

Evaluation of Montrose Settlements Restoration Program 2012 Fishing Outreach Mini-Grant Program



Patricia Kwon
Program Evaluator
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MSRP Fishing Outreach

Public Information to Restore Lost Fishing Services

The Montrose Settlement Restoration Program (MSRP)¹ 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.

¹ 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 Wildlife, the California State Lands Commission, and the California Department of Parks and Recreation.

Fishing Outreach Mini-Grants

In 2012 MSRP issued a fourth Request for Proposals for education outreach programs which focused on teaching young people safe fishing practices. This report evaluates three mini-grant programs implemented during 2012 (SEA Lab, City of Los Angeles, and Marina del Rey Anglers). The education and outreach programs utilize the MSRP comic book and fish identification card, with interactive components to their programs. Program activities included pier fishing, youth and community workshops, fish identification, safe fish preparation for consumption, safe fishing practices, and DDT/PCB contamination issues in Table 1 below.

Table 1—Key Program Elements of MSRP Education Outreach Programs

Program Element	SEA Lab	Marina del Rey Anglers	City of LA Cabrillo Pier
Pier Fishing	X		X
Boat Fishing		X	
Education Sessions	X	X	X
Fish Identification	X	X	X
Safe Fish Preparation	X	X	X
Safe Fishing Practices	X	X	X
DDT, PCB Contamination Concepts	X	X	X
Food Chain Concepts	X		
Participants			
Elementary School Students	373	288	345
Middle School Students		230	3
High School		57	

Fun Fishing Program at SEA Lab



The SEA Lab is a program of the Los Angeles Conservation Corps and operates under the auspices of Conservation Work Programs division. This coastal education facility in

Redondo Beach, encompasses an aquarium and a native plant nursery. Since 1997, the SEA Lab has provided marine and habitat conservation projects while the aquarium has provided educational activities for thousands of school children and local South Bay beach community residents and visitors. It also provides job training, employment and internship opportunities for 18- to 24-year-old at-risk young adults (known as corpsmembers) who act as informal educators.

The fourth year of the Fun Fishing Program started in September 2012 and ended in December 2012. During this time period, 684 elementary school students participated in a three-hour Fun Fishing session at the SEA Lab and at Hermosa Beach Pier. Each participant spent 90 minutes at the SEA Lab where they learned about the history of contamination and the impact of DDTs and PCBs on the environment. Students received a guided tour of the facility and learned how to identify fish that may pose a health risk. Students then headed to the Hermosa Beach Pier for a 90 minute fishing excursion where they learned basic fishing techniques and proper fish handling. The students also learned how to correctly measure fish and comply with California Department of Fish and Wildlife regulations, to interpret fish consumption advisories, and how to properly fillet and cook fish to minimize their exposure to contaminants. There were eight participating schools in the targeted communities.

Prior to the field trip, MSRP sent copies of the “What’s the Catch?” comic books to teachers in preparation for the student’s field trip. SEA Lab also sent a form to the teachers with field trip details that included information about using the comic book as a tool before their field trip, proper attire, pre-activities, and pre/post teacher and student surveys.

For this program year, pre and post survey instruments were developed for teachers and a post survey instrument for students to look at the effectiveness of SEA Lab’s Fun Fishing Program for elementary school students. Survey feedback enabled SEA Lab staff to better understand which program activities worked for which audiences and to adjust the program as necessary. Fifteen teachers responded to the post survey for a 33% response rate.

Teacher Background and Teaching Practices

Teachers came from Los Angeles Unified School District (68%), Torrance Unified School District (16%), Compton Unified School District (11%), and Long Beach Unified School District (5%). Teachers taught 4th grade (84%) or 5th grade (16%). Participating teachers averaged 17 years of teaching experience. The majority of teachers are science teachers (58%) and had participated in other science programs such as Santa Monica Pier Aquarium’s Key to the Sea, Target Science or the Sally Ride Academy (31% for all other programs). One-third of the teachers heard about SEA Lab’s program from another participant and the remaining two-thirds from a flyer sent to their school or parents who

had heard about the program. All of the teachers indicated that their students also spoke Spanish in addition to English, as well as some students who spoke Korean and Japanese. Teachers had an average of 29 students in their classrooms. On average, teachers spent 17% of their time in the classroom teaching science, hands-on activities (19%), using live animal components (2%), collaborating with other teachers on curricula (17%), informal science experiences (7%), and interactions with nature (5%). This means that on average, teachers spent about 67% of their time in the classroom in science related teaching activities and 33% of their time in other types of activities which were not directly surveyed.

Teacher and Student Attitudes and Knowledge about Science

Survey results are presented as strongly agree and agree responses, and almost all teachers responded in one of these two categories for all survey items. Teachers strongly agree on having a high level of interest in science after their SEA Lab visit (63%), and to a lesser degree on having a high level of science content knowledge (38%) or understanding of scientific research (20%). Teachers feel comfortable in teaching science (39%), and some use hands-on science regularly (23%) or are confident in their ability to teach science (46%). Teachers report that their students are very interested in science (53%), environmental issues (50%), and feel a high level of civic responsibility (21%). Results are shown in Table 2 below.

Table 2—Teacher and Student Attitudes and Knowledge of Science

	Post Visit	
	Strongly Agree	Agree
Teachers' Attitudes and Knowledge about Science		
High level of interest in science	63%	37%
High level of science content knowledge	38%	38%
High understanding of scientific research	20%	53%
Teachers' Comfort in Teaching Science	Strongly Agree	Agree
Feel comfortable teaching science	39%	62%
Use hands-on science regularly	23%	54%
Confident in my ability to teach science	46%	46%
Students' Attitudes and Knowledge about Science	Strongly Agree	Agree
Very interested in science	53%	47%
Very interested in environmental issues	50%	29%
Feel high level of civic responsibility	21%	50%
Have high science content knowledge	7%	50%
Have frequent science field experiences	7%	29%
Perform very well in science	0%	50%

Number of teacher survey respondents is 15 (33%) post visit from September 2012 to December 2012.

Usefulness of Comic Book and Fish ID Card

Teachers feel the comic book was useful in preparing their students for their upcoming SEA Lab visit (60%). The comic book served as a resource that teachers could easily include in the classroom (71%) and in a useful format for presenting information (73%), captured their students' interest (64%), as well as reinforcing content learned during their visit (71%). Almost half of the teachers feel that the fish identification card presented useful information for their students (47%) and reinforced content learned during their visit (46%). These results are shown in Table 3.

Table 3—Usefulness of Comic Book and Fish ID Card

	Post Visit	
	Strongly Agree	Agree
How Useful is the Comic Book		
Presented useful information for my students	64%	36%
Captures my students' interest	64%	36%
Useful format for presenting information	73%	27%
Resource I can use easily in the classroom	71%	29%
Useful for preparing students for their visit	60%	40%
Reinforces content learned during their visit	71%	21%
How Useful is the Fish ID Card		
Presented useful information for my students	47%	47%
Captures my students' interest	36%	50%
Useful format for presenting information	33%	47%
Resource I can use easily in the classroom	36%	43%
Useful for preparing students for their visit	29%	43%
Reinforces content learned during their visit	46%	39%

Number of teacher survey respondents is 15 (33%) post visit from September 2012 to December 2012.

Classroom Discussion of Ocean Stewardship and Fishing Issues

The number of teachers who discussed ocean stewardship or fishing issues with their students at least once a month or more frequently also was assessed. This included the importance of taking care of ocean and marine life (77%), how to identify fish and which fish are safe to eat (31%), some commonly caught fish are not safe to eat (42%), ways to safely prepare and eat fish (46%), and how fishing is part of many cultures around the world (54%). Overwhelmingly, teachers planned to utilize content learned from their visit in the classroom as part of a larger science lesson (92%); incorporate science, marine biology, environmental or conservation issues (85%); or follow up with additional curricula or science lessons (100%). These results are shown in Table 4.

Table 4—How Often do Teachers Discuss Ocean Stewardship and Fishing

Frequency that Teachers Discuss the Following Topics	Somewhat (1x/week)	Occasionally (1x/month)
General information about fishing	8	15
General information about marine life	23	39
Importance of taking care of ocean and marine life	23	54
Opportunities for students to pursue career in science	39	31
How DDT/PCB in ocean harms wildlife and people	8	39
How to identify fish and which fish are safe to eat	0	31
Some commonly caught fish in S. CA are not safe to eat	0	42
Ways to safely prepare and eat fish	0	46
Bioaccumulation	8	23
How fishing is part of many cultures around the world	8	46
Plan to Utilize Visit into my Teaching	Yes	Maybe
As part of a larger science lesson in my classroom	92%	8%
Incorporate science, marine biology, environmental or conservation issues into my regular curriculum	85%	15%
Follow up with additional curricula or science lessons	100%	0%

Number of teacher survey respondents is 15 (33%) post visit from September 2012 to December 2012.

Teacher Feedback on SEA Lab Activities

All of the teachers surveyed responded strongly agree or agree that the aquarium staff presentations, hands-on activities, and touch tank/animal interaction activities presented useful information, were interesting, pertinent to California Science Content Standards, and stimulated student interest in science careers. Results are shown in Table 5.

Table 5—Teacher Feedback on SEA Lab Activities

Feedback on SEA Lab Activities	Responded Strongly Agree and Agree		
	Aquarium Staff Presentations	Hands-on Activities	Touch Tank Activities
Presented useful information	100%	100%	100%
Interesting	100%	100%	100%
Pertinent to CA Science Content Standards	100%	100%	100%
Stimulated student interest in science careers	100%	100%	100%

Number of teacher survey respondents is 15 (33%) post visit from September 2012 to December 2012.

Student Feedback on SEA Lab Activities

Student survey feedback included 373 students for a 54% response rate. Students were in 4th (73%) and 5th (27%) grades. Fifty five percent of the students were girls and 45% were boys. Almost all of the students (96%) indicated that they enjoyed the fishing trip and activities that they did that day. Students responded very positively on all indicators to SEA Lab activities and felt a strong sense of environmental stewardship, with 98% responding that the ocean and marine life are important and that they need to take care of them. They also took away the main messages of the MSRP program such as safe fishing consumption practices (92%), knowing that some fish are not safe to eat (93%), and knowing that chemicals can harm wildlife and people (93%). Results are shown in Table 6.

Table 6—Student Feedback on SEA Lab Activities

Student Feedback	Yes	Maybe	No
I enjoyed the fishing trip and activities we did today	96	4	0
The fish card helps me identify fish I learned about	90	8	2
I learned that a few types of fish in S. CA are not safe to eat	93	5	2
I learned how chemicals can harm wildlife and people from the comic book	93	5	2
I enjoyed visiting science centers to learn more about fish	94	5	1
If you eat fish, do you plan to eat fish which are safe to eat?	92	6	2
I want to learn more about fishing and marine life in the ocean	93	5	2
The ocean and marine life are important and we need to take care of them	98	2	0

Number of student survey respondents is 373 (54%) post visit from September 2012 to December 2012.

Teacher and Student Benefits from SEA Lab Visit

Teacher feedback on the Fun Fishing Program described multiple benefits of participation for themselves and their students. Students got to participate in many hands-on activities and view marine life not available at their schools. Teachers learned a great deal of new information that they could use with their students in the classroom and were pleased to see their students so engaged and excited about marine life. Teachers felt that their students' participation in the Fun Fishing Program was beneficial. For many of their students, it was their first visit to the ocean or fishing. They were also able to better learn about contamination, safe fishing and consumption practices, and environmental stewardship and conservation. Teachers' direct quotes included the following:

- It provided many hands-on activities and specimens that are not available at our school site.
- The students were fascinated with the hands on activities.
- It was my first visit and it was great to see my students so engaged and excited about the presentations. I learned many new things about sea life that I can use in my class.
- Very well thought out activities and lessons which will translate into better understanding of life science standards.
- They were able to gain new experiences such as fishing, interaction with live animals, and a new outlook on future careers in science.
- Many of my students have not been to the ocean, so just being next to this extraordinary environment made them more cognizant of their surroundings. The exercises throughout the day were so appropriate and standards driven in the life and environmental sciences.
- My students learned so much from their visit. They can identify harmful chemicals found in some fish. They know how to tell their parents how to cook fish properly and they had their first experience with a fishing rod.
- Students benefited by learning about marine life, food chains and aquatic ecosystems. As well they are more aware of being environmentally conscious and respecting our oceans and not polluting one of our sources of food and recreation.
- The students got to see and touch animals and plant life from the ocean. These are things they would never get the chance to come in contact with living in East Los Angeles.

The strongest aspects of their SEA Lab visit included the fact that the visit and activities were very well managed and organized by the staff, and the hands-on activities really reinforced student learning:

- The visit was very well managed by the staff. They are by far the best organized of any place I have visited with kids in 18 years of teaching.
- I felt that the students really gained valuable knowledge by looking and touching the multiple aquariums.
- The food chain was very strong, and the fishing expedition.
- Hands on fishing!!! Most students had never been fishing!!
- I know the students enjoyed all the hands on activities, but I especially enjoyed the game. It was fun and meaningful to what they had read about.
- The strongest aspect of the visit was the hands on activities, which included fishing, and viewing of the tanks.
- The proximity to our school even though not close, but close enough for my students to convince their parents to go on a Saturday. The fact that our trip was provided to us because of a grant, this trip would not have been possible otherwise.
- The interactiveness, information, wonderful and well educated/versed staff, an exposure to marine wildlife.
- Your program is very well organized. All lessons were interesting and done well.
- The hands on where the students were able to touch the fish. The fishing experience. Even though we did not catch any fish, each student had a big smile on their face.

Suggestions for Future Improvements

Most teachers felt that the visit to the SEA Laboratory was a “perfect” field trip that didn’t need to be improved. Some teachers had some minor suggestions:

- I would more closely link all the activities together in a follow-up (by the staff) in the classroom. I would also advise the school staff and parents about the hike to the pier.
- Keep it small groups. More than 35 students at a time, may be a bit difficult and distracting.
- More time for the students in the lab.
- I can better prepare my students by teaching them about some animals they may encounter at the SEA Lab.
- The current arrangement is just fine. The only suggestion I could think of would be some accommodation for students with handicaps.

Marina Del Rey Anglers (MDRA)



MDRA was founded in 1975 as a fishing club. The board of directors is comprised of dedicated professionals and retirees. The club already successfully leads youth fishing trips, conducts major fishing tournaments and partners with the California Department of Fish and Wildlife, Hubbs Seaworld Research Institute and United Anglers of Southern California on a major white sea bass restoration project.

MDRA completed 24 boat fishing trips for 575 children within the Santa Monica Bay from July 2012 to August 2012. The children came from at-risk environments in the Los Angeles area and ranged from 10 - 16 years of age. During the fishing trips, MDRA taught the children and their counselors about local fish contamination and safe fishing practices and introduced the kids to the MSRP "What's the Catch" comic book. Copies of the "What's the Catch" comic book and the Fish Identification Card were distributed to the children to take home and share with their families MDRA explained how to identify each of the fish that were caught and which ones are recommended for consumption and which ones should not be consumed. Fishing staff on the boat showed the kids and counselors how to properly fillet a fish for the safest possible consumption.

Youth counselor feedback (n=13, 50% response rate) on the MDRA boat fishing trips was extremely positive. Counselors felt that all of the kids enjoyed the fishing trip and activities they did that day and also were able to identify fish and which fish are safe to eat. They also felt that kids would use the fish identification card to help identify which fish are safe to eat (92%). They felt that the children learned about how DDT, PCB, and mercury impact people (84%), and that they understand they have a responsibility to be good stewards of the ocean and marine life (100%). Counselor feedback is shown below in Table 7.

Table 7—Counselor Feedback on MDRA Pier Fishing Activities

Student Feedback	Strongly Agree and Agree
Our kids enjoyed the fishing trip and activities we did today	100%
The kids learned to identify fish and which fish are safe to eat	100%
The fish card helps kids and their families identify which fish are safe to eat	100%
The kids learned that a small number of locally caught fish species are not safe to eat	100%
I am sure that the kids will read the comic book and fish ID card and take them home to their families	92%
The kids learned about how chemicals, DDTs, PCBs, and mercury can harm wildlife and people	84%
Grilling and eating the fillet is the safest way to prepare and consume fish	77%
Contaminants such as DDTs and PCBs accumulate up the food chain	85%
These contaminants were dumped into the ocean more than 30 years ago and even though they are no longer being released they still remain on the ocean floor	62%
I plan to eat fish which are safe to eat and reinforce this to our kids and their families	100%
Fishing is one way in which people in many cultures around the world connect with and enjoy nature	100%
The kids understand we have a responsibility to be good stewards and preserve our ocean's resources	100%

Number of youth counselor survey respondents is 13 post fishing trip from July 2012 to August 2012.

Youth feedback (n=188, 33% response rate) on MDRA boat fishing trips was also extremely positive. Youth really enjoyed the fishing trip and activities (88%) and learned a great deal about fishing and fish (82%) and about how chemicals spilled in the ocean harmed wildlife and people (84%). Youth also felt a strong sense of environmental stewardship about the ocean and marine life (95%). Results are shown in Table 8.

Table 8—Youth Feedback on MDRA Pier Fishing Activities

Youth Feedback	Agree
I enjoyed the fishing trip and activities we did today	88%
I learned many things about fishing and fish today	82%
I learned how to identify fish and which fish are safe to eat	76%
The fish card helps me identify fish that I learned about	74%
I learned that a few types of fish caught in Southern California are not safe to eat	77%
I promise to read the comic book and share it with my family	56%
I learned about how chemicals were spilled in the ocean and how they can harm wildlife and people	84%
I plan to teach my family which fish which are safe to eat and which ones are not good to eat	72%
I plan to go fishing again next year and go fishing when I grow up	76%
The ocean and marine life are important and we need to take care of them	95%
Youth Feedback	Strongly Agree and Agree
Grilling and eating the fillet is the safest way to prepare and eat fish	60%
Contaminants such as DDTs and PCBs accumulate up the food chain	64%
These contaminants were dumped into the ocean more than 30 years ago and even though they are no longer released they still remain on the ocean bottom	69%

Number of youth survey respondents is 188 post fishing trip from July 2012 to August 2012.

Youth counselors and youth learned significantly about fishing and fish as confirmed by the percentage of counselors and youth correctly selecting which statements were true, such as looking for signs on the pier to find out which fish are safe to eat or following fishing regulations. On average, youth counselors and youth correctly selected the statements as true 90% and 80% of the time respectively. This is shown in Table 9.

Table 9—Counselor and Youth Fishing Knowledge

Which are safe fishing practices?	Counselors	Youth
Looking for signs at the piers which tell me which fish are safe to eat	92%	78%
Returning fish to the ocean which you do not plan to eat	85%	85%
Following fishing regulations	92%	86%
Eating only the fillet and throwing away the insides of the fish	85%	68%
Not eating fish that are contaminated	92%	83%
Telling your family and friends about contaminated fish	92%	82%

Number of youth counselor survey respondents is 13 and youth survey respondents is 188 post fishing trip from July 2012 to August 2012.

Youth counselors clearly felt that their kids benefitted from the pier fishing experience and felt it was a healthy way for them to enjoy themselves and experience the ocean. The counselors were also able to reinforce the messages from the trip during the summer. Counselors’ direct quotes included the following:

- It was a great trip for the kids. They enjoyed themselves. The staff on the boat was helpful and the kids responded well to everyone. Thank you for the experience.
- We continue to have a wonderful experience with this group. The kids enjoy themselves and verbalized having a great time. Being able to provide these experiences for our youth makes their summer enjoyable and teaches them healthy leisure interests. Thank you for everything.
- The fishing trip was a great experience for the youth. They learned new things about which fish are good to eat and how to use a fishing pole properly.
- The kids had a great time and look forward to coming again next year. Thank you.
- I thoroughly enjoyed myself today. This trip was absolutely perfect for our kids. Many caught fish today for the first time in their lives. It was so great to see all the smiles on everyone’s faces. What a beautiful day to be on the water. The volunteers were so patient and such a pleasure, friendly and helpful with everyone. Thank you!

Cabrillo Beach Pier Fishing Program

The City of Los Angeles, Department of Recreation and Parks (City) operates and maintains the City’s 16,000 acres of parkland, over 400 parks, 180 recreation centers, 59 pools, and two beaches. The City started a Cabrillo Beach Pier Fishing Program in 1988 instructing over 1,000 youth on how to fish. Due to budget constraints, the program did not receive funding and was cancelled for the summer of 2010. MSRP was able to provide funds to continue this program along with an educational component about safe fish consumption and the impact of the chemicals DDTs and PCBs to humans along the Los Angeles coastline.

From July to August 2012, the Cabrillo Beach Pier Fishing Program served 338 youth and 30 counselors from the greater Los Angeles area, ranging from 8 -16 years old. We did not

seek feedback from the counselors for the program. Youth from 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 Alpine, Banning, Cypress, El Sereno, Glassell Park, Green Meadows, Harbor City, Rancho Cienega, and Van Ness. Fifty-eight percent of the youth were boys and 42% were girls.



The fishing programs lasted three hours including a hands-on fishing activity on Cabrillo Pier. Prior to the fishing activity, City staff handed out comic books and fish identification cards to all participants, 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. The majority of youth participating on the fishing trips enjoyed the trip (77%), learned that some fish caught in Southern California are not safe to eat (67%), and felt a sense of environmental stewardship in the importance of marine life and the need to take care of them (85%). Youth feedback (n=338, 97% response rate) on pier fishing is in Table 10 below.

Table 10—Youth Feedback on Cabrillo Beach Pier Fishing Activities

Youth Feedback	Responded Yes
I enjoyed the fishing trip and activities we did today	77%
I learned how to identify fish and which fish are safe to eat	63%
The fish card helps me identify fish that I learned about	54%
I learned that a few types of fish caught in Southern California are not safe to eat	67%
I plan to eat fish which are safe to eat	59%
I enjoyed the comic book	55%
I learned about how chemicals can harm wildlife and people from the comic book	61%
I want to learn more about fishing and marine life in the ocean	63%
The ocean and marine life are important and we need to take care of them	85%

Number of youth survey respondents is 338 (100%) post fishing trip from July 2012 to August 2012.

Staff Interviews

Interviews with SEA Lab, MDRA, and City program staff provided further insight on how MSRP key messages were incorporated, how they used the comic book and fish identification card, the most successful aspects of their program, their intended target audiences, how they assessed the effectiveness of their program activities, and advice they would give to future mini-grant recipients.

Incorporating MSRP Key Messages

Maria Madrigal, program manager of SEA Lab, stated: “I think the messages intersect very nicely with the programs at the SEA Lab and the fact that we are using the comic book as a pre-activity for the kids. It’s hard to distinguish and separate them. The messages have been incorporated into our program for so many years now. The grade levels are the biggest difference for us. The comic book is geared towards the age range we are working with, and the enthusiasm of the kids we are working with. For older kids, it’s not as cool to show that they are excited about stuff. I did enhance our tour to make sure it is more in alignment with what we are doing, especially with the older kids. For the tour for the younger kids, I used more props...if they are on the pier, they might not get a chance to catch a living fish. Off the pier measuring the fish can be very stressful for the fish. So we use props on the tour to go over anatomy and measure fish, in addition to the live animals. I think it’s been fairly easy; it naturally fits in to incorporate messages about fish contamination and safe fishing practices. With the new advisories that are out, it makes it easier to get the message across.”

SEA Lab staff use a food chain game to teach messages about bioaccumulation of DDT and PCB in the ocean. Madrigal indicated that “If the kids read the comic book ahead of time, it really reinforces this message and their ability to understand the concept.”

SEA Lab staff also does the fish filleting demonstration on the pier when they divide students into separate groups in which one group goes fishing and the other group participates in hands-on activities or demonstrations such as fish filleting.

Larry Brown, Director, MDRA staff, felt the messaging is more focused on “protecting the kids and their families whenever we can extend that information to the contaminated fish in the area—which fish are good to eat, which are safe to eat, and which are not. We get that information from MSRP and through the comic books and the website. When we started there was only one fish listed on the advisory, and then it was updated to include five fish on the advisory, and then mercury as well as DDTs and PCBs. We take the kids through the pictorial of the area, I have these large posters I have made, and we take all of the kids to the back of the boat and we have a captive audience, we sit them on the deck and benches, and take them through a presentation of five posters. The first is the map, the next is the pipeline and where the outflows were, and then we talk about the contaminated fish and the food chain, most of the pictures come out of the comic book. A picture of the vertical food chain, then we show the fish ID card and have it blown up and ask the kids to identify which fish are good to eat and which fish are bad to eat. They are pretty engaged, they are on the water and they’re having fun, they are still in the harbor so the water is very calm, and they seem to get it.”

Mark Rose, Facility Director, City staff, states, “Our main message would be safe fish consumption and second would be safe fishing practices. For the secondary messages, we talk about the impact of human activity on the local coastline including DDTs and PCBs. Secondary messages are about how the chemicals affect the food chain or local marine life.”

Use of the Comic Book and Fish Identification Cards

SEA Lab staff felt that 80% of the students participating in the program read the comic book ahead of time. The comic book is provided to the classrooms participating as a pre-activity since there isn’t time during their visit to read the comic book. SEA Lab staff also performs a food chain game with students that uses images similar to those from the comic book and staff asks students if they recognize images or information from the comic book.

MDRA staff provides the comic book to participants after their boat trip, and use images from the comic in the large posters they use during their presentation to the children. Brown stated, “We try to teach the counselors to pass it forward. We encourage them to talk about what they learned to others who couldn’t make the trip. Even though I say it’s targeting the kids, it is also targeting the community. I think the counselors and parents are

just as important to include in the education. We encourage the counselors to be a part of the activity. Everyone is actively listening and we tell them we will test them on it afterwards.”

City staff goes over the comic book quickly with participants before their fishing activity.

All three programs hand out copies of the comic book and fish identification card to teachers, youth counselors, and students/youth. SEA Lab sends the comic book ahead of time, and MDRA and City staff provides it during their visit.

Fish identification cards are used at the pier during fishing so students can identify fish that they catch. MDRA staff has large fish identification cards posted on the boat for student reference. All three programs utilize some hands-on activities. Typically catch and release practices are used with the fish that are caught. Students observe fish filleting but are not allowed to do it themselves for safety reasons. City staff indicated that they would do fish filleting demonstrations in their program the following year, based on suggestions from other mini-grant recipients and MSRP staff.

Successful Aspects of the Programs

SEA Lab and City staff feels that MSRP funding allows them to expand their program activities, while MSRP funding allows MDRA staff to serve the same number of youth it has always served but without doing additional fundraising activities. MDRA and City staff feels that hands-on fishing is the most successful part of their youth programs, whether it is on a boat or on the pier. SEA Lab staff feels it was the combination of all of the activities—hands-on activities in the informal science center combined with pier fishing—which reinforce each other to make a strong program.

SEA Lab staff wants to continue serving third to fifth graders as their target audience since she feels that their program is most beneficial to that age group. “It supplements what teachers are doing in the classroom and their current science standards. It works with their discussion of food chains, contamination, life cycles. The survey feedback I saw from teachers is that it was in alignment with their standards.”

MDRA and City staff feels their programs serve a wide age range of youth. City staff commented, “We primarily serve under-served communities where our recreation centers are located. Children from these under-served communities are at our day camp, and we bring them out as part of an organized activity. The older ones are paired with the younger ones, so they get that kind of mentoring ability too.”

Assessing Effectiveness of Program Activities

As far as assessing the effectiveness of their programming, staff relies partly on survey data but also on responses from students, teachers, and youth counselors. Madrigal from SEA Lab indicated, “A lot of it to me personally is if I see the kids are responding to it. When you ask them questions, do you understand this? Also, I look for their enthusiasm for doing the activity. If they have no interest in doing a certain portion, then that isn’t going to work... Sometimes kids say it’s just peaceful to be out fishing. For those who do actually complete surveys you use that feedback to adjust your program. Based on the feedback from kids on the pier and when they weren’t catching something, I realized I needed something else for kids to do or otherwise they are going to be bored or distracted. Planning for different scenarios helps me come up with other possibilities and ways to get the same message across. Letters and thank you cards are really important, as well as the teacher feedback. I don’t rely on any one thing, I try to use as many tools as possible. Pre and post surveys from the teachers are the most beneficial. Not sure if the surveys from the kids tell you as much, not sure if they understand what you are asking them. Their comprehension is always so varied, so trying to find the perfect way of asking the question.”

MDRA staff relies strongly on evaluation forms. “Each of the programs we have done for Santa Monica Bay Restoration Foundation and MSRP, we have evaluation forms for the children, counselors, and make it a requirement that those forms are filled out and sent back to us. We are 90% successful in getting those back. We keep contacting them until they get them back to us and then there’s a good chance that they will get invited back.”

City staff stated, “Our best practices are based on past experience and are of interest to the target that we serve. In terms of what hasn’t worked, the education component is new so we are trying to find an interactive way to make this a big part of the program as well. We totally identify with the key messages of MSRP but it’s just something new to our staff.”

Advice for Future Programs

Program staff feels that for future mini-grant recipients it is important for grantees to communicate effectively with MSRP staff and to ensure they are clearly communicating the key messages. MDRA staff feels that for grantees implementing a similar program “I would say make it fun, make it short, and incorporate it with the primary activity. In this case, the primary activity is fishing. Try to incorporate it on the boat for two reasons. You have a captive audience and two, I think it’s more fun, and they will remember something that’s more fun. If you have it on the classroom or on the dock, they’re just not going to remember as much. Also have big visual aids.”

SEA Lab staff feels it was important “To be flexible and be willing to try different things. What may work with one group may not work with another. When you are trying to run a

fishing program, the weather may not cooperate so you always need a backup plan. Or if the bus doesn't arrive on time, give yourself a little wiggle room when you are doing any kind of activity outdoors."

Key Messages

MSRP developed a set of key and secondary messages for their program in 2012 which they encouraged their fishing mini-grant program recipients to incorporate into their programming. This was the first year that mini-grant recipients incorporated these messages. Through the fishing activity, the programs touched upon the key and secondary messages.

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 11—Implementation of Key Messages

Use of Key (1-3) and Secondary Messages (4-10)	Relates to Message	Students Responding Yes/Agree (%)		
		SEA Lab	MDRA	City of Los Angeles (City)
Plan to eat fish which are safe to eat	2	92	--	59
Learned how to identify which fish are safe to eat		--	76	63
A few fish are not safe to eat	3	93	77	67
Not eating fish that are contaminated		--	83	--
Contaminants bioaccumulate up the food chain	4	--	64	--
Chemicals can harm wildlife & people	5	93	84	61
Contaminants dumped in ocean more than 30 years ago are still in environment today		--	69	--
Grilling and eating fillet safest way to eat fish	6, 7	--	60	--
Look for signs telling which fish are not safe to eat	8	--	78	--
Return fish to ocean if you do not plan to eat them	9	--	85	--
Want to learn more about fishing & marine life	10	93	--	63
Ocean & marine life are important, need to take care of them		98	95	85

Students responded yes to SEA Lab and Cabrillo Beach Pier surveys and agree on MDR Anglers surveys. A double dash indicates where data was not collected for a particular message.

Table 11 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 section for these messages) and survey items from youth participant surveys. We can see in Table 11 that two of the key messages (2,3) were incorporated by all programs and had at least a 75% or higher rate of retention from two of the programs (MDRA, SEA Lab). Secondary messages (4-10) were emphasized differently among the various programs and with a 60% or higher retention for all of the programs. The surveys were administered to youth immediately after the fishing activity for the City and shortly after for SEA Lab and MDRA so longer term impacts of these messages cannot be determined at this time.

SEA Lab

SEA Lab staff did an excellent job of incorporating all key and some 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. SEA Lab reinforced concepts in the comic book during the educational activities that were sent to teachers and used in the classroom before the field

trip. Staff also presented an ecological perspective on how human actions impact human health in order to reinforce the environmental stewardship message.

Marina Del Rey Anglers

MDRA staff focused on all of the key and secondary messages throughout their program. Staff focused on teaching which fish are safe and not safe to eat and safe fishing practices, including catch and release techniques when not consuming fish, role of DDT and PCB contamination in the area, and a fish filleting demonstration. The comic book and fish ID card were disseminated to the youth following the fishing boat trips.

City of Los Angeles

City staff touched upon most of the key and secondary messages through the pier fishing activity. This included which fish species are safe to eat, fish contamination issues, and safe fishing practices. Staff did not explicitly discuss safe fish preparation practices. Staff utilized concepts from the comic book and disseminated the comic book and fish ID card to the youth.

Conclusions

The fishing mini-grant programs accomplished the goals of the MSRP program in relaying the key and secondary messages from the program, and disseminating educational materials such as the comic book and fish identification card.

To the extent possible, mini-grant programs conducted 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. Pre-surveys for the teachers were possible for the Fun Fishing Program at SEA Lab, but were generally less possible for the other programs which do not involve pre-registration before their fishing trips. For the 2012-2013 program year, surveys were collected by SEA Lab, MDRA and City staff.

MSRP mini-grant recipients were required to attend a training day with MSRP's Outreach Coordinator and other staff in May 2012. Participants at the training day were introduced to the key and secondary messages of the MSRP program and to evaluation as a way to determine each program's effectiveness in interpreting and disseminating these messages through their respective program activities. Programs explicitly documented which key and secondary messages were emphasized in program activities during the survey development process, and touched upon all of these key and secondary messages during their program planning to remain on target with their messaging. This is clearly indicated by staff during their interviews as well as by the responses from teachers, youth counselors, and students/youth responding to their surveys.

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. This is something that the City of Los Angeles Fishing program is doing this summer, in pursuing a partnership with the neighboring Cabrillo Marine Aquarium. Educational resources developed through programs funded by MSRP could also be shared with other education outreach programs such as COSEE-West. For example, City of Los Angeles staff shared their program with the California Coastal Commission.

The creation of new survey instruments for teachers, students, youth counselors, and youth are useful means of collecting further data to measure the impacts of the mini-grant programs and their effectiveness in delivering key and secondary messages of the MSRP program. Some additional slight revisions of the survey instruments for some mini-grant programs for consistency and to collect additional pieces of information were done for survey instruments being utilized by the upcoming mini-grant recipients for the 2013-2014 program year (see Appendix).

Another recommendation of the MSRP five year program review was that mini-grant recipients would 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. Mini-grant recipients shared their knowledge with other participants at the MSRP Training Day held in May 2013.

The MSRP program benefits greatly from funding different types of programming. The SEA Lab program targets teachers and their students which includes Target I schools. The SEA Lab program can be reinforced because of the long term relationship that teachers have with their students during the course of the school year. The City program takes advantage of informal opportunities of learning by taking youth fishing who participate in their recreation center day camps during the summer months. MDRA works with youth camps and programs that have disadvantaged or disabled children which also lack the funding to take these youth fishing from a boat. These programs have entirely different impacts and reach different populations of students and youth, and offer different ways for MSRP to connect youth to fishing opportunities and to conduct education and outreach about safe fishing practices.

APPENDIX

MDR Anglers youth survey—Add grade level

Cabrillo Beach Pier youth survey—Add open response for additional comments

SEA Laboratory student survey—Add open response for additional comments

MDR Anglers counselor survey—Add open response questions on 1) how did you benefit from the visit, 2) how did the youth benefit, 3) what were the strongest aspects of your visit, and 4) how would you improve future visits

Use strongly agree-agree-disagree-strongly disagree scale for questions on the youth and student surveys

Harmonize the questions on the MDR Anglers youth survey and the Cabrillo Beach Pier youth surveys:

- a. Delete Q6 on MDR Anglers youth survey: I learned many things about fishing and fish today (not strictly needed)
- b. Revise Q12 on MDR Anglers youth survey: I plan to eat fish which are safe to eat (simpler intentional statement)
- c. Revise Q10 on MDR Anglers youth survey: I enjoyed the comic book (this indicates they have read the comic book)
- d. Revise Q11 on MDR Anglers youth survey: I learned how chemicals can harm wildlife and people from the comic book – this helps attribute learning to the comic book
- e. Revise Q13 on MDR Anglers youth survey: I want to learn more about fishing and marine life in the ocean (links fishing with learning)
- f. Add question on MDR Anglers youth survey: I plan to eat fish which are safe to eat (signals intention)
- g. Add question on MDR Anglers youth survey: I want to learn more about fishing and marine life
- g. Add question on SEA Lab student survey: I learned how to identify which fish are safe to eat.
- h. Add question on SEA Lab student survey and Cabrillo Beach Pier youth survey: Not eating fish that are contaminated

- i. Add question on SEA Lab student survey and Cabrillo Beach Pier youth survey: Contaminants bioaccumulate up the food chain
- j. Add question on SEA Lab student survey and Cabrillo Beach Pier youth survey: Contaminants dumped in ocean more than 30 years ago are still in environment today
- k. Add question on SEA Lab student survey and Cabrillo Beach Pier youth survey: Grilling and eating fish safest way to eat fish
- l. Add question on SEA Lab student survey and Cabrillo Beach Pier youth survey: Look for signs telling which fish are not safe to eat
- m. Add question on SEA Lab student survey and Cabrillo Beach Pier youth survey: Return fish to ocean if you do not plan to eat them