

During the early stages of restoration planning, the Natural Resources Trustees for the Montrose case (Trustees) compiled about 100 potential restoration ideas. Some of the ideas in this initial inventory were outdated or were no longer applicable, as they had been identified years earlier during the damage assessment phase of the case; other ideas proposed guidelines or management plans that were more appropriately the responsibilities of other jurisdictions; and yet other ideas were variations on similar themes and could be combined. The Trustees edited, sorted, and reorganized this initial inventory of ideas before undertaking systematic evaluation. A complete compilation of all the original restoration ideas and a description of how they were sorted and organized into the lists described in this section has been placed in the Montrose Settlements Restoration Program (MSRP) administrative record (MSRP 2004).

After editing, sorting, and reorganizing the initial inventory of ideas, approximately 50 potential restoration ideas remained. To select actions from among such a large number of ideas, the Trustees developed a two-stage evaluation process. The first stage, Tier 1, consisted of a screening-level analysis of all of the restoration ideas.

The principal objective of the Tier 1 evaluation was to refine and narrow the list of restoration ideas within each resource category (see below) to a reasonable number of the most promising candidate restoration actions. The Tier 1 evaluation consisted of a limited, systematic analysis of each restoration idea and the rating of each idea's relative capabilities to achieve the restoration goals of the Montrose case. The result was a list of ideas arranged from most to least promising within each category, with the most promising ideas then advancing to a detailed evaluation and environmental impact analysis in the subsequent evaluation step, Tier 2.

To facilitate evaluation and to ensure that a diverse set of restoration ideas were carried forward for further consideration, the Trustees organized the restoration ideas into general resource categories. In the public scoping document prepared at the outset of restoration planning (MSRP 2001), the Trustees suggested the following general types of restoration actions:

- Cleaner fish for anglers: projects to restore fishing injured by DDTs and PCBs
- Continued reintroduction of bald eagles to Santa Catalina Island
- Expansion of efforts to reintroduce bald eagles to all the Northern Channel Islands
- Restoration of peregrine falcons on the Channel Islands
- Wetlands and estuarine projects to benefit resources injured in the Montrose case
- Seabird projects

Considering the input received during the scoping and the initial planning phase, the Trustees refined the general categories of restoration actions into the following:

- Fishing and fish habitat restoration projects
- Bald eagle restoration projects
- Peregrine falcon restoration projects
- Seabird restoration projects

In addition to restoration ideas that fell within these four categories, the Trustees received ideas to create and implement general public outreach and education programs, as well as several

specific research proposals. Public outreach programs and research proposals are addressed separately later in this section, as they differ in their fundamental nature from actions whose purpose is to directly restore injured natural resources and lost services.

5.1 TIER 1 CRITERIA AND PROCESS

5.1.1 Developing Criteria

Federal natural resource damage assessment and restoration regulations at Title 43 Code of Federal Regulations (43 CFR) Part 11 provide guidance on the selection of restoration alternatives. Specifically, under 43 CFR Part 11.82, these federal procedures require the authorized official (in this case the Trustees) to develop a reasonable number of possible restoration alternatives linked to the injured natural resources and the services those resources provide, and then select the alternative determined to be the most appropriate based on all relevant considerations. The federal procedures list the following factors to consider:

- Technical feasibility
- The relationship of the expected costs of the proposed actions to the expected benefits from the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources
- Cost-effectiveness
- The results of any actual or planned response actions
- The potential for additional injury from the proposed actions, including long-term and indirect impacts, to the injured resources or other resources
- The natural recovery period
- The ability of the resources to recover with or without alternative actions
- The potential effects of the proposed actions on human health and safety
- Consistency with relevant federal, state, and tribal policies
- Consistency with relevant federal, state, and tribal laws

This list is not a fixed list of the factors required of all natural resource restoration plans, but rather is a list of the potentially relevant factors to consider in developing evaluation criteria that are tailored to each restoration planning effort. Additional factors may be considered (for instance, this list does not include an explicit factor for evaluating the nexus between a potential restoration action and the injuries of a case). The Trustees considered these factors and other evaluation criteria developed for previous natural resource restoration plans. The Trustees then developed six criteria suited to this case and sought public input on those criteria during the public scoping of this plan in 2002 and 2003.

Table 5-1 summarizes the relationship between the six evaluation criteria (and their subcomponents) utilized in the Montrose Restoration Plan and the list of factors to consider from the federal regulations (43 CFR Part 11). For the Tier 1 evaluation step in which a large number of potential actions were screened, the Trustees limited the evaluation to the first four of these six criteria.

Table 5-1

Relationship between MSRP Evaluation Criteria and Evaluation Factors Listed in the Federal Natural Resource Damage Assessment Regulations (43 CFR Part 11)

MSRP Evaluation Criteria	Factors Listed under 43 CFR Section 11.82(d) Incorporated into Corresponding MSRP Criteria
<p>Nexus</p> <ul style="list-style-type: none"> • Nature of action • Location 	<p>Not listed</p>
<p>Feasibility</p> <ul style="list-style-type: none"> • Technical feasibility • Potential institutional or administrative barriers to an action’s implementation • Degree of ongoing operation and maintenance needed to ensure intended results 	<ul style="list-style-type: none"> • Technical feasibility • Consistency with relevant state, federal, or tribal policies and laws
<p>Resource Benefits</p> <ul style="list-style-type: none"> • Degree to which injured natural resource values and services are improved by the action • Degree to which benefits are measurable • Duration of benefits • Conservation status of resource(s) 	<ul style="list-style-type: none"> • Relationship of the expected costs of the proposed actions to the expected benefits from the restoration • Results of any planned or actual response actions • Natural recovery period • Ability of the resources to recover with or without alternative actions
<p>Ecosystem Benefits</p> <ul style="list-style-type: none"> • Degree to which action leads to sustainable improvements in broader ecological functions 	<ul style="list-style-type: none"> • Relationship of the expected costs of the proposed actions to the expected benefits from the restoration • Results of any planned or actual response actions • Natural recovery period • Ability of the resources to recover with or without alternative actions
<p>Environmental Acceptability</p> <ul style="list-style-type: none"> • Potential beneficial and adverse environmental effects 	<ul style="list-style-type: none"> • Potential human health and safety effects • Potential for additional injury resulting from the proposed action, including long-term and indirect impacts
<p>Cost</p> <ul style="list-style-type: none"> • Includes possible partnerships 	<ul style="list-style-type: none"> • Relationship of the expected costs of the proposed actions to the expected benefits from the restoration • Cost-effectiveness

The Trustees considered these an initial set of evaluation criteria for distinguishing the capabilities of the different potential actions to achieve the restoration objectives. The Trustees determined that the characteristics most important at the screening stage were the link between a potential restoration action and the injuries of the case (i.e., the nexus), feasibility, and potential benefits. The Trustees organized these characteristics into four specific Tier 1 evaluation criteria, which are described separately below.

Criterion 1: Nexus

Criterion 1 concerns the relationship between a potential action and the natural resource injuries and lost services of the Montrose case. The strength of a potential action's connection to the injuries of the Montrose case was evaluated by considering both the nature of the proposed action (i.e., whether it addresses injured resources or services that were lost) and the location of the proposed action.

To evaluate the nature of the proposed action, the Trustees evaluated the degree to which the fundamental objective of a potential action focuses on restoring one or more of the natural resources and services identified for restoration in the final Montrose case consent decree, which states: "The Trustees will use the damages for restoration of injured natural resources, including bald eagles, peregrine falcons, and other marine birds, fish and the habitats upon which they depend, as well as providing for implementation of restoration projects intended to compensate the public for lost use of natural resources" (United States v. Montrose, No. CV 90-3122-R [C.D. Cal 2001]).

The Trustees also considered the location of a potential action. Locations that provide benefits in proximity to where specific natural resource injuries and service losses are occurring or have occurred (i.e., in the Southern California Bight [SCB]) were given highest consideration. This consideration did not always equate to actions proposed at the immediate sites of injury, as contamination is still at issue, but after considering the limitations of ongoing contamination, greater value was placed on projects that are as close as feasible to sites of the original injury/lost services.

For the nexus criterion, the seabird category presented a special situation. A large number of potential actions benefit one or more species of seabirds, and specific evidence of injuries from DDTs and PCBs varies from species to species. For this reason, the Trustees adopted an evaluation approach for the seabird category that considers evidence of injury for each seabird species in addition to the nature of the proposed action and its location.

After consideration of the foraging ecology of seabirds in the SCB, the Trustee Council concluded that it was likely that most, if not all, species of seabirds using the SCB had been exposed to DDTs or PCBs. Across different species, this exposure either caused documented evidence of adverse injury (specifically, eggshell thinning), documented elevated DDT levels in eggs, or the injury was unknown. Severe eggshell thinning is documented when mean eggshell thickness is determined to be at least 15 percent reduced when compared to the thickness observed in pre-1947 museum specimens. The seabird species in the SCB for which there was evidence of severe eggshell thinning (as defined above) are the double-crested cormorant, Brandt's cormorant, the California brown pelican, and the western gull (Kiff 1994). A study in 1992 demonstrated that even though seabird populations in the SCB were not experiencing continued severe eggshell thinning (with the exception of the double-crested cormorant),

individual eggs of the ashy storm-petrel, western gull, and Cassin's auklet were measuring greater than 15 percent thinner than pre-1947 values (Kiff 1994). The 1992 study also found highly significant differences in mean eggshell thickness ($p < 0.01$) compared to pre-1947 values for the double-crested cormorant, the ashy-storm petrel, Cassin's auklet, and the western gull, as well as significant differences ($p < 0.05$) in mean eggshell thickness for the pelagic cormorant.

The Trustees also considered information regarding elevated DDT levels in seabird eggs in the SCB compared to eggs of the same or closely related species at distant colonies along the Pacific coast. Fry (1994) reported that total DDT egg residues were significantly elevated in the SCB colonies compared to other colonies for the following species: the western gull, the double-crested cormorant, the pigeon guillemot, and the ashy storm-petrel. Xantus's murrelets were also documented as having elevated residues of DDTs in their eggs on Santa Barbara Island (Fry 1994).

The Trustees assigned nexus ratings to different seabird species of the SCB after considering the above information regarding eggshell thinning and DDT levels in seabird eggs. A high nexus rating was given for those projects targeting species with severe or significant eggshell thinning and/or for which DDT egg residues were significantly elevated in the SCB colonies. Consequently, the following seabirds received a high nexus and are considered priority species for restoration: the double-crested cormorant, Brandt's cormorant, the California brown pelican, the western gull, the ashy-storm petrel, Cassin's auklet, the pelagic cormorant, and the pigeon guillemot. The Trustees assigned a moderate rating to projects aimed at a species whose eggs did not show severe or significant eggshell thinning but had elevated levels of DDTs in eggs (e.g., Xantus's murrelet). The Trustees gave the lowest ratings to projects directed at species that were likely exposed but for which no known evidence existed of severe or significant eggshell thinning or elevated levels of DDTs.

In addition to eggshell thinning and DDT data, the Trustees also considered the conservation status of a seabird species when determining priority seabirds for restoration. For example, the California brown pelican and Xantus's murrelet are considered priority species for restoration based on their endangered and threatened status, respectively.

Criterion 2: Feasibility

Criterion 2 concerns the likelihood that the benefits associated with potential actions will be achieved in actuality. The feasibility of a potential action refers to a number of considerations relating to the likelihood that the action will be completed and will produce its intended results. For this criterion, the Trustees considered three sub-factors:

- An action's technical feasibility (i.e., the practical question of an action's ability to be built and/or implemented as envisioned)
- Potential barriers to an action's implementation (e.g., regulatory hurdles or public acceptance)
- The degree of ongoing operation and maintenance needed to ensure that the action continues to produce the intended results

Criterion 3: Resource Benefits

Criterion 3 concerns the benefits of a potential action to specific injured natural resources/lost services. Specifically, the Trustees considered how effective each action would be in restoring the specific injured natural resources and lost services at issue in the Montrose case. For the purposes of Tier 1, evaluation of the Criterion 3 was isolated from considerations of feasibility or cost and included consideration of four sub-factors:

- The degree to which injured natural resource values and services are improved by the action
- The degree to which benefits are measurable
- The duration of the benefits
- The conservation status of the resource(s) receiving benefits

Criterion 4: Ecosystem Benefits

Criterion 4 concerns the degree to which a potential action leads to sustainable improvements in broader ecological functions. By design, some actions are narrowly focused on benefiting a particular resource (e.g., fish stock enhancement or fishing access improvements are intended specifically to benefit specific fishing services and not to have broader benefits on fish habitat). Under this criterion, the Trustees gave a higher rating to actions that not only benefit a targeted resource but also benefit multiple species or resources or employ an ecosystem approach to restoring resources and services.

5.1.2 Process for Applying the Criteria within Each Restoration Category

In the Tier 1 evaluation, each restoration idea was evaluated only in relation to the other ideas within the same category, as it is the Trustees intent to carry forward several ideas from all of the categories to maintain a diverse set of alternative actions. Thus, a peregrine falcon project was evaluated against other peregrine falcon projects, but not against bald eagle, seabird, or fishing projects.

Once all the restoration ideas within each category were evaluated, the ideas and their ratings were arranged in an ordered list, with those considered most promising at the top of the list. Tier 1 was not simply a pass/no pass evaluation; sometimes the most promising elements of two or more ideas were combined into a single stronger action. The following sections describe the specific considerations and results of the Tier 1 evaluation by category.

5.2 TIER 1 EVALUATION OF FISHING AND FISH HABITAT RESTORATION IDEAS

There were 21 wide-ranging restoration ideas evaluated within the fishing and fish habitat category. Many of them represented variations on common themes, and as a result the Trustees found it useful to organize and consolidate restoration ideas according to five common themes: habitat manipulation, stock enhancement, public access, marine protected areas, and public outreach and education.

5.2.1 Fish Habitat Manipulations

Habitat manipulations encompass three sub-themes or approaches, each of which arises from several individual project ideas. The first approach involves some variation of artificial reef creation, the second approach involves kelp forest restoration, and the third approach involves restoring wetland habitats. Reef construction and kelp forest restoration are primarily directed toward changing habitats from open, sandy-bottom habitats that produce or attract soft-bottom feeding fishes, which generally contain higher concentrations of DDTs and PCBs, to hard-bottom and structured habitats that produce/attract fish species that forage in the water column or on reef-based food items and generally contain lower concentrations of these contaminants. Wetland restoration has more general aquatic habitat benefits that, if properly designed, include some general and less area- or site-specific improvements to fishing via the contribution of estuarine/wetland habitats to fish production.

In applying the Tier 1 criteria, the various artificial reef approaches rate high. Because fish, fish habitat, and the services that fish provide to anglers are integrally linked, the MSRP restoration objectives target not just improvements to fishing services but also to fish and the habitats on which they depend. Constructing artificial reefs in areas where fish consumption advisories exist for soft-bottom-feeding species but not for water-column-feeding species accomplishes both the fishing and the fish habitat objectives of the restoration. Thus, reef construction provides a habitat-based solution to increase the relative abundance of fish that provide maximal health benefits and pose minimal health risks in areas affected by advisories.

Relative to the predominant expanses of soft-bottom and other types of hard-bottom habitats in the Southern California marine environment, kelp forests are relatively rare, with an average total of approximately 88 square kilometers (34 square miles) of canopy coverage in the Southern California Bight, including the Northern and Southern Channel Islands (Murray and Bray 1993). This coverage constitutes approximately 0.1 percent of the 78,000-square-kilometer (30,116-square-mile) area of the SCB (Dailey et al. 1993). Increasing the extent of kelp beds along the Southern California coast would provide conditions that favor the production of water-column feeding fishes that are less likely to feed from contaminated benthic (sediment) communities and may therefore be less likely to accumulate contaminants. However, kelp forest rehabilitation by itself (i.e., out-planting of kelp and other algae species in the absence of other actions to create suitable substrate) is not viewed as a sustainable approach to restoring habitat in part because of the transient nature of kelp-forest canopies (Dayton et al. 1992). Thus, “stand-alone” approaches to expanding kelp beds (e.g., the out-planting of kelp) in the absence of other actions do not rate as high as artificial reef development approaches that incorporate into their design the promotion of natural recruitment of kelp. Nevertheless, the out-planting approach might be investigated at a later date as an add-on component to artificial reef development should it be found that such out-planting methods accelerate the creation of self-sustaining kelp communities.

The restoration of full tidal exchange wetland and estuarine habitats has broad ecological benefits including benefits to several species of marine fish. However, based on analysis of factors influencing marine fish production at local and regional scales, the Trustees estimate that creation of artificial reefs at sites where consumption advisories are in place would have more direct, measurable benefits to the specific lost fishing services of the case. Although wetlands and estuaries are clearly important habitats for some fishes, the link between production of fish by newly restored estuarine habitats and changes in fishing services for the anglers that are most

affected by fishing advisories is difficult to establish (Appendix A3). However, contributing to wetland restoration may be viewed as fulfilling the MSRP fish habitat objective by increasing the amount and quality of what is currently an important but limited aquatic habitat in the region. Furthermore, this approach could be directed to specifically benefit popular sport fish species known to depend on coastal estuarine habitat at critical life stages (e.g., California halibut) and species that are at particularly low population levels (e.g., spotted sand bass). For this reason, wetland restoration was carried forward into detailed Tier 2 evaluation.

5.2.2 Stock Enhancement

Stock enhancement ideas for restoring fishing services (ideas 7, 8, and 15 in Table 5-2) include two approaches. One is a “put-and-take” approach, whereby fish are cultured until they reach a legal or nearly-legal size and then are released in marine waters near fishing locations where fish consumption advisories are in place. In theory, these fish would be much lower in contaminants and would be caught instead of existing fish that are contaminated (the released fish could be tagged so the angler would know which fish were safe to eat). Although the put-and-take approach has some positive features, its sustainability is limited because of its high and long-term operational and maintenance costs. For this reason, restoration ideas involving this put and take form of stock enhancement were not carried forward to the Tier 2 evaluation.

A second stock enhancement approach is to use captivity-reared fish to re-build populations of fish that have reached critically low levels of abundance or to increase the availability of popular sport fish that are typically lower in contamination. The effectiveness of this approach for marine species is uncertain, though there may be some potential for successful stock enhancement of some estuarine-dependent species (e.g., the California halibut or the spotted sand bass).

When considered as isolated projects, the hatchery-based approaches to restoration did not rate as high as other approaches for fulfilling the MSRP restoration objectives and were not carried forward to Tier 2.

5.2.3 Fishing Access Improvements

Several restoration ideas in this category proposed improving fishing services by creating or improving public access to fishing sites where anglers are likely to catch fish lower in contaminants (see ideas 5 and 14 in Table 5-2). These improvements could entail building new or extending existing fishing structures, operating fishing barges, and other similar approaches.

When evaluated apart from fish habitat improvement projects, fishing access projects only partially fulfill the restoration objectives of the case and thus are not rated high overall. Developing fishing access in association with the creation of artificial reefs links fishery improvements to anglers and thus is more highly rated. For this reason, stand-alone fishing access improvement projects were not carried forward to the detailed Tier 2 evaluation; however, fishing access improvements have been incorporated as potential design components to enhance the public benefits of artificial reef creation projects in the Tier 2 evaluation.

5.2.4 Marine Protected Areas

Marine Protected Areas (MPAs) are sections of the ocean set aside for various conservation, restoration, recreational, and fisheries management purposes. The MPA concept spans a broad

range of management options, from designation of ecological preserves to the application of limited fishing or biota collection restrictions. MPAs may, among other things, help rebuild depleted fisheries and improve fish catch outside of their boundaries, thus enhancing fishing services.

Two fishing restoration ideas proposed for MSRP funding suggested the use of MPAs as a means of restoring both fishing and fish habitats. One idea is that the Trustees contribute funds to support a more comprehensive implementation (i.e., monitoring, public education, and enforcement) of the newly established Channel Island MPAs. The other idea is for the Trustees to pursue, in partnership with other appropriate entities, the future establishment of MPAs in closer proximity to the areas affected by the contaminants of the Montrose case (i.e., closer to the Palos Verdes Shelf).

Of the two specific MPA ideas, only the idea of providing implementation support to the existing Channel Islands MPAs was carried forward for detailed Tier 2 evaluation. Because these MPAs already exist this proposal is readily achievable, and strengthening the management and evaluation of the Channel Island MPAs would contribute to MSRP goals by clarifying the “spillover” benefits of MPAs to fishing and fish stocks outside their boundaries, which may ultimately benefit fishing services throughout California. The idea of creating new MPAs in the Palos Verdes Shelf region did not receive a high feasibility rating, as the Trustees consider the likelihood of successfully implementing new MPAs to be uncertain at this time. This idea was not carried forward to Tier 2.

5.2.5 Public Outreach and Education on Fishing

Public outreach and education activities are key components of MSRP restoration activities on a number of levels (see Section 5.4.1). Under the category of fishing and fish habitat restoration, public outreach and education activities were proposed as a specific approach to restoring lost natural resource services by providing information to people that allows them to make knowledgeable choices about where to fish, what to fish for, and how to prepare fish for consumption. Because contamination levels are not uniform but vary by location and species of fish, adequate fish contamination data would make it possible to identify and promote optimal fishing services and thus increase public use and enjoyment of fish services. This type of activity would transcend current outreach efforts, which focus on warning the public about where they should avoid fishing or which fish they should avoid catching and eating.

Although a public information program on fishing services would not provide any fish habitat benefits, the concept rated high enough with respect to nexus, feasibility, and resource benefits to be brought forward to the Tier 2 evaluation.

5.2.6 Other Fishing and Fish Habitat Ideas

Several other ideas evaluated in Tier 1 did not rate as high overall as the four combined ideas that have been carried forward to Tier 2. Each of these ideas is discussed briefly below.

- **Convert decommissioned oil platforms to artificial reefs.** This idea did not rate high enough to be brought forward to Tier 2 because of regulatory feasibility issues and its appropriateness for MSRP implementation. This idea calls for modifying existing permit requirements to allow decommissioned oil platforms to remain in place; however, there

would be no need for MSRP funding given that the decommissioning is the responsibility of platform owners/operators. Also, the locations of these platforms would not make fishing readily accessible to shore-based anglers. Finally, there is a potential that chemical contaminants in shell mounds (formed over time under platforms as encrusting invertebrates fall from the platform support surfaces and accumulate on the bottom) may need to be addressed.

- **Restoring overgrazed seashore in Abalone Cove.** This idea did not rate high in the areas of technical and regulatory feasibility. The culturing and out-planting techniques suggested raised technical practicability issues and long-term sustainability is uncertain.
- **Provide transportation for anglers to areas with “clean” fish.** This idea raised operational and regulatory feasibility issues (e.g. concern that such a program could be sustained financially and whether local communities would object to out fluxes/in fluxes of anglers) as well as concerns that benefits to anglers would likely be short-term and highly dependent on many use and preference factors beyond the control of the program.
- **Restore white abalone.** This idea did not have a strong nexus to the injuries of the case.
- **Clean up Consolidated Slip.** This idea did not meet the requirements of the final Montrose consent decree, which prohibits use of settlement funds for response actions in the “onshore areas,” which the U.S. Environmental Protection Agency and the State of California continue to pursue.
- **Create a 50-acre wetlands and wildlife preserve within the Consolidated Slip.** This idea did not rate high overall, principally on technical feasibility grounds (creating wetlands out of uplands). In addition, the nexus to the injuries of the case was moderate since higher, intertidal type of wetlands would not likely function as good habitat for the species of fish, such as California halibut, commonly caught by marine anglers.
- **White croaker commercial market certification program.** This idea did not rate high in the areas of operational feasibility and ecosystem benefits. The feasibility issues that such a program would present include having a verifiable system to ensure the integrity of the certification that white croaker for sale are in fact clean.

The results of the Tier 1 evaluation of fishing and fish habitat restoration ideas are presented in Table 5-2. Several separately listed ideas pertaining to reefs, kelp, and fishing access were combined into a single concept for the purposes of Tier 2 evaluation.

**Table 5-2
List of Ideas to Restore Fishing and Fish Habitats**

Idea No.	Fishing and Fish Habitat Restoration Ideas	Pass to Tier 2?
1	Construct artificial reefs and fishing access improvements	Yes
2	Provide public information to restore lost fishing services	Yes
3	Restore full tidal exchange wetlands (several potential locations)	Yes
4	Augment funds for implementing Marine Protected Areas in California	Yes
5	Operate fishing barge(s) over existing or constructed reef(s)	Merge concept with #1
6	Create protected shallow water habitat in existing harbor areas	No
7	Supplement near-shore fisheries in areas affected by the contaminants of the case with clean, hatchery-raised fish	No
8	Spotted sand bass hatchery program	No
9	Restore depleted kelp beds of Malibu and Palos Verdes	Merge concept with #1
10	Convert decommissioned oil platforms to artificial reefs	No
11	Establish new Marine Protected Areas within the Palos Verdes Shelf region	No
12	Restore overgrazed seashore in Abalone Cove	No
13	Provide transportation for anglers to areas with “clean” fish	No
14	Improve public amenities and fishing access at Marina del Rey, White Point Beach, Point Vicente, and Point Fermin	Merge concept with #1
15	Giant sea bass hatchery program	No
16	Restore white abalone	No
17	Restore algae (kelp) on Palos Verdes coast	Merge concept with #1
18	Protect and restore Ormond Beach wetlands	Merge concept with #3
19	Clean up Consolidated Slip	No
20	Restore/create 50-acre wetlands and wildlife preserve within the Consolidated Slip of Los Angeles Harbor	No
21	White croaker commercial market certification program	No

5.3 TIER 1 EVALUATION OF BIRD RESTORATION IDEAS

Three categories of bird resources were considered separately for the purposes of this Restoration Plan: bald eagles, peregrine falcons, and seabirds.

5.3.1 Bald Eagles

The Trustees are funding two ongoing studies for bald eagles in the SCB (see Section 4.2.1). The outcomes of the studies will influence the ultimate selection of bald eagle restoration actions within this Restoration Plan. Nevertheless, the Trustees were able to refine some of the initial restoration options through Tier 1 evaluation, irrespective of future study results. These results are presented below.

All of the restoration ideas for bald eagles fell into three main concepts: (1) restoring bald eagles to the Northern Channel Islands, (2) restoring bald eagles to Santa Catalina Island, and (3) restoring bald eagles to the mainland.

- Restoring bald eagles to the Northern Channel Islands. In 2002, the Trustees initiated a multi-year study to investigate the feasibility of re-establishing bald eagles on the Northern Channel Islands. This study, described in an Environmental Assessment released by the Trustees (MSRP 2002), seeks to determine whether current levels of DDTs in the marine environment surrounding the Northern Channel Islands have declined sufficiently to allow a self-sustaining population of bald eagles to once again occupy this habitat. Because the young bald eagles hatched onto Santa Cruz Island under this study will not attain reproductive age for several years, the outcome of the study will not be known within the time frame of the development of this Restoration Plan. For this reason, the Trustees will continue to retain options in support of restoring bald eagles to the Northern Channel Islands, including maintaining a bald eagle captive breeding program and releasing additional eagles. These options were further explored within the context of the Tier 2 evaluation; however, final decisions on whether to implement additional actions will be made once the outcomes of the Northern Channel Islands (NCI) Feasibility Study are known (in or around 2008). Once the Trustees decide on a specific course of action, they will document it and provide the public an opportunity for review and comment.
- Restoring bald eagles to Santa Catalina Island. This concept entails continuing and/or modifying the ongoing program to restore/maintain bald eagles on Santa Catalina Island in addition to completing the NCI Feasibility Study. This program was initiated in the early 1980s by the Institute for Wildlife Studies, the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and other parties, independent of the governments' natural resource damage assessment case against the Montrose defendants. The MSRP began funding this effort after the settlement in 2001 as a data gap study (see Section 4.2.1). Although DDT discharges virtually ceased many years ago, exposure to the residual levels of DDTs still present in the environment have thus far prevented the Santa Catalina Island bald eagles from successfully reproducing without human intervention. Annual collection of eggs from the nests of Santa Catalina Island bald eagle pairs, artificial incubation of the eggs, and fostering of chicks back into the nests are required to maintain this population. In recent years, the Trustees have assumed full funding of this program to ensure that the option of maintaining a population of bald eagles on Santa Catalina Island received consideration

within this Restoration Plan. The current program and any additional options to restore this population were rated high enough to be brought forward to detailed analysis in the Tier 2 evaluation.

- Restoring bald eagles on the mainland. The third concept entails restoration of bald eagles at one or more sites on the mainland of Southern California and Baja California. The goal of this concept would be to promote and enhance breeding and wintering opportunities in general geographic proximity to, but not in the Channel Islands. This concept could include such actions as the enhancement of nesting and foraging habitat, protection of nest and roosting trees, and reintroduction of eagles into suitable, but unoccupied, habitat. Several specific ideas for this concept were proposed, including the reintroduction of eagles to the Baja California coastline and enhancement of foraging habitat at Ken Malloy Harbor Regional Park, located on the Palos Verdes Peninsula.

In the Tier 1 evaluation, the mainland bald eagle restoration concept did not rate as high as the Northern Channel Island and Santa Catalina Island concepts for nexus and resource benefits. Mainland restoration of bald eagles was not found to have a strong nexus to the Montrose case (as the bald eagle injuries occurred and continue to occur in the Channel Islands). Furthermore, because bald eagle populations on the mainland of California are already recovering from past decline (Jurek, pers. comm., 2004), and because intensive urbanization throughout the greater Los Angeles metropolitan region leaves suitable bald eagle breeding habitat extremely scarce, the potential benefits did not rate as high as the benefits associated with the other two concepts. Thus, the mainland bald eagle restoration concept was not carried forward to Tier 2 evaluation. The results of the Tier 1 evaluation of bald eagle restoration ideas are presented in Table 5-3. The two ideas brought forward to Tier 2 were further developed and renamed as described in Section 5.5, Section 6, and Appendix B.

**Table 5-3
List of Ideas to Restore Bald Eagles**

Idea No.	Bald Eagle Restoration Project Ideas	Pass to Tier 2?
1	Restore bald eagles to the Northern Channel Islands	Yes
2	Restore bald eagles to Santa Catalina Island	Yes
3	Restore bald eagles on the mainland	No

5.3.2 Peregrine Falcons

A total of five restoration ideas for peregrine falcons were analyzed within the Tier 1 evaluation. These ideas ranged from restoring peregrine falcons to the Southern Channel Islands to forming a management group to address peregrine falcon-related issues. The project ideas fell into the following five concepts: (1) restoration of peregrine falcons to the Southern Channel Islands, (2) restoration of peregrine falcons on the Baja California Pacific Islands, (3) acquisition and enhancement of peregrine falcon habitat on the Palos Verdes Peninsula, (4) creation of a peregrine falcon management group, and (5) enhancement of foraging habitat for peregrine falcons at Ken Malloy Harbor Regional Park.

The first concept involves the restoration of peregrine falcons to the Southern Channel Islands. It is estimated that historically up to 30 pairs of peregrine falcons nested on the Channel Islands

prior to 1945 (Hunt 1994). The first re-established pair of peregrine falcons was recorded in 1987 on San Miguel Island. Although peregrine falcons have resumed nesting on all the Northern Channel Islands, up until recently no nesting observations have been confirmed for peregrine falcons on the Southern Channel Islands, with the exception of Santa Barbara Island. To confirm the anecdotal accounts of the presence of breeding peregrine falcons on Santa Catalina Island, the Trustees funded a survey of the island in 2004 (PBRG 2004). The survey confirmed the presence of two pairs of peregrine falcons on Santa Catalina Island, although successful breeding was not observed. Coupled with observations of increasing numbers of peregrine falcons throughout the Channel Islands, the Trustees brought forward two different approaches for evaluation in Tier 2 for the restoration of peregrine falcons to the Channel Islands: implement active peregrine falcon restoration (Appendix C1) and monitor the recovery of peregrine falcons (Appendix C2).

The Trustee Council also brought forward the concept of restoring peregrine falcons populations on the Pacific islands off of Baja California, Mexico. By increasing the number of peregrine falcons on these islands, the recovery of this species on the Channel Islands may occur faster due to an increase in dispersing juveniles from the Baja California Pacific Islands. The Trustees further explored this concept within a Tier 2 evaluation (Appendix C3).

The concept of enhancing foraging habitat for peregrine falcons on the Southern California mainland (ideas 3 and 5 in Table 5-4) was not selected for Tier 2 evaluation. This decision was largely due to the successful recovery of peregrine falcons on the mainland. The Trustees received two specific restoration ideas for habitat enhancement on the Palos Verdes Peninsula; however, because peregrine falcons in this area are not limited by foraging habitat, the benefits associated with this concept are expected to be minimal.

The final concept of creating a management group to work on peregrine falcon issues was likewise not carried forward to the Tier 2 evaluation. Although the presence of such a group would be useful in coordinating regional issues, the creation of a management group would not result in on-the-ground restoration of peregrine falcons. This concept does not further the Trustees’ goal of restoring the peregrine falcon population on the Channel Islands.

The results of the Tier 1 evaluation of peregrine falcon restoration ideas are presented in Table 5-4.

**Table 5-4
List of Ideas to Restore Peregrine Falcons**

Idea No.	Peregrine Falcon Restoration Project Ideas	Pass to Tier 2?
1	Restore peregrine falcons to the Channel Islands	Yes, divided into two actions: implement active restoration and monitor ongoing recovery
2	Restore peregrine falcons to the Baja California Pacific Islands	Yes
3	Acquire and enhance peregrine falcon habitat on the Palos Verdes Peninsula	No
4	Create a peregrine falcon management group	No

**Table 5-4
List of Ideas to Restore Peregrine Falcons**

Idea No.	Peregrine Falcon Restoration Project Ideas	Pass to Tier 2?
5	Enhance foraging habitat for peregrine falcons at Ken Malloy Harbor Regional Park	No

5.3.3 Seabirds

Eighteen restoration ideas receiving consideration fell within the category of seabird restoration. The Trustees evaluated these projects against the criteria and rating considerations identified in Section 5.1.

For the nexus criterion, the seabird category presented a special situation, given the large number of proposed actions that would benefit one particular species of seabird or group of similar seabirds. Not all seabirds proposed for restoration can be clearly shown to have been impacted by DDTs and/or PCBs. The Trustees concluded that they would consider injury evidence for seabirds species by species and rank higher those projects that benefit species having an injury associated with these contaminants (see Section 5.1.1).

The seabird projects that were carried forward to Tier 2 represented a diverse set of ideas to restore seabird populations in the SCB. The majority of the projects that were carried forward include some form of habitat restoration, creation, or enhancement that would provide benefits to multiple species. The highest-rated projects also demonstrated a high degree of feasibility and benefit, as demonstrated by similar projects that have been successfully carried out elsewhere.

Several other ideas evaluated in Tier 1 did not rate as high overall as the eight ideas that were carried forward to Tier 2. These other ideas are described briefly below.

- **Restore ashy storm-petrels to the Southeast Farallon Island.** This idea did not rate as high as other seabird projects primarily due to its location outside of the SCB. Although this project targets a priority species for restoration (the ashy storm-petrel), other projects targeting ashy storm-petrels within the SCB received higher ratings with respect to nexus.
- **Create mainland nesting habitat for colonial seabirds.** This idea did not pass Tier 1 due to a relatively weak nexus to the injuries of the case (see Section 5.1.1). Although the benefits of this idea were considered high for the target species, this idea did not rate high in the ecosystem benefits category because it focuses on certain colonial seabirds.
- **Create cormorant nesting platforms.** Although this idea rated high for nexus, benefits were not considered long term due to the necessary maintenance on such platforms. This idea also received a lower rating in the category of ecosystem benefits since it would be designed solely to attract nesting cormorants.
- **Fund a California brown pelican patrol/enforcement position.** This idea did not pass Tier 1 because the benefits were anticipated to last only as long as the project was in place, and would therefore not be self-sustaining. This idea also received a lower rating in the category of ecosystem benefits, as it would primarily target California brown pelicans.
- **Enhance nesting habitat for shearwaters in New Zealand.** This idea did not pass Tier 1 due to a relatively weak nexus and a location outside of the SCB (see Section 5.1.1).

- **Reintroduce tufted puffins to Prince Island.** This idea did not pass Tier 1 due to a combination of factors. This species received a lower nexus rating and is not considered a priority for restoration (see Section 5.1.1). This idea also received a lower rating in the category of ecosystem benefits, as it focuses on the reintroduction of a single species.
- **Purchase Bird Rock off of Santa Catalina Island.** This idea did not pass Tier 1 because its benefits to the priority seabirds and ecosystem are expected to be low. Given its proximity to Santa Catalina Island, seabirds on the 1.3-acre Bird Rock receive a high level of disturbance from human activity (e.g., from kayakers and boaters). It is also highly unlikely that Bird Rock would be developed in the future; therefore, purchase of the Rock would not provide substantial long-term benefits to seabirds.
- **Create a Geographic Information System (GIS) atlas of California brown pelican roost sites.** Although this project targets a priority seabird, the atlas would cover areas outside of the SCB, as a similar atlas is currently being created for Southern California. Because this idea would target areas outside of the SCB, it received a relatively low nexus rating. The benefits of this atlas are expected to be lower than on-the-ground restoration projects for California brown pelicans because it would largely be a planning tool for events such as oil spills and would need to be updated on a periodic basis. This idea also received a lower rating in the category of ecosystem benefits, as it focuses only on the roosting locations of California brown pelicans.
- **Enhance nesting habitat for grebes and loons in Northern California.** This idea proposes to reduce human disturbance at nesting locations. This idea did not pass Tier 1 due to a relatively weak nexus (see Section 5.1.1). Also, implementation of this idea would occur outside of the SCB. In addition, this idea received a lower rating in the category of ecosystem benefits, as it focuses on reducing human disturbance at particular nesting colonies.
- **Attract common murrelets to Prince Island.** This idea did not pass Tier 1 due to a relatively weak nexus (see Section 5.1.1). Common murrelets do not currently breed in the target area, and the feasibility of the idea is uncertain. This idea also received a lower rating in the category of ecosystem benefits, as it focuses on the restoration of one species.
- **Attract California brown pelicans to Prince Island and Scorpion Rock.** This idea was evaluated separately for the two locations. Although the nexus rated high for both locations, the benefits of the idea received a low rating. California brown pelicans are currently not limited by available breeding habitat on Anacapa and Santa Barbara Islands; therefore, no substantial benefits are anticipated from establishing breeding at these locations. This idea also received a lower rating in the category of ecosystem benefits, as it focuses on the restoration of one species.

The results of the Tier 1 evaluation of seabird restoration ideas are presented in Table 5-5.

Table 5-5
List of Ideas to Restore Seabirds

Idea No.	Seabird Restoration Project Ideas	Pass to Tier 2?
1	Restore seabirds to San Miguel Island	Yes
2	Restore alcids to Santa Barbara Island	Yes

**Table 5-5
List of Ideas to Restore Seabirds**

Idea No.	Seabird Restoration Project Ideas	Pass to Tier 2?
3	Restore seabirds to San Nicolas Island	Yes
4	Restore seabirds to Scorpion and Orizaba Rocks	Yes
5	Restore seabirds to Baja California Pacific Islands	Yes
6	Create/enhance/protect California brown pelican roost habitat	Yes
7	Implement an entanglement reduction and outreach program to protect seabird populations	Yes
8	Restore ashy storm-petrels to Anacapa Island	Yes
9	Restore ashy storm-petrels to the Southeast Farallon Island	No
10	Create mainland nesting habitat for colonial seabirds	No
11	Create cormorant nesting platforms	No
12	Fund a California brown pelican patrol/enforcement position	No
13	Enhance nesting habitat for shearwaters in New Zealand	No
14	Reintroduce the tufted puffin to Prince Island	No
15	Purchase Bird Rock off of Santa Catalina Island	No
16	Create a GIS atlas of California brown pelican roost sites	No
17	Enhance nesting habitat for grebes and loons in Northern California	No
18	Attract common murrelets to Prince Island	No
19	Attract California brown pelicans to Prince Island and Scorpion Rock	No

5.4 TIER 1 EVALUATION OF OUTREACH PROGRAMS AND RESEARCH PROPOSALS

5.4.1 Outreach Programs

Effective public communication and involvement is an integral element of the MSRP. Public outreach and education activities are a means for achieving several goals: ensuring transparency and public involvement in the planning and implementation of the restoration program; improving utilization of and thus increasing human use services provided by natural resources; and potentially benefiting natural resources themselves by modifying human actions that can cause injuries. For the purposes of this restoration plan, the Trustees are not classifying proposals for public outreach and education work as a separate natural resource restoration category. Instead, the Trustees are including outreach ideas submitted for consideration in developing a comprehensive and coordinated public outreach and education program that will ensure the accuracy and consistency of messages, establish effective partnerships with other programs sharing common goals, and support the restoration goals of the MSRP.

In response to solicitations for restoration ideas during the initial stages of restoration planning, the Trustees received several proposals that MSRP funds be used to support existing outreach and education programs that raise awareness of regional environmental issues and stewardship on a broader scale. These programs are listed in Table 5-6. To the extent that such programs may support MSRP restoration goals (e.g., through the development of educational materials specific

to the injuries and restoration of the Montrose case) or the utilization of facilities and staff in direct support of MSRP outreach goals, the programs are being retained for funding consideration. However, the Trustees are not evaluating such programs against specific projects that restore fishing and fish habitat, bald eagles, peregrine falcons, and seabirds. Rather, as the MSRP outreach program proceeds, these proposals will receive consideration as a means of implementing outreach objectives.

5.4.2 Research Proposals

The received several proposals that MSRP funds be used for scientific investigations designed to fill gaps in our current understanding of the pathways Trustees and exposures of biota to DDTs and PCBs in the SCB as well as gaps in our understanding of the conservation status and recovery of seabirds. These proposals are listed in Table 5-6.

One of the goals identified in this restoration plan is to conserve as much of the funding as possible for actual on-the-ground restoration. Although many important questions remain unanswered regarding the fate and effects of DDTs and PCBs in the marine ecosystem, the Trustees seek to limit expenditures on scientific investigations to those deemed essential to informed restoration decision-making, design, and implementation. Rather than passing these research proposals through tiered evaluation, the Trustees will retain them for consideration in a stepwise fashion as planning and decision-making proceed and specific data needs become apparent.

**Table 5-6
List of Public Outreach and Research Ideas**

Outreach Ideas	
1	Provide funds for the Channel Islands National Park/ Sanctuary educational programs
2	Provide funds for the Center for Marine Studies educational programs
3	Expand the existing educational program of the Marine Mammal Care Center
4	Develop interdisciplinary curriculum/activity guide for middle school grade levels
5	Provide funds for construction of an interpretive center at White Point Nature Preserve
Research Ideas	
1	Monitor DDT/PCB concentrations in peregrine falcons
2	Marine mammal monitoring/sampling program in the Los Angeles area
3	Enhancement of restoration efforts for birds through collection and assessment of pinniped carcasses
4	Seabird monitoring <ul style="list-style-type: none"> • Implement a comprehensive seabird monitoring program (contaminant concentrations, population, effectiveness of MPAs in protecting populations) • Expand monitoring of seabird populations at Northern Channel Islands • Augment seabird monitoring of Anacapa Restoration Program funded by the American Trader Restoration Council
5	Determine current DDT/PCB concentrations in seabird eggs within and adjacent to the SCB
6	Analysis of impacts to seabirds from chronic releases of DDT and PCBs into SCB
7	Increase scope and monitoring of brown pelican nesting area closures

5.5 TIER 2 EVALUATION

Seventeen actions were brought forward from the Tier 1 evaluation for detailed evaluation in Tier 2:

Fishing and Fish Habitat

- Construct artificial reefs and fishing access improvements
- Provide public information to restore lost fishing services
- Restore full tidal exchange wetlands (several potential locations)
- Augment funds for implementing Marine Protected Areas in California

Bald Eagles

- Complete the NCI Bald Eagle Feasibility Study before deciding on further restoration actions
- Complete the NCI Bald Eagle Feasibility Study; regardless of its outcome, continue funding Santa Catalina Island Bald Eagle Program

Peregrine Falcons

- Restore peregrine falcons to the Channel Islands
- Monitor the recovery of peregrine falcons on the Channel Islands
- Restore peregrine falcons to the Baja California Pacific Islands

Seabirds

- Restore seabirds to San Miguel Island
- Restore alcids to Santa Barbara Island
- Restore seabirds to San Nicolas Island
- Restore seabirds to Scorpion and Orizaba Rocks
- Restore seabirds to Baja California Pacific Islands
- Create/enhance/protect California brown pelican roost habitat
- Implement an entanglement reduction and outreach program to protect seabird populations
- Restore ashy storm-petrels to Anacapa Island

5.5.1 Tier 2 Criteria

For the Tier 2 evaluation, the Trustees expanded on the set of criteria used in Tier 1 to distinguish how well the different potential restoration actions achieve the restoration objectives. Four of the criteria for evaluating actions in the Tier 2 evaluation are identical to those used in the Tier 1 evaluation:

- **Criterion 1: Nexus** (relationship to the natural resource injuries and lost services of the Montrose case)
- **Criterion 2: Feasibility** (likelihood that potential benefits will be achieved in actuality)

- **Criterion 3: Resource benefits** (benefits to specific injured natural resources and lost services)
- **Criterion 4: Ecosystem benefits** (degree to which the actions lead to sustainable improvements to broader ecological functions)

Among these criteria, the Trustees consider the nexus and resource benefits to be of paramount importance.

In the Tier 2 evaluation the Trustees considered two additional factors:

- **Criterion 5: Environmental acceptability.** All of the restoration actions under consideration are intended to improve the natural and human environment. Nevertheless, there can be environmental trade-offs in any project and the National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), and other requirements mandate full consideration and disclosure of potential environmental consequences. Actions are evaluated to determine whether they have no significant impacts to the environment, have impacts that may be easily mitigated to non-significance, or are likely to result in significant impacts that require substantial mitigation commitments.
- **Criterion 6: Cost.** Cost estimates were developed for each action. If an action being evaluated is still conceptual (e.g., an artificial reef program) and is scalable, estimates of incremental components were developed. For the actions ultimately selected, the Trustees may pursue partnerships to increase the effectiveness of the projects and reduce their costs.

5.5.2 Results of the Tier 2 Evaluation

All of the actions evaluated individually in Tier 2 were found to satisfy the evaluation criteria and are considered reasonable approaches to restoration, though some are still conceptual and would require further evaluation and impact assessment on development of greater project specificity. The complete write-ups of the Tier 2 evaluations are lengthy and have been provided in Appendices A–D.

All 17 actions cannot be included within a single comprehensive restoration plan alternative, as some are mutually exclusive (e.g., the two bald eagle actions) and available funding is not sufficient to cover all the projects. The ultimate aim of this Restoration Plan is to identify alternative combinations of these individual actions and to select one alternative that optimizes restoration of natural resources and services within the constraints of available funds.

As a final step in developing this Restoration Plan, the Trustees assembled different combinations of the individual restoration actions from Tier 2 into comprehensive alternatives for comparison and analysis. In the next section, the 17 potential restoration actions are first summarized, and then the comprehensive alternatives assembled from different combinations of these actions are described.