

# The California Current Marine Bird Conservation Plan

## Chapter 10

### Education and Outreach



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# The California Current Marine Bird Conservation Plan Chapter 10

*Education and Outreach*

**Version 1.0**

**Edited By:  
Kyra L. Mills, William J. Sydeman  
and Peter J. Hodum**

Marine Ecology Division  
PRBO Conservation Science  
4990 Shoreline Highway  
Stinson Beach, CA 94970

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## CHAPTER 10. EDUCATION AND OUTREACH

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Scientific efforts for conservation have little impact without the support of local communities, stakeholders, and government managers. To build understanding and support, research, management, and conservation programs must share their findings and involve community groups, individuals, and partners in conservation through education and outreach.

Moreover, education and outreach activities focused on the California Current System (CCS) should take an ecosystem approach that teaches across taxa – from zooplankton to humans.

For the purposes of this chapter, outreach refers to communication with land managers, agencies, planners, business interests, nonprofit organizations, academia, and volunteers. Outreach activities include, but are not limited to, conferences and workshops that facilitate communication among experts, participation in use planning, volunteer restoration and monitoring programs, field trips, and ecotourism.

Education, an important component of outreach, refers to the range of activities that educate and involve students and adults. Education activities include class and group visits to field sites, interpretive displays, specialized curricula, and participation in festivals.

In this chapter of the plan we will:

- outline key messages about the California Current System to be disseminated through education and outreach programs,
- identify user groups to address through outreach programs,
- summarize existing resources for use by educators and outreach groups, and
- highlight examples of educational opportunities and successful programs.

### 10.1 CHALLENGES AND KEY CONCEPTS FOR EDUCATION AND OUTREACH PROGRAMS

There are many complex conservation issues confronting seabirds in the CCS. Seabirds, however, also pose a major challenge to managers and educators, namely a lack of awareness about seabirds among the general public. In contrast with waterfowl, shorebirds, and songbirds, many people do not interact with most species of seabirds during their daily routines. With growing interest in outdoor adventure pursuits (e.g., kayaking, diving, and whale watching), there is both a greater opportunity and a need to raise public awareness about seabirds and coastal habitats, and how humans can negatively impact seabird populations.

The CCS is fortunate to have active marine refuges, state parks, and sanctuaries that support outreach programs and work alongside science and management. Moreover, there are numerous private organizations involved in marine education. All of these can serve as resources upon which to build CCS-focused education and outreach programs. For seabird and marine ecosystem education to be successful, lines of communication between educators and outreach specialists across the CCS must be developed, so that we can share resources and learn from successes and failures.

## 10.2 KEY CONCEPTS FOR SEABIRD CONSERVATION

The following list of *Key Concepts for Seabird Conservation* should be incorporated into education and outreach programs. These concepts are important to include in any program concerning conservation, and are indispensable for programs focusing on birds and the CCS.

1. ***To adequately support seabirds and other marine life, we must not overexploit marine resources.***

***Ecosystem example:***

Murres and cormorants (and many other seabirds) depend on a reliable supply of fish and zooplankton to feed themselves and their growing young. If the prey that they have come to depend on disappears or is drastically reduced due to over-fishing, this may jeopardize adult survival and successful chick-rearing.

2. ***To sustain healthy populations, seabirds must be able to evade predators and find food for several years before they reach breeding maturity.***

***Ecosystem example:***

Western Gulls (*Larus occidentalis*), endemic seabirds to the CCS, must be at least 4 years old to breed. To maintain their population, a sufficient number of fledged chicks must survive to replace birds that die or emigrate out of the population. In order to survive the first four years of their life, gulls must find safe, disturbance-free roosting areas; find enough food to eat; avoid disease; evade predators; and, finally, once old enough, find a breeding colony to raise their young.

3. ***Seabirds possess special adaptations that allow them to thrive in marine environment – often in harsh conditions.***

***Ecosystem example:***

Common Murres (*Uria aalge*), commonly seen seabirds of the San Francisco Bay area, spend most of their life at sea; but they depend on remote, rocky cliffs along the West Coast to roost and breed. Because murres lay one oblong-shaped egg that will not roll away during incubation, they can take advantage of steep and narrow rock ledges for nesting, which few land predators (e.g., coyotes) can negotiate.

4. ***Seabirds depend on habitats that are diverse in structure and flora.***

***Ecosystem example:***

Rhinoceros Auklets (*Cerorhinca monocerata*) need islands or mainland coasts with soft soil in which they can dig their nesting burrows. Without adequate plant cover, coastal soils are susceptible to erosion, which severely reduces the quality and availability of nesting habitat for this species.

5. ***Non-native plants and wildlife and an overabundance of native predators can upset the dynamic balance of seabird habitats.***

***Ecosystem example:***

Seabirds have evolved on islands and other isolated ecosystems that have been free from many mammal predators. When humans, whether inadvertently or purposefully, introduce non-native species (e.g., rats) to these sensitive ecosystems, the introduced species must find food and habitat to survive—often seabird eggs, young, and nesting burrows.

6. ***Seabirds are vulnerable to disturbance from humans and predators during the nesting cycle.***

***Ecosystem example:***

Brandt's and Pelagic cormorants (*Phalacrocorax penicillatus* and *P. pelagicus*, respectively) depend on steep, rocky cliffs above the ocean to nest during the spring and summer months. Approaching a cormorant colony by foot or watercraft can cause cormorants to fly away from their nests, thus leaving their eggs and young vulnerable to predation and exposure to inclement weather. Severe or repeated disturbances can even cause seabirds to abandon entire colonies.

### 10.3 “DID YOU KNOW?” AND “HOW YOU CAN HELP” FACTS ABOUT SEABIRDS IN THE CCS

Compelling facts can capture the interest of your audience on an educational display or can be incorporated into classroom activities. “Did you know?” facts are a great way to teach the public of all ages about seabirds in the CCS. We recommend including conservation action-items, like “How you can help” information in educational displays. Following are a few examples to include in educational programs, signs, curriculum, flyers, and presentations:

**Did you know?** Because of its unique physical, biological, and oceanographic properties, the CCS is one of the richest marine ecosystems of the Pacific Ocean, providing habitat and food for far-ranging and highly migratory species.

**>>How you can help:**

- Support your local National Marine Sanctuary or other marine refuge, park, preserve, or reserve in the CCS by becoming a volunteer.
- Encourage marine education programs in your local schools.
- Support research and conservation efforts in the CCS.

**Did you know?** The CCS supports 38 species of breeding birds and at least 54 bird species that commonly migrate through its waters and shores.

**>>How you can help:**

- Participate in International Coastal Clean-up Day (<http://www.coastalcleanup.org/index.cfm>) and clean your favorite beach of plastics and other dangerous marine debris that can injure and kill marine life.
- Support the establishment of Marine Protected Areas (MPAs) that support important habitats for migratory and resident seabirds in the CCS.

**Did you know?** Most seabirds only come ashore to breed, defend territories, or court mates; the rest of their life is spent feeding and roosting on the open ocean.

**>>How you can help:**

- Share our ocean resources with birds. Be a wise consumer of seafood, by consulting Monterey Bay Aquarium’s Seafood Watch program (<http://www.mbayaq.org/ct/seafoodwatch.asp>) for best-buy purchases at restaurants or markets.
- Learn more about the fascinating life cycles of seabirds.
- Share your knowledge about seabirds with a friend or a local school.

**Did you know?** Seabirds in the CCS depend on a food web that consists of small coastal pelagic fish, young of the year predatory fish (e.g., salmonids and rockfishes), macro-zooplankton (e.g., copepods and euphausiid crustaceans), and squids.

**>>How you can help:**

- Share our ocean resources with birds. Be a wise consumer of seafood, by consulting Monterey Bay Aquarium’s Seafood Watch program (<http://www.mbayaq.org/ct/seafoodwatch.asp>) for best-buy purchases at restaurants or markets.
- Become a volunteer at an aquarium or visitor center that teaches the public about diversity within the CCS.

**Did you know?** Domestic and feral cats kill approximately four million birds a day in this country alone, and have devastating impacts on seabirds across the world.

**>>How you can help:**

- Keep your cat indoors and educate your neighborhood about the impact of cats on birds and other wildlife. This unnecessary impact can easily be reduced if cat owners would keep their cats indoors, and if broad education on the impact of cats on wildlife is conducted.
- Support the American Bird Conservancy's (ABC) Cats Indoors! Campaign, which seeks to educate the public on the facts of cat predation on birds and other wildlife, and the hazards to free roaming cats. This information is available at the American Bird Conservancy's web site at <http://www.abcbirds.org>.
- Educate your community about outdoor cats as a conservation threat to birds and other wildlife and distribute brochures and information from ABC's website broadly.
- Attend town hall meeting to raise awareness, especially in problem areas where there are large concentrations of feral or stray cats.

Other actions that cat owners can take to help birds:

- Keep cats only as indoor pets.
- Don't abandon unwanted cats; rather, give them to the local SPCA or Humane Society.
- Spay and neuter your cats.
- Don't feed stray or feral cat populations. A more humane alternative for cats and wildlife is to reduce the unwanted cat population by limiting reproduction and facilitating adoption by responsible pet owners.
- Support local efforts to remove feral cats from the wild.

## 10.4 KEY AUDIENCES AND EXAMPLE PROGRAMS FOR OUTREACH

When designing and implementing outreach programs on seabirds and the CCS, it is a priority to share information with other groups who are conducting marine or seabird outreach in the CCS. Through sharing one can receive invaluable input on your program, possibly receive additional ideas, and avoid unnecessary redundancy with already established programs.

We identify four broad target groups for CCS seabird outreach programs:

- A. Stakeholders (e.g., fishers, marine tour operators, sport fishing boat operators, outdoor recreation companies)
- B. Community members (e.g., families, leisure boaters, sport fishers, outdoor recreators)
- C. Educators (school teachers and environmental educators)
- D. Land and marine managers (government agencies, private landowners, homeowners)

**A. Stakeholders** - Stakeholders are people who rely on the habitat for their livelihood, for example, fishers, outdoor recreation companies, etc. These are often the groups of people that have the highest potential for protecting CCS birds, yet they may be the most difficult to reach.

In order to communicate effectively with stakeholders, conservationists and educators need to find a common ground and build a relationship of trust. Highlighting the economic value of seabirds is often a great way to reach these groups. For example, fishers have come to depend on seabird flocks to guide them to their catch; thus, seabirds play an important role in the livelihood of fishers around the world.

Providing economically feasible alternatives to current practices is an asset to any outreach program targeted at stakeholders. For example, seabird entanglement on fishing lines is a problem in the CCS, both for seabirds and the fishers using this gear. Thus, solutions that diminish entanglement can be beneficial to both the birds and the fishers.

**Outreach Example: Seabird Training Program for Seafood Industry.**

Effective programs that target stakeholders must involve person-to-person contact. These programs can be as simple as a presentation to a local group of fishers or a field trip to view seabirds; they can also be as involved or structured as a training program. The following is an excellent example of the latter.

Although this program is not currently taking place in the CCS, it is a unique educational program established in New Zealand to teach and train new fishers about seabird-fisheries interactions and safe fishing practices to reduce seabird deaths and injuries. The Seafood Industry Training Organisation's (SITO) fisher-training program is aimed at heightening awareness and building a sense of pride about practicing good fishing at sea. See: <http://www.doc.govt.nz/Conservation/001-Plants-and-Animals/004-Seabirds/Southern-Seabird-Solutions/News/SS-media/training.asp>.

**B. Community Members** - Community members include the public, birders, local businesses, homeowners, families, and outdoor recreation groups. Economically, this group has a great deal of influence, especially in terms of access to recreation areas. In addition, community members can participate in conservation indirectly through creating favorable public sentiment, promoting legislation to protect marine habitats, and voting on measures to protect and enhance marine environments.

Appropriate programs for this group include general awareness-building activities such as informational flyers, birding trips, presentations within the community, outreach at local fairs, articles in newspapers and newsletters, and educational materials on the web.

In this broad audience there will be users that are receptive to messages about seabird conservation, such as birders or conservationists. Other users, such as rod and boat clubs or marinas, may be more difficult to reach because conservation measures may limit their activities. In this case, continued outreach is needed to slowly build a trusting relationship.

It is essential to provide conservation messages to diverse communities; this is often best done through partnerships with other groups who are already working and familiar with the community—a first step in building conservation connections!

**Outreach Example: Seabird Hooking and Entanglement by Fishers.**

City wharfs are places where both seabirds and sport fishers gather to fish. Unfortunately, this interaction can lead to entanglement or hooking of seabirds, including Brown Pelicans (*Pelecanus occidentalis*). The City of Santa Cruz, California, experienced this problem firsthand in 2002, when a school of anchovies near a city wharf drew pelicans and fishers in large numbers, leading to the entanglement and hooking of numerous pelicans. Targeting sport fishers, the City of Santa Cruz initiated a Pelican Protection Program to reduce entanglement and hooking on the wharf (<http://santacruzbirdclub.org/art-pel2.html>).

The Pelican Protection Program involved a variety of community groups and government agencies, including local bird conservationists, research institutions, rehabilitation specialists, and marine managers. Many fishers who use the wharf did not understand English, thus the program worked with translators to communicate the critical outreach messages. A training program was implemented for wharf staff and local lifeguards to raise awareness of the problem, and to inform them of when and what actions to take when they see a flock of pelicans in the area (including closing the wharf to fishing).

For more information about The Pelican Protection Program, contact Dan Buecher, Wharf Headquarters, 21 Municipal Wharf, Santa Cruz, CA 95060. NOAA's Channel Islands National Marine Sanctuary is also conducting an outreach campaign addressing this issue. Their plan is to distribute educational brochures and place signs on piers in Santa Barbara and Ventura counties, California, in the near future.

The seabird entanglement and hooking issue highlights the potential for coordinating outreach efforts between agencies and organizations across the CCS. Sharing successes, failures, and outreach messages, especially those that have been translated into different languages, will help ensure that we deliver consistent and clear messages to the public.

**C. Educators** - Educating educators expands the potential to reach larger numbers of people with fewer direct staff. It is essential to train educators such as school-teachers, naturalists, bird tour leaders, and docents in the key messages for seabird conservation. Identifying existing education programs in schools, nature centers, and visitor centers and partnering to infuse conservation messages into their existing programs is a cost-effective way to reach a broader audience.

To accomplish this, teacher trainings through existing networks and partnerships are an excellent way to train teachers. Providing them with materials in the form of activities, posters, and bird identification guides or cards is well received. Aligning educational programs with state science standards also makes the teachers more receptive to the messages presented through materials.

When trying to reach educators at nature centers or other docent groups, it is best to offer training for staff and provide them with outreach materials to distribute (informational flyers, posters, signs). (See the resource table for materials to distribute.)

***Outreach Example: Involving Schools and Communities in Seabird Restoration.***

By 1986, Common Murres had abandoned their "Devil's Slide Colony" south of San Francisco. The abandonment of this formerly thriving colony has been attributed to an overall population decline of murres in the early 1980s from the combined effects of gill netting and two devastating spills in San Francisco Bay area waters (*Puerto Rican* 1984 and *Apex Houston* 1986). The Common Murre Project was implemented in 1996 to restore this important colony for breeding murres.

In an innovative program involving researchers, managers, and educators, the project has been a great success, surpassing its goal of 100 breeding pairs at the colony. Employing a concept called "social attraction," the project placed murre decoys, a solar-powered sound system, and mirrors on the surfaces of the former colony. Classes from local schools were enlisted to paint and refurbish the murre decoys, and participating schools receive regular updates on the progress of the murres. See [http://desfbay.fws.gov/Archives/Murre/Common\\_Murre.htm](http://desfbay.fws.gov/Archives/Murre/Common_Murre.htm) or <http://www.scc.ca.gov/coast&ocean/winter2002-03/pages/toc.htm>.

**Outreach Example: Seabird Curriculum and Teacher Training at Moss Landing Marine Laboratories.**

Moss Landing Marine Laboratories (MLML) runs a summer-time Teacher Enhancement Program on marine ecology, with a special focus on seabirds. One of the overarching goals of this program is to bring MLML research to the community through teachers. The program was structured for high school teachers; however, its curriculum is adaptable.

**Key elements include:**

- overview presentation about seabird ecology (e.g., their families, life-histories, their life cycles, and applicable conservation topics);
- hands-on labs using actual data and collected materials (stomach contents of Common Murres and diving physiology);
- classroom activities using actual data that are aligned with science standards (e.g., hypothesis testing).
- For more information about this program, see: <http://www.mlml.calstate.edu/forteachers.htm> or contact Dr. Simona Bartl, Adjunct Professor MLML (sbartl@mlml.calstate.edu).

**D. Marine and Land Managers** - Marine and land managers are user groups that require more technical information to make informed decisions about changing management practices to benefit seabirds. In addition, managers are often charged with managing their jurisdiction for a variety of resources and are often understaffed for the amount of work they are expected to accomplish. As a result, connecting land managers with seabirds in the CCS becomes extremely important.

It is critical to get managers into the field with biologists, connecting them to the resource and showing them the direct benefit their actions can produce for seabirds. Clear and concise messages advising managers on how to alter or enhance practices are needed. Slide presentations are also effective in reaching this group.

## 10. 5 EDUCATION PROGRAM OPPORTUNITIES

The concepts and guidelines outlined in this chapter can be presented to the public and to students through a variety of media. Following is a list of common education opportunities and some suggestions for content.

### A. Classroom Education

Programs in the classroom should focus on communicating key concepts (see section 10.2) to students through hands-on activities. Lessons should stress studying seabirds in the field, e.g., a nearby marine sanctuary or wildlife refuge, and include observational or data collection activities. Coordinating a field trip with a group who is conducting bird conservation and monitoring projects is one way to foster interest and enthusiasm for wildlife and teaches students the importance of, and the science behind, conserving marine birds.

Project-based learning provides students and teachers with meaningful educational experiences that allow an open-ended approach to solving a conservation problem in the school or surrounding community or ecosystem. Students identify a local conservation issue in their community and through library and field research plan and implement a project from idea conception to project completion. Teachers and students work cooperatively to make important decisions, while simultaneously working with biologists, land managers, business people, private landowners, and others in the community. Because of this investment and emphasis on self-direction, students take ownership of their work, and the lessons learned are profound and long lasting (L. Rogers, pers. comm.).

***An excellent example of project-based learning about seabirds in the CCS is The Murre Project (see section 10.4).***

A great way to get students interested in marine birds is through observation in the field. While access to binoculars is sometimes limiting, you can contact your local Audubon Society chapter, nature center, or other local wildlife education group to see if pairs are available for check out. If you feel uncertain of your birding skills, contact your local Audubon Society chapter or nature center to see if there are any docents or naturalists who can join your class for a day of birding.

### B. Volunteer Involvement

Using volunteers to aid in data collection or habitat restoration projects is an excellent way to gain additional help. It is one of the best ways to teach people about conservation. Increasingly, families, individuals, and school groups have opportunities to participate in docent programs or projects. Volunteers that participate in counting and studying birds quickly develop a connection to them, which directly and intimately involves the volunteer in the conservation effort. To ensure reliable data collection, supervisors must match monitoring techniques with the skill level of the volunteer.

### C. Interpretation at Natural Areas

Interpretation is an excellent way to disseminate key concepts about bird conservation to the public. Displays at visitor centers should highlight the birds using the habitats and show the specific features of the habitat that are critical to bird reproduction and survival, including assemblages of native plants. Displays should be aimed at the general public, teaching the causes of the decline of marine birds and emphasizing solutions and simple ways to help. Again, integrating people as part of the solution encourages their support for conservation issues.

### D. Participation in Community Festivals and Fairs

Birding festivals are becoming a popular means of enhancing local economies through ecotourism, which can help promote local support for conservation of natural areas—a requirement for long-term sustainability of conservation actions. Festivals also present an excellent opportunity to further educate people already familiar with birds about the scientific reasons behind bird conservation. Birders already recognize and love birds and can easily be taught the reasons for bird conservation and what a healthy bird population needs to survive. Birders also constitute a pool of experienced observers who may volunteer for monitoring programs.

Representation of bird conservation at environmental fairs is another way to reach large numbers of people, convey the key concepts behind bird conservation, and build conservation partnerships in the region. Booths that convey the key conservation messages and provide information on how individuals can help through interactive games or activities for children engage families and visitors in bird conservation topics.

The National Fish and Wildlife Foundation has published Bridges to Birding, an interactive program for introducing birds, bird watching, and bird conservation to your community. It contains step-by-step instructions on how to put on a festival or fair focusing on birds. To obtain a copy contact the International Migratory Bird Day (IMBD) Information Center at (703) 358-2318 or [IMBD@fws.gov](mailto:IMBD@fws.gov).

Conducting an IMBD celebration is another excellent way to get local recognition of birds through this international program of the National Fish and Wildlife Foundation. International Migratory Bird Day celebrates the incredible journeys of migratory birds between their breeding grounds in North America and their wintering grounds in Mexico, and Central and South America. For more information, visit [www.birdday.org](http://www.birdday.org).

## 10.6 RESOURCES FOR SEABIRD AND MARINE EDUCATION

The following table of resources is by no means complete; as the CCS Plan is a living document, we look forward to updating and building on this table in future versions.

**Table 10.1** – Resources for seabird and marine education in the CCS region.

TOPIC or PROGRAM	WEB LINK
<b>REGIONAL</b>	
Oregon Coast National Wildlife Refuges – informational booklet	<a href="http://oregoncoast.fws.gov/OCR.pdf">http://oregoncoast.fws.gov/OCR.pdf</a>
Overview of breeding seabirds in WA, OR, CA	<a href="http://biology.usgs.gov/s+t/noframe/b022.htm">http://biology.usgs.gov/s+t/noframe/b022.htm</a>
Save our Shores: Educational Resources and links, some of which are available in Spanish	<a href="http://www.saveourshores.org/Education_&amp;_Outreach/index.html">http://www.saveourshores.org/Education_&amp;_Outreach/index.html</a>
Moss Landing Marine Laboratories: Teacher Enhancement Program	<a href="http://www.mlml.calstate.edu/summer_inst.htm">http://www.mlml.calstate.edu/summer_inst.htm</a>
<b>NATIONAL</b>	
Marine Protected Areas	<a href="http://www.mpa.gov">www.mpa.gov</a> ; click on the MPA Center and then MPA Education project
Sea Education Association K-12 Lesson Plans	<a href="http://www.sea.edu/k12LessonPlans/k12pgmtop.htm">www.sea.edu/k12LessonPlans/k12pgmtop.htm</a>
National Sea Grant Library	<a href="http://nsgd.gso.uri.edu/edu.html">http://nsgd.gso.uri.edu/edu.html</a>
BRIDGE: Oceans Sciences Teacher Resource Center	<a href="http://www.vims.edu/bridge/">http://www.vims.edu/bridge/</a>
Classroom Exploration of Oceans: Teacher Workshop Series	<a href="http://www.coexploration.org/ceo/">http://www.coexploration.org/ceo/</a>
OBIS/SEAMAP: Marine Education Activities	<a href="http://obismap.env.duke.edu/outreach/">http://obismap.env.duke.edu/outreach/</a>
Environmental Education on the Internet – Searchable Resources	<a href="http://eelink.net/classroomresources-directories.html">http://eelink.net/classroomresources-directories.html</a>

## 10.7 EDUCATION AND OUTREACH RECOMMENDATIONS

### Fishing Interactions:

1. Develop outreach programs that target commercial and recreational fishermen to inform them about the importance of protecting seabirds and how to minimize seabird bycatch.
2. Inform fishers of safe-fishing practices and heighten their awareness of threats facing seabirds.
3. Increase awareness of, and build interest in, seabird conservation and fisheries among the public by teaching basic marine ecosystem concepts, disseminating seabird findings and recommendations, and encouraging scientific inquiry.
4. Improve lines of communication between researchers, conservationists, resource managers, and fishers in CCS.
5. Build partnerships with other groups that are conducting educational outreach on fisheries-related issues (e.g., Monterey Bay Aquarium's Seafood Watch Program, Coastal Conservancy, The Nature Conservancy, Blue Ocean Institute, etc.).
6. Disseminate practical "how you can help" recommendations on how to minimize seabird bycatch.
7. Set up a CCS seabird observation network that allows fishers and other mariners to submit their at-sea or at-port seabird observations (e.g., location and size of feeding flocks, or unusual sightings) to promote more interest in marine birds.
8. Publish a CCS newsletter that collaborates with fishers (e.g., include an article or column written by a fisher in the CCS).
9. Collaborate with existing educator groups and/or teacher training workshops to heighten teacher awareness of seabird-fisheries interactions in order to successfully bring these concepts and messages into the classroom.
10. Improve public understanding of marine food webs (e.g., emphasizing how we and seabirds are connected by being predators of fish) and the need for balanced fishery practices and management.

11. Develop and disseminate multimedia resources to educators, including teaching tools and workshops, on seabird-fisheries interactions.
12. Conduct seabird and marine ecosystem educational outreach at fishing derbies, fairs, and events.
13. Conduct pelagic or coastal bird cruises to heighten public recognition and understanding of seabirds.
14. Heighten public understanding of existing marine laws that protect seabirds and fish.

### Marine Ecosystem Protection:

1. Increase public awareness about the major threats to marine ecosystem protection (human disturbance, bycatch, prey competition, overfishing).
2. Educate public about seabird life histories in the CCS, highlighting diverse ecological requirements.
3. Educate public about the importance of Marine Protected Areas and "marine hotspots."
4. Collaborate and communicate with other groups and agencies in the CCS who are conducting educational outreach on marine topics.
5. Develop and disseminate multimedia resources, including teaching tools and workshops, to educators on marine ecosystems.
6. Conduct seabird and marine ecosystem educational outreach at fairs or other events.
7. Conduct pelagic or coastal bird cruises to heighten public recognition and understanding of marine ecosystems.
8. Heighten public understanding of existing marine laws that protect marine ecosystems.
9. Create a constituency for MPAs among the wildlife-watching public (bird and whale-watchers).

**Habitat Protection:**

1. Develop public education programs on the effects of human disturbance on seabird colonies; this is crucial for colony protection, especially for small colonies that exist near human habitation and ecotourism destinations (i.e., caves, sea kayaking).
2. Educate boaters on direct (running over adults and chicks, disruption of feeding flocks) and indirect effects (flushing and predation of eggs and chicks) of boat disturbance on seabirds.
3. Establish regular education programs (and distribution of leaflets) for pilots (both military and civilian) to educate them on the effects of aircraft disturbance to seabirds.
4. Initiate a U.S., Mexico, and Canada partnership to begin joint recovery/protection/ education programs. Coordinate protection of existing breeding habitat and restoration of historic habitat.
5. Heighten public awareness of the importance of protecting islands and rocky shore habitat for the life cycle of seabirds.
6. Disseminate to the general public and land managers “how you can help” recommendations that pertain to the protection of terrestrial habitats for seabirds.
7. Develop and disseminate multimedia resources to educators, including teaching tools and workshops, on marine habitats (e.g., a visual schematic showing different nesting seabird niches on a hypothetical island in the CCS).

**Population Monitoring:**

1. Initiate a U.S., Mexico, and Canada joint partnership to begin monitoring of breeding populations and development of education programs.
2. As part of this partnership, assist/coordinate training of researchers and volunteers to help standardize protocols and monitoring methodologies.
3. Organize forums to help disseminate information regarding the value of long-term monitoring in understanding ecosystem health, and why seabirds are great indicators of this.
4. Involve marine user-groups, e.g., fishers, in data collection and provide volunteer opportunities to the public on how they can become involved with seabird population monitoring.
5. Promote the importance of long-term population monitoring to the general public and marine managers.
6. Provide press releases on the health of seabird populations in the CCS, and publish this type of information in a CCS newsletter (i.e., how did the seabirds do this year?).
7. Place cameras in seabird nest boxes with a live feed to a website, which can be accessed by biologists, schools, and education groups.

**Pollution Effects:**

1. Educate the public on the effects of oil on seabirds (both at large scales, such as an oil spill, and small scales, such as oil in storm drain runoff usually ending up in the ocean).
2. Identify specific pollution threats and shape education recommendations around these threats. Also, working in parallel with management points is necessary for effectiveness.
3. Collaborate with other groups and agencies that are conducting educational outreach on pollution to provide information on effects of pollution on seabirds.
4. Use innovative outreach strategies (like painted fish over storm drains) to educate the public about urban runoff and pollution.
5. Conduct targeted outreach campaigns to primary marine polluters that provide practical recommendations on managing waste at sea and at port.
6. Develop and distribute educational flyers or brochures on different types of marine pollution—from oil spills to six-pack holders—and their effects on seabirds.
7. Create and disseminate teaching tools for educators, focusing on marine pollution and its effects on seabirds and marine ecosystems.

**Ecological conditions/climate change/global warming:**

1. Collaborate with groups and agencies that are conducting educational outreach on climate change to provide information on effects of climate change on seabirds.
2. Collaborate with existing educator groups and/or teacher training workshops to heighten teacher awareness of climate change and global warming to successfully bring these concepts and messages into the classroom.
3. Create and disseminate teaching tools for educators, focusing on ocean processes, climate change and global warming, their potential effects on seabirds and marine ecosystems, and what can be done to help.
4. Create and disseminate handouts, white papers, and brochures on climate change and global warming and their potential effects on oceans and seabirds.
5. Publish a column or article(s) in a CCS newsletter on climate and oceans, which defines and explains ocean climate condition indicators such as Pacific Decadal Oscillation and El Niño Southern Oscillation, etc.
6. Place cameras in seabird nest boxes with a live feed to a website, which can be accessed by biologists, schools, and education groups.

**Other Recommendations:**

1. Assure that CCS educational activities are aligned and coordinated with the North American Waterbird Conservation Plan.
2. Participate in regional and national waterbird education working group(s).
3. Increase visibility and awareness of seabird conservation, in general, since seabird-related issues are overlooked far too often.
4. Form committees and hold meetings and/or breakout groups that specifically address waterbird education and outreach at scientific and conservation conferences.
5. Encourage greater communication, coordination, and development of outreach components between the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and organizations involved in seabird research and protection.