

*Public Use at
Don Edwards
San Francisco Bay
National Wildlife Refuge*



Annual Narrative 1996

*Education, interpretation, volunteers, law enforcement
and other wildlife-oriented programs for people*

CONTENTS

E.2. Youth Programs	1
E.4. Volunteer Programs	1
H.1. General Public Use	8
H.2. Field Trips (Outdoor Classrooms) - Students	9
H.3. Environmental Education - Teachers	18
Field Trips	
Field Trip Orientation	
Educational Resources	
Educator Workshops	
Educational Courses, Programs, and Organizations	
H.4. Interpretive Trails	27
H.5. Interpretive Routes (Nothing to Report)	27
H.6. Interpretive Exhibits, Demonstrations, and Special Events	27
H.7. Other Interpretive Programs	50
H.9. Fishing	52
H.10. Trapping (Nothing to Report)	53
H.11. Wildlife Observation	53
H.12. Other Wildlife Oriented Recreation (Nothing to Report)	53
H.13. Camping (Nothing to Report)	53
H.14. Picnicking (Nothing to Report)	53
H.15. Off-Road Vehicles (Nothing to Report)	54
H.16. Other Non-Wildlife Oriented Recreation	54
H.17. Law Enforcement	54
H.18. Cooperating Associations	54
Public Use Staff Photos	58
Appendix A: "Linking Girls To The Land" Workshop Resource List	63
Appendix B: Law Enforcement Statistics	65

1996 ANNUAL NARRATIVE PUBLIC USE SECTIONS

E.2. Youth Programs

Boy Scouts and Girl Scouts -- During 1996, the Refuge had 6 employees involved with Scouting. The Refuge logged a total of 144 hours, consisting of 48 hours of duty time and 96 hours of volunteer time.

Staff and volunteers continued to meet, upon request, with girl and boy scout troops during after-school and weekend visits to the Refuge. Usually the troops were fulfilling requirements for badges and the staff or volunteers presented programs based on what the troop leader requested.

Staff at the Environmental Education Center provided a "Beginning Birding Workshop" for 70 Scouts, a "Bike the Bay" program for 11 Scouts and a general tour of the Refuge for another 11 Scouts.

At the Visitor Center, two staff members and one education intern led 70 Girl Scouts through our popular "Trekking the Refuge" program. Headquarters staff also presented indoor wildlife conservation messages to over 170 Boy Scouts and Cub Scouts.

Eagle Scout projects included restoring native vegetation to the Visitor Center area (8 scouts), landscaping our Native Plant Nursery (6 scouts), uplands habitat restoration along the Tidelands Trail (6 scouts), and construction of a wheel chair ramp on the Tidelands Trail (17 scouts).

E.4. Volunteer Programs

Once again, volunteers were vital to the continued success of many of the Refuge's programs. Volunteers staffed the Visitor Center 95% of the time, patrolled the Refuge trails and fishing pier, and presented 98% of the weekend interpretive programs, including walks, slide shows and tours.

Volunteers were vital to the Environmental Education Program, helping develop new activities and materials, and assisting with learning stations on field trips. Two volunteers in particular, Sal Lopez and Joan Telfer, were instrumental in presenting programs for the Common Murre Restoration Project. Volunteers provided administrative help in the office with mailings, data entry, and general clerical help, and also assisted with many maintenance projects around the Refuge, especially weeding, pruning, and painting. Resource management projects which utilized our volunteers included plantings of native species, weedings of non-natives, the Annual Butterfly Count at Antioch Dunes NWR, bird call counts and surveys, and data entry and cleaning, painting, and mounting decoys for the Common Murre Restoration Project.

Total hours contributed by 961* registered volunteers throughout the year was 21,027*, which at a minimum wage of \$4.75 per hour, saved the government \$99,878.25. This included Refuge volunteers, non-Refuge volunteers and Student Conservation Association (SCA) interns. Refuge volunteers are required to go through a 20-hour orientation and training, and to commit 16 hours a month (which is flexible). Currently, there are 151 Refuge volunteers on staff. Non-Refuge volunteers include community, scout, school, church, prison work and alternative sentencing groups, as well as other one-time volunteers.

Volunteers were vital to the success of many Refuge events, including the Native Plant Sales, Earth Day, Migratory Bird Day, Coast Clean-up and National Wildlife Refuge Week.

Volunteers helped organize and run the Earth Day festivities this year. Hourly programs, children's activities, nature walks, environmental organizations' displays, Refuge cleanup, and the Native Plant Sale focused on this year's theme of "Be An Earth Saver."

Approximately 435 people contributed 1,305 hours during the 12th Annual Coast Clean-up. Volunteers from the public and Refuge volunteers helped clean up three main sites: the Refuge headquarters area, the Environmental Education Center, and Coyote Creek Lagoon.

Volunteers also helped organize and run events in celebration of National Wildlife Refuge Week. Volunteers assisted with the Evening "Campfire" Sing-Along, Wildlife Art Auction, Environmental Information Fair, Plant Sale, and Shark Day.

Some of our youngest volunteers shared their knowledge with their peers during this past summer's Junior Naturalist program. These volunteers, previous graduates of the Junior Naturalist program, as well as other new and established environmental education volunteers assisted staff in teaching 3rd through 6th graders about the salt marsh and the importance of preserving the environment.

Volunteers assisted in various projects at other National Wildlife Refuges. Working with our cooperating association, volunteers continue to order the books not only for Don Edwards San Francisco Bay NWR, but also for sales outlets at Klamath, Sacramento, and Malheur NWRs. Two Student Conservation Association interns once again assisted Humboldt NWR at an environmental education conference in Humboldt County. Teachers and their classes learned about conservation and the environment through activities led by these interns. (See Section H.2)

Volunteers Harry and Gretchen Sanders were invaluable in continuing to develop the Native Plant Nursery. Harry, a retired chemist and University of California Master

* Total numbers of registered volunteers and hours do not include those from Farallon or Humboldt NWRs.

Gardener, and Gretchen cultivated 6,000 individual plants of almost 200 native species. They organized two plant sales, each raising thousands of dollars for habitat restoration.

A vital part of the Refuge's personnel is the Student Conservation Association (SCA) interns. SCA is a worldwide organization that provides internship opportunities with natural resource agencies so that participants can gain experience in careers in conservation. This past year there were 11 SCA interns who contributed 40 hours a week for at least 16 weeks. One intern, Jennifer Hartle, stayed about eight months, spending the first four with the Environmental Education Staff and the second four with the Biology staff. In exchange for her full-time volunteer service during the second four months, the Refuge provided her with housing and a small subsistence stipend of \$75.00 per week.

Six of the SCA interns, Stephene Benkert, Kathy Martin, Jennifer Hartle, Andrea Agee, Julie Henry, and Caleb Spiegel worked with the Wildlife Biologists, assisting with endangered California clapper rail and predator surveys, Aleutian Canada goose surveys, habitat restoration and snowy plover monitoring and protection activities.

Five other interns, Amy Helm, Kathryn Schulz, C.J. Fuss, Jon Lê, and Kerstin Butz (as well as Jennifer Hartle) were just as vital to the Environmental Education Program. These SCA interns were essential in assisting with teacher orientations, field trips, classroom presentations, Marsh-In Camp and the Junior Naturalists Program.

In May, Refuge volunteers were recognized for their efforts at the Annual Volunteer Picnic and Recognition Ceremony (for calendar year 1995). This year the event was held at the new P.O.S.T. Learning Pavilion at the Environmental Education Center. Chicken and steaks were barbecued by staff and everyone else brought a dish to share. This year the staff presented the awards at the First Annual "Volunteer Academy Awards," which was a big hit with everyone. The staff even sang songs such as "There's No Business Like Your Business," "Volunteer of Distinction," and "Thanks to the Volunteers" (all to tunes of well known songs). All volunteers received a Certificate of Appreciation, and some also received gifts such as San Francisco Bay Wildlife Society tote bags, pen sets, plaques, or gift certificates depending upon how many hours they had volunteered. In addition, volunteers who had accumulated hours in increments of 500 and 1000 were recognized with special pins and plaques. Volunteer of the Year honors went to Harry Sanders, for the second year, who contributed 757.75 hours to the Refuge!

Nine groups comprised of 155 volunteers from Sierra Singles, Community Impact, Quantum Corporation, Bay Networks, Intel, Indian Guides and Princesses, and Veritas Software helped to create two new interpretive exhibits at the Environmental Education Center. The Butterfly Garden and the Migratory Songbird Garden provide unique opportunities to investigate the importance of preserving and protecting native habitat. The Gardens demonstrate to visitors how to successfully garden without using herbicides by spreading a thick layer of mulch to deter non-native vegetation, and then removing what remains by hand. These projects have brought a whole new audience to the EEC, and actively engaged them in enhancing native habitat.

One group of volunteers who came for the Butterfly Garden Planting added approximately 100 native plants to the garden that are attractive to California butterflies. A second group provided drip irrigation to the plants in preparation for the dry season. Other groups removed invasive, non-native vegetation and spread a 4 inch layer of coarse mulch to deter its growth in the future. Thanks to these dedicated volunteers the Butterfly Garden is becoming well established. It is being utilized in the weekday field trip program and the weekend interpretive program.

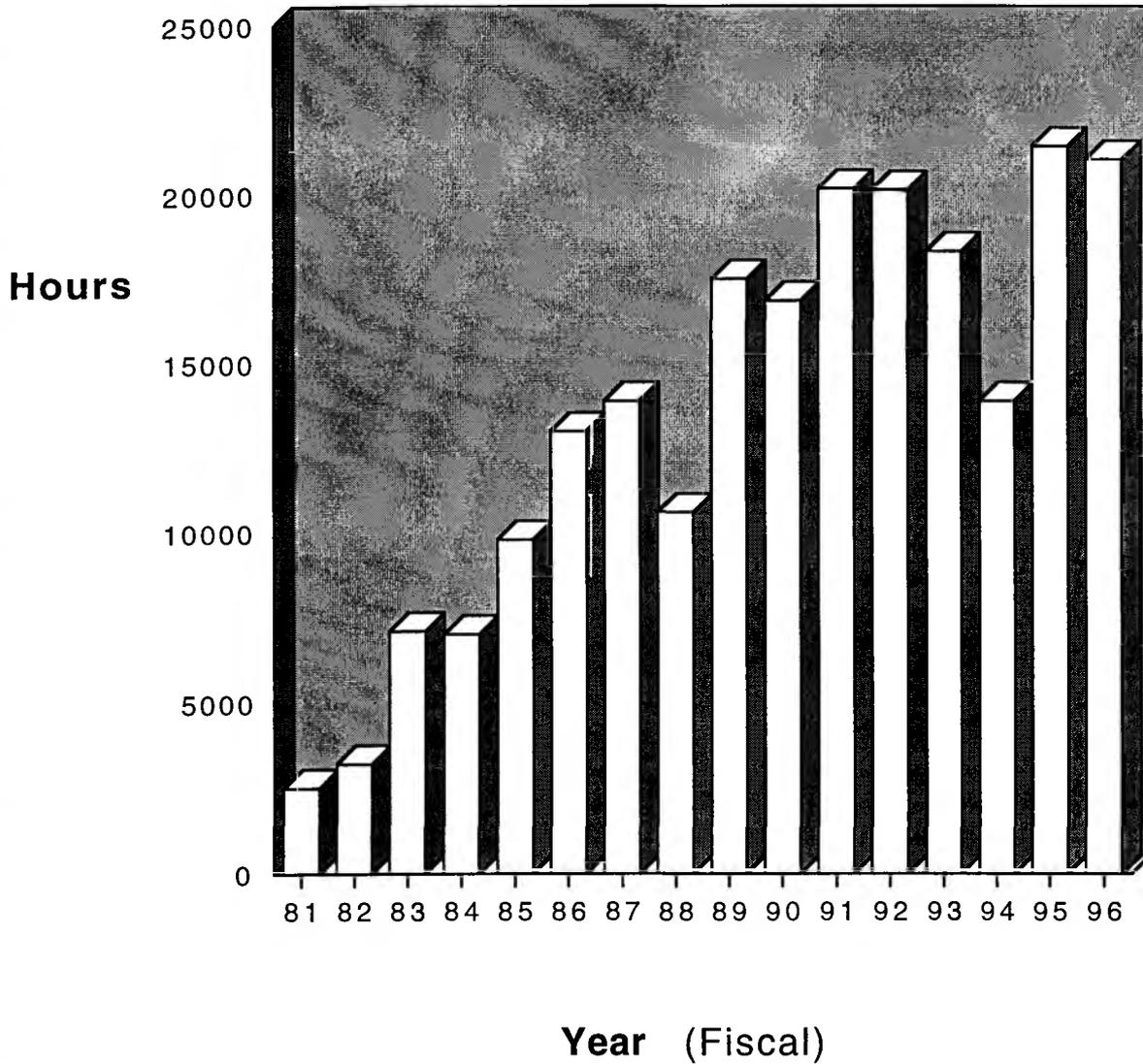
A group of volunteers from Viacom Corporation helped develop the Migratory Songbird Garden. They bought drip irrigation supplies, and approximately 60 native plants that are attractive to migratory songbirds. Forty-eight other volunteers from local companies installed the drip irrigation, planted the native plants, and spread a 4 inch layer of coarse mulch. This ongoing project will also be incorporated into the EEC programs in the future as it becomes more fully developed.

One advantage of the location of this urban wildlife refuge is that there is a large population base located nearby that serves as a vast reservoir of potential volunteer candidates. We recruit new volunteers through displays at various off-site fairs, word-of-mouth advertising, and articles in the quarterly *Tideline* newsletter. An application which describes the volunteer program is also available in the Visitor Center. We conducted one 20-hour training session and one 16-hour training session (when the Environmental Education Center was under renovation) for new volunteers in 1996. (Please refer to the schedules at the end of this narrative.) The fall training session was not held in order to give Nancy Fries, the Volunteer Coordinator, an opportunity to evaluate the program. Surveys were sent out to all staff and active and inactive volunteers to assess the Volunteer Program. Individual staff interviews were also conducted to better track the needs of the staff and upcoming projects. This process will continue into next year, and will hopefully allow for better matching of volunteers to projects, and a more efficient use of volunteer time, talent, and energy. (Please refer to the Surveys, etc. at the end of this narrative.)

At year's end, volunteer Harry Sanders was nominated for the National Wildlife Refuge Association's Volunteer of the Year in recognition of the superb job that he has done managing the Native Plant Nursery.

VOLUNTEER HOURS

San Francisco Bay National Wildlife Refuge Complex



NOTE: Farallon and Humboldt Bay NWRs
Hours not included



Harry Sanders receives his Volunteer of the Year Award (for 1995) from Volunteer Coordinator Nancy Fries



The team of Gretchen and Harry Sanders are the heart of an incredible effort that has become the Native Plant Nursery



Deputy Project Leader Harvey Hill works the grill at the 1996 Volunteer Awards Ceremony; supervision provided by his wife Betty



Staff members Rich Haire, Amy Hutzler, Christine Coy, Sandy Spakoff, Nancy Fries, John Steiner, and Barry Tarbet sing "Thanks To The Volunteers" at this year's Award Ceremony

H.1. General Public Use

San Francisco Bay National Wildlife Refuge serves a dense, local population of over 7 million people. It is an ideal place for Bay area urbanites to visit a relatively unspoiled area, enjoy the local wildlife and learn about nature, conservation and wildlife management.

The Public Use Division is composed of three sub-divisions. The Environmental Education Program teaches conservation and wildlife values to children. The Interpretation and Outreach Program explains natural history and salt marsh ecology to families and other audiences on and off the Refuge in a wide variety of media, and generates public recognition of the National Wildlife Refuge System. The Law Enforcement program, which became part of the Public Use Division in October, enforces laws and provides for public safety.

The Public Use Program includes Refuge signage responsibilities, development of exhibits, construction of visitor facilities, writing of brochures and other publications, administration of an active volunteer program, and advancement of general community relations and involvement.

During the year, 302,373 people visited the Refuge. Forty-thousand nine hundred people stopped in at the Visitor Center, and 3,134 attended interpretive programs, special events, artist receptions and other events. Over 11,000 students, teachers, and other adult leaders attended outdoor classroom activities at the Environmental Education Center in Alviso or the Visitor Center in Fremont. Over 75,069 visitors received our self-guided interpretive messages when they read our wayside exhibits.

The Visitor Center in Fremont was closed on Mondays and Federal holidays. The trails and fishing pier remained open from 7:00 a.m. to sunset every day except New Year's Day, Thanksgiving and Christmas.

The Weekend Interpretive Program at the Environmental Education Center continued to be funded by the Santa Clara County Nonpoint Source Pollution Control Program. It is staffed by a full-time, temporary Interpretive Specialist (GS-7) who is an employee of our cooperating association, the San Francisco Bay Wildlife Society. The Center is open to the public from 10 AM to 5 PM on Saturdays and Sundays. In addition, programs are scheduled upon request during the week. There was a good turn out by the public for trail usage and nature walks. The number of drop-in visitors at the EEC weekend program increased 28% this year to a total of 6,411 visitors. The combined weekday total for all visitors at the EEC including field trip usage in 1996 was 14,259. This figure includes school groups; general public drop-in visitors; workshop, meeting, and field trip orientation participants; summer camps; and volunteer training.

Most of our 1996 visitors participated in recreational activities other than formal programs at one of the two centers. The public fishing area (6,000 users) , trails (107,241 users), sloughs (3,900 duck hunters in boats, and 237 wildlife oriented recreational boaters), and other public areas were used by 117,378 visitors. Many of these people were contacted in the field by Refuge volunteers on patrol.

H.2. Field Trips (Outdoor Classrooms) - Students

The Refuge's Environmental Education Program (EEP) is administered at both the Environmental Education Center in Alviso and the Visitor Center in Fremont by Environmental Education Specialists. Once again, the Refuge offered exciting field trip programs for students.

The *Wetland Round-Up* (K-8 grades) and *Trekking the Refuge* (3-6 grades) field trip program formats allow for small groups of students to rotate from one learning station to the next throughout the day. As a result, students and accompanying adults spend an entire school day learning about the importance of the resource management objectives of the Refuge: preserving and protecting significant wildlife habitat in the South Bay, protecting threatened and endangered species, and protecting migratory birds.

Before bringing a group to one of our field trip programs, at least one educator and one other adult must attend a 4-hour field trip orientation workshop. Other adults from a group are encouraged to attend these workshops too. Upon completion of a field trip orientation workshop, an educator has all the necessary tools to plan and conduct an exciting field trip.

A high adult-to-student ratio (2 adults to every 10 students) is required. This ratio allows one set of adults to be learning station leaders and the other set to be chaperons who also assist the station leaders. The learning experience is enhanced by the small group setting and students are taught more effectively because of individual attention.

A *Wetland Round-Up* field trip includes an opening slide show for the students conducted by a volunteer (usually a Student Conservation Association intern) while a staff person orients the parents to the lay of the land. Then the students divide into small groups and begin activities at different learning stations, rotating from station to station during the course of the day. One adult is a small-group chaperon, moving with his/her group to each learning station. The other adult teaches an activity at a learning station, repeating the activity for each group during the field trip day. The educator acts as a "floater", available to help parent leaders with their learning station activities, answer field trip logistic questions and take care of any student emergency. A closing activity at the field trip's conclusion summarizes topics and ties together any loose ends to make the day's visit more memorable for the children.

The *Wetland Round-Up* field trip requires the help of a staff person and volunteer in conducting the field trip opening and closing activities, showing the adult leaders and chaperons the sites where the learning-station rotation activities are to be conducted, demonstrating the first rotation of an activity, and overseeing the flow of the field trip with the educator in charge. The educators select their own field trip activities and pre- and post-trip activities from the *Salt Marsh Manual - an Educator's Guide*. A typical field trip has six learning stations (hands-on, environmental education activities are conducted at these stations) and the group consists of two educators, sixty-five students, six learning station leaders, and six to eight chaperons.

Wetland Round-Up Sample Schedule

9:00	Bus arrives at the refuge
9:15 - 9:45	Habitat slide show - staff or intern
	Adult orientation - staff or intern
9:45 - 10:15	Station #1 (Mud Studies)
10:15 - 10:45	Station #2 (Beaks & Feet)
10:45 - 11:15	Station #3 (Where Have All The Wetlands Gone?)
11:15 - 11:45	Station #4 (Wetland Water Café)
11:45 - 12:10	Lunch
12:10 - 12:40	Station #5 (Salinity Testing)
12:40 - 1:10	Station #6 (Marsh Walk With Mini-Expedition)
1:10 - 1:30	Closing with students - staff or intern
	Clean-up by adults
1:30	Departure

The *Trekking The Refuge* field trips differ from the *Wetland Round-Up* field trips in the amount of staff time needed and number of students allowed on each field trip. For *Trekking The Refuge* field trips, the teacher checks out day packs filled with investigative equipment. One staff person hands out the activity equipment day packs at the beginning of the field trip and assists the adults in cleaning and counting the equipment at the end of the field trip. A maximum of 35 students (one class size) is allowed on each field trip. This policy limits the impact on the habitats, especially at the Visitor Center where the whole class is trekking a loop trail for part of the day.

Trekking the Refuge at the VC Sample Schedule

9:00	Bus arrives at the refuge
9:15 - 9:30	Bathroom Break at Visitor Center for students
	3 adults pick up and count the equipment
9:30 - 9:50	Opening Discussion led by educator
	<i>The Bay Begins at Your Front Door</i>
9:50 - 10:40	Trail Trekkers (whole group hike)
10:40 - 11:10	Station #1 (Salt Marsh Safari)
11:10 - 11:40	Station #2 (Salt Pond Private Eye)
11:40 - 12:10	Lunch

12:10 - 12:40	Station #3 (Salt Marsh Safari)
12:40 - 1:10	Closing Discussion led by educator <i>Wetland Wrap-Up</i> 3 adults return and clean equipment
1:15	Departure

The on-site field trip activities have been pre-selected by the EE staff. A pre-visit packet, checked out from our lending library, is mailed to the teacher two weeks before the field trip. It contains a slide show, a video, laminated posters, and laminated plant and animal pictures was designed to complement the *Trekking the Refuge* guide.

During 1996 educators conducted *Trekking the Refuge* field trips once a week at the Environmental Education Center. This program is still in the testing stage to evaluate the field trip activities and the field locations they share with the *Wetland Round-Up* field trip program. In 1997 the guide will be revised based on teacher and parent recommendations and staff observations of the field trips.

Trekking the Refuge at the EEC Sample Schedule

9:00	Bus arrives at the refuge	
9:15	4 adults pick up and count the equipment Opening Discussion: <i>The Bay Begins at Your Front Door</i> , led by educator	
9:45	Educator divides students into 4 groups - they are combined such that:	
	<u>Groups 1 & 2 are combined</u>	<u>Groups 3 & 4 are separate</u>
9:50	Station #1: Discovery Walk (80 min)	Group 3 is at Station #2 (40 min) Group 4 is at Station #3 (40 min)
10:30	Station #1: Discovery Walk (80 min)	Group 3 is at Station #3 (40 min) Group 4 is at Station #2 (40 min)
11:00	Lunch at Pavilion	
	<u>Groups 1 & 2 are separate</u>	<u>Groups 3 & 4 are combined</u>
11:40	Group 1 is at Station #2 Group 2 is at Station #3	Station #1: Discovery Walk (80 min)
12:20	Group 1 is at Station #3 Group 2 is at Station #2	Station #1: Discovery Walk (80 min)
1:00	Closing Discussion: <i>Wetland Round-Up</i> , led by an educator	

4 adults return and clean equipment

1:30 Departure

With only one environmental education specialist stationed at the Education Center and only one at the Visitor Center, the high quality of the field trip program and the number of students served would not be possible without the help of Student Conservation Association (SCA) interns and a few dedicated volunteers.

The volunteers and SCA interns learn the basics of the *Wetland Round-Up* field trip program and lead the first rotation of a particular activity for each field trip. In addition, they conduct opening and closing presentations, and provide support to educators and parent leaders by answering any questions they have about conducting activities at the learning stations. When not busy with visiting school groups, the interns and some volunteers help the staff with special projects, such as designing activity props, writing closing activities, conducting pre-field trip slide show presentations, and developing new field trip activities, which enhance the educational experience for the students.

An Environmental Education Plan guides the Environmental Education Program. This Plan provides a direction for the EE Program and ensures implementation of the Plan's components as time and staff availability allows. The Plan is up-dated in the spring and fall of each year.

Resource Management Objective sheets show the connection between field trip activities, student behavior and the Refuge's resource management objectives and issues. During field trip orientations, educators and parents are introduced to our resource management objectives. Every activity that is developed relates to the Refuge's resource management objectives and a specific resource management issue, states what the Refuge staff is doing to resolve the issue, and gives ideas of what students can do to help the staff revolve the issue.

Reservations for the field trips were taken twice during the year. On the first day of reservations we took calls from 4:00pm to 6:30pm, to allow teachers time to get out of school and call us in the afternoon. Reservations for the Winter and Spring session, conducted February through July, began on December 4, 1995. Reservations for the Fall session, conducted October through December, opened on September 9, 1996. Using this type of booking schedule, we had minimal field trip cancellations.

Adding the *Wetland Round-Up*, *Trekking the Refuge*, and "non-traditional" field trips from both the EEC and the VC gives the refuge a grand total of 8,791 students, 387 educators, and 1,998 educator-recruited volunteer leaders and chaperons participating in educator-led field trips in 1996.

Environmental Education Center Field Trips - Most of the groups using the EEC for a field trip participated in the *Wetland Round-Up* field trip program. 2,410 students, 104 educators, and 255 station leaders and 288 chaperons visited the site on this type of educator-led field trip. Attendance numbers were considerably reduced

because of building construction which included remodeling the offices in the EEC. Construction concluded March 28 and field trips began April 2.

Over the past seven years there was a greater demand for the *Wetland Round-Up* field trip program than the staff was able to meet. Many classes were turned away. To help alleviate this problem a new field trip program, *Trekking the Refuge*, was piloted with selected schools in the spring and then tested with random schools in the fall. The program is designed for grades 3-6, with a format similar to the *Trekking the Refuge* program at the Visitor Center. These field trips are conducted solely by educators and volunteer leaders (recruited by the educator), after attending the required 5-hour workshop led by EEC staff. Educators use the *Trekking the Refuge Educator's Guide* received at the workshop to plan the field trip, select activities, do pre- and post-visit activities and to lead the opening and closing activities with the entire class. Educators may choose to do four pre-selected, activity learning stations or two learning stations and one 80-minute Discovery Walk. All of the needed equipment is in day packs that the educators check out and carry with them.

Trekking the Refuge field trips at the EEC are staged out of our new learning pavilion and take place in the same proximity as the *Wetland Round-Up* field trips. To minimize impact to the habitats and allow for the two field trip programs to run concurrently, a maximum of 35 students (one class) participate at a time. There were 8 *Trekking the Refuge* field trips in 1996, with 10 educators, 22 station leaders, 34 chaperons and 250 students participating. Although the numbers are not enormous, *Trekking the Refuge* has been well received at the EEC and we look forward to future growth.

The EEC was also used by various student groups not participating in either the *Wetland Round-Up* or *Trekking the Refuge* field trip programs. The Santa Clara Valley Audubon Society brought 850 students, 73 educators and 58 volunteer leaders/chaperons to the EEC for their Wetlands Field Trip Program. George Mayne Elementary, the local school in Alviso, conducted three family science events at the EEC with a total of 102 children, 81 parents, and 18 teachers participating. At the other end of the academic spectrum, 133 college students from Mission College visited the site with instructor Janis Taylor-Buchanan, a former SCA intern. Numerous other groups have used the EEC as well. Totals for "non-traditional" field trips (including the above mentioned groups) are 1208 students, 94 educators, and 152 leader/chaperons/parents.

The combined totals for usage by all education groups at the EEC for 1996 are as follows: 9,999 students, 481 educators, 2,150 station leaders and chaperons.

Visitor Center Field Trips - The *Wetland Round-Up* field trip program at the Visitor Center completed its tenth year at the end of 1996. One hundred seventeen classes, 3,402 students, 124 educators, and 937 volunteer leaders participated.

At the VC, a pavilion and an old, former pump house serve as the hub for the daily field trip program. The pavilion, completed in 1992, is an important building for the *Wetland Round-Up* field trips; field trip opening and closing activities are conducted in the pavilion, along with some of the activity stations.

In the past, there has been a greater demand for the *Wetland Round-Up* field trip program than the staff was able to meet. Long waiting lists existed and many classes were turned away. Beginning in 1995, the *Trekking the Refuge* field trip program, which was designed to allow double bookings, was fully implemented. During 1996, there were no waiting lists for field trips and we were able to accommodate every educator that wanted to bring students on a field trip.

Trekking the Refuge field trips take place on the Tidelands Trail, a 1 mile loop, with a maximum of 35 students at a time. The program is designed for grades 3-6. These field trips are run entirely by educators and volunteer leaders. Educators lead the opening and closing activities with the entire class, and lead the class on a 45-minute trail walk guided by observation questions in a bingo style format. Educators recruit 2 to 3 adult volunteers to lead three pre-selected, activity learning stations, and 2 to 3 adult volunteers to act as chaperons. All of the needed equipment for the opening and closing activities and learning station activities is in 4 day packs that the educators check-out and carry with them.

There were 51 *Trekking the Refuge* field trips in 1996, with 55 educators, 310 leaders, and 1,521 students participating. Between 1995 and 1996, the number of students participating in *Trekking the Refuge* field trips increased from 681 to 1,521, demonstrating the success and growth of this new program. (For descriptions of these field trips, see section H.2 Field Trips.)

Adding together the *Wetland Round-Up* field trips and *Trekking the Refuge* field trips gives us a grand total of 4,923 students, 179 educators, and 1,247 leaders participating in educator-led field trips at the Visitor Center.

Summer Day Camps -- Day camps for local children were conducted during the month of July at both the Environmental Education Center and the Visitor Center. The Refuge offered the camps free of charge. The two on-site EE Specialists cooperatively designed, planned and conducted both the Marsh-In camp at the EEC and the Junior Naturalist camp at the VC. The two environmental education interns assisted by adapting activities, making props, and setting up equipment. The interns, along with several volunteer leaders, enthusiastically led the campers through a variety of activities that included simulation games, guided imageries, wildlife observations, art projects, and share circles. There was a combination of large group and small group activities, with some amount of time spent each day at each small group's special spot. While at their special spot, campers had the chance to plan a skit, which were performed during the Thursday evening program.

The theme for 1996 was *H₂O Olympics*. During the week, campers journeyed through the San Francisco Bay watershed, learning about the importance of water to the plants, animals, and habitats of the San Francisco Bay. Through hands-on activities, stories, art, and exploration, campers learned about water molecules, the water cycle, states of water, urban run-off, tides, wetlands, aquatic creatures, and endangered species. Campers visited a creek that ran to the bay and a wetland around the bay, comparing the physical and biological components of the two sites. Each day, campers entered the "molecularizer" and turned into water molecules for our journey through the watershed. At the end of each day, they sat in a water cycle

circle and shared what we had learned.

Marsh-In Camp originated with the intent of building rapport with the children living in the local community of Alviso. The fifteenth annual Marsh-In summer day camp was held for one session, Monday, July 22 through Friday, July 26. The camp was attended by fifteen children; seven children going into grades 1-3 and eight children going into grades 4-6. This was the second year that younger children (grades 1-3) attended. Whole-group activities were designed to be appropriate for children of all ages. Small-group activities were designed for either older or younger children. Activities were led by two SCA interns (Kathy Schulz and CJ Fuss), two summer youth employees (Marion Adams and Jorge Rodriguez), and one Fish and Wildlife Service intern (Melissa McElroy). The combination of enthusiasm and high leader-to-camper ratio allowed for the campers to receive a good amount of individual attention.

This was the tenth year of the five-day program with an overnight session. (Younger students did not participate in the overnight session.) The camp was a great success. As a result of the summer camp program the children living in Alviso have an increased awareness of the many factors that impact the habitats of the Refuge. Additionally, young persons who have participated in the summer programs have developed a greater sense of stewardship for the EEC.

Junior Naturalist Camp provides children in the South Bay an opportunity to learn more about nature at the Refuge. Because of the popularity of the program, children must apply by sending a letter stating the reasons they want to become Junior Naturalists; this activity reduces the number of applicants. To ensure that the same children don't attend year after year, while others are turned away, preference is given to first-time participants. Two weeks of camp were held for students entering 3rd, 4th, 5th, and 6th grades. From July 8 to 12, camp was attended by 14 children and from July 15 to 19, 23 students attended. Whole-group and small-group activities were led by two SCA interns (Kathy Schulz and CJ Fuss), two summer youth employees (Marion Adams and Jorge Rodriguez), one Fish and Wildlife Service intern (Melissa McElroy), and three refuge volunteers (Ed Kantack, Joan Telfer, and Haven Thompson).



The morning after the Marsh-In Camp
overnight session



A Junior Naturalist camper prepares to enter the
"molecularizer" to be turned into a water molecule



Junior Naturalists "rain" over
the watershed they just built



The last day of Junior Naturalists
Summer Day Camp

H.3. Environmental Education - Teachers

In the San Francisco Bay Area, where many environmental education facilities and programs are available for educators to choose from, the Refuge Environmental Education Program is unique. We provide a facility where educators lead their own field trips. As in previous years, we conducted trainings for educators (teachers, youth leaders and outdoor recreation leaders) and adult learning station leaders (parents, aides, grandparents, etc.) interested in participating in the Refuge's educator-led field trip programs. Following the training and guidance we provide, educators plan their field trip, prepare the students and adult leaders and conduct the field trip. By having educators fully responsible and highly involved in their field trip, they are more likely to integrate the classroom curriculum with their field trip activities, providing students with a learning environment which extends into the classroom beyond the day spent on the Refuge. As a result, students achieve a more meaningful, in-depth experience. Over 12,000 students their educators and many of their parents went through the field trip program.

Warwick Elementary School , which has adopted the Refuge, worked closely with the Visitor Center Environmental Education Specialist throughout the year. Teachers and parents attended workshops, and students came on field trips throughout the year. During National Wildlife Refuges Week, a special presentation about endangered species and National Wildlife Refuges was put on at the school for 250 students.

Wetland Round-Up Field Trip Orientations and Planning - The majority of each field trip orientation is spent on background information and learning how to lead the activities found in the *Salt Marsh Manual - an Educator's Guide*. The logistics of planning a field trip, as well as rules and regulations, are also discussed during the workshops. By the end of the orientation, the educators and recruited volunteers understand that we are a resource management agency, the identity of our agency, and that each field trip activity is designed to meet the Refuge's resource management objectives. The staff is available for individual planning sessions should educators require assistance in planning their trips. A total of 9 Field Trip Orientation Workshops were conducted at the Environmental Education Center in Alviso with 80 educators 135 educator-recruited volunteer leaders participating. Six educators returned for a one-hour planning session to finalize the details of their field trip. A total of 7 Orientations were held at the Visitor Center in Fremont with 68 educators and 74 volunteer leaders being trained and 3 educators returning for one-hour planning sessions. The confidence gained by educators and volunteer leaders at these orientations culminated in successful field trips.

We continue to distribute the *Salt Marsh Manual - an Educator's Guide*. This curriculum guide was designed to facilitate discovery, learning, and enjoyment of field trips to the San Francisco Bay National Wildlife Refuge. In 1996 the guide was revised as the 4th edition and became two separate guides, one for each site, in order to focus more closely on the differences between the habitats. Each guide contains background information, area maps, planning and group management hints, classroom and on-site activities, and additional resource information. The additions to this revision include field trip openings and closings, Outstanding Volunteer Award sample, field trip emergency procedures, a learning assessment for educators to use

for measuring what students have learned during this study unit on bay ecology, an activity for preparing students for the field trip, post trip activities correlated to field trip activity sections on "Habitats, Bird Migration, Endangered Species and The Bay Begins At Your Front Door", and a chapter on "How Children Learn" that includes theme building, life skills, how the brain learns and learning theory. The design of the field trip activities was changed to a script format upon the suggestion of a parent leader. The "Read", "Ask", and "Do" format makes the field trip activities easier for the parent leaders to conduct. The activities in this guide are for grades K-8. The Educator's Guide is available free of charge to all educators and group leaders who attend a *Wetland Round-Up* Field Trip Orientation Workshop. New classroom and field trip activities were tested with teachers and students in order to refine them and make sure they were user-friendly. New field trip activities were observed by refuge staff and classroom activities were mailed out to educators with requests for evaluation.

Trekking the Refuge Field Trip Orientations

During the field trip orientation workshops, the educators and parents learn how to conduct pre-selected openings and closings, a trail walk or discovery walk, and three to five learning station activities depending on the site chosen for a field trip. The logistics of planning a field trip, as well as background information, policies and rules, are also discussed during the workshops. By the end of the orientation, the educators and parents have a understand that we are a resource management agency, the identity of our agency, and that each field trip activity is designed to meet the Refuge's resource management objectives. Because *Trekking the Refuge* is an entirely educator-led field trip, the workshop is essential to the success of the field trip. In 1996, 9 orientations were held for 38 educators and 32 volunteer leaders. The staff at the EEC conducted 3 pilot workshops with 9 educators and 20 educator-recruited volunteers participating; and 1 full-fledged workshop with 6 educators and 8 educator-recruited volunteers participating.

The *Trekking the Refuge* Educator's Guide includes:

- An introduction to the Refuge
- Background information on habitats, plants, and animals
- Pre-visit preparation hints
- Classroom activities with resource management objective and issue information
- On-site activities
 - Opening and closing activities
 - A walk
 - Learning station activities

A pre-visit packet with materials such as a slide show, a video, laminated posters, and laminated plant and animals pictures complements the *Trekking the Refuge* guide.

Educational Resources -- The Audio Visual Lending Library for the Environmental Education Program exists at both sites. VHS videos are available for educators to check out for 2 to 3 week periods.

It's Wet, It's Wild, It's Water! is an up-to-date look at water conservation and pollution prevention issues for South Bay area students in grades three through eight. The viewer learns where water comes from and where it goes by traveling to the Sacramento-San Joaquin River Delta and the San José/Santa Clara Water Pollution Control Plant with student reporters. The video underscores our connection to our watershed, with emphasis on how students can actively prevent water pollution and help protect our environment.

Who Did the Owl Eat? depicts a barn owl's hunting and eating habits, regurgitation of an owl pellet and directions on how to dissect a pellet. Appropriate for grades first through sixth, the video is accompanied by charts, curriculum, and script. Educators are encouraged to copy the tape and charts to keep in their school curriculum library for future use. Other refuges have copied the tape to lend out to educators.

The 25-minute video about the San Francisco Bay and Delta, *Secrets of the Bay*, shows the history of the bay and its sometimes conflicting interests. This video is appropriate for fourth grade through college.

Fabulous Wetlands is an 8-minute video that takes a humorous, yet informative look at wetlands -- what they are, how important they are, and what we can do to protect them. Perfect for pre-field trip preparation, this video is appropriate for third grade through high school.

A Home for Pearl and accompanying guide is a video that teaches about wildlife habitats. It is divided into four parts: two 15-minute segments and two 20-minute segments. Each can be viewed as a separate unit incorporating supplementary activities provided in the guide. It is appropriate for first through sixth grades.

Do your Part! is a 19-minute video featuring students teaching each other what they can do to help preserve the wetlands. It is appropriate for grades 3-8.

In Celebration of America's Wildlife is a 28-minute video that features success stories in wildlife conservation. It is appropriate for grades four through adult.

The Surfer, the Garbage Man, and the Lady in the Sky, is a 15-minute video featuring a high school student sleeping in class and dreaming about pollution of soil, air, and water, and ways to prevent pollution. It is a fun, fast-paced video for grades 4-8.

Into the Wild is a video divided into three segments, each focusing on one endangered species and the efforts being undertaken to help the species. The featured species are: whooping cranes (12 minutes), red wolves (12 minutes), and whales (16 minutes). recommended for grades 3-6.

Tinka's Planet is a 12-minute video that introduces children to the need for recycling. It is very good for grades K-3.

Water You Doing? is divided into five, six minute segments that cover water quality in Puget Sound in a fun and informative style. The issues are very applicable to the San Francisco Bay. It is recommended for grades three through eight.

In addition to classroom videos, several training videos are available through the Audio-Visual Lending Library. Educators can show the videos to adult leaders as training for an upcoming field trip. These training videos consist of background and "how to" information and footage of the activity during an actual field trip.

- *Wetland Round-Up* Field Trips at the Visitor Center
- Brine Shrimp Lab at the Environmental Education Center
- Brine Shrimp Lab at the Visitor Center
- Mud Creature Study at the Visitor Center.

Educator Workshops -- The environmental education staff, Fran McTamane, Sandy Spakoff, and Amy Hutz, conducted and attended several environmental education workshops in 1996.

In many schools throughout California there are large populations of students that speak very little, if any, English, Spanish being their native language. Therefore, many teachers are learning Spanish in order to better communicate with their students. One language instructor, Darla Briggs, brings her classes to Alviso, which is a predominantly Mexican-American community. One of the stops on this visit is the Environmental Education Center. Here, Environmental Education Specialist Sandy Spakoff presents an overview of the Refuge, highlighting the Environmental Education Center and the Field Trip Programs. In 1996, 32 teachers participated in these presentations which began in the fall of 1994.

In April, the environmental education staff conducted an all-day *Project WILD* workshop for 16 educators.

The Non-Game Migratory Bird Education Workshop held on October 16 & 17, 1996 covered Shorebird, Seabird and Songbird education. Heather Johnson, External Affairs, Region 7, Tara Zimmerman, Migratory Bird Program, Region 1 were the main presenters with additional presentations by Refuge Environmental Educators Amy Hutz and Fran McTamane. The objectives of the workshop were to attain a working familiarity with nongame bird educational curricula and to develop outreach strategies for promoting distribution and use of these material in local communities, schools and refuges. One full day was devoted to shorebird curricula and an interactive INTERNET program. Participants viewed the new "Shorebird Sisters Schools" on-line education program and how they could add information to the Web page and participate in the program. Participants received the "Shorebird" curriculum guide that was developed for the Pacific flyway. The "Songbird Blues Kit" materials were shown and some of the activities were demonstrated. Heather Johnson discussed how the Learn About Seabirds curriculum program and guide was developed. Amy Hutz and Fran McTamane discussed how this seabird program was used to develop a Murre Restoration Education Program for a Murre restoration project on nearby Devil's Slide Rock (See H.6). Each participant received a copy of the seabird curriculum guide. In attendance were 16 Region One refuge managers, outdoor recreation planners, environmental educators and interns and 15 local environmental educators from federal, state, county and private non-profit organizations.

In cooperation with the City of San Jose, Environmental Services Department, Environmental Education Specialist Sandy Spakoff conducted a teacher in-service for 32 science teachers from the Eastside Union High School District. The in-service was comprised of a tour of the San Jose/Santa Clara Water Pollution Control Plant and a later presentation, including a guided walk and hands-on activities, at the Environmental Education Center. The objective of the training was to give teachers a better understanding of the water cycle (where water comes from and where it goes) in the South San Francisco Bay. The presentation at the Refuge focused on how water discharged from the pollution control plant has changed habitats and impacted wildlife.

The environmental education staff and interns attended the North American Association for Environmental Education annual conference held in Burlingame, November 1-5, 1996. The conference focused on environmental education of the next generation - professional development and teacher training.

Environmental Educators Fran McTamane and Sandy Spakoff conducted a session on "Educator-Led Field Trips - Applying the Multiplier Principle at Your Site". They shared their 15 years experience on how to train teachers and youth professionals to conduct their own all day nature study field trips with a slide show and a walk through the *Salt Marsh Manual* - an educator's guide.

Environmental Education Specialist Fran McTamane along with a native Rumsien Ohlone and an educator from another agency gathered materials and conducted a Life Skills of the California Indians workshop on November 16, 1996. Through hands-on experiences recreating traditional material culture items the "old way", participants had an opportunity to develop a greater awareness of the interrelationships between an environment and a culture; to understand that we need to care for the plants, animals and earth if we are to leave all of these things well for the people who come after us; and to appreciate the abundance and diversity of life in California's ecosystems. 30 participants attended the workshop and made tule duck decoys, tule mats, hoop and poles, staves game pieces, acorn meal, and manzanita cider.

For the National Science Teachers Association's Global Summit on Science and Science Education, Environmental Educator Fran McTamane led a tour of the EEC as part of the Santa Clara Valley Water District's Watershed workshop on December 27, 1996. On December 30, 1996, she and Christine Coy, Interpretative Specialist at the EEC, conducted a 5-hour Wetland Round-Up Field Trip Orientation for the same group of visiting teachers.

The Resources in Environmental Education Fair (REEF) workshop was held in March, 1996. EE Specialists Sandy Spakoff and Fran McTamane and SCA interns attended and distributed Refuge information. Sandy Spakoff and Tamera Gilbert from the City of San Jose Environmental Services Department co-presented two 90-minute workshop sessions on watersheds and the impacts of non-point source pollution on habitats and wildlife.

Educational Courses, Programs, and Organizations -- Don Edwards San Francisco Bay NWR EE personnel were involved in varying degrees with the

following courses and programs and committees.

National Environmental Education Course

This course is sponsored by the U.S. Fish & Wildlife Service, Office of Training and Education.

Public Outreach, Advocacy and Education: Overview and Planning

This course was offered by the U.S. Fish & Wildlife Service, Office of Training and Education at Anchorage, Alaska in January, 1996. The course was open to all interested Service personnel, and was attended by supervisors, refuge managers, project leaders, and administrative personnel from all levels of the Service.

The goal of the course was to provide an awareness of the value of education and outreach in the Fish & Wildlife Service. Participants learned about education and outreach strategies and how these strategies could help achieve resource management objectives of the Service.

Fran McTamane presented the session on *Strategies That Work!- San Francisco Bay National Wildlife Refuge*. The main focus of her session was showing how each activity conducted at the Refuge met a resource management objective. A work sheet used in the session, helped participants to identify their own resource management objectives.

California Aquatic Science Education Consortium - California

In 1990, a consortium of agencies, organizations, and citizen groups was established for the purpose of encouraging, supporting, and enhancing aquatic (fresh and marine) education programs for informal groups in the State of California. The initial formation of *The California Aquatic Science Education Consortium* was funded by a grant from the National Science Foundation. Five aquatic curriculum guides were developed: *Plastic Eliminators, Water Inspectors, Fresh Water Guardians, Wetland Protectors and Creek Watchers*.

DESFBNWR is a member of the Consortium and uses activities from these guides when conducting educator workshops and sessions for workshops on and off-site. The Refuge now houses the remaining inventory of the five guides after the consortium office closed when the NSF grants expired. Our inventory includes Spanish copies of each guide.

Santa Clara Valley Environmental Partners

A group of environmental educator in Santa Clara County have joined together to promote environmental education in the South Bay. The group is called the *Santa Clara Valley Environmental Partners* and is made up of nonprofits, local, state, and federal agencies, and teachers.

One of the projects was to create an annual environmental education fair for teachers beginning in spring of 1996. (See workshop section for details of the workshop) The purpose of the event was to let teachers know what environmental education programs and resources are available locally. The goal was to bring environmental educators and teachers together to teach the next generation of the importance of

and procedure to preserve and protect our natural resources. The EEP coordinator is a member of this group.

Midpeninsula Environmental Education Alliance

This environmental education organization was reactivated in June of 1995 after a dormancy of two years. Environmental education agencies and organizations located in Santa Clara and San Mateo counties are invited to join this informal group. The mission of this group is to provide a forum for collaboration among environmental educators to maximize resources and achieve common goals. During 1996, the group shared expertise about volunteer training, grant writing, program planning, monitoring and assessment, entrance fees, EE activities, etc. The EEP coordinator is a member of this group.

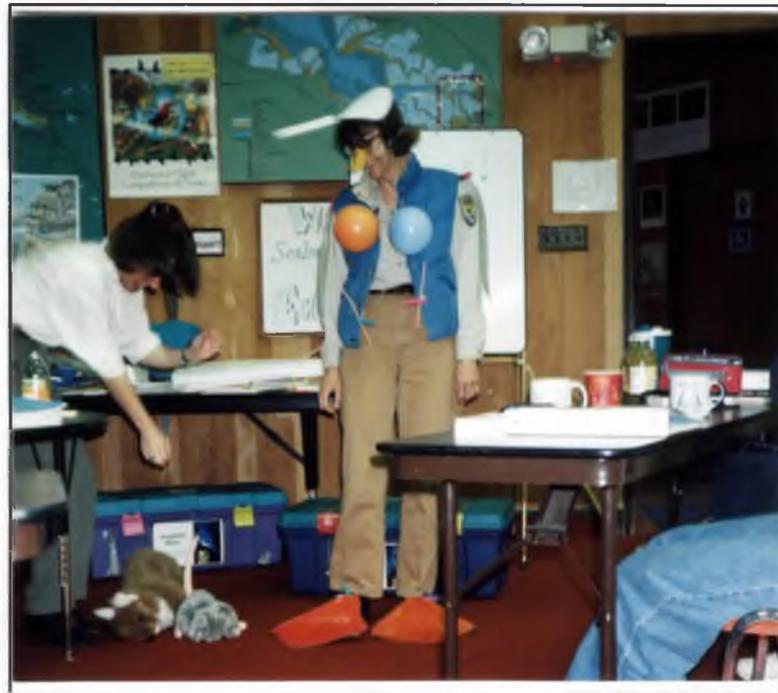
Watershed Mapping

A watershed map committee was formed with members of local EE organizations through the leadership of Christine Coy, interpretative specialist at the EEC. The purpose of the project is to provide a versatile educational tool that multiple agencies and groups can use to educate school children and the public about the watershed of Santa Clara County. The map will highlight the watershed in the county.

During 1996, decisions were made on the size of the map, the elements that should be included on the map, research of printing costs, contacting local artists who would be interested in designing such a map and looking into possible grants for fund the cost of the artist and printing. Fran McTamaney and Sandy Spakoff are members of this committee.



Non-Game Migratory Bird education workshop participants enjoy a presentation



Workshop leader Heather Johnson transforms Environmental Educator Specialist Fran McTamaneey into a large water bird



Project WILD participants listen attentively



Project WILD participants "Learn to look and Look to see"

H.4. Interpretive Trails

The Refuge has two trails with interpretive wayside exhibits. These displays describe the habitat, the cultural history, the ecological dynamics and geology of the areas that visitors walk through. They are entertaining, easy to read, visible without being intrusive and serve as an important supplement to our interpretive effort.

The self-guided trails are especially important during hours when the Visitor Center is closed. Before 10 am, and from 5pm to sunset trail use is often heavy. Refuge volunteers patrol the trails, talking with visitors and providing more information to people as needed. They also pick up trash and make note of the wildlife they see.

The Refuge's main interpretive trail, the Tidelands Trail, is registered as a National Recreation Trail in the National Trails System.

Butterfly Garden -- We continued to improve the Environmental Education Center's new native plant garden which was designed to attract butterflies, and demonstrate the connection between high quality habitat and abundant wildlife. The garden is utilized in the weekday field trip program and the weekend public interpretive program. It provides a unique opportunity to investigate the interactions of nature.

H.5. Interpretive Routes Nothing to report.

H.6. Interpretive Exhibits, Demonstrations, and Special Events

During 1996, 204,684 visitors participated in interpretive activities at the Refuge. Of these, 201,550 took advantage of our self-guided interpretive trail and observation platform, viewed exhibits, or visited the Visitor Center or the Environmental Education Center to watch films or videos and look at the educational displays. The remaining 3,134 participated in the numerous naturalist-conducted programs such as walks, van tours, talks, slide presentations, astronomy programs, or bicycle trips.

Every day brings a steady stream of inquisitive Refuge visitors past our Visitor Center reception desk. On weekends, the Environmental Education Center also receives drop-in visitors. Our volunteers who staff the desk daily are knowledgeable and always willing to help out. We would not be able to present the variety of programs we do without them.

The natural history of the Refuge was well represented in our 1996 programs with topics such as salt march ecology, birds, seasonal wetlands, endangered species, edible plants, geology, water pollution, mammals, dinosaurs, native Americans, and astronomy. Our volunteer staff was quite active during 1996, giving 98% of our weekend public tours and interpretive programs. For complete descriptions of these programs, look in the calendar section of the *Tidelands* newsletters included at the back of this narrative.

Throughout the year, staff members spoke to numerous civic, business, church, and

social groups, and participated in career fairs for high school students providing nearby communities a service while disseminating information about the Refuge and its resources.

Our program audiences were as diverse as the program topics that were presented. Audubon chapters, day care centers, garden clubs, historical societies, scout troops, community groups, senior centers, teachers' associations, and college classes among many others, took advantage of the available programs. The greatest demand for naturalist-led activities, however, came from families.

On-Refuge:

Special events were held at the Refuge during 1996. The following briefly describes these programs and events:

Earth Day -- The annual Earth Day event was held at the Refuge Visitor Center on Sunday, April 21. This year's theme was "Be An Earth Saver." Hourly programs, children's activities, nature walks, a Refuge cleanup, and the environmental information fair helped visitors learn how they could become involved and become an "Earth Saver." (Please refer to the flyer at the back of this narrative.) Over 500 people were in attendance. The day began with the traditional Refuge cleanup, and many families and scout groups decided to start their day by beautifying the Refuge roads and trails. Volunteers Brenda Daneshi and Nancy Terranova registered the participants; Gene Bobik drove a van full of eager boys to the fishing pier and Mary Bobik kept an eye on them. Thirty-eight people helped out with the clean-up, collecting approximately 1,000 pounds of garbage. They were very industrious!

The hourly programs included presentations by Refuge Volunteer Karen Bane-Gaston on the endangered species of the San Francisco Bay area; by U.S. Coast Guard Officer Andrew Aguilar on the hazards of pollution at sea in "Save Our Seas!"; and by Interpretive Specialist Nancy Fries in "Be An Earth Saver" a hands-on program that relates the importance of reducing, reusing, and recycling to the preservation of habitat. The final program was followed by a game of "Earth Ball" in which children played volleyball with an earth beach ball and a net made of six-pack rings.

Children's activities included a brine shrimp discovery station led by Volunteer Bryan Kerns, Endangered Species Jeopardy led by Volunteer Ed Kantack. Children who wished to make a button commemorating the day's events were helped by Volunteer Inese Celusnak.

Throughout the day visitors participated in volunteer-led interpretive programs, such as "Bike the Bay" led by Martin Celusnak and Norton Bell, "Botanical Wanderings" led by Alvin Docktor, and "A Walk with the Birds" led by Jane Starbird.

Nine different environmental organizations from around the Bay Area staffed informational tables. The groups included the Alameda County Home Composting Program, Bay Area Amphibian and Reptile Society, Citizens Committee to Complete the Refuge, Growing Native, Ohlone Audubon Society, Sierra Club (Southern Alameda County), the Tri-City Ecology Center, USCGR Sea Partner Program, and U.S. Fish and Wildlife Service Law Enforcement.

The Native Plant Nursery held a plant sale to educate the public about native plant species, how to use them in landscaping a home, and how to care for them.

Earth Day was celebrated at the EEC in April with approximately 125 visitors. It was the official reopening of the EEC after construction during the winter. There was a dedication ceremony for the new Peninsula Open Space Trust (P.O.S.T.) Pavilion, named in honor of the organization which secured funding for its construction. This addition facilitates expansion of both the environmental education and interpretive programs. Presentations throughout the day included a slide show on salt marshes, a tour of the salt marsh with activities to reveal its importance, a slide show on local butterflies, and "Protectors of the Bay, Part 1" (a variety of activities about preventing storm drain pollution). Visitors were especially thrilled to see the presentation on live, local wildlife from Sulphur Creek Nature Center. There were many ongoing activities including a butterfly sun-catcher art activity, a salt pond water lab, and a radio telemetry demonstration. There was also a wetlands jeopardy game, a salt marsh survival game, and a baby bird matching game. Overall it was a grand celebration.

Endangered Species Poster Contest -- The Endangered Species Poster Contest is a traditional annual event, held in conjunction with Earth Day, that encourages elementary students to study and discuss endangered species in class, and then create posters to illustrate their feelings about their favorite endangered species. Announcements sent to every public and private elementary school in Newark, Fremont, and Union City brought in hundreds of creative posters, many of excellent quality that conveyed very important messages about conservation of endangered species. This year over 350 entries were received! Volunteer judges Frances Sedayao and Jan Cavagnaro made some difficult decisions. First place winners and their parents received entry passes for a behind-the-scenes tour of the Marine Mammal Center in Marin, California, a marine mammal rehabilitation center; second place winners and their parents received passes to Marine World Africa USA, a bay area exotic animal and marine mammal park; and third place winners received passes to the Children's Discovery Museum of San Jose, a hands-on scientific discovery center for children.

California Coast Clean-Up Day -- The Refuge celebration of California Coast Clean-Up Day on Saturday, September 21 was a resounding success. The Refuge organized clean-up sites at six different locations on the Refuge: the Dumbarton Fishing Pier, Marshlands Road, Ravenswood Fishing Pier area, the boat launch, Coyote Creek Lagoon Trail, and the Environmental Education Center. We were unable to clean Shoreline Levee North as it had been regraded with wet dredge material only a month before. Refuge volunteers and staff were on hand to register volunteers, distribute bags, drive vehicles and do everything else needed to make the clean-up a success. Staff from Coyote Hills Regional Park combined their cleanup efforts with ours at the Pier areas. We had fewer participants in 1996 due to the fact that the Newark Days Parade and Fair was held on the same day.

Despite the neighborhood parade, approximately 360 people came out to the Refuge fishing pier, 35 people came to Coyote Creek Lagoon, and 40 to the Environmental Education Center for the three-and-a-half hour clean-up. There were numerous

school groups, including large groups from American High, James Logan High, Washington High, and St. Matthew Elementary. Local boy and girl scout troops were also well represented. Approximately forty members of the Alpha Phi Omega Alumni Association of the San Francisco Bay Area participated as well. They provided their own vans and went to Ravenswood Pier to clean up. Just over 6 tons of debris were collected from the sites on the Refuge. One hundred eighty-four bags of plastic, glass, and aluminum were collected separately and then recycled by the East Bay Conservation Corps. Trash bags were provided by the California Coastal Commission and the Refuge. East Bay Disposal and BFI provided debris boxes. The City of Fremont, Alameda County, and East Bay Regional Parks provided pick-up trucks, vans, porta-potties, a flatbed, and drivers.

Water, juice and soda were available throughout the morning. The traditional thank you gift for participants of discount admission tickets to Marine World Africa USA, a bay area exotic animal park, were provided by the California Coastal Commission.

National Wildlife Refuges Week - National Wildlife Refuge Week got off to a great start on October 5th with two major events: the annual Autumn Sale of Native Plants and the first Wildlife Art Auction.

Native Plant Sale -- The plant sale went all day, from 10 in the morning until 4 in the afternoon at the Native Plant Nursery near the Maintenance Shop. Harry and Gretchen Sanders, along with their intrepid crew of nursery workers, sold plants and provided expert advice to the shoppers. It was a wonderful day, and \$2,600.00 worth of plants went off to new homes.

The plant sale is always a lot of work, but it always brings hundreds of people to the Refuge who otherwise would never make it here. It also allows us the opportunity to interpret the value of native plants, and discuss other important issues such as water conservation. Finally, the income helps to run the Nursery.

Presently, the folks at the Native Plant Nursery are growing endangered plant species for Antioch Dunes National Wildlife Refuge. That's not a bad way for our Nursery volunteers to spend their time; if we continue to keep the Antioch Dunes evening-primrose and the Contra Costa wallflower from going extinct, it will be due largely to the efforts of the Native Plant Nursery. Volunteers Harry and Gretchen Sanders work almost non-stop in their efforts to manage the Nursery, and members of the public were suitably impressed on October 5.

Volunteers greeted arriving visitors at either the Refuge entrance or at the turn off to the Nursery/Auction area on Marshlands Road. We got many compliments from visitors about the nice reception. Other volunteers helped park cars, sell plants, or transport the purchased plants to visitors' cars.

Wildlife Art Auction -- The auction was a new event this year, and occurred on the same day as the Sale of Native Plants. Six dozen photographs, paintings, sculptures and other works of art were auctioned off Saturday afternoon under a tent next to the Maintenance Shop. This event generated about \$2,200.00 after payments to the various participating artists.

Although some of the works of art were donated (artist Robert Steiner contributed a signed, artist proof, lithograph of the State of California duck stamp), most were auctioned with an agreement to return 75% of the purchase price to the respective artists. This arrangement resulted in increased willingness on the part of the artists to participate.

Refreshments were sold throughout the events. Hot dogs, Polish sausages, chips, and an assortment of other snacks, hot coffee and cold drinks brought in several hundred dollars. Volunteer Renée Fitzsimons organized the snack bar, and worked there all day long.

Many environmental organizations set up booths at the San Francisco Bay Care Faire, organized and managed by Renée. The California Conservation Corps, the Citizens Committee to Complete the Refuge, the Greenbelt Alliance, the Ohlone Audubon Society, the Peninsula Open Space Trust, the Planet Drum Foundation, the San Francisco Bay Wildlife Society, the Santa Clara Valley Audubon Society, the Sierra Club, the Tri-City Ecology Center and the Wildlife Center of Silicon Valley handed out literature, solicited contributions, and recruited members throughout the day. It is always important to involve the local community in our special events, and Volunteer Renée Fitzsimons did a marvelous job of organizing this important event and taking care of all the details.

Proceeds from the Sale of Native Plants, the Wildlife Art Auction, and the snack bar were managed by San Francisco Bay Wildlife Society, the Refuge's cooperating association.

Shark Day -- Approximately 300 people participated in *Shark Day* events in honor of National Wildlife Refuge Week at the Environmental Education Center. Visitors were thrilled to touch and learn about the live bay fish, including leopard sharks, from the Marine Science Institute. They were also fascinated to see their shark tagging demonstration and learn about their research on leopard sharks in the bay. Visitors got to see actual shark specimens in the California Academy of Sciences' presentations about their new tropical shark exhibit. Other presentations included marsh walks describing how marshes help make the bay a great nursery for sharks, and a slide show presented by Diane Conradson on her recently re-released book, *Exploring Our Baylands*. Visitors enjoyed a variety of ongoing activities. In two scavenger hunts they learned about sharks and National Wildlife Refuges, and in a toss game they learned about what sharks eat. Many participants also creatively painted t-shirts using shark stencils and fish printing. All in all it was a wonderful celebration in which visitors learned a lot about sharks, and how the Refuge helps provide healthy habitat for them.

International Migratory Bird Day -- Coyote Creek Riparian Station and the Santa Clara Valley Audubon Society cooperated with the refuge this year. Local experts also helped make the event unique. The Wild Bird Center presented a nest box program, the San Francisco Bay Bird Observatory gave a slide show on migratory shorebirds, a biologist shared his experience with a common murre restoration project, and Peter White presented a slide show on his book *Farallon Islands, Sentinels of the Golden Gate*.

Other highlights of the event were the award ceremony for a migration poster contest, during which a local group played traditional Latino music, and the beginning bird walk for kids in which participants colored their own bird identification books and used them in the field to identify local migratory birds.

Visitors participated in a variety of activities. There were two games which showed the obstacles that birds must overcome to complete migration, activities to demonstrate the skill that barn swallows need to build mud nests and forster's terns need to fish, and a painting project in which participants imagined that they were biologists making decoys to restore a murre colony. In a mud lab visitors also discovered what shorebirds eat, and learned how to help protect them by preventing storm drain pollution.

The Ohlone Audubon Society, the Wildlife Center of Silicon Valley, and the San Francisco Bay Bird Observatory provided information and answered questions in a mini-environmental fair. One hundred and forty six visitors really enjoyed this event, learning about the wonders of migratory birds, and how to protect them.

Sing-Along -- On Friday, October 11 the Refuge hosted Mary Miché, a long-time friend, who led an evening of song and fun with her "Earthy Tunes." Children and adults of all ages thoroughly enjoyed learning the words and motions to songs such as "Dirt Made My Lunch" and "Six Plant Parts." The sing-along was followed by a Night Hike to discover the magic of the Refuge after dark. Interpretive Specialist Nancy Fries and volunteers Tooky Campione, Alice Baker, and Mary and Gene Bobik led the well attended hikes.

The **Halloween Party** at the EEC in October was well attended by the community of Alviso. Especially popular was the Snake Encounter presented by the president of the Bay Area Amphibian and Reptile Society, and the lizard hike in search of lizards and their habitat afterwards. There was also a Beginning Bird Walk in which participants colored their own bird identification books while learning about the "creepy crawlies" that different birds eat, and then used their books to find the birds on a guided walk. Visitors enjoyed playing a fishing game, a spider web toss, and a pin the beak on the barn owl game. They were also enthusiastic as they made Halloween masks that looked like frogs and lizards, decorated Halloween cookies, and played a scavenger hunt about preventing nonpoint source pollution. Over 100 people had a wonderful time while learning about the variety of life found around the bay, and about how each one of us can help protect it.

New Interpretive Displays -- Two new interpretive displays about preventing nonpoint source pollution were completed and are now on display at the EEC. The first display is entitled "Save the Bay." Visitors who use this display learn independently about protecting the habitat and water supply of the Santa Clara Valley by properly disposing of left-over products. The display includes photos showing options of places to dispose of various left-over products. Visitors place magnets representing the left-over products by the photo showing where they choose to dispose of them. If their choice does not pollute the bay, lights around a picture of a healthy bay light up. If their choice does pollute the bay, lights around a picture of an unhealthy bay light up. The objective for visitors is to get the most lights lit up

around the picture of the healthy bay.

The second display is entitled "Bay Interactions". The concept for this display was developed by Christine and Sandy, and the City of San Jose contributed \$15,000 to design and build it. The colorful, 6 foot tall and 4 foot wide, free standing display is intriguing and popular. On one side of the display visitors place balls representing different pollutants down a storm drain to see that they flow directly to creeks, sloughs and the bay. On the other side visitors then place the balls into containers which they manipulate to simulate how these pollutants can accumulate through the food chain to levels which are harmful to animals and people. This display draws in much attention, effectively showing the importance of preventing pollutants from flowing down storm drains.

Interpretive Events --

Drawbridge -- As in past years, one of the most popular activities during 1996 were the tours of Drawbridge, an abandoned hunting and fishing community in a salt marsh setting. The dilapidated town stands as a reminder of the consequences of human destruction of the native environment. This was the theme as more than 450 people visited the area during tours offered on Saturdays from May through October. Other weekday and weekend tours were arranged by special request for walking clubs, photography groups, and other organized groups.

Volunteer Bob Kleinbrahm continued to lead his extremely popular photographic tours of Drawbridge on the third Sunday of every month. Volunteer Sharon Hemenway was his dedicated train guard as the two led the tours at 7:30 in the morning to capture the best light. These tours were advertised through one photographic interest site on the INTERNET and received many requests.

Slide Shows -- "A Ghost Town in San Francisco Bay?" was the most popular slide show again in 1996. The volunteers presenting the shows did an excellent job of relating the history of the ghost town. Visitors always left with the understanding that the old hunting village failed because the surrounding habitat was destroyed.

Interpretive Walks -- Interpretive birding walks were the most popular walks at the Visitor Center. These included "Good Morning, Bird Watcher!", "Birding at Low Tide", "Birding the Coyote Hills," "Birding at Coyote Creek Lagoon" and seasonal birding walks. These two- or three-hour walks usually took place in the morning with an average of 15-20 participants. Many people that attended the walks were new to birding, and enjoyed the opportunity to learn about the bird species of the Refuge.

Some bird walks focused on a particular group of birds such as shorebirds, or parent birds, while others were a general survey of the bird population. Often a sample of mud or water was collected and observed to see examples of organisms that the birds eat. Many people that attended the bird walks were new to bird watching and took advantage of the binoculars we have to loan.

Several other interpretive walks were given along the trails of the Visitor Center covering topics such as botany, geology, and salt marsh ecology. In the fact the new geology program "A Trip Through Time" was very well accepted and well attended.

Butterflies and Native Plants, and *Butterfly Wonders* -- These interactive programs include an indoor presentation and a guided walk. *Butterflies and Native Plants* demonstrates the life cycle of butterflies and their important role in an ecosystem, while *Butterfly Wonders* demonstrates unique adaptations of butterflies. Both programs introduce visitors to common local butterflies and some of the native plants that they depend on. Tips are given for how to attract butterflies to gardens, and how to avoid using pesticides by spreading a thick layer of coarse mulch to deter unwanted non-native vegetation.

Protectors of the Bay -- These interactive programs showed how each one of us can protect the bay by preventing nonpoint source pollution. Participants used a functional model of a city by the bay which demonstrated how household products placed in the streets flow down storm drains directly to creeks and the Bay. Another activity simulated how pollutants concentrate to harmful levels as different organisms consume them. Participants evaluated photos that point out activities that contribute to pollution, and activities that prevent pollution from reaching the Bay. They also played a toss game which shows alternatives to throwing pollutants into storm drains. A puppet show portrayed life in a healthy river and bay, which suddenly became polluted. The characters searched to find a way to stop the pollution. Participants helped tell the story with the puppets and contribute their ideas for preventing pollution. People had fun in both of these programs as they learned about how to prevent non-point source pollution.

Save Our Seas -- Presented by a first-class petty officer of the U.S. Coast Guard, the program included a video demonstrating coastal pollution and its harmful effects on marine organisms. Many colorful visual aids illustrated sources of coastal pollution and examples of how to prevent it. Participants used the flows to the bay model to discover that they could help prevent pollution by not allowing anything other than rain flow down storm drains.

Salt Marsh Mystery Adventure -- This family program taught about the importance of conserving water in the South Bay. In each presentation, six participants were asked to solve two mysteries: 1.) Why the salt marsh harvest mouse has become endangered, and 2.) What each one of us can do to help protect the salt marsh harvest mouse. Visitors discovered in a scavenger hunt that the salt marsh harvest mouse has become endangered by loss of habitat. After doing water comparisons outside, they discovered that each one of us in the South Bay can help protect the remaining habitat of the salt marsh harvest mouse by conserving water.

Wetland Walks -- These sixty to ninety minute evening walks included activities that revealed the unique attributes of salt marshes. Visitors were fascinated to see the diversity of life that depends on Refuge habitats, and to learn about the important ecological role that wetlands play in the Bay Area.

Beginning Birding, and Duck Identification Workshops -- These programs opened with a slide show and talk about how to identify a wide variety of local birds frequently seen at the refuge. After the presentation, visitors went outside and practiced their new identification skills. The *Duck ID Workshop* focused on migrating ducks. Many participants borrowed our binoculars to search for the birds at the

refuge.

Duck Day for Kids -- This program was a new spring workshop developed for families. Participants enthusiastically participated in activities to learn about ducks. They colored their own duck identification books and then used their books to identify the ducks in a Beginning Duck Walk. Visitors collected a sample of water from the slough for an indoor lab to observe the tiny water organisms that the ducks eat. They also painted dough duck decorations.

Nest Box Workshop -- Participants were intrigued to learn about cavity dwelling birds that may use nest boxes, and how providing nest boxes can help compensate for population declines due to loss of habitat and competition from non-native species. After learning about the important elements of nest boxes, participants assembled their own nest boxes from pre-cut wood.

Decorating For The Birds -- Participants made edible decorations for birds to put in their yards. They then took a walk outside to observe the kinds of birds that might eat the edible decorations.

Salt Marsh Gifts Walk -- This program began with a walk through the salt marsh to investigate its "gifts" (or beneficial characteristics). Later, participants opened actual presents that represented the "gifts" discovered outside. They also took part in an activity that taught them how they can protect the gifts of the salt marsh by preventing nonpoint source pollution.

Easter Hunt -- Participants went on a walk in search of natural Easter Eggs, or evidence of them. After viewing many nesting birds, visitors returned inside to play a scavenger hunt which showed that each one of us can help protect nesting birds by properly disposing of waste products. They also painted dough eggs in the shape of natural eggs laid around the Refuge, and received treats.

Native American Stories -- Native American stories from Keepers of the Earth by Michael J. Caduto and Joseph Burchac comprised this new night program. Participants gathered in the pavilion to hear a selection of these enchanting stories which taught an appreciation for the earth, and the importance of conserving its precious resources. Afterwards visitors roasted marshmallows over a barbecue.

Edible Plant Walk -- Visitors learned which plants of the marsh and uplands are edible and which are poisonous. Participants tasted samples of the edible plants, including pickleweed and fennel seeds, as well as products made from the plants, such as horehound candy and elderberry jam.

Organized public groups visited the EEC for programs other than regularly scheduled weekend programs. Two hundred and ninety two visitors with eleven groups of scouts and other clubs such as the Lyceum, Model T club, and Moms and Tots participated in tours of Refuge wetlands. In discussions and activities they learned about the uniqueness of our habitats, the diverse life dependent on them, and how to protect them by preventing nonpoint source pollution through storm drains.

College classes participated in water habitat tours which compared current wetland habitats with historic habitats. They learned about the importance of wetlands, and how to protect them by preventing nonpoint source pollution.

Off-Site:

Many off-site events helped to increase recognition of the Refuge and its programs. Staff members and volunteers attended information booths at these events, where they distributed literature and in some cases led environmental education activities, reaching over 5,000 people. The Bay Area Environmental Education Resources Faire for K-12 educators, the Santa Clara Audubon Society Education Day, Berkeley Bay Day, and many other special events all provided opportunities for the Public Use staff and volunteers to reach out to the public.

National Wildlife Refuges Week -- Two environmental education specialists and two environmental education interns visited schools and gave presentations to students. The main goal of the visits was to inform students about endangered species and National Wildlife Refuges. In addition, the presentations provided an opportunity to advertise upcoming National Wildlife Refuges Week refuge events, such as Shark Day and a Sing-Along. The presentations were given at Warwick Elementary and George Mayne Elementary, to a total of 350 students. The two interns designed the presentation, which focused on four endangered species: the Florida manatee, the California clapper rail, the gray wolf, and the spotted owl. The students sang about each animal, learned where it lived, and learned how to make the sound of the animal. The presentation ended with a discussion and song about the importance of preserving habitat for endangered species. Stolen from Bob Dylan, the final song went: "The answer my friend is protecting land, the answer is protecting land."

Bay Area Environmental Education Resource Fair -- On Saturday, January 13, at the Marin Civic Center in San Rafael, three environmental education specialists, one interpretive specialist, and one volunteer from Don Edwards DESFBNWR attended the popular Bay Area Environmental Education Resource Fair. The focus of the fair was to bring people closer to the resources and issues surrounding our natural world. It provided science and ecology workshops and exhibits for educators. The staff and volunteer worked at a booth, handing out refuge information (such as refuge brochures, *Tideline*, EE brochures, etc.), selling items from the bookstore, playing the "Salt Marsh Survival" board game with visitors, and talking to educators about refuge EE resources. The Endangered Species Road to Recovery display from the Regional Office was the beautiful backdrop for the booth. Along with this display, there was an Endangered Species Jeopardy game also from the Regional Office, which succeeded in getting people to stop, play, and learn about endangered species and the refuge. Staff attended workshops offered at the fair and visited other organizations' booths.

Santa Clara Valley Audubon Society Education Day -- On Saturday, March 23, volunteers attended the Santa Clara Valley Audubon Society Education Day, where they led bird activities and informed the public about the Refuge. The focus of this fair was on environmental education programs for K-6 students, parents, and teachers. The event was held at McClellan Ranch in Cupertino - Santa Clara Valley Audubon Society headquarters.

Redwood Environmental Education Fair -- Annually, environmental educators and volunteers from San Francisco Bay NWR Complex prepare for and conduct the EE presentations and activities at the Redwood Environmental Education Fair in Humboldt County. In 1996, one Refuge EE Specialist and two Refuge interns participated, supporting the staff at Humboldt Bay NWR which does not have a public use staff. The fair was held on June 7, 1996. Four classes of approximately 30 students each attended the four refuge sessions. The students were all in third, fourth, or fifth grade. Each session was 45 minutes long, which included a ten minute opening discussion, two 15 minute activities, and a five minute closing discussion.

The title of the session was "Refuges: McDonalds of the Flyways" The staff person and interns led a discussion about the importance of wetlands for migratory birds, and the role of refuges in protecting wetlands for migratory birds. From the window of the room, Humboldt Bay NWR was pointed out to the students. The students then had the chance to taste pickleweed collected at the refuge and to see eelgrass, an important food for Black Brandt. The classes were then split into two groups of about 15 students each, to allow more personal contact with the students. Each group participated in both Not-So-Trivial Migratory Bird Pursuit (a Jeopardy! style game with questions about wetlands and migratory birds) and Migration Headache (a simulation activity in which students become black brandt and migrate from Alaska to Humboldt Bay). A wrap-up discussion at the end focused on how students could help protect wetlands. The presentations met Humboldt NWR's resource management objective that promotes understanding of the importance of wetlands and the need to preserve and restore wetlands for migratory birds.

Environmental Education Day Open House on Mare Island -- On January 20, three environmental education specialists and three refuge volunteers participated in an open house on Mare Island, the potential site for an environmental education center, visitor center, bookstore, and offices for San Pablo Bay National Wildlife Refuge. Staff and volunteers worked at a booth selling bookstore items, distributing brochures, talking to visitors, and making buttons. The Endangered Species Road to Recovery display from the Regional Office provided the backdrop for the booth. The Endangered Species Jeopardy game, also from the Regional Office, was led by a volunteer. Staff also led a group into the salt marsh to take a close-up look at the plants, animals, and physical characteristics of the marsh. Marge Kolar, Project Leader, and Betsy Radtke, San Pablo Bay Refuge Manager, spoke at the open house.

Flyway Festival -- On November 9, another open house was held in Building 505 on Mare Island. One environmental education staff person, one San Francisco Bay Wildlife Society staff person, and two Refuge volunteers worked at a booth, selling bookstore items, distributing brochures, talking with visitors, making buttons, and conducting bird-related educational activities. The migratory bird display from the Regional Office served as the backdrop. One additional Refuge volunteer led bird walks for children in the morning, spending time indoors first making bird books and then heading outside to look for the birds in their new books. Betsy Radtke, San Pablo Bay Refuge Manager, spoke at the open house.

Forest Conservation Days - On March 11 and 18, two environmental education interns participated in Forest Conservation Days at Sanborn Park in Saratoga. Forest Conservation Days is designed to increase awareness, knowledge, and appreciation of natural resources and their management and increase understanding of forestry and the role of foresters in resource management. The event lasts a total of two weeks, and involves nearly 3,000 Bay Area, 5th grade students. The students rode a bus to Sanborn Park and spent a half day at the event. The interns acted as hike leaders, taking groups of 20 students at a time on a two-hour, 1/2 mile hike.

Seabird Restoration Education Program -- As part of a new education program, 537 third through seventh graders in Pacifica, Montara, El Granada, and Half Moon Bay are working with biologists to restore a common murre colony to Devil's Slide Rock along the Central California Coast. The restoration project is funded by a natural resource damage settlement resulting from oil spilled by the Apex Houston barge in 1986. U.S. Fish and Wildlife Service biologists from San Francisco Bay National Wildlife Refuge Complex, with scientists from the National Audubon Society, Humboldt State University Foundation and the National Biological Service are using murre decoys, three sided mirror boxes, and a CD player that projects amplified murre calls to attract the birds and make the rock appear to be a thriving murre colony.

Beginning this fall, students became involved in the restoration project. A Seabird Restoration Education Program was approved and budgeted by the Apex Houston Trustee Council, made up of representatives from the U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, and California Department of Fish and Game. The education program is being coordinated by Refuge Environmental Educators Amy Hutzell and Fran McTamoney.

The education program began with a workshop for seventeen participating teachers, from six elementary schools. The workshop was conducted by Amy and Fran, along with Mike Parker, a restoration biologist. Two Refuge volunteers, Joan Telfer and Salvador Lopez, also attended the training and have become instrumental in the implementation of the program. The workshop provided teachers with background information about seabirds, field trip and classroom activity ideas, and teaching materials, including videos, a slide show, reference books, and activity guides.

Classroom presentations were conducted by environmental education specialists and volunteers after the workshop. Students were introduced to the restoration project and shown mirror boxes and decoys. Letters from the students indicated a strong interest in the project and in seabirds. In October, students were given the opportunity to participate in the restoration project after biologists had removed the 384 decoys from the rock and cleaned off the thick coating of guano. The decoys were in need of repainting, a perfect project for the students. The students took the repainting very seriously and have demonstrated a strong tie to the restoration project, anxiously waiting for the decoys to be placed back on the rock in December. Classes will be kept updated on the number of murres visiting the rock through the school year.

The excitement of connecting teachers, students, parents, biologists, and

environmental educators has truly made the Seabird Restoration Education Program successful. Teachers have taken a strong interest in the project, conducting activities, making paper mache murre eggs, creating a web page, setting up seabird bulletin boards in the classrooms, recruiting parents to assist with decoy painting, and contacting local newspapers. Students have demonstrated incredible enthusiasm and knowledge, conducting seabird research, writing essays and letters, and creating wonderful artwork. The program will be repeated each year, until the goal of creating a murre colony is reached, an achievement in which the students can truly take pride.

Storm drain pollution programs -- Interpretive demonstrations that show ways to prevent storm drain pollution by properly disposing of waste products were developed and given to the Youth Science Institute and Palo Alto Baylands for use in their interpretive programs. These demonstrations are toss games which have toss boards showing pictures of a trash can, recycling bin, and sink. A mural is placed in front of the toss boards showing the surrounding habitat with storm drains indicated. The object of the game is to toss the waste products which are pictured on bean bags into the proper receptacle shown on the toss boards, instead of letting them be thrown into, and pollute, the surrounding habitat. These games were used extensively in the summer camps at the Youth Science Institute and Palo Alto Baylands effectively showing simple ways to prevent nonpoint source pollution. They will also be used in their future interpretive programs.



National Wildlife Refuges Week is jam-packed with special events and activities for visitors



Our first Wildlife Art Auction brings a new audience to the Refuge and funds to the Environmental Education Program



Retired Senator Don Edwards speaks to the crowd during our Refuge re-naming dedication ceremony



"Teddy Roosevelt" poses with a visitor the day after the Don Edwards renaming ceremony



SCA intern Kathy Schulz leads Migration Headache at the Redwood Environmental Education Fair. The students are pretending to be Black Brants



Refuge volunteer Joan Telfer teaches students about common Murres as part of the Seabird Restoration Education Program



Visitors touring the wetlands during the
Earth Day grand re-opening



How exciting it is for these visitors to get to touch
the live wildlife from Sulphur Creek Nature Center!



Marine Science Institute instructors demonstrate tagging of a live leopard shark



Participants of Shark Day eagerly reach out to touch a live leopard shark!



Volunteers from Viacom work hard to create a new Migratory Songbird Garden by installing drip irrigation and planting native plants around the P.O.S.T. pavilion.



Volunteers from Intel extend the Butterfly Garden by adding drip irrigation and native plants that are attractive to butterflies



Visitors color their own bird identification books at the Beginning Birding Workshop



Beginning Bird Walk participants use the identification books that they have made to find migratory birds on Migratory Bird Day



These visitors are thrilled to touch the live snakes at the Halloween Party



Visitors have fun playing the spider web toss and fishing game at the Halloween Party



A group of community volunteers remove trash from the Ravenswood Area during California Coast Clean-Up Day

H.7. Other Interpretive Programs

In spite of all of the efforts that we made during the year to contact the public, we know that there are many thousands of people out there who don't know about us or whose interests do not include endangered species, wetland preservation, migratory birds or anything else along those lines. Reaching *these* people is one of the most challenging tasks with which the public use staff is confronted. People first need to know that the Refuge exists, then the next step in reaching them is getting them out to the Refuge where they can see with their own eyes what sort of job we are doing and what needs to be done in order to protect wildlife habitat.

In order to get the word out about us and to ultimately get people to the Refuge, the Public Use staff participated in some non-traditional education and outreach efforts. The following briefly describes what projects were undertaken in 1996.

Tideline -- Foremost among our non-traditional interpretation efforts was the production of a quarterly newsletter, *Tideline*. A copy of each issue of the newsletter is included at the back of this narrative. In 1996, *Tideline* was distributed quarterly to 23,500 Bay Area households, schools, universities, businesses, churches, hospitals and libraries. It was considered to be our very best means of communicating our interpretive and educational program schedules, announcements, news stories, advertisements and editorial comments. In fact, many of our programs

were filled to capacity by *Tideline* recipients. The lead article of each *Tideline* described a local endangered species, its natural history, reasons for decline, and what has been done to protect the species. Lead articles were written by biologists in the Fish and Wildlife Service, State Parks, the Nature Conservancy, and other resource management agencies.

Tideline has been used as a text at a training course for urban managers at the National Park Service's Training Center at Harper's Ferry in West Virginia. It has also been used as a supplement to formal text books in many high school biology classes. We repeatedly get requests from biology teachers for subscriptions for that purpose.

Tideline, which is financed by San Francisco Bay Wildlife Society, was printed on recycled paper. Our mailing list was managed by Volunteer Howard Collins and Kris Young, who coordinated additions, deletions and changes to the list. Volunteers also applied address labels to the issues before mailing. Without volunteer assistance, *Tideline* would not be possible.

Avocet Gazette -- A quarterly newsletter called the *Avocet Gazette* is published for volunteers and staff members. It focuses on news, events, and upcoming projects at the Refuge. This is an excellent way for staff members to recruit volunteers for projects, and to report on events. Volunteer Shelley Buranek continues to do a wonderful job putting the newsletter together every quarter.

Artist's Reception -- During 1996, the Refuge held a reception for a local artist who exhibited her original artwork in the Visitor Center auditorium. Her exhibit portrayed habitats and wildlife found on the Refuge and around the San Francisco Bay area, specifically salt marshes and endangered species that rely on them. Visitors had the opportunity to meet and talk with the artist. Through this artwork, visitors can experience the beauty and wonder found in the habitats of the bay, and come to better understand the need for conservation.

Other artwork displayed in the Auditorium this year included the 1995 Junior Duck Stamp Design Contest winners, 1996 Endangered Species Poster Contest winners, letters from school children, and "Refuge Reflections," a collection of volunteer photographs of the Refuge.

A special one-man Art Exhibition and Sale was held on December 6 with nationally-acclaimed wildlife artist Don Nicholson-Miller. The artist created a special painting of black-necked stilts specifically for the evening's sale, which he donated to the Refuge. It was sold through silent auction and the Refuge received one hundred percent of the proceeds from its sale.

The receptions and art shows were advertised in *Tideline*, and were well attended. Many people who came to the receptions were first time visitors to the Refuge. The San Francisco Bay Wildlife Society provided refreshments.

Other Interpretive Programs -- Volunteer Ed Kantack developed *A New Series of Illustrated Programs* designed to introduce the visitor to the National Wildlife Refuge System, Don Edwards San Francisco Bay NWR itself, and the habitats, endangered

species, and flora and fauna of the Refuge. The series began with "The National Wildlife Refuge System," an introduction to the NWRS in general and specifically DESFBNWR. It continued with "Refuge Ecosystems," "Life in the Uplands," and "What Lands? Wetlands!". Volunteer Karen Bane-Gaston's program, "Endangered Species of the Bay Area" was incorporated into the series and presented again on Earth Day to a receptive crowd. In the coming year we hope to add a program on the effects of non-native plants on the native ecosystem and a program on migration and migratory birds that visit the Refuge.

Starstruck! -- Visitors interested in astronomy participated in our special night program, which begins with a slide show and lecture on the visible stars of that night. Afterwards, participants move outside and use telescopes to view the stars they learned about during the lecture. The volunteers leading this program provided high-end telescopes for special viewing opportunities, and participants also used their own telescopes.

Discovery Packs -- This program is designed for families and other groups who want to hike the Tidelands Trail and take an up-close look at the habitats and plants and animals along the way. Discovery Packs are kept in the Visitor Center and can be checked out by visitors (such as families, scout groups, etc.). A poster advertises the program. The person who checks out the pack leaves their driver's license with the volunteer at the desk. When they return the pack, they clean the equipment, count items issued, and retrieve their driver's license. The packs have activity ideas for investigating the habitats at the refuge, such as mini-expedition, brine shrimp lab, and bird bingo. In 1996, a total of approximately 100 people checked out Discovery Packs.

H.9.Fishing

Anglers made good use of the several saltwater fishing areas on the Refuge.

Dumbarton Fishing Pier and the adjacent north and south trails along the Bay are favorite fishing spots for anglers. The access road to this area is closed to motor vehicles from April through August each year to protect the threatened Western Snowy Plover which nest adjacent to the road. Plover chicks have been known to enter the roadway, which put them at risk of being struck by the often heavy traffic moving to and from the pier. The road is still open to pedestrian and bicycle traffic, and a shuttle is available by reservation to take anglers to the fishing pier on weekends.

Coyote Creek Lagoon, at the southeast portion of the Refuge, is a favorite bank fishing spot for those hoping to hook a white sturgeon. Bank fishing also occurs on a smaller scale in the Ravenswood area located at the west approach to the Dumbarton bridge. All together, we estimate that we hosted over 6,000 saltwater angler "uses" on the Refuge this year.

Fishing from or near the pier has netted a variety of fish: leopard shark, sand shark, bat ray, shiner surf perch, kingfish, sculpin, and the elusive striped bass, white

sturgeon and salmon.

Sport fish in San Francisco Bay contain chemicals at levels that may harm those who eat the fish. The Refuge posted information supplied by the California Office of Environmental Health Hazard Assessment that advised anglers to limit the amount of Bay fish that is eaten. These warning signs were posted in Korean, Spanish, Cambodian, Chinese, Vietnamese, and English at the most popular fishing areas.

H.10.Trapping - Nothing to report.

H.11.Wildlife Observation

The opportunity to view wildlife in its natural habitat attracts many of our visitors. The Refuge offers a variety of habitats such as salt marsh, sloughs, extensive mud flats, open water and upland coastal chaparral, grassland and trees. This range of habitats provides an ideal area for visitors to explore, on their own or with our naturalists, when seeking local wildlife.

Some visitors participated in van tours or canoe trips on Mallard Slough and Triangle Marsh, where marsh-nesting and feeding birds were easily seen. Most visitors walked or biked the many miles of Refuge trails on their own, viewing resident nesting birds, migrating and wintering shorebirds and waterfowl, and young birds during the spring and summer months. Bird watchers revel in these opportunities. In addition, many nature study groups led field trips to our Refuge, and the Audubon Society once again conducted its annual Christmas bird count here.

One of the most popular sites for local bird watchers was the restored tidal area, Avocet Marsh, where great numbers of shorebirds and migrating waterfowl gather to feed. There is also a peregrine falcon commonly sighted here.

In June, the Refuge participated in the 8th Annual Butterfly Count sponsored by the North American Butterfly Association. The event drew a number of seasoned, professional lepidopterists as well as first-time amateurs. The counters spent the day searching out butterflies near the Visitor Center and EEC, as well as a nearby riparian corridor. They noted 21 species among a total of 390 butterflies sighted. It was great fun for everyone and will be repeated in 1997!

H.12.Other Wildlife Oriented Recreation - Nothing to report.

H.13.Camping - Nothing to report.

H.14. Picnicking - Nothing to report.

H.15. Off-Road Vehicles - Nothing to report.

H.16. Other Non-Wildlife Oriented Recreation - Nothing to report.

H.17. Law Enforcement

The goals of our public safety unit are to swiftly react to urgent crime and public safety concerns, to continually evaluate our efforts to prevent crime from occurring, and to correct public safety hazards before they claim any victims. As our visitation and properties increase at the San Francisco Bay National Wildlife Refuge Complex, our officers will be severely challenged.

Patrol of the Refuge is done selectively, depending on previous incidents and the number of visitors using the Refuge. Patrol activities in the North Bay were routinely conducted by the North Bay assistant refuge manager who had law enforcement authority. Random weekend patrols were conducted as scheduling and activity allowed.

On May 11, Officer Tarbet confronted two suspects acting suspiciously on a Refuge trail. The temperature of the day was in the high 90's. The suspects were dressed in hooded sweatshirts with the hood pulled over their face. The Refuge was in the midst of a face-lift for the upcoming re-dedication of the Refuge. It was soon discovered that they had spray-painted trail signs and a rock face. This rock had been used as a landmark for ships and sloops sailing in nearby sloughs. One of the suspects paid restitution and entered the U.S. Army. The other was put on juvenile probation.

On March 9, Officer Haire (newly appointed) was called to assist in a heroin case on the Refuge. He received hands-on training in the art of car and suspect searches. Officer Haire placed his first suspect under arrest and was introduced to the associated forms and the booking facility at the Fremont Police Department. Although Officer Haire's primary position is Outdoor Recreation Planner, he has been called upon to assist in numerous criminal investigations.

Tables and graphs that represent the type of criminal activity that occurred at the Refuge during 1996 can be found in Appendix B on page 64.

H.18. Cooperating Associations

For nine years, San Francisco Bay Wildlife Society (SFBWS), a nonprofit cooperating association, has sponsored and underwritten education and outreach programs for the Refuge. Originally established to just support one refuge, the association has grown to the position of assisting seven National Wildlife Refuges during FY-96. Five refuges had visitor center bookstores managed by the Society: Klamath Basin, Malheur, Sacramento, Salton Sea and Don Edwards San Francisco Bay. Turnbull's new education program and Hopper Mountain's Condor Recovery Fund were also supported by SFBWS. All seven refuges, to a certain degree, accepted cash or in-

kind donations and memberships from individuals or businesses in their community. Several refuges, in addition, received corporate, foundation, or government grants to support their programs.

SFBWS cultivated income from a variety of sources to support its own overhead and Don Edwards San Francisco Bay NWR; bookstore, native plant and publication sales, memberships, donations, corporate, foundation and government grants, and events. The education, interpretation, law enforcement and volunteer programs of the Refuge all benefited from SFBWS revenues. The major uses of funds continue to be the *Tideline* newsletter, the volunteer program, general publications and capital equipment. In addition, the education and interpretive programs receive annual budgets.

Bookstore income at both the Fremont Visitor Center (VC) and Alviso Environmental Education Center (EEC) was lower than anticipated this year due to government closures during the normally busy holiday season. At \$27,292, we nearly equaled FY '95 revenues but didn't meet our budgeted target. Community fairs and Refuge events continue to be top sales events for the bookstore. Popular inventory items continue to be logo merchandise items that incorporate the Refuge name as well as finger puppets, magnets, key chains and other items retailing for less than \$5.00.

Publishing a revised edition of "Exploring Our Baylands", an interpretive book that describes San Francisco Bay salt marshes, was an important year-end project for SFBWS. Grants for production expenses came from two corporations, the U.S. Fish and Wildlife Service, and individuals. Sales of "Exploring Our Baylands" are expected to be an important fund raiser for FY '97.

The Refuge's Native Plant Nursery held large fall and spring plant sales in conjunction with other events. Five thousand, seven hundred ninety-one dollars raised from these sales was used for purchase of plants, supplies and equipment for Refuge re-vegetation programs. In addition, extra annuals or non-native plants were sold outside the Visitor Center bookstore. Cash donations, managed by SFBWS, supported the purchase of needed materials for the EEC Butterfly Garden.

Donations of \$1,389 were received from VC and EEC donation boxes. New signage was added to the boxes to hopefully increase the volume and size of gifts. Memorials were also received in honor of Refuge volunteers and friends.

Successful grant proposals written by both Society and Refuge staff members yielded greater financial support for Refuge education programs. Corporate and foundation grants were awarded for equipment and supplies as well as for enhancement of education programs. We received 1,488% more grant income in FY-96 than in FY-95; primarily for underwriting a new position at the EEC. Grants were also received for curriculum and publication development, and purchase of educational supplies and equipment. Grant writing has also initiated and sustained efforts at the Turnbull National Wildlife Refuge and supported the Earth Stewards program at Sacramento National Wildlife Refuge.

Society memberships have grown to become a key part of our revenue. For FY-96,

gross revenues from new and renewing members totaled \$18,307. A membership grant paid for a large mailing to those on the *Tideline* mailing list as well as a new membership brochure. Inserting pre-printed remittance envelopes into each *Tideline* issue also generated additional members and a higher renewal rate. Successful promotions increased the number of \$50.00-plus memberships. Complimentary baseball caps or "Exploring Our Baylands" books were sent to new or renewing members at Supporting level (\$50.00 or greater). Anyone who joined the Wildlife Society "on the spot" at the Refuge received a free water bottle.

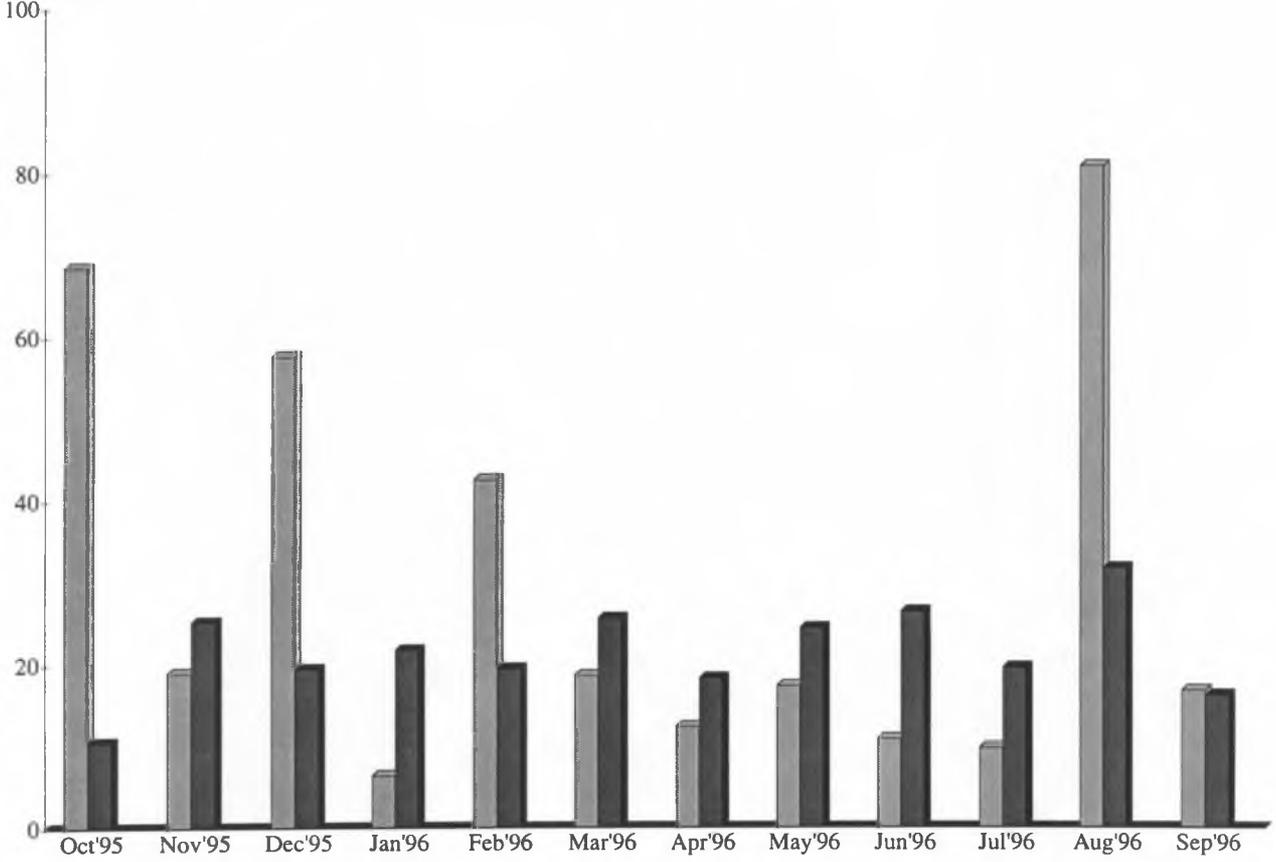
Special events supported by Refuge staff members and volunteers increased community awareness and support. A Fremont Chamber of Commerce Mixer brought about 50 new visitors to the Refuge. Food carts at the Fremont Festival of the Arts netted \$4,543 over one weekend. A dedication ceremony for the newly renamed Don Edwards San Francisco Bay NWR called for new logo merchandise to be produced and sold. The Society now offers caps, t-shirts, sweatshirts, mugs, water bottles, magnifying lenses and license plate holders with the Refuge name.

A nine-member, all volunteer Board of Directors sets policies for the organization. Cecily Harris, part-time Program Administrator, manages finance, fund raising, and Refuge relations activities for the Society. Other Refuge volunteers assist with the bookstore, membership, and bookkeeping activities.

Income and Expense by Month
Oct '95 - Sep '96

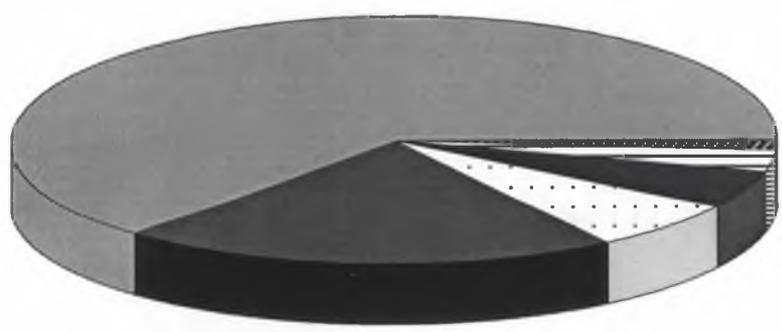
Income
Expense

\$ in 1,000's
100



Income Summary
Oct '95 - Sep '96

4-4000 — Grants	%63.04
4-3000 — Bookstore Sales	21.36
4-5000 — Refuge Program Income	6.53
4-2000 — Memberships	5.15
4-1000 — Donations	2.73
4-9000 — Other Income	1.14
4-8000 — Misc. Income	0.04
Total	\$361,776.43



By Account



JOHN STEINER: Chief of Public Use



RICH HAIRE: Outdoor Recreation Planner



NANCY FRIES: Interpretive Specialist



AMY HUTZEL: Education Specialist



**FRAN MC TAMANEY: Environmental
Education Coordinator**



**SANDY SPAKOFF: Environmental Education
Specialist**



BARRY TARBET: Police Officer



JON ADAMSON: Police Officer



**CHRISTINE COY: Interpretive
Specialist**



**CECILY HARRIS: San Francisco
Bay Wildlife
Society Program Administrator**

APPENDIX A

U.S. Fish & Wildlife Service Environmental Education Resource List for "Linking Girls to the Land" Workshop participants

National Office for FWS, Refuges

FWS, Refuges

Nancy Marx (703) 358-2029 x 5245

Program: - Watching Wildlife, A Skills Workshop Guide for youth.

Region 1

Glenda Franich (503) 872-2705 Environmental Education Coordinator

USFWS, Refuges & Wildlife

911 N.E. 11th Avenue

Portland, OR 97232

Don Edwards San Francisco Bay National Wildlife Refuge

Fran McTamaney (408) 262-5513

Program: - Trekking the Refuge Educator-Led Field Trip

Sacramento National Wildlife Refuge

Denise Dachner (916) 934-2801

*Programs: - CARGO for Conservation box - presentations
- Field Trips and Educator Workshops*

Ecological Services, Sacramento

Bob Pine (916) 979-02752

*Program: - Habitat Evaluation Procedure (HEP) - hands-on
activity for Girl Scouts*

Region 2

Diana Trajillo (505) 766-8044 Environmental Education Coordinator

USFWS, Refuges & Wildlife Girl Scout Coordinator

P.O. Box 1306

Albuquerque, NM 87103

*Program: - Completing CD ROM for middle school age youth on habitat
management.*

Region 3

Tom Worthington (612) 725-3691 Environmental Education Coordinator

USFWS, Federal Building

1 Federal Drive

Fort Snelling, MN 55111-4056

Minnesota Valley National Wildlife Refuge

Keith VanCleve (612) 725-3145

Program: - Wetland Trunk (Available on loan)

Suzanne Trapp (612) 725-3145

Program: - Watchable Wildlife Patch and Workshop for youth.

- *Watching Wildlife, A Skills Workshop*

Region 4

Donna Stanek (404) 679-7177 Environmental Education Coordinator
USFWS, Refuges & Wildlife
1875 Century Blvd
Atlanta, GA 30345

Panama City Field Office

Laura Jenkins (904) 769-0552
Program: - Gulf of Mexico patch developed for Girl Scouts

Gulf Island National Sea Shore (National Park Service)

Susan Merrifield (601) 875-0821
Program: - Gulf of Mexico patch developed for Girl Scouts

Region 5

Sarah Bevilacqua (413) 253-8515 Environmental Education Coordinator
USFWS, Refuges & Wildlife
300 Westgate Center
Hadley, MA 01035

Chesapeake Bay Field Office

Rich Mason (410) 573-4500
Program: - 3-D Watershed model of Chesapeake Bay (loan)

Region 6

Sherri Featherman (303) 236-8145 Environmental Education Coordinator
USFWS, Refuges & Wildlife
P.O. Box 25486, Denver Federal Center
Denver, CO 80225
Program: - Scientist in the Classroom, Endangered Species program.

Ecological Services, Chevenne WY

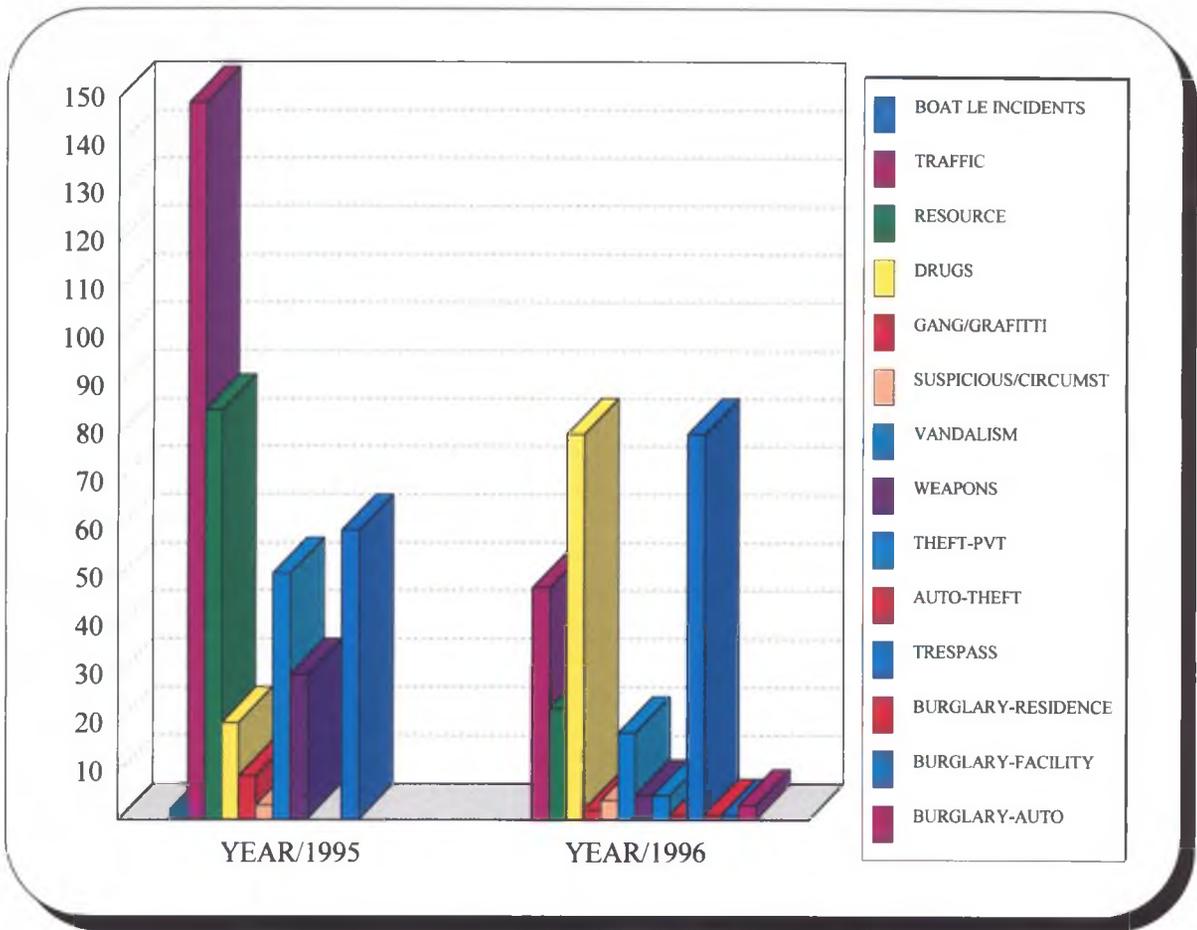
Jane Roybal (307) 772-2374
Program: - Developing a wildlife patch for youth groups

Region 7

Cathy Rezabeck (907) 786-3351 Environmental Education Coordinator.
Connie Wassen (907) 786-3383 Girl Scout Coordinator
USFWS, Division of External Affairs
1011 E. Tudor Road
Anchorage, AK 99503
Program: - Puppet Kits - Bears of Alaska (loan)

Ecological Services, Juneau, AK

Carol Hale (907) 586-7240
*Program: - Badge Burst, Wildlife Badge (Junior -Girl Scouts)
- Science in Action (Brownie and Junior - Girl Scouts)*

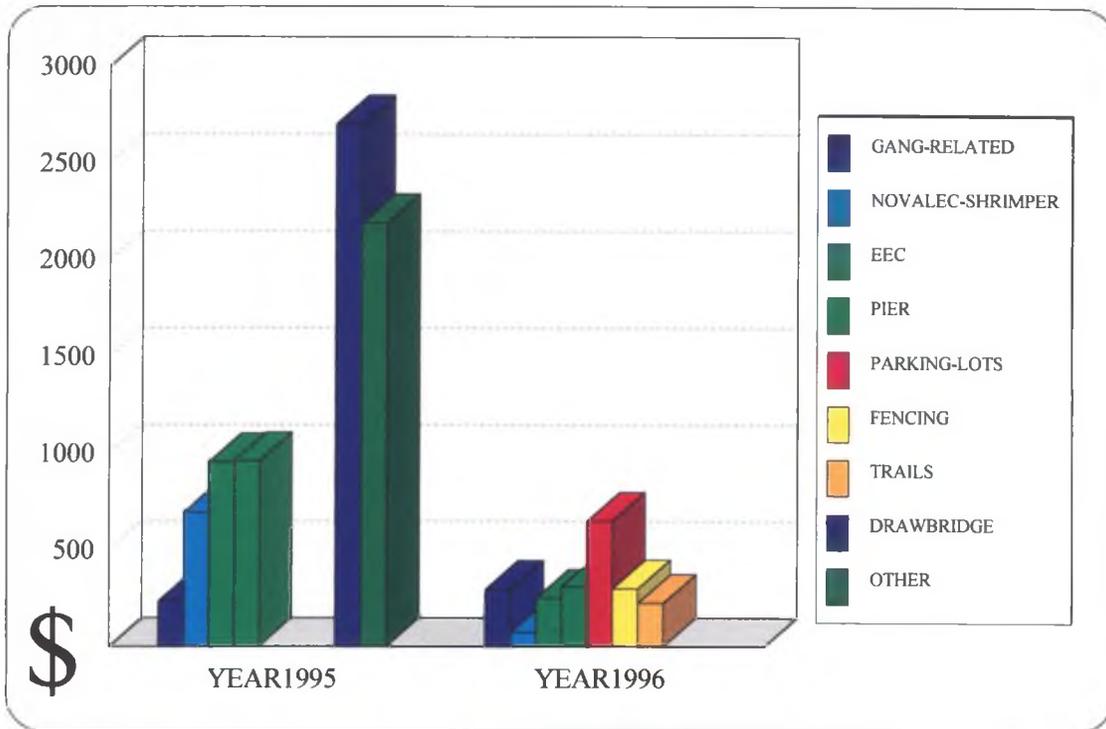


COMPARISON OF INCIDENTS BY SINGLE OCCURRENCE

The above graph represents the number of single incidents per category. This refuge complex is now patrolled by two full time officers and a collateral duty officer (restricted to 10% law enforcement). Statistics are based on written reports, field interview cards, daily logs or other documents and communications input by individual officers. There are fewer officers so there is a smaller amount of crime detected, reported and documented.

A suspicious circumstance is any occurrence that happens but cannot be explained with hard evidence that anything existed or an actual crime has been committed. There were three such incidents on the Refuge reported or discovered by law enforcement personnel. These included joggers reporting that they were being stalked by a suspicious vehicle, a Refuge intern hearing unexplainable noises against her trailer a few nights after another interns car had been stolen and the discovery of torn female undergarments in a Refuge parking lot.

Gang graffiti is seperated as a category to document gang activity in the area and the need to justify and schedule extra patrols if needed for a particular area.



ESTIMATED COST COMPARISON OF REPAIR IN DOLLARS FOR VANDALISM REPORTED AND REPAIRED

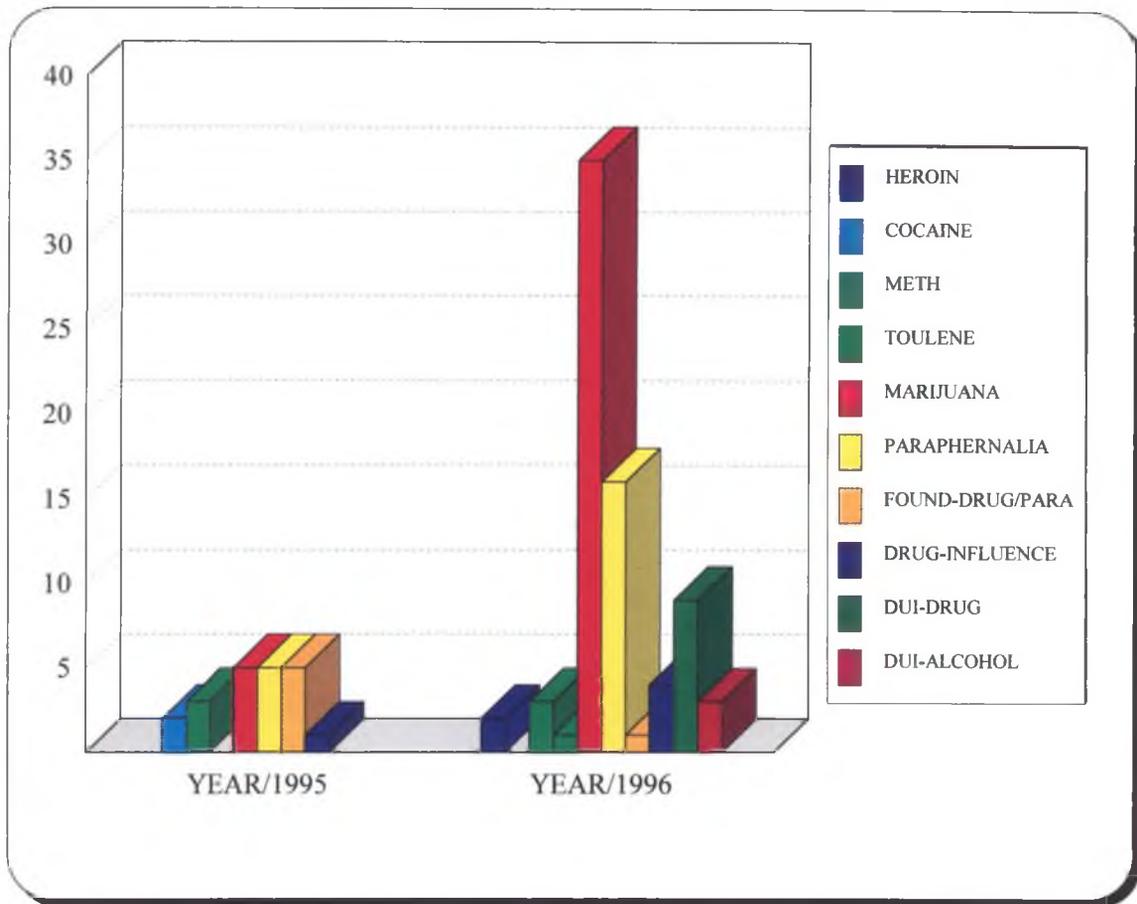
The above graph represents locations most effected by vandalism and those areas routinely vandalized. Most vandalism takes the form of spray paint, markers and marring of wood surfaces. One bar of the graph represents "Gang Related" vandalism. Gang graffiti is found all over the Refuge but mostly on the fishing pier and pavilion locations. This type of graffiti is only a part of the total cost in graffiti removal and vandalism damage estimates.

Another location routinely vandalized during "beer busts" is a Refuge salt pond being fished for brine shrimp. The salt pond is closed to the public except during waterfowl season. The company, Novalec Inc., is harvesting shrimp in this salt pond and other Refuge ponds in the area. Their equipment has been routinely smashed, stolen and damaged at least 3 to 4 times a year. There is a problem with waste disposal and trespass into the pond area. The nearby light industrial park tenants have been asked to report anything out of the ordinary.

Fencing includes perimeter fences and fishing pier gates. Parking lots include damage to vehicles during auto burglaries. Other damage relates to vandalism in areas not specified such as damage done to boundary sign etc.

The above graph represents cases of vandalism that were discovered and repaired. It should be understood that this graph does not reflect a reduction in crime of

a particular category. With the reduction of full time law enforcement officers and the priorities of the collateral duty officer crimes are less likely to be discovered and documented.



DRUG POSSESSION, USE AND CONTROL
BY INDIVIDUAL

In the above graph there has been a change in statistical content and type of representation. The bar graph for 1995 is shown in number of drug incidents for that year. The bar graph for 1996 shows the total number of individuals contacted on patrol for drugs. During a drug investigation for one incident there may be numerous suspects contacted, arrested and searched.

APPENDIX B
Law Enforcement Statistics

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