event, outreach team, internet, media, friend/family, other). In this reporting period, there was less participation in the sign-in sheets. Many of the community events did not have signatures and of those that did, only a few signatures were present. It is recommended the community outreach partners continue to improve sign-in at the events, particularly focusing on engaging the visitors and educating them on the reason for the data collection.

The distribution of outreach materials during community events continues to be successful in providing education to the community. Based on the percentage of the types of materials distributed, the tip cards and “What’s the Catch” comic book are the most popular during community outreach. It is recommended to include these as key materials evaluated during the next round of revision to the outreach materials and printing.

5.5 FCEC PARTNERS MEETINGS

The FCEC Partners Meeting was held on 23 April 2019 for stakeholders to discuss the angler, community, and enforcement outreach activities. The topics included summaries of the angler, community event, enforcement, and electronic outreach updates, pier sign tracking, and the revisions to outreach materials. Key items discussed during the meeting were revisions to the outreach materials to update technical information and translation into Korean language, improvements to the FCEC website content and user interface (e.g., Korean), and sharing of outreach material inventory until new materials are produced. FCEC partners were encouraged of partners to participate in the FCEC website improvements and provide more frequent updates to the Facebook fan page.

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FIGURES

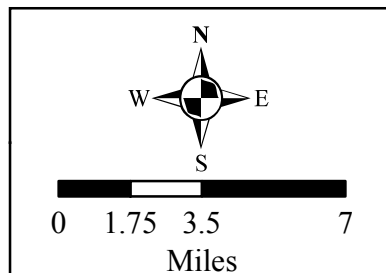
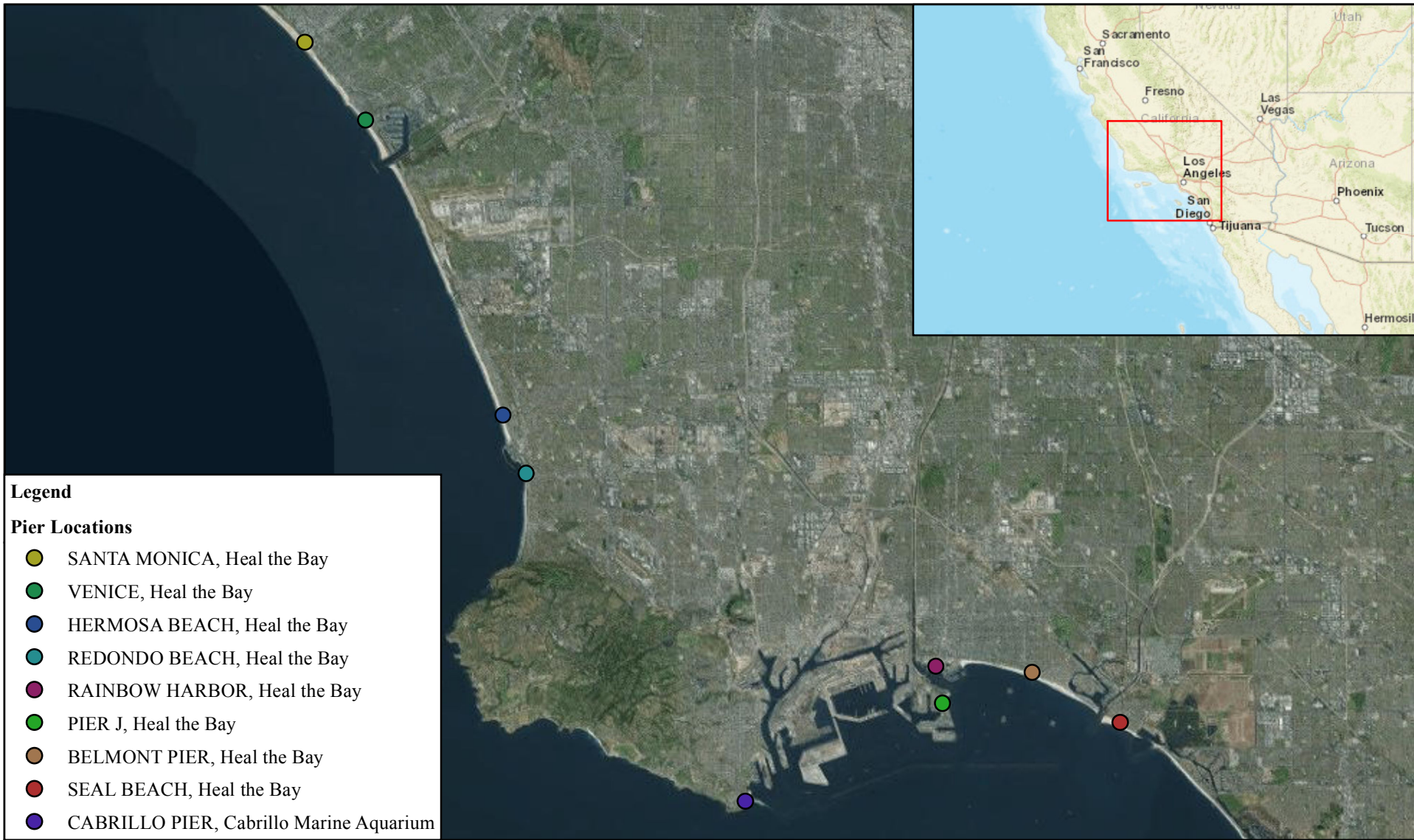
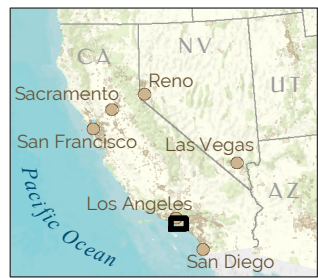


Figure 1. Pier Locations Map

Palos Verdes Shelf Superfund Site
Los Angeles County, California



- Legend**
- Bait Shop Location
 - Bait Shop Added (2018-2019)
 - Bait Shop Removed (2018-2019)

◆ Pier/Coastal Structure



Palos Verdes Shelf Superfund Site
Los Angeles County, California

December 2019
Data Sources: CSMW, 2007; esri, 2006, 2017;
Los Angeles County, 2016; US Census Bureau, 2016

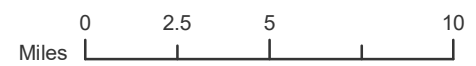


Figure 2
Bait Shops and Piers

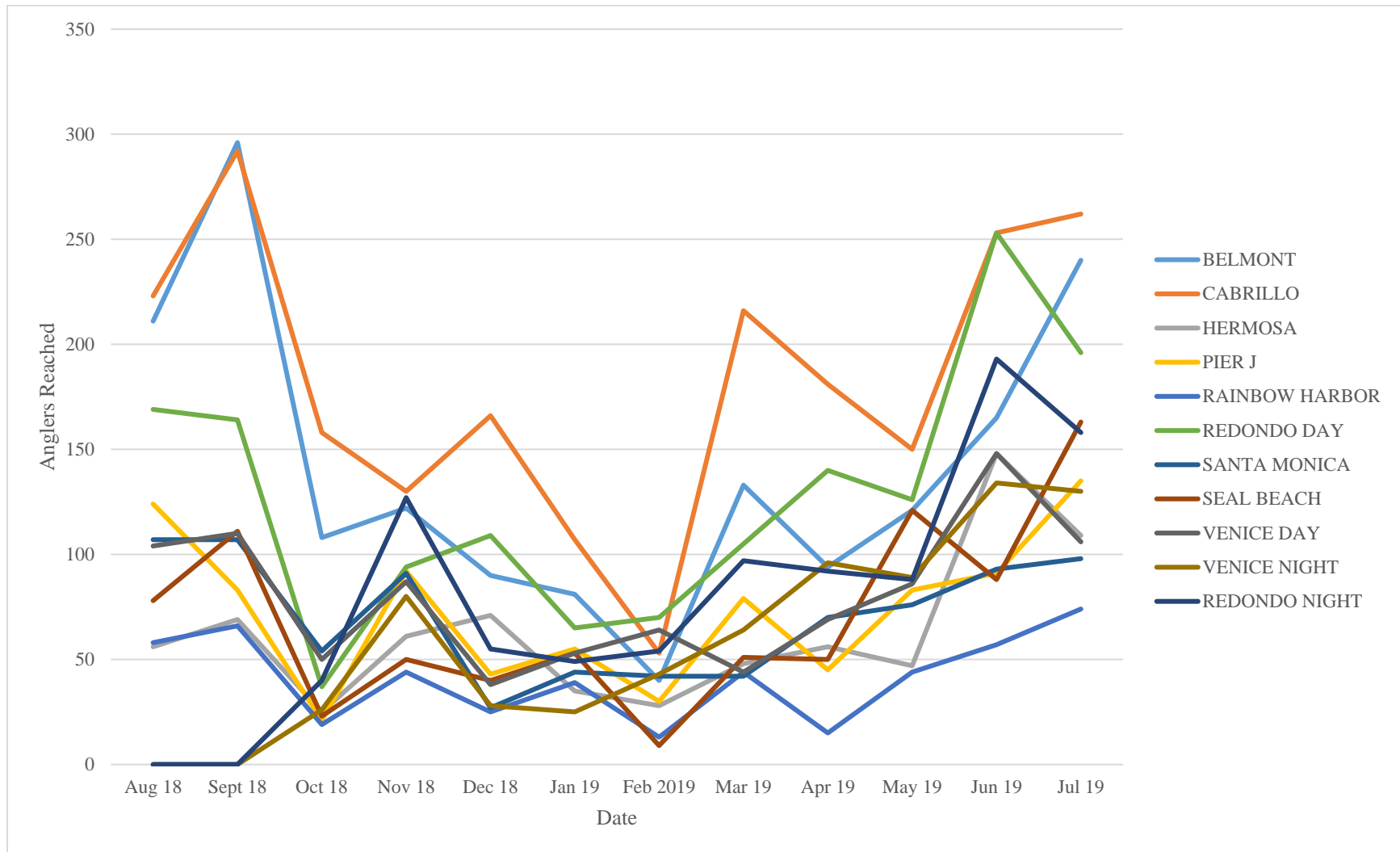


Figure 3. Seasonal Fluctuation in the Number of Anglers Contacted

Palos Verdes Shelf Superfund Site

Los Angeles County, California

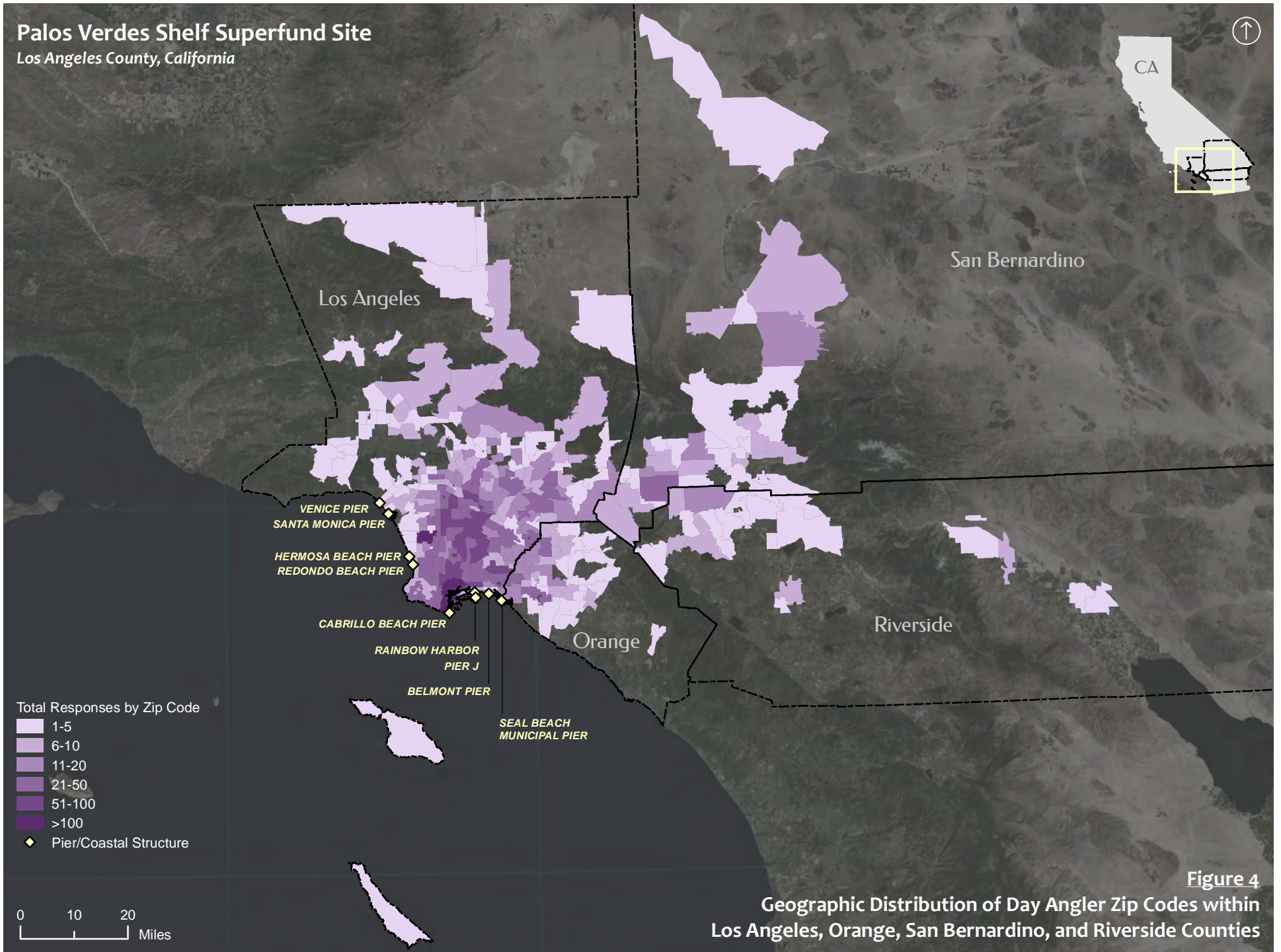


Figure 4
Geographic Distribution of Day Angler Zip Codes within
Los Angeles, Orange, San Bernardino, and Riverside Counties

Palos Verdes Shelf Superfund Site

Los Angeles County, California



CA



Los Angeles

San Bernardino

VENICE PIER

REDONDO BEACH PIER

Orange

Riverside

Total Responses by Zip Code



◆ Pier/Coastal Structure

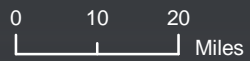


Figure 5

Geographic Distribution of Night Angler Zip Codes within Los Angeles, Orange, San Bernardino, and Riverside Counties

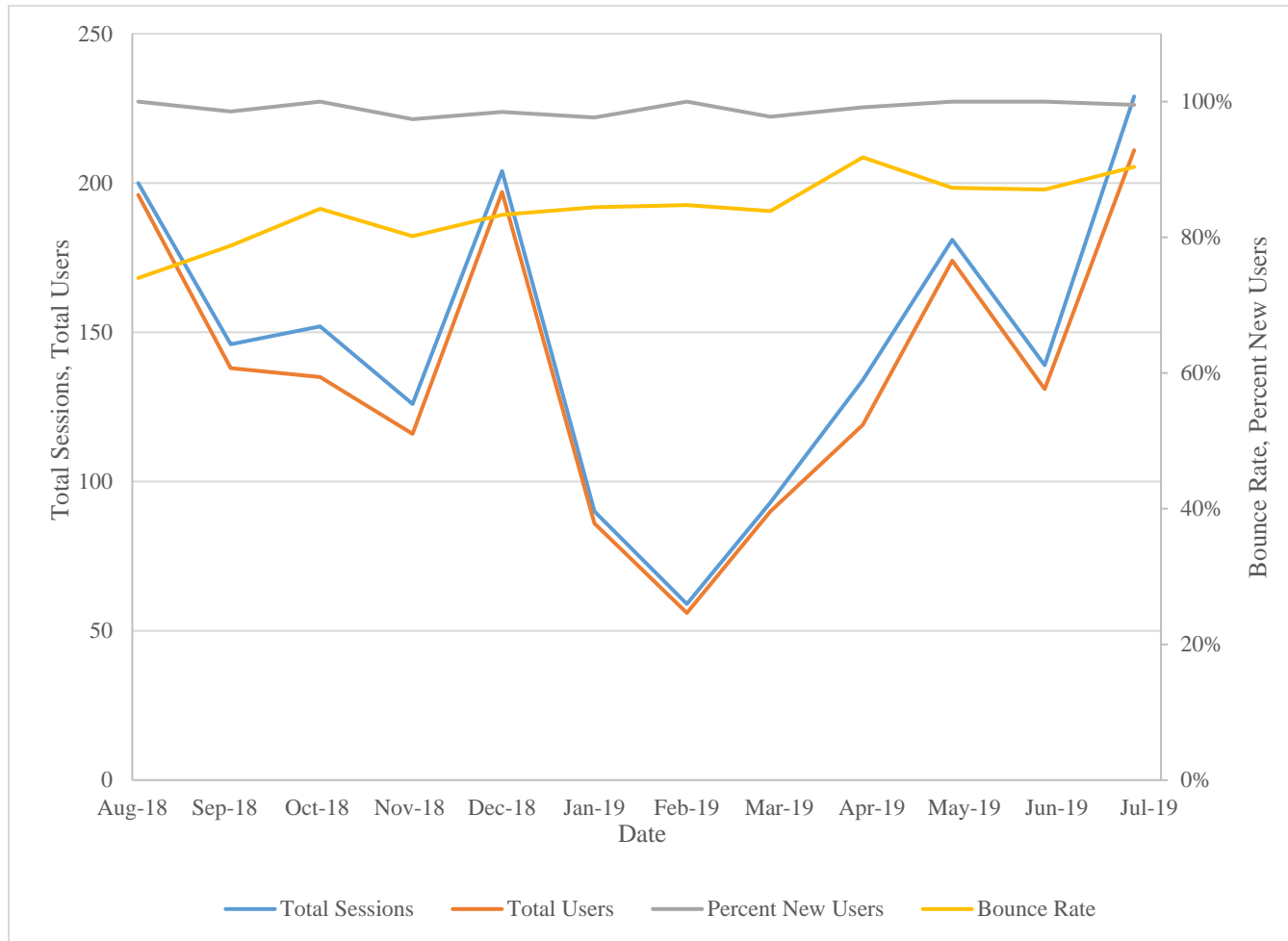


Figure 6. Total Sessions, Users, Page Views, Bounce Rate, and New Users

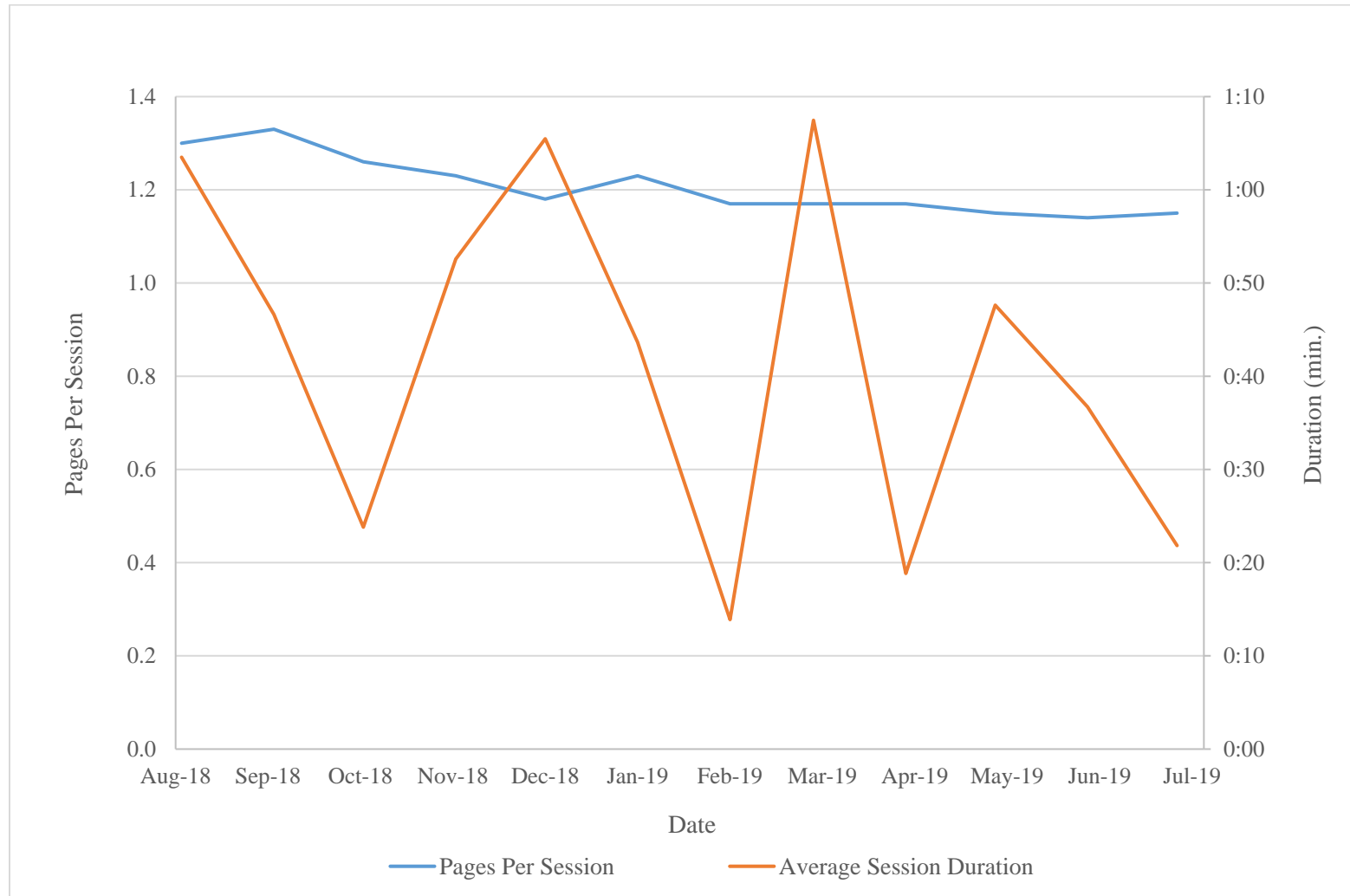


Figure 7. Pages per Session and Average Session Duration

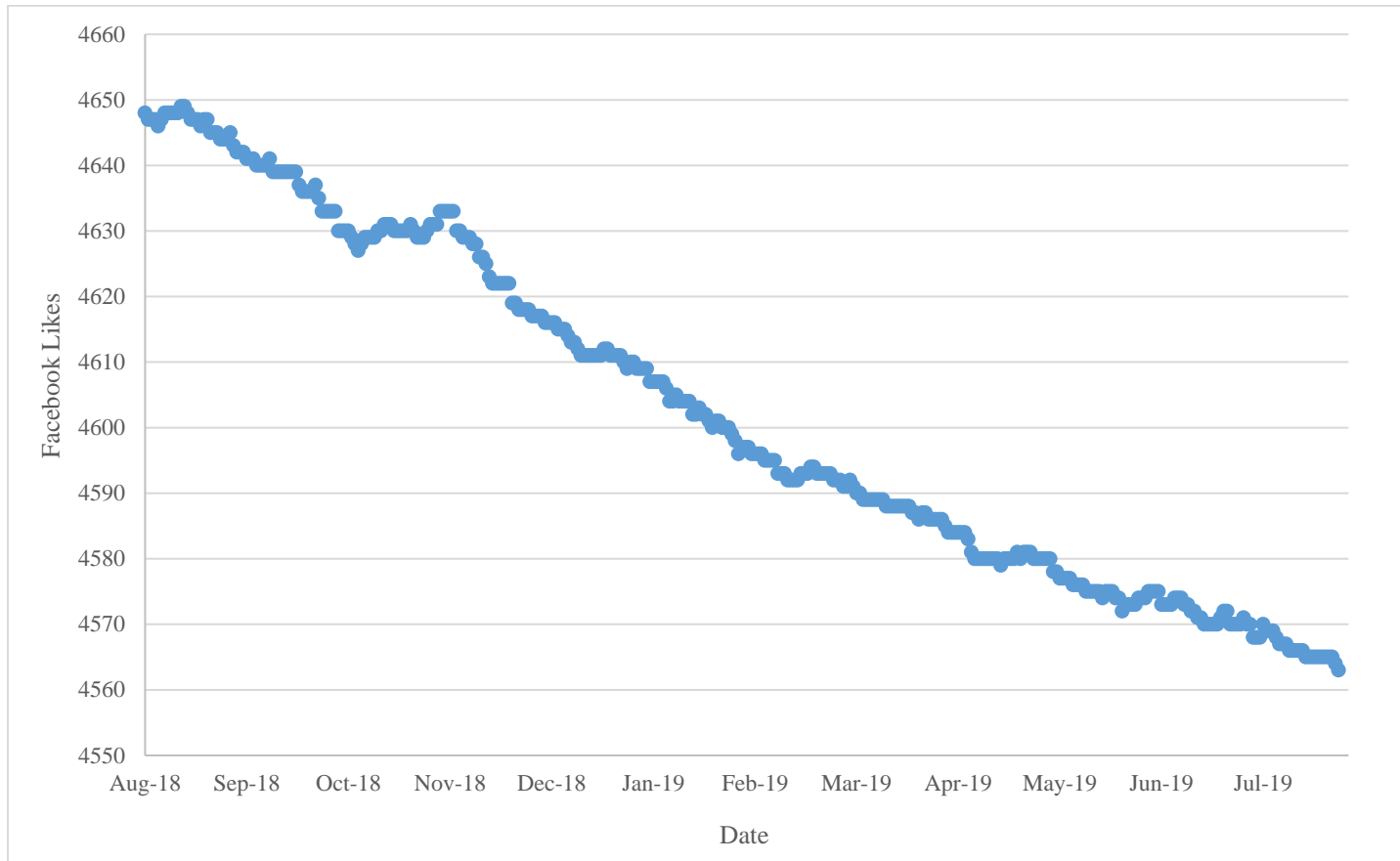


Figure 8. Number of “Likes” Received by the FCEC Facebook Fan Page

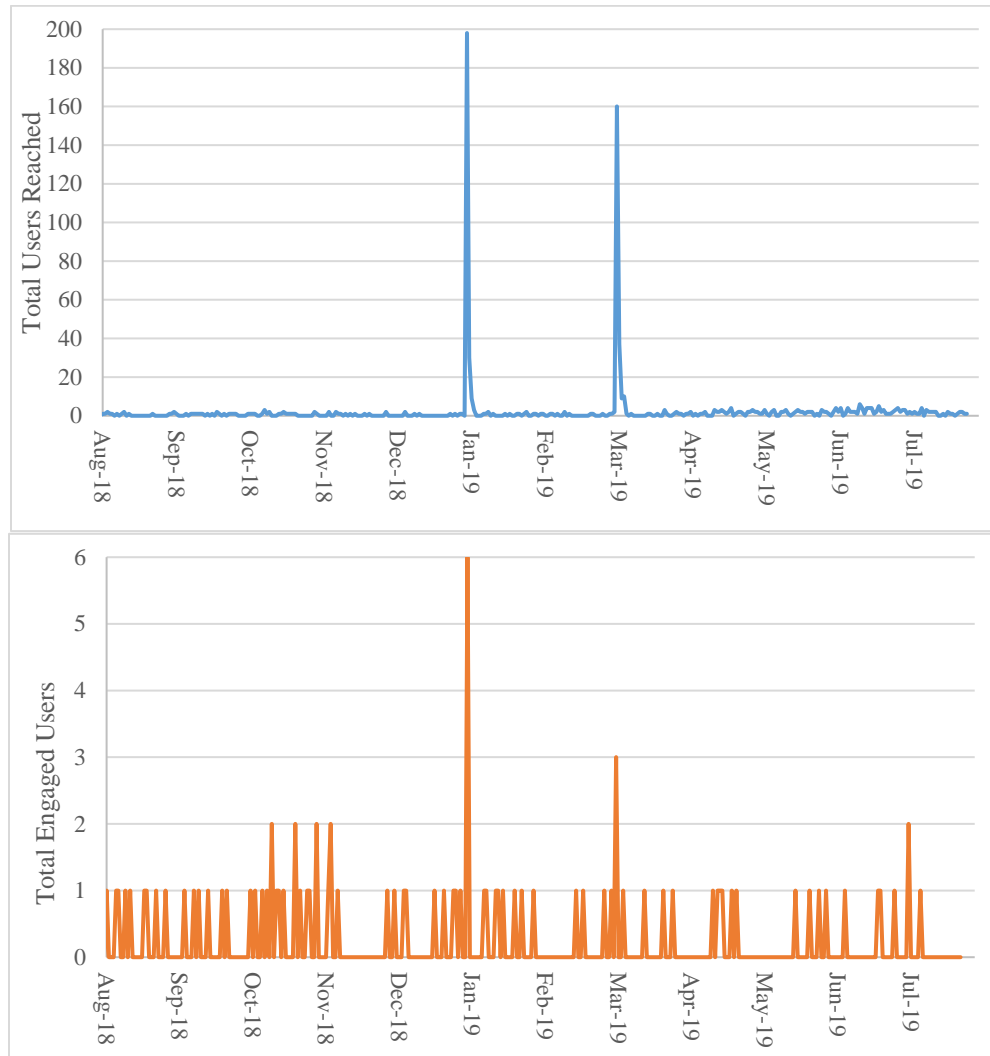


Figure 9. Total Number of Users Reached and Engaged by Posts to FCEC Facebook Fan Page

TABLES

Table 1. Anglers Contacted During Outreach Period

Date	BELMONT PIER	CABRILLO PIER	HERMOSA BEACH	PIER J	RAINBOW HARBOR	REDONDO BEACH	SANTA MONICA	SEAL BEACH	VENICE	Grand Total
Aug-2018	211	223	56	124	58	169	107	78	104	1,130
Sep-2018	296	292	69	83	66	164	107	111	110	1,298
Oct-2018	108	158	25	21	19	37	54	23	50	495
Nov-2018	122	130	61	92	44	94	91	50	87	771
Dec-2018	90	166	71	43	25	109	27	40	38	609
Jan-2019	81	107	35	55	39	65	44	53	53	532
Feb-2019	40	53	28	30	13	70	42	9	64	349
Mar-2019	133	216	48	79	44	105	42	51	44	762
Apr-2019	94	181	56	45	15	140	70	50	69	720
May-2019	121	150	47	83	44	126	76	121	86	854
Jun-2019	165	253	148	91	74	196	98	163	106	1,294
Jul-2019	240	262	109	135	57	253	93	88	148	1,385
Total (2018)	827	969	282	363	212	573	386	302	389	4,303
Total (2019)	874	1,222	471	518	286	955	465	535	570	5,896
Total (Outreach Period)	1,701	2,191	753	881	498	1,528	851	837	959	10,199

Table 2. Anglers Aware of Contamination and “Do Not Consume” Warnings

Date	BELMONT PIER	CABRILLO	HERMOSA	PIER J	RAINBOW HARBOR	REDONDO	SANTA MONICA	SEAL BEACH	VENICE	Average
Aug-2018	72%	84%	70%	56%	29%	73%	63%	45%	46%	65%
Sep-2018	65%	81%	55%	64%	82%	77%	59%	50%	61%	68%
Oct-2018	69%	87%	92%	67%	53%	62%	56%	70%	78%	74%
Nov-2018	67%	84%	46%	57%	52%	65%	54%	54%	69%	63%
Dec-2018	59%	81%	52%	47%	36%	68%	70%	40%	82%	64%
Jan-2019	73%	83%	57%	69%	64%	55%	82%	38%	49%	66%
Feb-2019	58%	83%	46%	53%	46%	67%	67%	56%	64%	64%
Mar-2019	53%	84%	63%	62%	64%	59%	71%	49%	84%	67%
Apr-2019	60%	71%	63%	51%	67%	52%	60%	34%	59%	59%
May-2019	45%	69%	60%	57%	59%	53%	68%	45%	55%	56%
Jun-2019	48%	63%	59%	57%	46%	43%	49%	43%	59%	53%
Jul-2019	50%	66%	45%	45%	57%	43%	49%	42%	67%	52%
Average	60%	77%	57%	56%	55%	58%	60%	45%	61%	61%

Table 3. Repeat Respondents to Angler Outreach

Date	BELMONT PIER	CABRILLO	HERMOSA	PIER J	RAINBOW HARBOR	REDONDO	SANTA MONICA	SEAL BEACH	VENICE	Average
Aug-2018	46%	59%	48%	45%	62%	41%	43%	44%	32%	47%
Sep-2018	39%	50%	42%	49%	64%	37%	45%	32%	55%	44%
Oct-2018	56%	79%	44%	52%	42%	43%	44%	35%	62%	59%
Nov-2018	43%	74%	44%	48%	34%	39%	48%	46%	59%	50%
Dec-2018	48%	66%	49%	47%	40%	47%	52%	25%	61%	52%
Jan-2019	57%	62%	57%	60%	59%	42%	75%	17%	27%	53%
Feb-2019	43%	79%	43%	53%	31%	51%	62%	33%	64%	56%
Mar-2019	43%	73%	56%	58%	45%	45%	67%	37%	80%	57%
Apr-2019	48%	65%	50%	49%	47%	47%	59%	34%	58%	53%
May-2019	37%	61%	51%	55%	48%	46%	62%	37%	56%	50%
Jun-2019	38%	46%	53%	56%	35%	40%	46%	35%	53%	47%
Jul-2019	40%	53%	35%	44%	31%	38%	49%	31%	63%	42%
Average	43%	61%	47%	51%	46%	42%	52%	34%	56%	49%

Table 4. New Respondents to Angler Outreach

Date	BELMONT PIER	CABRILLO	HERMOSA	PIER J	RAINBOW HARBOR	REDONDO	SANTA MONICA	SEAL BEACH	VENICE	Average
Aug-2018	46%	59%	48%	45%	62%	41%	43%	44%	32%	47%
Sep-2018	39%	50%	42%	49%	64%	37%	45%	32%	55%	44%
Oct-2018	56%	79%	44%	52%	42%	43%	44%	35%	62%	59%
Nov-2018	43%	74%	44%	48%	34%	39%	48%	46%	59%	50%
Dec-2018	48%	66%	49%	47%	40%	47%	52%	25%	61%	52%
Jan-2019	57%	62%	57%	60%	59%	42%	75%	17%	27%	53%
Feb-2019	43%	79%	43%	53%	31%	51%	62%	33%	64%	56%
Mar-2019	43%	73%	56%	58%	45%	45%	67%	37%	80%	57%
Apr-2019	48%	65%	50%	49%	47%	47%	59%	34%	58%	53%
May-2019	37%	61%	51%	55%	48%	46%	62%	37%	56%	50%
Jun-2019	38%	46%	53%	56%	35%	40%	46%	35%	53%	47%
Jul-2019	40%	53%	35%	44%	31%	38%	49%	31%	63%	42%
Average	43%	61%	47%	51%	46%	42%	52%	34%	56%	49%

Table 5. Source of Angler Awareness

	AWARENESS SOURCE								TOTAL
	PIER SIGNAGE	TIP CARD	PIER OUTREACH TEAM	INTERNET	EVENTS	MEDIA	FRIENDS/FAMILY	OTHER	
Belmont	241	0	735	35	4	39	53	18	1,125
Cabrillo	595	5	1,186	16	0	3	76	21	19,02
Hermosa	68	0	323	17	0	9	8	2	427
Pier J	24	0	456	8	0	1	2	18	509
Rainbow Harbor	53	0	237	2	0	2	0	4	298
Redondo	224	0	645	44	9	39	20	4	985
Santa Monica	32	0	455	19	0	0	4	11	521
Seal Beach	40	0	264	22	4	4	23	12	369
Venice	34	0	534	8	0	5	8	17	606
Total	1,311	5	4,835	171	17	102	194	107	6,742
Percent (total Sources)	19.4%	0.1%	71.7%	2.5%	0.3%	1.5%	2.9%	1.6%	--

Table 6. Languages Spoken by Anglers from Los Angeles, Orange, San Bernardino, and Riverside Counties

Language Spoken	Los Angeles	Orange	Riverside	San Bernardino	Total Non-English
English	95.2%	97.2%	98.4%	94.4%	NA
Spanish	2.9%	2.8%	1.6%	5.6%	3.0%
Chinese	1.9%	0%	0%	0%	1.6%

Table 7. Night Anglers Contacted

Date	REDONDO	VENICE	Total
Oct-2018	40	26	66
Nov-2018	127	80	207
Dec-2018	55	28	83
Jan-2019	49	25	74
Feb-2019	54	43	97
Mar-2019	97	64	161
Apr-2019	92	96	188
May-2019	88	89	177
Jun-2019	193	134	327
Jul-2019	158	130	288
Total (Night Outreach)	953	715	1668

Table 8. Night Anglers Aware of Contamination and “Do Not Consume” Warnings

Date	REDONDO	VENICE	Average
Oct-2018	40%	46%	42%
Nov-2018	24%	28%	26%
Dec-2018	38%	75%	51%
Jan-2019	31%	68%	43%
Feb-2019	70%	67%	69%
Mar-2019	44%	61%	51%
Apr-2019	51%	65%	58%
May-2019	49%	51%	50%
Jun-2019	41%	49%	44%
Jul-2019	36%	51%	43%
Average	41%	53%	46%

Table 9. Repeat Respondents to Night Angler Outreach

Date	Redondo	Venice	Average
Oct-2018	52%	46%	50%
Nov-2018	21%	26%	23%
Dec-2018	44%	64%	51%
Jan-2019	31%	68%	43%
Feb-2019	57%	56%	57%
Mar-2019	42%	56%	48%
Apr-2019	41%	51%	46%
May-2019	35%	47%	41%
Jun-2019	35%	43%	39%
Jul-2019	28%	37%	32%
Average	36%	45%	40%

Table 10. New Respondents to Night Angler Pilot Outreach

Date	Redondo	Venice	Average
Oct-2018	48%	54%	50%
Nov-2018	79%	74%	77%
Dec-2018	56%	36%	49%
Jan-2019	69%	32%	57%
Feb-2019	43%	44%	43%
Mar-2019	58%	44%	52%
Apr-2019	59%	49%	54%
May-2019	65%	53%	59%
Jun-2019	65%	57%	61%
Jul-2019	72%	63%	68%
Average	64%	55%	60%

Table 11. Source of Night Angler Awareness

	AWARENESS SOURCE								TOTAL
	PIER SIGNAGE	TIP CARD	PIER OUTREACH TEAM	INTERNET	EVENTS	MEDIA	FRIENDS/FAMILY	OTHER	
Venice	56	0	324	21	0	0	22	0	423
Redondo	36	0	337	7	0	9	29	6	424
Total	92	0	661	28	0	9	51	6	847
Percent (total Sources)	11%	0%	78%	3%	0%	1%	6%	1%	--

Table 12. Languages Spoken by Night Anglers from Los Angeles, Orange, San Bernardino, and Riverside Counties

Language Spoken	Los Angeles	Orange	Riverside	San Bernardino	Total Non-English
English	91.5%	100%	100%	100%	NA
Spanish	0.6%	0%	0%	0%	0.5%
Chinese	7.8%	0%	0%	0%	6.5%

Table 13. Summary of Google Analytics Data.

Date	Total Sessions	% Change from Previous Month	Users	Page Views	Pages/ Session	Avg. Session Duration (min.)	Bounce Rate	New Users	Returning Users
Aug-2018	200		196	261	1.30	1:04	85.92%	74.00%	0.0%
Sep-2018	146	-27.0%	138	194	1.33	0:47	81.75%	78.77%	1.4%
Oct-2018	152	4.1%	135	192	1.26	0:24	87.39%	84.21%	0.0%
Nov-2018	126	-17.1%	116	155	1.23	0:53	89.90%	80.16%	2.6%
Dec-2018	204	61.9%	197	240	1.18	1:06	90.80%	83.33%	1.5%
Jan-2019	90	-55.9%	86	111	1.23	0:44	88.79%	84.44%	2.3%
Feb-2019	59	-34.4%	56	69	1.17	0:14	89.52%	84.75%	0.0%
Mar-2019	93	57.6%	90	109	1.17	1:08	92.24%	83.87%	2.2%
Apr-2019	134	44.1%	119	157	1.17	0:19	82.03%	91.79%	0.8%
May-2019	181	35.1%	174	208	1.15	0:47	91.95%	87.29%	0.0%
Jun-2018	139	-23.2%	131	159	1.14	0:37	96.97%	87.05%	0.0%
Jul-2019	229	64.7%	211	263	1.15	0:22	88.06%	90.39%	0.5%