Technical Assistance Services for Communities
Contract No.: GS-10F-030N
TASC WA No.: EP-G13S-00087
Technical Directive No.: R9 #1 United Heckathorn

Fish Advisory Signage, the Fishing Community's Awareness and Understanding of Fish Advisories, and What May Assist the Fishing Community in Following Fish Advisories

Introduction

In 2012, the U.S. Environmental Protection Agency's (EPA's) Technical Assistance Services for Communities Program (TASC) conducted a Technical Assistance Needs Assessment (TANA) for the citizens of Richmond, California. The purpose of the assessment was to better understand the technical assistance needs of the community related to the United Heckathorn Superfund site and provide recommendations for EPA to consider implementing to meet those needs. During this TANA, the community demonstrated concern about the safety of eating fish caught from the Richmond shoreline. In particular, community members were concerned about people following the fish advisory signs and whether the signs are understandable and accessible, especially to people with limited English proficiency. The community was also concerned that the "for more information" phone numbers on the signs lead to offices that are unable to handle questions and are not open on evenings and weekends.

As a follow-up to the TANA, EPA requested TASC services to analyze the fish advisory signage, examine the fishing community's awareness and understanding of fish advisories, and make recommendations to help make it easier for the public to understand and follow fish advisories. This report summarizes TASC's research and recommendations on these topics. The report has four sections. The first section provides a brief history of fish advisories in the San Francisco Bay Area. The second section discusses the current fish advisory signage, its development process, and results from an informal follow-up of the "for more information" phone numbers listed on the signs. The third section addresses the fishing community's awareness, understanding and following of fish advisories. The fourth section provides recommendations for further action to improve the public's understanding and following of fish advisories.

TASC derived the information contained in this report primarily from the San Francisco Bay Fish Project (SFBFP), a two-year project coordinated by the California Department of Public Health (CDPH). CDPH created SFBFP in partnership with the Aquatic Science Center, the Office of Environmental Health Hazard Assessment (OEHHA) and the San Francisco Bay Regional Water Quality Control Board with funding from the Bay Area Clean Water Agencies, the Western States Petroleum Association, the Bay Area Stormwater Management Agencies Association and the EPA. TASC found no recent Richmond-specific studies about fish advisories and the fishing community's understanding of advisories; however, the SFBFP and its grant awardees engaged diverse communities across the San Francisco Bay Area that reasonably reflect fishing populations in Richmond. The SFBFP released its final report at the end of October 2012, a few weeks after TASC completed the United Heckathorn TANA. TASC

conducted the TANA around the same time the SFBFP was developing and posting new fish advisory signs.

In addition to reports and documents from the SFBFP, TASC conducted follow-up phone calls and email correspondence with individuals from OEHHA, Contra Costa Environmental Health and the CDPH to better understand current fish advisory signs and the "for more information" phone lines. Further, TASC engaged in supplemental conversations with two of the four SFBFP grant awardees to better understand community outreach efforts surrounding fish advisories.

I. A Brief History of Fish Advisories

OEHHA's predecessor organization issued the first fish consumption advisory for the San Francisco Bay in 1972, when there were concerns about mercury contamination in striped bass. OEHHA updated the advisory in 1993 and incorporated it into the 1994 San Francisco Bay and Delta interim fish advisory, which considered polychlorinated biphenyls (PCBs) in addition to mercury. Most recently, OEHHA updated the fish advisory in 2011. This updated advisory includes a specific warning for the Lauritzen Channel in Richmond, advising that no one eat any fish from the Lauritzen Channel because of high levels of dichlorodiphenyltrichloroethane (DDT) and dieldrin. The other part of the advisory is broader and covers the entire San Francisco Bay. The advisory recommends certain limits on fish consumption because of mercury, PCBs, DDT or other contaminants that are unrelated to the United Heckathorn Superfund Site. The advisory identifies fish species that are safe to eat frequently, species that are safe to eat once a week and species that should not be eaten. The advisory is different for women of childbearing age and for children.

II. Current Fish Advisory Signage

Because the community had concerns about the confusion surrounding the fish advisory sign, TASC analyzed the sign by examining the SFBFP's reports and supporting documents and calling the phone numbers listed on the sign.

Signage Development
To accompany the 2011 updated fish advisory, the CDPH collaborated with community groups, local agencies and tribes to raise public awareness about fish contamination under the SFBFP. The SFBFP began with a Needs Assessment in 2010 to identify what was already being done in the San Francisco Bay Area regarding fish contamination awareness and education, and what could be done to improve awareness and understanding of fish advisories. SFBFP created a Stakeholder Advisory Group, and a Signage Development Subcommittee within this group developed a new warning sign for the updated advisory. During the sign development process, the CDPH conducted field studies with several draft versions of the sign to test different titles and phrases and the effectiveness of the images. During these field tests CDPH conducted surveys with anglers to better understand community needs and what could be improved.

Community groups that participated in the 2010 Needs Assessment identified areas for improvement for the existing signs. They mentioned that the old sign (Figure 1) was too busy and lacked a focal point, and that a clean, simple and repetitive message would be helpful. The Stakeholder Advisory Group offered many suggestions to improve the messaging and encourage

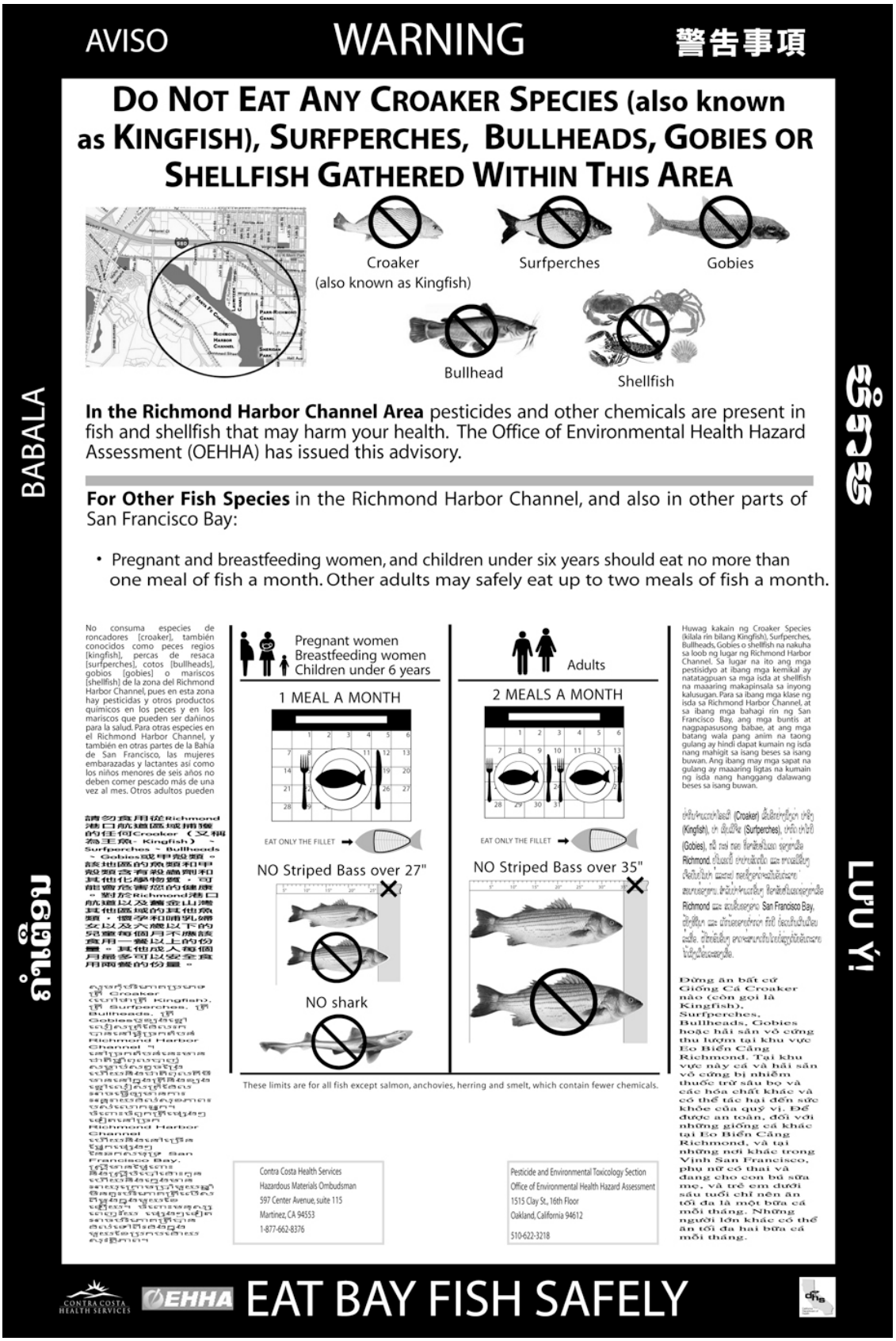

Figure 1 Pre-2012 Fish Advisory Sign in the Richmond Inner Harbor

people to follow the advisory. The suggestions that were incorporated into the new signs included: visual images supported by minimal text; using a fork image alongside the circle-slash symbol to symbolize “do not eat”; listing an easy-to-remember website for more information; increasing the sign size to accommodate more languages; and allowing space for local contact information. The Signage Development Subcommittee also brought up the importance of having a positive message.

CDPH developed and distributed 319 copies of the new sign to local agencies for posting around the San Francisco Bay. The signs included a phone number for OEHHA, and had space for local agencies to add a sticker with local contact information (TASC highlighted this space with a red box in Figure 2). For signs in Richmond and the rest of Contra Costa County, the sticker has the following information:

Contra Costa Health Services Environmental Health Division
Consumer Protection/Recreational Health
2120 Diamond Blvd. Suite 200
Concord, CA 94520
925-692-2500
http://cchealth.org/eh/

The final sign (Figure 2) includes text in three languages: English, Chinese and Spanish. The website (www.sfbayfish.org) and QR code (which leads to the website when scanned with a smart phone) on the sign offer educational brochures in 11 different languages. The CDPH also agreed to accommodate alternative languages on the sign by providing stickers with the different translations to cover the Spanish or Chinese translation in case a different language was more prevalent in the community than Spanish or Chinese. As of October 2012, no counties had requested alternate language stickers.

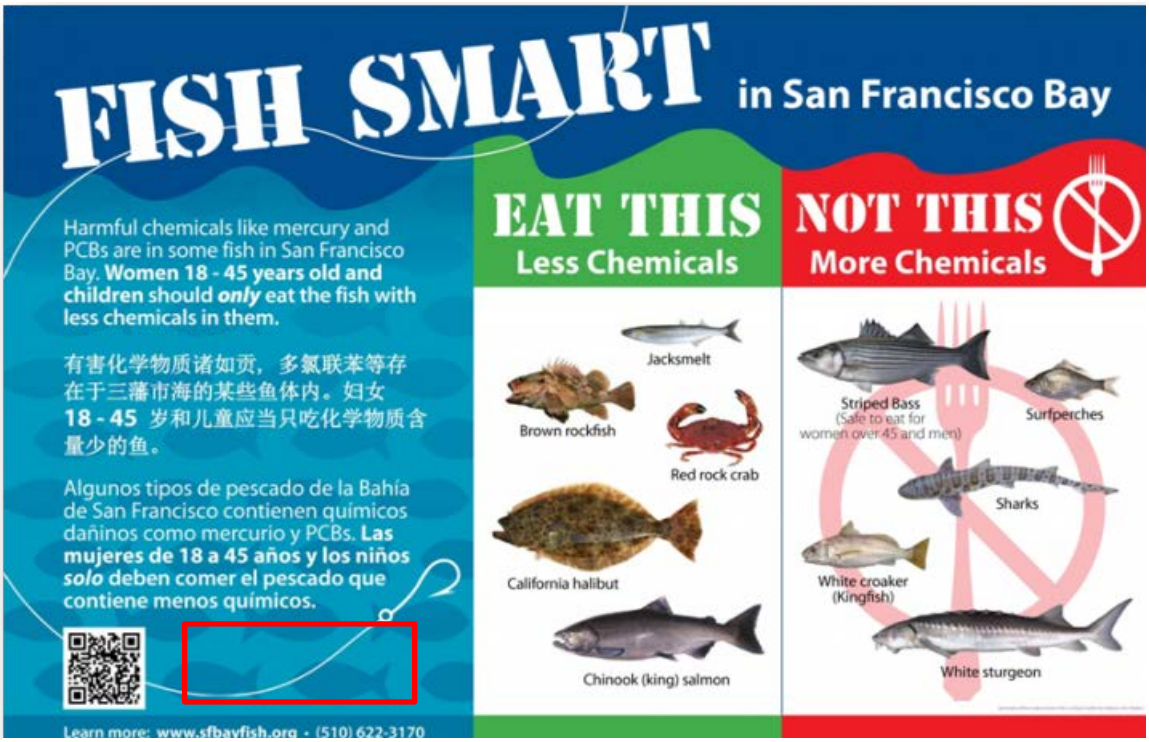

Figure 2 Current Fish Advisory Signs Posted in the San Francisco Bay Beginning in May 2012
***TASC highlighted the space set aside for local contact information with a red box.**

In addition to this new fish advisory sign, CDPH also developed a “kiosk” version of the advisory brochure (Figure 3). These kiosk signs provide detailed information about the advisory and were posted near some of the fish advisory signs at kiosks or bulletin boards.

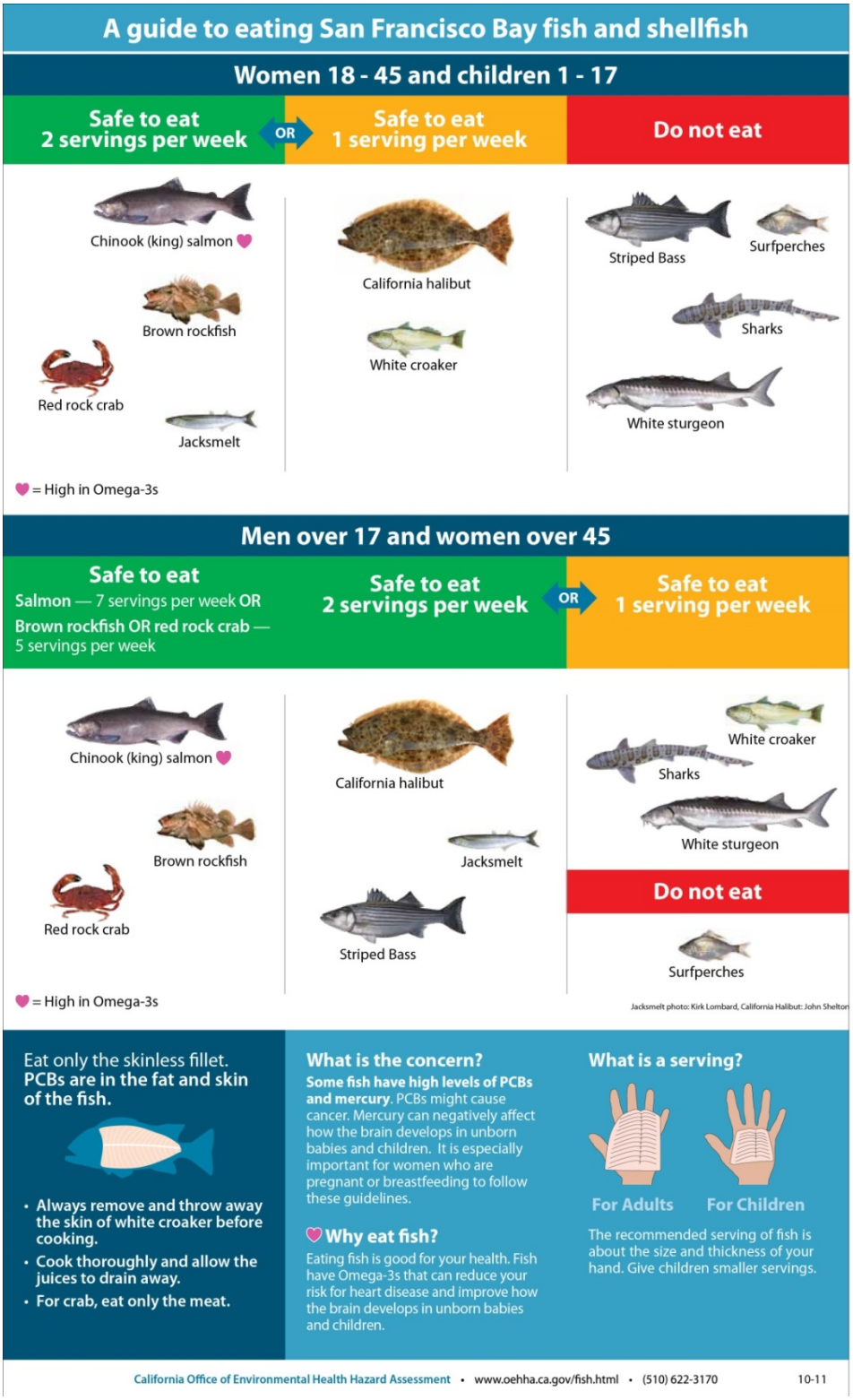

Figure 3 Current Kiosk Sign to Supplement Fish Advisory Sign at Some Locations

Signage Posting

In order to avoid confusion when the new signs were posted, counties along the San Francisco Bay Shoreline were encouraged to remove any old and outdated signs. Mr. Lino Ancheta of Contra Costa Environmental Health was responsible for the signs in Contra Costa County, and he confirmed that he removed all old signs that he saw when he was posting the new signs. The locations of the new signs are mapped online at http://www.sfei.org/content/educatinal-materials. A screenshot of this map shows sign locations in Richmond as of December 5, 2012 (Figure 4). The red markers and the red thumbtack indicate posting sites for the 2012 signs.

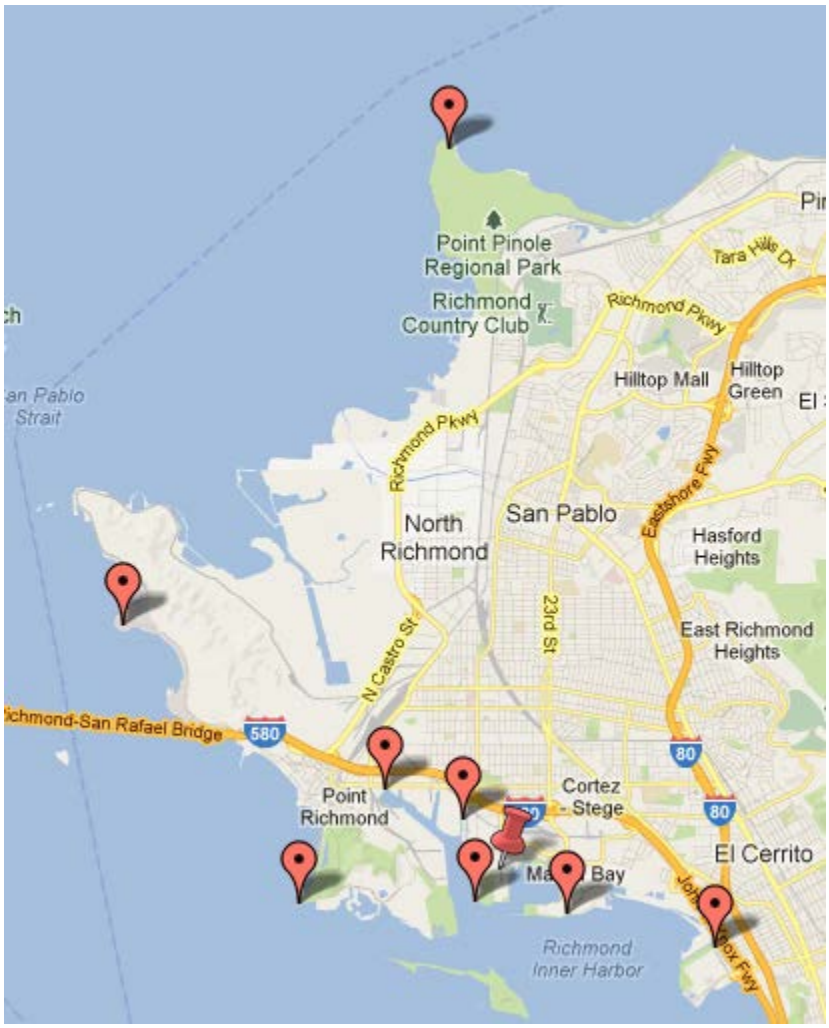

Figure 4 Map of New Fish Advisory Signs in Richmond as of December 5, 2012

Following Up with Phone Numbers Listed on Signage

Because of community concerns that the phone numbers listed on the signs did not lead to offices that could easily assist Richmond anglers, TASC anonymously called the phone numbers listed on the 2012 signs. TASC's primary goals were to assess what happens when the numbers are called after office hours and how well the offices were able to accommodate callers with limited English proficiency. TASC also separately contacted the offices via email as TASC to assess how many calls the offices have received regarding the fish advisories and how the offices report that they accommodate callers after hours and callers with limited English proficiency.

The pre-2012 sign in Contra Costa County (Figure 1) had different phone numbers listed, which may have been a source of the confusion indicated in the TASC TANA. The Contra Costa Health Services phone number on the pre-2012 sign led to Michael Kent, the Hazardous Materials Ombudsman at Contra Costa Health Services, and during a SFBFP Stakeholder Advisory Meeting he said that he received very few calls regarding the signs.

OEHHA (510)622-3170

This is the phone number printed on all of the 2012 signs posted throughout the San Francisco Bay Area. When TASC called after hours or on weekends, the phone continued ringing and there was no option to leave a voicemail message (Table 1). TASC called twice during office hours to inquire about the fish advisory. Both times, the receptionist transferred the call to a toxicologist, Dr. Margy Gassel, but it seemed that the receptionist did not encounter these questions often because it took some time for the receptionist to make the transfer. Once transferred, the call reached voicemail both times. TASC left a voicemail once to request to speak with Dr. Gassel about fish advisory questions, and Dr. Gassel returned the call within a few hours that evening after office hours. TASC was unavailable to receive the returned call, and Dr. Gassel left a voicemail message with her direct number. TASC called Dr. Gassel's direct line three times during office hours the following day and reached her voicemail each time.

When TASC called the phone number on the sign and spoke in Spanish, the receptionist did not speak Spanish, and was only able to help once the caller said the word "fishing" in English. At this point, the receptionist transferred the call to a Spanish speaker in the office who was unable to understand TASC's questions but eventually directed the caller to a website.

Through separate email correspondence, TASC asked Dr. Gassel about calls regarding fish advisory signs. Dr. Gassel said that she does not keep records of calls, and she does not remember receiving any calls about the San Francisco Bay advisory signs. In response to calls in Spanish or Chinese, she said that there are people in the office who speak Spanish and Chinese and could potentially help. Finally, she confirmed that no one answers calls to the main number listed on the sign after hours. After responding to these questions, Dr. Gassel indicated interest in ways that TASC could help OEHHA improve access to information by phone.

Table 1 Summary of Calls to OEHHA

Date	*Time*	*Notes*
3-12-2013	9 a.m.	Receptionist transferred to Dr. Margy Gassel; Voicemail
3-27-2013	4 p.m.	"Your party cannot be reached, please hang up and try again"
3-29-2013	5 p.m.	Continued ringing
3-31-2013	11 a.m.	Continued ringing
4-3-2013	4 p.m.	Receptionist transferred to Dr. Margy Gassel; Voicemail; Dr. Gassel returned call at 6 p.m.
4-4-2013	10 a.m. & 2 p.m.	Called Dr. Gassel's direct line; Voicemail
4-5-2013	12 p.m.	Spanish; Receptionist transferred TASC to a Spanish speaker in the office with little understanding of the fish advisories

Contra Costa Health Services (925)692-2500
This is the phone number on the sticker that is on all the 2012 signs in Contra Costa County. When TASC called this number during office hours, the caller reached a complex automated phone menu. None of the menu options seemed appropriate for fish advisory questions, so TASC requested the operator. The operator transferred the call to Mr. Lino Ancheta, who was able to answer questions and direct additional questions to his colleagues. The automated phone menu was also available in Spanish, and a Spanish voicemail greeting was available during non-office hours. There did not appear to be an option to leave a voicemail in English unless an extension was known or a menu option was selected. The phone menu seemed difficult to navigate for a native English speaker with fish advisory questions, and would therefore be even more difficult for callers with limited English proficiency.

Through separate email correspondence with Mr. Ancheta about calls regarding fish advisories, he said he has received very few calls about the fish advisory signs. He has not received any in 2013 as of early April, and can remember only receiving two or three calls since posting the signs in 2012. Mr. Ancheta indicated that he had several colleagues in the office who are qualified to provide direct translation in Spanish for public inquiries related to the fish advisory, and that translation for Arabic, Cantonese/Mandarin, Dari, Farsi, Hindi, Hmong, Korean, Urdu, Laotian, Vietnamese, Mien, Pashto, Punjabi, Russian and Tagalog could be provided but would require advance notice. The Contra Costa Health Services office offers more immediate interpreter services that are available around the clock every day, but these services are only for medical encounters and open only to members of the Contra Costa Health Plan.

Mr. Ancheta also said that Contra Costa Health Services is in the midst of improving its phone systems and outgoing messages. Questions about fish advisories are grouped with swimming pool and beach monitoring questions, which are all under the Recreational Health program and transferred to Mr. Ancheta. However, a caller with fish advisory questions is unlikely to know to request a transfer to the Recreational Health program in the menu. Mr. Ancheta has been looking into adding a prompt that is specific to fish advisories for direct relay to his desk line. However, Mr. Ancheta is also responsible for facility inspections and other field work and may not be able to take calls right away. He makes every effort to return all calls within 24 hours unless the call falls on a Friday, weekend or holiday.

III. Awareness, Understanding and Following of Fish Advisories

Because the community had concerns about whether people were aware of, understanding and following fish advisories, TASC researched this by examining the SFBFP's reports and supporting documents.

Awareness of Fish Advisories
In the SFBFP's 2010 Needs Assessment, community groups and agencies reported that awareness of fish advisories was low to moderate. During a field test with the 2012 signs in December 2011, most people were aware of a fish advisory for the Bay, but almost no one was aware that the advisory had been updated that year.

After posting the new signs, the SFBFP surveyed a convenience sample of 37 anglers across the San Francisco Bay in August and September of 2012. Of those surveyed, eight anglers spoke

Chinese and one spoke Spanish. Of the 37 anglers, 34 anglers (92 percent) had seen the new sign (Table 2). Twenty-one of those who saw the new sign (62 percent) said that they would share this information with others, thereby increasing awareness of the advisory.

Understanding Fish Advisories

Throughout the sign development process for the 2012 signs (Figure 1), SFBFP engaged with community members through both the Stakeholder Advisory Group and field tests on fishing piers to assess how well the public understood draft fish advisory signs. During field tests with early versions of the new signs in December 2011, most people (88 percent) understood the images on the sign without accompanying text, and most people (96 percent) understood the sign when both the images and the text were present. In a separate survey, several people (55 percent) did not recognize or understand "PCB" on the sign, but the majority (82 percent) thought it was important to have the names of the chemicals on the signs. Several people were confused about the advisory applying to just fish in the San Francisco Bay Area versus all fish.

In the 2012 convenience sample of 37 anglers across the San Francisco Bay after the posting of new signs, most people who had seen the sign (65 percent) were able to correctly answer at least one type of fish that was good to eat. Most people who had seen the sign (62 percent) were also able to correctly answer at least one type of fish that was not good to eat. When asked why the fish were not to be eaten, most anglers (79 percent) remembered that the sign mentioned chemicals and toxins in fish.

Following Fish Advisories

In the 2010 SFBFP Needs Assessment, community groups and agencies reported that fishing populations may often ignore messages and fish advisories because of cultural and traditional beliefs. Groups also indicated that the economy placed a higher demand on fishing, especially for low-income communities and immigrant and minority groups. Additionally, fishing populations may feel a low sense of urgency with the fish advisories because it is difficult to show harm from eating contaminated fish. Lastly, community groups discussed confusing messaging on the signs as another reason why people did not follow fish advisories.

In the convenience sample of 37 anglers in the San Francisco Bay after posting the new signs, only 32 percent of the anglers who had seen the sign said that the sign would influence their future decisions. Of these 11 anglers who saw the sign and would change their actions, 64 percent said they would follow the sign, 18 percent said they would not eat as much of a certain "do not eat" fish, and 18 percent said that they would throw back "do not eat" fish. The remaining anglers said that the signs would not influence their future decisions.

The SFBFP also awarded grants to four community groups for outreach and education programs to help increase understanding of the fish advisory and reduce exposure to contaminants. Each of the groups successfully increased awareness and understanding of the fish advisory, and this increased understanding led some participants to change their behaviors and follow the advisory. One grant awardee, APA Family Support Services, increased awareness of fish contamination through workshops and outreach efforts for various Asian Pacific Islander groups. The organization developed materials that were linguistically- and culturally-appropriate to effectively reach out to the diverse Asian Pacific Islander population. APA Family Support Services also developed materials that were accessible to communities with low literacy rates.

The California Indian Environmental Alliance (CIEA) and the Native American Health Center's Women, Infants, and Children (WIC) program engaged 769 people in the WIC clinic waiting room in Oakland with one-on-one nutritional counseling about fish consumption and fish advisories and surveys regarding fishing advisories. Of these participants, 47 completed an outcome evaluation. Of these 47 people, 93 percent indicated that their conversation with CIEA increased their knowledge of the fish advisory, 96 percent said that they would share information about the advisory with friends and family and 78 percent said that they would follow the advisories in the San Francisco Bay.

CIEA also developed a "Making Healthy Fish Choices" WIC course in English, Spanish and Vietnamese for clients with children ages one to five, and reached 1,340 people. The course was initially designed as a three-month course, and clients and staff thought it was such a success that the WIC Registered Dieticians extended the curriculum for an additional two months. Of the 810 participants who attended during the original three-month course, 48 percent signed pledge forms after the course. The pledge stated, "I eat fish caught in San Francisco Bay, I promise to follow the advisory guidelines for women and children." Of the participants who signed the pledge, 44 percent indicated that they ate fish from the San Francisco Bay and would follow the advisory.

Greenaction for Health and Environmental Justice (Greenaction) was another organization that received grant money for fish advisory outreach, and its program provided education to anglers at fishing locations, held workshops at clinics, and provided education at community meetings. From engaging with 835 people, 90 percent said the fish advisory information they received from Greenaction was useful, 99 percent planned to share the information with family and friends and 83 percent planned to follow the fish advisory and eat less toxic fish. Lastly, Kids for the Bay, another grant awardee, trained elementary school students, who then gave presentations to their parents and guardians about Bay fish contamination. After the presentation, 91 percent of the parents stated that they planned to follow the advisory recommendations for eating fish from the San Francisco Bay.

Table 2 Summary of Awareness, Understanding, and Following of Fish Advisories from the SFBFP

Description	**Percent**
Awareness of Fish Advisories	
Anglers who had seen the 2012 sign.	92
Of the anglers who had seen the 2012 sign, those who would share the information with others.	62
Understanding Fish Advisories	
People who understood the images on the sign without accompanying text.	88
People who understood the sign when both images and text were present.	96
People who did not recognize or understand "PCB" on the signs.	55
People who thought it was important to have the names of the chemicals on the signs.	82
Anglers who had seen the 2012 sign and were able to correctly state at least one type of fish that was good to eat.	65

Anglers who had seen the 2012 sign and were able to correctly state at least one type of fish that was not good to eat.	62
Anglers who had seen the 2012 sign and were able to remember that the sign mentioned chemicals and toxins in fish.	79
Following Fish Advisories	
Anglers who had seen the sign and said that the sign would influence their future decisions	32
Anglers who said that the sign would influence their future decisions and they would follow the sign.	64
Anglers who said that the sign would influence their future decisions and they would not eat as much of a certain "do not eat" fish.	18
Anglers who said that the sign would influence their future decisions and they would throw back "do not eat" fish.	18
CIEA: Participants who said that they would follow the advisories in the San Francisco Bay after engaging with CIEA representatives.	78
CIEA: Participants who signed a pledge to follow advisory guidelines for women and children.	48
CIEA: Of the participants who signed a pledge to follow advisory guidelines for women and children, those who ate fish from the San Francisco Bay and would follow the advisory.	44
Greenaction: Participants who planned to follow the fish advisory and eat less toxic fish.	83
Kids for the Bay: Parents of participants who planned to follow advisory recommendations.	91

IV. What May Assist the Fishing Community in Following Fish Advisories

Based on the research conducted for this report, in this section TASC provides recommendations for what may help the community follow fish advisories, especially since there may be cultural and economic challenges that prevent people from following fish advisories. These recommendations are geared towards those who are interested in helping the community follow fish advisories, including agencies and community groups. Because the fish advisory signs were recently redesigned with input from community members, the recommendations focus on areas other than the sign content.

Outreach to Help Understanding and Following of Fish Advisories

Similar information from multiple sources: When people receive similar information from multiple sources, the message is reinforced and people are more likely to make lifestyle changes. In a follow-up conversation with Sherri Norris of the CIEA about its project engaging people at the WIC clinic through the SFBFP grant, she provided some suggestions for ways to better engage the community about fish advisories. These included having maps of the bay area for the public to identify where they fish, so that the signs are posted exactly in the areas where people are fishing. CIEA has developed a curriculum for doctors and nurses at the WIC clinic and distributed materials about safe fish consumption and local fish advisories. With similar

information about fish advisories reaching the community through their medical providers as well as at their fishing sites, people may be more likely to make a change. Ms. Norris and Rose Chan of Greenaction both indicated that larger fish advisory campaigns would also be helpful to get more information into the community, such as more radio and TV public service announcements. It would be helpful if there was more coordination in outreach efforts across the bay area among agencies and community groups. This could be accomplished through:

-Regular meetings among community groups and agencies.
-An information repository for brochures, fact sheets and other outreach materials.
-A mailing list for all groups involved in fish advisory outreach.

Expand fish advisory trainings and workshops: The four SFBFP grant awardees successfully raised awareness and increased understanding of the fish advisory through their outreach workshops, trainings, presentations and one-on-one community engagement. Ms. Norris indicated that CIEA is looking to do more pilot projects and offer its curriculum in more languages. The WIC clinic in Richmond is one of the clinics being considered for fish advisory and fish consumption trainings, and Ms. Norris mentioned that CDPH could help with Laotian translation if necessary. It would be helpful if the agencies concerned with fish advisories supported and sponsored more of these trainings for community members.

Positive messages and offering alternatives: Both the Signage Development Subcommittee and Ms. Norris indicated that positive messages would be helpful in encouraging people to follow advisories. Ms. Norris suggested that pointing people to cleaner water bodies rather than discouraging people from fishing is more effective. More research about which bodies of water are safer for fishing is needed. Also, risks of overfishing in these cleaner water bodies would need to be considered. It would be helpful if agencies concerned with fish advisories could recommend alternative fishing areas to the public and provide outreach materials with this information.

Hands-on demonstrations for cooking fish: By presenting alternative ways to prepare fish or ways to prepare alternative and safer fish, people may be more likely to follow fish advisories. Both Ms. Norris and Ms. Chan discussed the importance of hands-on experiences on behavior change. Agencies or community groups conducting trainings and workshops may wish to include fish preparation demonstrations at fish events.

Additional Recommendations

The following recommendations pertain to the phone numbers listed on the 2012 fish advisory sign and how these phone lines can better assist the community in following fish advisories.

More inviting voicemail greetings for phone numbers listed on the advisory signs: Voicemail greetings can be more inviting to callers. While it may be comforting to have questions answered by an expert, it may be intimidating to leave a message after hearing a voicemail greeting from a doctor. Additionally, when a receptionist transfers the call, perhaps the direct number can be provided as well so the caller can make a direct call if there are further questions. It would be helpful if the OEHHA and Contra Costa Health Services offices updated their voicemail greetings to specifically welcome questions about the fish advisory. It would also be helpful for the direct phone extensions to be printed on the advisory signs and brochures.

More availability when calls with advisory questions arrive: When a caller has a question about a fish advisory, the caller may be at a fishing pier looking at the advisory, and the question may only be relevant at that time. Having people on the line after hours or at least having the ability to leave a voicemail after hours would allow callers to ask questions when they have them. It would be helpful if OEHHA and Contra Costa Health Services could update their voicemail settings to accommodate calls after hours. It would also be helpful to have the phone lines forward to an existing after-hours hotline, and train the hotline staff to answer questions about the advisory. For example, the California Environmental Hotline (1-800-CLEANUP) is integrated into Earth's 911, which is a public/private partnership between the EPA, states and other public and private organizations. The hotline is in operation 24 hours a day to provide information on the environment, including recycling and household hazardous waste. OEHHA and Contra Costa Health Services could consider collaborating with Earth's 911 as well.

More availability for information in different languages: Callers with limited English proficiency could be better accommodated. Staff with proficiency in languages other than English in the OEHHA and Contra Costa Health Services offices could understand the basics of the fish advisory so they can better accommodate diverse callers. It would be helpful for the state or the county to host trainings to teach the multilingual staff about the fish advisory. It would also be helpful for the voicemail messages and phone menus at OEHHA and Contra Costa Health Services to be in English, Spanish and Mandarin to match the trilingual advisory signs.

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This report is funded by EPA's TASC program. Its contents do not necessarily reflect the policies, actions, or positions of the EPA.