

2007-  
2011

# Evaluation of Montrose Settlements Restoration Program Fishing Outreach Mini-Grant Program



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January 2013

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## **MSRP Fishing Outreach**

### **Public Information to Restore Lost Fishing Services**

The Montrose Settlement Restoration Program (MSRP)<sup>1</sup> allocated \$1 million in its 2005 Final Restoration Plan (RP) and Environmental Impact Statement/Environmental Impact Report for education outreach products and programs, building upon the work of U.S. EPA's Fish Contamination Education Collaborative (FCEC), a federal, state and local partnership which addresses public exposure to contaminated fish in the Southern California coastal region. FCEC focuses on public education about the human health hazards associated with DDT and PCB contamination in fish and provides information to enable the public to reduce their exposure to these contaminants in local fish. MSRP Trustees augmented the existing effort of the FCEC program by providing information to anglers to allow them to make sound decisions about where and which species to fish, and helping anglers consume locally caught fish in a manner that minimized their health risk and exposure to DDTs and PCBs. MSRP worked to develop outreach materials to establish the linkage between the ecology and life history of a particular species of fish and its tendency to bioaccumulate contaminants, and fish species which are free of consumption advisories and locations where these fish can be found. These actions most directly and effectively address the loss of human fishing associated with the Montrose case. The implementation of this public information campaign is still ongoing and has incorporated the updated fish consumption advisories released to the public in June 2009.

### **MSRP Education Outreach Products**

#### ***What's the Catch? Comic Book***

An initial version of this comic book was developed in 2005 and was later updated and translated into Spanish and Mandarin. Ten thousand copies of the comic book are distributed annually through local education centers, outreach programs, aquaria, and events. New fishing advisory information was incorporated in the latest addition of the comic book printed in 2012.

#### **Southern California Fish Identification Card**

An initial version of the fish identification card was developed in 2005 and was later revised to include additional fish images, key sportfishing regulations, and general information updates. Ten thousand copies of the fish identification card are distributed annually through local education centers, outreach programs, aquaria, and events.

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<sup>1</sup> The MSRP is a joint federal and state program made up of the following natural resource trustee agencies (or Trustees): National Oceanic and Atmospheric Administration, the U.S. Fish and Wildlife Service, and National Park Service, the California Department of Fish and Game, the California State Lands Commission, and the California Department of Parks and Recreation.

## Fishing Outreach Mini-Grants

In 2007, 2009, 2011, and 2012 MSRP issued a Request For Proposals for education outreach programs which focused on teaching young people safe fishing practices. This report only evaluates mini-grant programs implemented during the period of 2007 to 2011. The education outreach programs utilize the comic book and fish identification card, and have interactive components to their programs. Each year, 2-3 projects were selected for funding. Past grant recipients are Cabrillo Marine Aquarium, SEA Lab, Asian Youth Center, Friends of Colorado Lagoon, City of Los Angeles, and United Anglers of Southern California.

**Table 1—Key Program Elements of MSRP Education Outreach Programs**

Program Element	Cabrillo Marine Aquarium	SEA Lab	United Anglers of So. Calif.	Asian Youth Center	Friends of Colorado Lagoon	City of LA Cabrillo Pier
Pier Fishing	X	X	X			X
Teacher Workshops	X					
Youth Education Sessions	X	X	X	X	X	X
Community Workshops	X		X	X	X	
Fish ID	X	X	X	X	X	X
Safe Fish Preparation	X	X	X	X	X	
Safe Fishing Practices	X	X	X	X	X	X
DDT, PCB Contamination	X	X	X	X		X
Food Chain		X				
Fish Prints	X	X				
Fish Dissection	X	X			X	
Beach Seines					X	
Comic Book Reading Circles/Acting Out		X			X	
Participants						
Teachers	100					
ES Students	unknown	1479		100		
MS/HS Students	unknown	995		50		
Youth <sup>2</sup>			240			250
Public	unknown			2000	1800	
Families				1199		
Restaurant, Market Owners				18		

## *What's Your Catch? – Implementing Practices for Safe Fish Consumption Cabrillo Marine Aquarium (2007-2009)*

Cabrillo Marine Aquarium created a Fish Contamination Education Curriculum for students in grades 4-6 using science, history/social science, mathematics, and language arts content

<sup>2</sup> For Youth category, age and grade were not indicated by program for these participants

standards which complement the content in the comic book *What's the Catch?* Topics included the history of DDT and PCB contamination, environmental impacts from contamination, fish species identification and safe preparation of fish for human consumption. Cabrillo Marine Aquarium hosted a total of five teacher workshops on using the curriculum with their students and five community safe fishing workshops for families on safe fishing practices, identification of species and preparation of fish for human consumption. Workshop materials were designed for the local fishing community, while maintaining compliance with California science content standards for K-12 schools. Educators in Los Angeles and Orange Counties received teaching materials and comic books for classroom use.

From April 2007 to March 2008, Cabrillo Marine Aquarium staff conducted three student workshops on safe fishing practices and fish preparation as well as a fishing trip. Students who had been fishing or were interested in learning how to fish were recruited for the student workshops. Students learned about contamination issues and how to identify fish they had caught, as well as safe consumption behaviors for kids and families. Students were given the opportunity to fish either from a boat or the pier. Then they grilled fish to eat, trying different types of fish that they had not eaten before. A teacher workshop in June 2007 was hosted with Cabrillo Marine Aquarium, MSRP, and COSEE-West staff, with 10 classroom and informal educators participating. The workshop focused on fish identification, fish prints, fish dissections, fish cleaning, and safe fish preparation. Teacher packets of existing materials and the comic book were provided as information resources to the participants.

From April 2008 to April 2009, four additional student workshops, five community workshops, and three educator workshops were hosted. Community members learned about fishing regulations, how to fish, and which fish are safe to eat. Teacher input and testing of the curriculum were used to finalize the educator curriculum, and 1,000 copies of the curriculum were printed in 2009. MSRP staff assisted in incorporating MSRP restoration efforts into the educator curriculum guide. Thirty-two formal educators (preservice and current educators) and informal educators participated in the three educator workshops, targeted for 4<sup>th</sup> – 8<sup>th</sup> grade teachers. Participants indicated that these lessons could be implemented easily into everyday instructions and that they helped meet science and ecology content standards in their classrooms, and were a valuable use of their time.

An additional educator workshop was offered at the National Marine Educators Association Conference in June 2009 and the educator curriculum guide was posted on the Cabrillo Marine Aquarium website. Students participating in education programs at Cabrillo Marine Aquarium were taught about safe seafood practices and fish contamination issues through Sea Search Classes and Science at the Seashore programs, further increasing the

content and capacity of the Aquarium's informal education efforts. Survey feedback (shown in Table 2) showed that teachers benefited greatly from participating in the teacher workshop and that workshop activities were helpful in presenting this information to their students. All of the teachers felt the lecture and workshop activities were helpful in understanding workshop content and presenting it to their students.

**Table 2—Teacher Workshop Feedback**

Teacher Feedback	Responding Strongly Agree (%)
The session met my expectations	68
Session content well organized around clear goals	59
Time planned carefully and used effectively	59
Content was presented using variety of learning modalities	68
Session content appropriate for students at that grade	50
Session enhanced my professional expertise	73
Will implement what I learned at my school	50
What I learned will be supported at my school	45
Share information with teachers at other schools	50
Information about State Standards will be used	55
Information about National Standards will be used	50
Lecture helpful in understanding workshop concepts	100
Workshop activities helpful in presenting information to students	100
Speaker knowledgeable about content	91
Speaker presented content information effectively	68

Number of survey respondents is 34 for June 2007 workshop.

### ***Fun Fishing Program at SEA Lab Los Angeles Conservation Corps (2008, 2009, 2011)***

SEA Lab educates students on the benefits of recreational fishing and the alternatives to consuming contaminated fish species. Since October 2007, 995 middle and high school students have participated in the Fun Fishing Program. Students learned about fish identification, proper handling and releasing of fish, proper preparation of fish for consumption, and engaged in pier fishing. In 2010, SEA Lab expanded the Fun Fishing Program to 1,479 elementary school students in an interactive education outreach program that included in-school presentations, three learning stations, and a pier fishing trip. Students learned about fish contamination issues through the use of interactive games and activities. SEA Lab was awarded grants for three consecutive funding cycles.



### *Fun Fishing Program-Year One (2008)*

The first year of the Fun Fishing Program started in January 2008 and ended in December 2008. 246 middle and high school students participated in the program between April 2008 and September 2008, working as Clean & Green teams. These students learned how to identify commonly caught marine fish, marine fishing areas, and areas of concern. Students toured the SEA Lab, engaged in pier fishing, demonstrated proper etiquette (handling and release of live fish), and proper filleting techniques for consumption. Four Corpsmembers received training to lead students in the Fun Fishing Program, with two student Clean & Green teams participating in January and February 2008. Rainy weather and bad road conditions prevented additional student groups from participating. By April 2009, 523 students had participated in the program. Students were given a post program survey to answer at home, which also included information on family members. 428 students completed a post program survey (82% response rate).

### *Fun Fishing Program-Year Two (2009-2010)*

The second year of the Fun Fishing Program started in October 2009 and ended in October 2010, and was revised the following year to include a two day program for Clean & Green teams and to begin in-school education sessions for 3<sup>rd</sup>-5<sup>th</sup> grade students. For the in-school sessions, SEA Lab staff worked with the Fish Contamination Education Collaborative (FCEC) to obtain data on communities with high fish consumption and to contact schools within targeted communities to schedule in-school presentations. Additional interns were trained to deliver the in-school program.

Both program activities surveyed students using pre and post program surveys to evaluate the program's success. Between October 2009 and October 2010, 303 middle and high school students participated in the two-day Fun Fishing Program. The two day program included a three hour classroom activity incorporating content from the *What's the Catch?* comic book, guided tour of SEA Lab to learn fish identification, three hour fishing excursion at Redondo Beach fishing pier to learn basic fishing techniques, proper fish handling, and



compliance with California Department of Fish and Game regulations, how to interpret consumption advisories, and how to properly fillet and cook fish to minimize exposure to contaminants.

SEA Lab also continued to implement in-school education sessions for students during the academic year, with 603 elementary school students participating. These education sessions included having SEA Lab staff and interns guide small groups of students through three learning stations in which they acted out and discussed the *What's the Catch?* comic book storyline. The three learning stations included an interactive game focused on food chains that related how DDTs and PCBs impact the environment; a hands-on fish identification lesson incorporating Gyo-taku art form as part of the study of fish specimens; and a mock fishing activity on a life size map that allowed students to interpret fish consumption health advisories. Program staff presented an ecological perspective on how everyday actions not only impacted the environment and its inhabitants, but also impacted human health. Ten in-school sessions were presented to students in grades 3-5, and linked to life science content standards in studying food webs and ecosystems (grade 4: 2a, 2b, 3a, 3b; grade 5: 2a, 2c). Participating schools in the targeted communities included Frank del Olmo, Charles Kim, Marvin, Malabar, Humphreys, Lorena, Lincoln, and Normandie Elementary Schools.

The fishing trips were evaluated with pre and post surveys. Students were given the opportunity to note their favorite and least favorite aspects of their fishing trips and their SEA Lab visits. The in-school presentations were evaluated through teacher tracking sheets, noting that "students had fun and more importantly retained the information. They were able to answer many questions when they finished each activity." Teachers were pleased that presentations used 4<sup>th</sup> and 5<sup>th</sup> grade life science content standards.

#### *Fun Fishing Program-Year Three (2011-2012)*

The third year of the Fun Fishing Program started in July 2011 and ended in June 2012, and continued the two day program and in-school education sessions for students. During this time period, 169 middle and high school students participated in the two day Fun Fishing Program and 876 elementary school students participated in the in-school education sessions. Fishing trips for the Fun Fishing Program took place at the Redondo Beach and Hermosa Beach Piers. Eleven in-school sessions were presented to students in grades 3-5. Participating schools in the targeted communities included Malabar, New River, John Adams, Normandie, Lorena, Ambassador School of Global Education, Halldale, Point Fermin, and New Heights Elementary Schools.

Teachers felt that "instructors were detailed and enthusiastic and kept students engaged." One teacher had the in-school education session in her classroom the previous year and asked them to visit her classroom again this year: "This team was especially organized and



great with classroom management. Because of this, the students really learned a lot and had so much fun they didn't want to go home!"

The majority of students enjoyed their fishing experience (78%), learned about fish consumption advisories (96%) about which fish are safe to eat, and learned how to limit their exposure to contaminants (55%, 66%, 83% different years). These results are shown in Table 3.

### ***Pier Fishing Trip Survey Data (2008-2012)***

**Table 3—Student Feedback on Pier Fishing Trips**

Student Feedback	2008-2009	2009-2010	2011-2012
Number of participants—Fun Fishing Program	523	303	169
In-School Education Sessions	--	603	876
Female participants (pre survey 2008, 2009, post survey 2010)	40%	36%	48%
Fishing for the first time (pre survey)	47%	54%	
Learned how to limit their exposure to contaminants (post survey)	55%	66%	83%
Learned about fish consumption advisories (post survey)	96%	--	
Enjoyed their fishing experience (post survey)	78%	--	

Number of survey respondents is 428 (after their fishing trips) from March 2007 to April 2009. Number of survey respondents is 199 (prior to their fishing trips) and 174 (after their fishing trips) from October 2009 to October 2010. Number of survey respondents is 71 (after their fishing trips) from July 2011 to June 2012. Data on last two questions were not collected in later years.

Student feedback on the pier fishing trips indicated that almost all students learned about fish consumption advisories (96%) and the proper way to limit exposure to contaminants from fish (55%, 66%, and 83%). Students also enjoyed their fishing experience (78%).

### ***In-School Education Sessions Survey Data (2012)***

**Table 4—Teacher Feedback on In-School Education Sessions**

Teacher Feedback	2012
Number of participants	683
Instructor clarity rated as excellent	67%
Appropriate to age/grade level rated as excellent	67%
Challenging to participants rated as excellent	56%
Fun for participants rated as excellent	67%
Rate overall quality of program as excellent	56%
Rate overall quality of presenters as excellent	78%

Number of survey respondents is 9 from January 2012 to February 2012.

Teacher feedback on the in-school education sessions indicated that the presenters (78%) did an excellent job and that the overall quality of the program was excellent (56%), as shown above in Table 4. Teachers enjoyed that their students' participation in the in-school education sessions of the Fun Fishing Program was beneficial. Their comments included the following:

- I think it was very educational for my students. It was my students' first [time fishing] as well as mine.
- Everyone did a great job! One of my special ed students learned the first time and was even teaching me how to do it!
- Overall the presenters did a good job informing the students of the steps to follow whenever they decide to go fishing. Good information about the types of fish.

Students enjoyed their participation in the in-school education sessions of the Fun Fishing Program. Their comments included the following:

- Everything was fun but the part that I most enjoyed today was when we went to the pier and went fishing.
- I think the funnest part was when a girl got one fish and the fish was moving a lot.
- Learning how to fillet and fish and fishing.
- The way they taught me how to fish.
- When I caught a fish!

### *Your Day on the Water in Southern California United Anglers of Southern California (2009)*

The United Anglers of Southern California (UASC) partnered with the Cabrillo Marine Aquarium to hold a "Fishing with Uncle Larry" event in August 2009 for children and their families at the Cabrillo Pier. UASC is a non-profit organization dedicated to marine conservation and maximizing recreational fishing opportunities. UASC developed an education booklet with information about fish, marine mammals and seabirds that children might see while fishing, and information about conservation issues for certain species, and consumption alerts for fish species contaminated with DDT and PCB. Booklets were distributed to children at the pier fishing event and incorporated into UASC's existing education outreach program of boat fishing trips for students and their teachers.



The Fishing With Uncle Larry event provided a successful launch for UASC's program, combining a fun morning of fishing with an opportunity for kids and families to learn some very important lessons about Southern California's ocean and coastal wildlife, unique environmental challenges, fishing techniques, and ethical angling guidelines. Uncle Larry is Larry Fukuhara, Program Director for the Cabrillo Marine Aquarium. In addition to his love for teaching kids about ocean life and ecology, Fukuhara is an avid recreational fisherman. Along with the Cabrillo Marine Aquarium, this unique pier fishing event was supported by UASC Youth Fishing Partners including NOAA National Marine Fisheries Service, 976-TUNA Youth Fishing, Friends of Rollo, and Fred Hall & Associates. Approximately 40 kids and their families were treated to a fun morning of fishing on the Cabrillo Pier. The exceptional variety of fish species caught provided a literal marine biology lesson. More than a dozen local species were caught from the waters inside San Pedro Harbor, including sole, halibut, top smelt, white croaker, herring, sculpin, lizardfish, perch, sand bass, spotted bay bass, cabazon and even a juvenile bocaccio.

An aquarium on the pier allowed the kids to observe many of these fish and learn about their unique adaptations. Kids and their parents were also provided a live demonstration of proper techniques for filleting local fish kept for personal consumption.

Bolstering the education aspect of this event was the debut of a new UASC publication, *Your Day on the Water in Southern California*. This 56-page booklet was written by professional educators specifically to target 4<sup>th</sup> to 6<sup>th</sup> grade students, providing a wealth of information on fish, marine mammals and bird life, effective and ethical angling practices, boats and navigation, local coastal ecosystems and more. Each youngster received one of these booklets, along with a variety of other useful and educational information in a goodie bag provided by NOAA National Marine Fisheries Service. UASC and other sponsoring organizations also provided a wide variety of free prizes for the kids, including spinning rod and reel combos to help them enjoy future fishing trips.

“We’ve done a lot of youth fishing events, but this was particularly special,” said Beth Lafferty, UASC’s Director of Youth Fishing. “With this inaugural event, we’ve taken a big step in combining a fun day fishing with some valuable life lessons focusing on Southern California. Judging by the reactions of the volunteers and parents and the smiles on the kids’ faces, I think we planted some seeds that will grow into a new generation of responsible anglers. I can’t say enough about all the great people who got behind this project and helped us make it reality. They all have my eternal gratitude,” added Lafferty.

### *Fish for Health Project Asian Youth Center (2009)*

The Asian Youth Center has been providing social services and health advice for the large Asian population in the San Gabriel Valley since 1989. The Asian Youth Center held workshops for children in their afterschool program about safe fishing practices and fish contamination. The Asian Youth Center translated the *What’s the Catch?* comic book and fish identification card into Mandarin. The comic book and fish identification card were used at large outreach events. The Asian Youth Center also educated fishing tackle shop owners and their customers about fish contamination issues and safe fishing practices through media outreach and education opportunities at local fishing and tackle shops.



Asian Youth Center staff distributed the comic book to 951 Chinese families in the large Chinese immigrant community in the San Gabriel Valley during Chinese New Year celebration events in Alhambra, Monterey Park, and Rosemead in February 2010. They also distributed 2,000 comic book and fish identification cards at other Chinese community events during the year. Fish contamination materials were presented to 18 local restaurants and seafood markets so business owners could become more aware of contaminated fish near the coast of Los Angeles and Orange Counties.

150 students participated in workshops hosted at Central High School, Ynez Elementary School, and Ramona Elementary School. Copies of the comic book were distributed. Students also participated in presentations on fish preparation, indoor/outdoor grilling techniques, and fish anatomy. Students were surveyed before and after the workshops to



measure changes in their knowledge, with almost all of the students deciding to change their eating habits and becoming more aware of fish contamination.

Monthly workshops were conducted at local churches and schools for a total of seven workshops throughout the grant program to educate families and students about fishing and the dangers of contaminated fish. 248 families participated in these workshops.

### *Fishing Outreach Program Friends of Colorado Lagoon (2011)*

The Friends of Colorado Lagoon (FOCL) provided wetland and nature education to the public visiting the Colorado Lagoon, hosting 39 events for a total of 1,800 members of the general public in the summer of 2011. FOCL conducted education outreach through their Summer Science Shack Educational Program and also held Sunday Funday Fishday activities each Sunday afternoon from 3:00pm – 4:30pm, coordinating these activities with local marine fisheries experts from Reef Check, California State University Long Beach, Catch 22 Fisheries and Aquarium of the Pacific. Sunday Funday Fishday activities included beach seines, fish filleting, fish identification nature walks, safe and sustainable fishing instruction, and comic book reading circles to engage Lagoon visitors in fun and instructive fishing practices.



During the school year, FOCL held eight monthly beach seine activities throughout the school year for local students to learn about safe fishing practices. The beach seine activities for students were designed to help them identify marine organisms in the Colorado Lagoon, promote sustainable and safe fishing practices, and raise awareness of the detrimental impacts of ocean pollution. The *What's the Catch?* comic book was distributed to classes before their arrival at the Lagoon. Students participated in a beach seine to document marine species and to discuss safe fishing practices and pollution impacts. During the school year, FOCL naturalists also conducted outreach to Lagoon fishermen. FOCL naturalists and interns used the comic book to proactively approach fishermen with concepts in the comic book, handed it out to interested youth, read the comic book together as a group with engaged participants, and addressed comic book

concepts in regular educational programming. Data was not analyzed for this program since data from other programs was evaluated for this report.

### *Cabrillo Beach Pier Fishing Program City of Los Angeles (2011)*

The City of Los Angeles, Department of Recreation and Parks, administered the Cabrillo Beach Pier Fishing Program in San Pedro, California for over two decades. City budget constraints caused the cancellation of this program in 2010. With funding from MSRP in 2011, the City of Los Angeles, Department of Recreation and Parks staff offered a four week fishing program two days per week with a three hour fishing experience, conducting eight education and hands-on fishing sessions. This program served 250 youth from the greater Los Angeles area, ranging from 8 -16 years old. Youth were participating in various recreation center day camps run by the Department of Recreation and Parks and were transported to the Cabrillo Pier. These recreation center day camps were located in low-income areas of Los Angeles including Penmar, Banning, Normandale, Glassell Park, Van Ness, Eagle Rock, Nickerson Gardens, and El Sereno.



City program staff visited each recreation center's day camp one week prior to the scheduled fishing session at the Cabrillo Pier to provide a one hour education program utilizing concepts from the *What's the Catch?* comic book. City program staff explained the risks associated with consuming fish which contained high concentrations of DDTs and PCBs, demonstrated ways to identify contaminated fish, and discussed the group's fishing session at the Cabrillo Beach Pier, a highly contaminated area. Youth received instruction on safe fishing practices, including how to bait a hook, cast a fishing line, and catch and release techniques. City program staff suggested future improvements such as conducting the education session at the program site on the same day as the fishing session to ensure that all participants received both parts of the program; scheduling buses to arrive earlier at the recreation centers to ensure that participants arrived at the Cabrillo Pier with sufficient time to do a guided tour of the Cabrillo Marine Aquarium, and asking future

participants to complete pre- and post-activity surveys of lessons learned to better determine the program's effectiveness.

One hundred sixty nine youth were surveyed after their fishing session, with the following results (response rate 68%):

- 47% reported it was their first time fishing
- 93% enjoyed engaging in the hands-on fishing activity
- 90% wanted to participate in the Cabrillo Beach Pier Fishing Program again
- 92% were aware that it is unsafe to eat white croaker if caught off the Cabrillo Beach Pier

### *Seal Beach Fishing Derby on the Pier United Anglers of Southern California (2011)*

The United Anglers of Southern California (UASC) partnered with the Rotary Club of Los Alamitos/Seal Beach for an annual Youth Fishing Derby event in August 2011. UASC provided additional outreach support, outreach materials and safe fishing practices, and other event support such as media relations, event advertising, and graphic design work. MSRP messages and materials were disseminated to youth participants during the event and UASC provided giveaways, event coordination, and media relations for this event. Sean Payne, a member of the Rotary Club, said the Youth Fishing Derby is one of the Rotary's outreach programs focused on the children of the community, with the Rotary Club supplying fishing gear, bait, weighing station, and lunch for the 200 young anglers who participated for the event. The Youth Fishing Derby was more successful than in past years with a larger number of participants, more media coverage, event promotion, and vendor/partner participation. Local newspapers, radio shows, and websites were involved in media coverage of the event.





## Key Messages

MSRP developed a set of key and secondary messages for their program in 2012 which they are now encouraging fishing mini-grant program recipients to incorporate into their programming. Since these key and secondary messages were only recently developed, the fishing mini-grant programs reviewed in this report were not expected to incorporate these messages. However, a review of the fishing mini-grant programs found that programs were generally successful in incorporating the three key messages of the NOAA MSRP program, and to a lesser extent in communicating the secondary messages of the MSRP program.

### *Key Messages*

- Fishing is one of the most widely pursued outdoor activities in the world. The sport of fishing provides kids/families a direct connection to nature. (1)
- There are many fish that you can catch in southern California that are safe to eat. (2)
- A small number of fish that are commonly caught in southern California are not safe to eat because of contaminants. (3)

### *Secondary Messages*

- DDT and PCB contaminants bioaccumulate up the food chain. (4)
- DDTs and PCBs, harmful chemicals to wildlife and humans, were dumped into the ocean for more than 30 years in southern California and are still in the environment today. (5)
- Eating only the filet and throwing away the insides of the fish is a safe way to eat. (6)
- Grilling a filet is the safest way to prepare fish to eat. (7)
- Look for signs on piers telling you which fish are not safe to eat. (8)
- All fish are an important part of the ocean ecosystem. If you do not keep a fish for the table, gently return it to the ocean. (9)
- You play an important role in preserving our ocean resources. Follow fishing rules and regulations to be good ocean stewards. (10)

**Table 5—Implementation of Key Elements of MSRP Education Outreach**

Program	Incorporates Key Messages by Audience or Program	Incorporates Secondary Messages	Comic Book	Fish ID Card	Created Additional Resources <sup>3</sup>
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<sup>3</sup> Cabrillo Marine Aquarium developed a Fish Contamination Education Curriculum guide for 4<sup>th</sup>-6<sup>th</sup> grade teachers using content from the comic book. UASC developed an education booklet with information about fish, marine mammals and seabirds, conservation issues, and consumption alerts for fish species contaminated with DDT and PCB. Asian Youth Center translated the comic book and fish identification card into Mandarin.

Cabrillo Marine Aquarium	2,3 teachers <sup>4</sup>	4-9 teachers 6-9 students <sup>5</sup> , parents <sup>6</sup>	X	X	X
SEA Lab	2,3 students	4-10 students	X	X	
United Anglers of Southern California, Cabrillo Pier and Seal Beach	2,3 students	4-10 students			X
Asian Youth Center	2,3 public <sup>7</sup> , students	8,9 public 6-9 students	X	X	X
Friends of Colorado Lagoon	2,3 summer <sup>8</sup> 2,3 school year <sup>9</sup>	6-9 summer 4-9 school year	X		
City of Los Angeles, Cabrillo Pier	2,3 students	4,5,8,9 students	X	X	

Table 5 indicates the degree to which key elements of MSRP education outreach were incorporated into the fishing mini-grant programs. This includes the use of key and secondary messages (see previous page for these messages) and use of the comic book, fish ID, or additional resources created by that program.

The degree to which programs incorporated the key and secondary messages of the MSRP program and utilized resources such as the comic book or fish ID card are difficult to fully determine. When programs conducted fish identification activities with youth or parents, it was not clear if key messages on which fish species are safe to eat and that some fish species caught in Southern California are not safe to eat due to contamination were emphasized. When programs provided fishing opportunities, instruction on safe fishing practices may not have included an emphasis on eating only the fillet and grilling as the safest preparation method. Program activities focused on safe fishing practices or fish preparation but not necessarily on available information such as fish consumption advisories on fish which are not safe to eat. Four programs (Cabrillo Marine Aquarium, SEA Lab, UASC, Friends of Colorado Lagoon) emphasized the secondary message on DDT and PCB acting as contaminants which bioaccumulate up the food chain. Two programs (SEA Lab, UASC) emphasized the secondary message on the importance of good ocean stewardship and discussed fish consumption advisories. None of the programs emphasized the importance of fishing as one of the most common outdoor activities in the world which establishes a direct connection to nature. However, given that key and secondary messages

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<sup>4</sup> Teachers refers to teacher workshops

<sup>5</sup> Students refers to student workshops

<sup>6</sup> Parents refers to community or public workshops

<sup>7</sup> Public refers to community or public workshops

<sup>8</sup> Summer refers to a summer program

<sup>9</sup> School year refers to a program taking place during the school year

were only developed this year, it is surprising how strongly and consistently many of these messages were emphasized in fishing mini-grant programs over the past five years.

### *Cabrillo Marine Aquarium*

Cabrillo Marine Aquarium staff conducted teacher workshops which focused on the majority of the key and secondary messages and utilized the comic book. Staff also created a curriculum and educators guide for teachers to use with 4<sup>th</sup> – 6<sup>th</sup> grade students. The key message about fishing being a widely pursued outdoor activity providing a direct connection to nature and the secondary message about being a good ocean steward do not appear to have been emphasized in the teacher workshops. The fish ID card was included with the educators guide.

The workshops that Cabrillo Marine Aquarium staff conducted for students and their parents focused on safe fishing practices and fish preparation, or secondary messages 6-9. It is not clear if related fish ID topics on which fish species are safe to eat and that some fish species caught in southern California are contaminated were emphasized in these student and community workshops to the same extent they were discussed in the teacher workshops.

### *SEA Lab*

SEA Lab staff did an excellent job of incorporating almost all key and all of the secondary messages through their fish identification, proper handling and preparation of fish, safe fishing techniques, how to interpret fish consumption advisories, DDT and PCB contamination issues, and the importance of being good ocean stewards. Staff trained corpsmembers who in turn trained students in these key and secondary messages through interactive activities and games. The comic book and fish ID card were used in these activities with students. Staff also presented an ecological perspective on how human actions impact human health in order to reinforce the environmental stewardship message.

### *United Anglers of Southern California, Cabrillo Pier and Seal Beach*

UASC staff focused on most of the key and secondary messages but through a hands-on activity of a fishing derby and boating trips at Cabrillo Pier. UASC staff developed an educational booklet targeted for 4<sup>th</sup> – 6<sup>th</sup> grade students. Information from this booklet was incorporated into the education program associated with the boating trips. The key message about fishing being a widely pursued outdoor activity providing a direct connection to nature was not emphasized during the fishing derby or boating trip. UASC staff also did not use the comic book or fish ID card, using their own educational booklet instead. UASC's partnership with the Rotary Club of Los Alamitos/Seal Beach for their

Annual Fishing Derby was a larger event which involved more students and touched upon the same key and secondary messages as the activities at Cabrillo Pier.

#### *Asian Youth Center*

Asian Youth Center staff focused on messages related to safe fishing practices and fish contamination issues with students, fishing tackle shop owners and customers, and restaurants. Staff translated the comic book and fish ID card into Mandarin in order to successfully conduct outreach to members of the Chinese community in the San Gabriel Valley. This focused on key messages as to which fish species are safe to eat and secondary messages on looking for signs on the pier indicating which fish species are safe to eat and returning fish to the ocean which are not being consumed. In addition to these messages, students also learned about safe fish preparation practices (eating only the fillet and grilling fish). Other key and secondary messages are included in the comic book but it is unclear to what extent these messages were disseminated as progress reports do not indicate any discussion of other topics. Asian Youth Center staff was also successful in conducting outreach to large numbers of those in the Chinese community at cultural New Year events and reaching key audiences who purchase and/or consume fish.

#### *Friends of Colorado Lagoon*

FOCL staff conducted beach seines and fish ID nature walks, but progress reports do not indicate whether FOCL naturalists emphasized key messages on fish which are safe to eat in Southern California and fish which are not safe to eat because of contaminants. FOCL provided safe fishing instruction and fish filleting exercises but again it is not clear if naturalists touched upon one of MSRP's key messages that fishing is one of the most widely pursued activities in the world which provides a direct connection to nature, and on secondary messages on grilling fillets and eating only the fillet as the safest fish consumption practices. In their fish ID activities, it is not clear if FOCL naturalists used the fish ID card or taught students how to use this card to identify safe fish species for consumption as there is no explicit reference to the use of this card. However, there is active dissemination and use of the comic book in key program activities, though not specifically which key or secondary messages from the comic book were emphasized. The comic book emphasizes all of the key and secondary messages except the key message of fishing as a widely pursued outdoor activity which provides a direct connection to nature.

#### *City of Los Angeles, Cabrillo Pier*

City of Los Angeles Recreation and Parks staff touched upon which fish species are safe to eat, fish contamination issues, and safe fishing practices. Staff did not explicitly discuss safe fish preparation practices, environmental stewardship, or fishing as a common worldwide activity. Staff utilized concepts from the comic book and disseminated it to the youth.

## Conclusions

The fishing mini-grant programs accomplished the goals of the MSRP program in relaying the majority of the key and secondary messages from the program, disseminating educational materials such as the comic book and fish identification card, generating additional education outreach materials for teachers to use in the classroom or in different languages, and conducting education outreach workshops for youth, parents, teachers, fishing tackle shop owners, restaurant owners, and the general public.

Unfortunately most of the programs funded by the mini-grants did not conduct pre- and post-activity surveys of their fishing trips or education outreach workshops to better understand their effectiveness and how to improve these program activities. In some instances, surveys were collected but survey results were not available for further analysis. Surveys were only collected from program participants in programs by Cabrillo Marine Aquarium, SEA Lab, and City of Los Angeles Department of Recreation and Parks. It is recommended that in the future, all programs should conduct pre- and post-activity surveys to better determine program effectiveness. Some programs, which provide impromptu education outreach to members of the general public who do not register ahead of time, would be unable to do pre surveys but programs which conduct outreach to students during the school year would generally be visits arranged ahead of time and able to conduct surveys before and after the activities on those students.

Programs who are receiving MSRP mini-grants should meet at the beginning of each program year to be reminded of the key and secondary messages of the MSRP program, and to determine each program's effectiveness in interpreting and disseminating these messages through their respective program activities. Having programs explicitly document which key and secondary messages are emphasized in program activities and to touch upon all of these key and secondary messages if possible during their program planning will help programs remain on target with their messaging.

Programs should also use previously developed MSRP education resources, particularly the *What's the Catch?* comic book and fish ID card. The fish contamination educator curriculum guide for teachers in school visits developed by Cabrillo Marine Aquarium staff the UASC educational booklet should also be utilized by other programs as appropriate based on their program activities and target audiences. The Cabrillo Marine Aquarium curriculum guide would be a good resource for teachers serving students in grades 4-6 and it would be beneficial to other programs hosting teacher workshops to have Cabrillo Marine Aquarium staff train staff from other programs on the use of this curriculum guide.

Programs should have an opportunity at the end of the program year to report on the success of various program activities, share their knowledge, and disseminate lessons learned from their events. Programs which host fishing derby events could come up with

best practices as could programs hosting workshops for specialized audiences such as students or teachers. Programs should also be encouraged to disseminate their results at educator conferences such as the Southwest Marine Educators Association conference or other related conferences or professional development meetings.

Successful programs can also increase their outreach by partnering with other local organizations such as school districts, universities or education programs hosted by informal science centers. Educational resources developed through programs funded by MSRP could also be shared with other education outreach programs such as COSEE-West. For example, the City of Los Angeles Department of Recreation and Parks shared their Cabrillo Pier program with the California Coastal Commission.

The collection of survey data and slight redesign of existing program activities for current mini grant recipients to ensure that key and secondary messages of the MSRP program are being accurately and consistently emphasized will enable better evaluation of the effectiveness of MSRP funding. Additional knowledge sharing, compilation of best practices with different types of program activities and outreach approaches to specialized audiences, and promotion of greater dissemination of program results, will also more effectively leverage MSRP funding. As a result of developing programs and resources using MSRP funds, this should increase the capacity of these organizations to apply for other funding sources which will enable them to increase their outreach and to refine and improve their program efforts.