

## Appendix C. Compatibility Determinations

### C.1 Introduction

The compatibility determinations (CD) we developed during the Comprehensive Conservation Plan (CCP) planning process evaluate uses as projected to occur under Alternative B, the Preferred Alternative in the Draft CCP/Environmental Assessment (EA) for the Rose Atoll National Wildlife Refuge (the Refuge). The evaluation of funds needed for management and implementation of each use also assumes implementation as described under Alternative B, the Preferred Alternative (also see Appendix D). Chapter 6 of the Draft CCP/EA also contains analysis of the impacts of public uses to wildlife and habitats. That portion of the document is incorporated through reference into this set of CDs.

### C.2 Uses Evaluated At This Time

The following section includes full CDs for uses at the Refuge that are required to be evaluated at this time. According to Service policy, CDs are to be completed for all uses proposed under a CCP that have been determined to be appropriate. Existing wildlife-dependent recreational uses must also be re-evaluated and new CDs prepared during development of a CCP. According to the Service's Compatibility policy, uses other than wildlife-dependent recreational uses are not explicitly required to be re-evaluated in concert with preparation of a CCP, unless conditions of the use have changed or unless significant new information relative to the use and its effects have become available or the existing CDs are more than 10 years old. However, the Service planning policy recommends preparing CDs for all individual uses, specific use programs, or groups of related uses associated with the proposed action. Accordingly, the following CDs are included in this document for public review.

Refuge Use – Rose Atoll NWR	Compatible	Year Due for Re-evaluation
Research, Surveys, and Scientific Collections	Yes	2022
Environmental Education	Yes	2027

### C.3 Compatibility—Legal and Historical Context

Compatibility is a tool refuge managers use to ensure that recreational and other uses do not interfere with wildlife conservation, the primary focus of refuges. Compatibility is not new to the Refuge System and dates back to 1918, as a concept. As policy, it has been used since 1962. The Refuge Recreation Act of 1962 directed the Secretary of the Interior to allow only those public uses of Refuge lands that were “compatible with the primary purposes for which the area was established.”

Legally, refuges outside of Alaska are closed to all public uses until officially opened through a CD. Regulations require that adequate funds be available for administration and protection of refuges before opening them to any public uses. However, wildlife-dependent recreational uses (hunting, fishing, wildlife observation and photography, environmental education (EE) and interpretation) are to receive enhanced consideration and cannot be rejected simply for lack of funding resources unless the refuge has made a concerted effort to seek out funds from all potential partners. Once found compatible, wildlife-dependent recreational uses are deemed the priority public uses at the refuge. If a proposed use is found

not compatible, the refuge manager is legally precluded from approving it. Economic uses that are conducted by or authorized by the refuge also require a CD.

Under the Compatibility policy, uses are defined as recreational, economic/commercial, or management use of a refuge by the public or a non-Refuge System entity. Uses generally providing an economic return (even if conducted for the purposes of habitat management) are also subject to CD. The Service does not prepare CD for uses when the Service does not have jurisdiction. For example, the Service may have limited jurisdiction over refuge areas where property rights are vested by others; where legally binding agreements exist; or where there are treaty rights held by tribes. In addition, aircraft overflights, emergency actions, some activities on navigable waters, and activities by other Federal agencies on “overlay refuges” are exempt from the CD process.

New compatibility regulations, required by the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act), were adopted by the Service in October 2000 (<http://refuges.fws.gov/policymakers/nwrpolicies.html>). The regulations require that a use must be compatible with both the purpose(s) of the individual refuge and the Refuge System mission. This standard helps to ensure consistency in application across the Refuge System. The Improvement Act also requires that CD be in writing and that the public have an opportunity to comment on most use evaluations.

The Refuge System mission emphasizes that the needs of fish, wildlife, and plants must be of primary consideration. The Improvement Act defined a compatible use as one that “... in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the Refuge.” Sound professional judgment is defined under the Improvement Act as “... a finding, determination, or decision, that is consistent with principles of sound fish and wildlife management and administration, available science and resources ...” Compatibility for priority wildlife-dependent uses may depend on the level or extent of a use.

Court interpretations of the compatibility standard have found that compatibility is a biological standard and cannot be used to balance or weigh economic, political, or recreational interests against the primary purpose of the refuge (*Defenders of Wildlife v. Andrus* [Ruby Lake Refuge]). The Service recognizes that CDs are complex. For this reason, refuge managers are required to consider “principles of sound fish and wildlife management” and “best available science” in making these determinations (House of Representatives Report 105-106). Evaluations of the existing uses on Rose Atoll National Wildlife Refuge is based on the professional judgment of Refuge and planning personnel including observations of Refuge uses and reviews of relevant scientific literature.

In July 2006, the Service published its Appropriate Refuge Uses policy (603 FW 1). Under this policy, most proposed uses must also undergo a review prior to compatibility. Uses excepted from the policy include wildlife-dependent recreational uses and uses under reserved rights (see policy for more detail). Appropriate Refuge Uses Findings are included in Appendix B.

## Compatibility Determination

**Use:** Research, Surveys, and Scientific Collections.

**Refuge Name:** Rose Atoll National Wildlife Refuge, Manu'a District, American Samoa.

**Establishing and Acquisition Authority(ies):** Fish and Wildlife Act of 1956.

### Refuge Purpose(s):

“... for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” 16 USC § 742f (a)(4); “... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...” 16 USC § 742f(b)(1) (Fish and Wildlife Act of 1956, 16 U.S.C. §742(a)-754, as amended).

### National Wildlife Refuge System (Refuge System or NWRS) Mission:

“The mission of the [National Wildlife Refuge] System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Improvement Act).

### Other Management Direction:

#### *Presidential Proclamation 8337*

“... for the purposes of protecting the objects identified in the above preceding paragraphs ...” “For the purposes of protecting the objects identified above, the Secretaries of the Interior and Commerce, respectively, shall not allow or permit any appropriation, injury, destruction, or removal of any feature of this monument except as provided for by this proclamation or as otherwise provided for by law.”

#### *Secretarial Order 3284*

“... For each of the areas subject to this delegation, the [Fish and Wildlife Service] Director shall provide for the proper care and management of the monument, including all objects of scientific and historic interest therein; the conservation of fish and wildlife; and the development of programs to assess and promote national and international monument-related scientific exploration and research.” (Section 4.a.(2). “... The Director shall manage the emergent and submerged lands and waters out to 50 nautical miles from the mean low water line at Rose Atoll as the Rose Atoll Marine National Monument. The Director shall continue to manage the existing wildlife refuge at Rose Atoll within the boundaries set forth in the Notice of Establishment, 71 FR 13183 (April 5, 1974). Those areas beyond such mean low water line for which NOAA has the primary management responsibility for fishery-related activities are not included in the National Wildlife Refuge System.” (Section 4.c.).

### Description of Use(s):

This use involves research, surveys, and scientific collections conducted by non-National Wildlife Refuge System (Refuge System) parties on Rose Atoll National Wildlife Refuge (NWR or Refuge).

Research refers to a planned, organized, and systematic investigation of a scientific nature. Such studies are designed to determine the cause(s) of observed biotic or abiotic phenomenon over a finite time period, where cause and effect relationships usually can be inferred through statistical analyses.

Survey activities include scientific inventories and monitoring of fish, wildlife and plants, public use, and abiotic refuge resources (e.g., soils, water).

Scientific collecting involves gathering of refuge natural resources or cultural artifacts for scientific purposes. Examples include collection of vegetation, marine invertebrates, and soils; contaminant sampling; adult and larval insect collection; and collection and curation of cultural resources.

Refuge staff periodically receive requests from outside parties (e.g., universities, Territorial agencies, other Federal agencies, and nongovernmental organizations) to conduct research, surveys, and scientific collecting on Refuge lands and waters. These project requests can involve a wide range of natural and cultural resources as well as public-use management issues such as basic absence/presence surveys, collection of undescribed species for identification, study of habitat use and life-history requirements for specific species or species groups, evaluation of practical methods for habitat restoration, documenting extent and severity of environmental contaminants, testing techniques to control or eradicate pest species, measuring effects of climate change on environmental conditions and associated wildlife and habitat response, identification and analyses of paleontological specimens, documenting wilderness character, modeling wildlife populations, and assessing response of habitat and wildlife to disturbance from public uses. Projects may be species-specific, Refuge-specific, or evaluate the relative contribution of Refuge lands and waters to larger landscapes (e.g., ecoregion, region, flyway, national, and international) issues and trends.

The US Fish and Wildlife Service's (Service's) Research and Management Studies (4 RM 6) and Appropriate Refuge Uses (603 FW 1) policies indicate priority for scientific investigatory studies that contribute to the enhancement, protection, use, preservation, and management of native wildlife populations and their habitat as well as their natural diversity. Projects that contribute to refuge-specific needs for resource management goals and objectives, where applicable, would be given a higher priority over other requests. Attached to this compatibility determination (CD) are examples of high-priority research, survey, and scientific collection topics for Rose Atoll NWR.

This use is a privilege and not a right. It is not a wildlife-dependent recreational use. Research, surveys, and scientific collections on the Refuge would generally be authorized through individual Special Use Permits (SUP) consistent with Refuge regulations (Title 50 of the Code of Federal Regulations Parts 25-37) and Service policy (5 Refuge Manual [RM] 17). Applicants would also be required to obtain any other relevant permits. Within the SUP, conditions would be clearly defined so as to protect and conserve the existing resources found within the Refuge. Before being allowed on the Refuge, this use would need to be found appropriate (603 FW 1) and then be determined compatible (603 FW 2).

Research and exploration proposals may be for any time of the year and may be requested for any area of the Refuge. The Service in consultation with the National Oceanic and Atmospheric Administration (NOAA) and others, as applicable, would evaluate each proposal and may put limits on the activities to ensure that negative impacts to resources are avoided or limited.

Each research, survey, or scientific collections project would likely have different protocols and methods; therefore, each study necessitates its own scientific review. Each project would be carefully reviewed to prevent any significant short-term, long-term, or cumulative impacts. New research or exploration requests would be evaluated by Service staff, applicable scientific partners at NOAA and American Samoa government, as well as other subject-matter experts if determined necessary by the Service.

Evaluations and reviews would be conducted to determine if the species studied, methods used, or habitat type and locations affected may lead to undesirable cumulative impacts. Some of the standard and specific conditions are included in this Compatibility Determination (CD) under Stipulations Necessary to Ensure Compatibility.

Collections of scientific specimens would be closely monitored and tracked as donations or loans to the permittee. Requirements for entering biological data or metadata into a national open-access database may be specified on SUPs. Donations or loans of collections would be managed in accordance with Title 50 of the Code of Federal Regulations, sections 12.35-12.38, FWS Manual 701 FW 5, and Director's Order No. 109, as amended. Permittees may use specimens collected under a permit, any components of any specimens (including natural organisms, enzymes, genetic materials or seeds), and research results derived from collected specimens for scientific or educational purposes only, and not for commercial purposes unless they have entered into a Cooperative Research and Development Agreement (CRADA) with the Service. The Service prohibits the sale of collected research specimens and other transfers to third parties must have Service authorization prior to any transfer. Permittees may be also required to transfer specimens to a museum or other curator, as identified by the Service.

Projects that involve public or private economic use of the natural resources of the Refuge would need to comply with relevant Federal regulations for such uses (50 CFR 29.1). In such cases, the Refuge would need to first determine that the use contributed to the achievement of Refuge purpose or the Refuge System mission prior to making a determination regarding the project's compatibility. Public or private economic uses of specimens collected are not considered in this CD.

This use has been primarily proposed because the collection and analysis of scientific data are extremely valuable to the Service for its ongoing management of the Refuge. The gathered information would also be used by other scientists, managers, decision-makers, and educators around the world. The published manuscripts from this research help to disseminate the Service mission and the significance of the Refuge resources to other researchers and the public.

This programmatic CD has been developed and made publicly available concurrent with the Draft Comprehensive Conservation Plan (CCP) and associated Environmental Assessment (EA) for Rose Atoll NWR. Much of the information and some of the analyses contained in this CD are addressed in greater detail in the CCP/EA, which are incorporated through reference herein.

**Availability of Resources:**

Refuge responsibilities for research, surveys, and scientific collections by non-Refuge System entities are primarily limited to the following: review of proposals, preparation of an SUP(s) and reviewing other appropriate compliance documents submitted (pursuant to the National Environmental Policy Act, Endangered Species Act (ESA), National Historic Preservation Act, etc.), and monitoring project implementation to ensure that impacts and conflicts remain within acceptable levels (remain compatible) over time, and review scientific results. Additional administrative, logistical, and operational support could also be provided depending on each specific request. Law enforcement and dissemination of information about research and surveys in the Refuge are not included in these cost estimates. Estimated costs for one-time and annually re-occurring tasks by Refuge staff are determined on a project-by-project basis. Sufficient funding in the Refuge's general operating budget would need to be available to cover expenses for these projects. The terms and conditions for funding and staff support necessary to administer each project on the Refuge would be clearly stated in the SUP(s).

The Refuge has the following staffing and funding to administratively support and monitor research, surveys, and scientific collections that are currently taking place on Rose Atoll NWR (see table below).

Within the past 5 years, no more than 3 SUPs have been issued in a calendar year for Rose Atoll NWR. We would manage this use at the projected level with current capabilities of the Rose Atoll NWR and the Pacific Reefs NWR Complex. Any substantial increase in the number of projects would create a need for additional resources to satisfy administrative and monitoring needs to ensure the projects were implemented in a compatible manner. Any substantial additional costs above those itemized below could result in determining a project not compatible unless expenses were offset by the investigator, sponsoring organization, or other party.

Following is an estimate of costs associated with administering this use on the Refuge.

Category and Itemization	One-time (\$)	Annual (\$/yr) <sup>1</sup>
Administration and management		\$7,000
Monitoring and Adaptive Management		\$6,800
Refuge overhead costs associated with the above-listed work <sup>2</sup>		\$3,000
Offsetting revenues		\$16,800

<sup>1</sup> Annual costs. Annual personnel costs include salary, locality pay and COLA, and benefits for a GS-12 Refuge manager, GS-12 Refuge biologist, and GS-7 biological technician.

<sup>2</sup> Overhead costs include overhead expenses such as support personnel and do not include salary-related benefits.

**Anticipated Impacts of the Use(s):**

Use of the Refuge to conduct research, surveys, or scientific collecting would generally provide information of benefit to native fish, wildlife, plants, and their habitats or cultural resources. Scientific findings gained through these projects could provide important information regarding life-history needs of species and species groups as well as identify or refine management actions to achieve natural or cultural resource management objectives. Reducing uncertainty regarding wildlife and habitat responses to refuge management actions undertaken in order to achieve desired outcomes (objectives) is essential for adaptive management (522 Departmental Manual [DM] 1).

Potentially, some projects' methods could cause impacts to or conflict with Refuge-specific natural or cultural resources, priority wildlife-dependent public uses, other high-priority research, or Refuge management programs. In such cases, in order for the project to be determined compatible in the SUP review, it would need to be clearly demonstrated that the project's scientific findings would contribute to Refuge management and that the project could not be conducted off-Refuge. The investigator(s) would need to identify approaches, methods, and strategies in advance to minimize or eliminate potential impacts and conflicts. If unacceptable impacts, including long-term and cumulative impacts, could not be avoided, then the project could not be determined compatible.

***Refuge Goals and NWRS Mission***

It is likely that most proposed research, survey, or scientific collection projects would support one or more of the Refuge goals (particularly Goal 6), but each would need to be evaluated separately. Projects that were determined supportive of Refuge purposes, goals, and the Refuge System mission would have a greater chance of being found appropriate, determined compatible, and authorized for implementation.

### ***Fish, Wildlife, Plants, and Their Habitats***

Impacts would be project- and site-specific, and would vary depending upon the nature and scope of the field work. Data collection techniques would generally have minimal animal mortality or disturbance, habitat destruction, no introduction of contaminants, and no introduction of non-indigenous species. In contrast, projects involving the collection of biotic samples (plants or animals) or requiring intensive ground-based data or sample collection would at least have short-term, localized impacts.

Disturbance to seabirds would likely be one of the greatest wildlife effects caused by terrestrial and nearshore research, surveys, and scientific collections. When birds are breeding they are all more vulnerable to disturbance. Flushing of birds or even raising their alert levels creates stress and requires animals to expend energy that would otherwise be invested in essential life-history activities such as foraging, mating, nesting, brood-rearing, and predator avoidance. Disturbance can cause nest desertion; affect survival of individual birds, eggs, nestlings, or broods; and alter behavior of non-breeding birds.

Sea turtles that have come ashore to dig nests and lay eggs are highly focused on their reproductive objective and are not easily deterred from this ancient imperative. Hatchlings may have difficulty emerging from the nest, if the overlying sand has been compacted by human trampling and activities that introduce artificial light into the environment such as camping may disorient them on their way to the water. Disturbance and physical damage to fish, marine invertebrates, and corals may result during snorkeling, swimming, or diving activities.

Field research could also cause trampling of native plants and benthic marine biota, erosion, and introduction or spread of exotic species, including microbes, invertebrates, terrestrial plants, algae, and other pest species. All of these impacts could adversely affect native fish, wildlife, plants, and their habitats.

Improper boat operation could result in localized impacts to the coral reef from anchoring, touching, or other avoidable physical disturbance to the benthos including coral and CCA.

Spread of non-native or pest plants, invertebrates, or pathogens is possible from ground disturbance and transportation of project equipment and personnel. These effects would be minimized or eliminated by requiring proper cleaning of investigator equipment and adherence to quarantine protocols for clothing and camping gear and supplies. Restoration or mitigation plans in place and regular surveillance for new invasions would minimize damage from accidental introductions.

Increased use of waters also increases the potential for introductions of nonnative species and interactions (some negative) by boats or snorkelers/divers with sea turtles, fish, cetaceans, and live corals. One accidental introduction of a nonnative species on a boat or dive equipment could devastate the Refuge. Groundings by inappropriate boat operation could cause physical damage and introduce elements to enhance the spread of invasive species, such as was the case with the *Jin Shiang Fa*.

There also could be localized and temporary effects from collecting of soil, plant, and algal samples, or trapping, handling, or collection of fish and wildlife. Impacts could also occur from infrastructure necessary to support a project (e.g., permanent transects or plot markers, exclosure devices).

All of these impacts could adversely affect native fish, wildlife, plants, and their habitats. Increased activity increases risk of adverse impacts also. Individual circumstances associated with specific studies would determine the degree of actual effects upon reproduction, survival of individuals, and diversity and abundance of native species (community health).

However, given the experience of staff with similar research projects conducted at the Refuge and other refuge atolls it is anticipated that these impacts can be avoided altogether or minimized. Examples includes avoiding nesting areas, minimizing lights utilized at night, Refuge-authorized personnel accompanying researchers and educating them on minimizing such impacts, requiring existing biosecurity protocols be followed, live-boating, using a diver to hand-place the anchor, using a diver to clear the anchor from the bottom before it is hauled up, and frequently checking the position of the boat for drift or anchor drag.

**Public Review and Comment:**

Public availability of this CD has been widely announced together with announcement of the availability of the Refuge’s Draft CCP/EA. The review and comment period has also been the same as for the Draft CCP/EA.

**Determination: (check one below)**

Use is Not Compatible

Use is Compatible with following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

Permission to use the Refuge for research, surveys, or scientific collections would be officially authorized through issuance of a SUP. Generally, SUP would be issued on a year-to-year basis. The SUP would cover use by a specified individual or organization and could not be assigned or sub-permitted to others. These permits may stipulate more detailed access restrictions and regulations to protect wildlife or Refuge integrity from anticipated site-specific negative effects caused by the research project. At the discretion of the Refuge manager, Refuge-approved staff may be assigned to accompany researchers.

Prior to potential SUP renewal, Refuge staff would communicate with researchers to share new information, discuss results of monitoring, review compliance with SUP conditions, and address other issues. Other meetings would be scheduled as needed.

The Refuge staff would supply researchers with information about the Refuge; its purposes and goals; natural and cultural resources of concern; rules and regulations; and any hazardous conditions. Researchers are responsible for reviewing and understanding this information and ensuring that any associates entering the Refuge also received, reviewed, understood, and complied with this information.

**General**

1. In addition to the stipulations listed here, the general SUP conditions and requirements, and the special SUP conditions, researchers and their colleagues are required to comply with Refuge System-related and other applicable laws, regulations, and policies including “Prohibited Acts” listed in 50 Code of Federal Regulations (CFR) 27.
2. Only activities specifically authorized in a SUP would be permitted. Other activities are prohibited, for example (but not limited to):
  - a. Rose Atoll NWR is closed to general public use, so the SUP would include maps clearly depicting the areas researchers are authorized to access and use, including the Refuge entry point(s). Permittees are prohibited from straying outside the areas depicted on the maps.

- b. Researchers are prohibited from constructing new or maintaining existing structures on the Refuge without specific, prior written approval of the Refuge Manager.
  - c. Consistent with Service policy regarding management of non-hazardous solid waste on refuges (561 FW 5), permittees are prohibited from littering, dumping refuse, abandoning equipment or materials, or otherwise discarding any items on the Refuge.
  - d. Unless it was an element included in their approved project proposal, researchers and their colleagues are prohibited from collecting and removing any archaeological or historic artifacts, abiotic or biological specimens or samples, or mementos from the Refuge.
3. No changes could be made to any of these stipulations without specific, prior written approval of the Refuge Manager.

***Specific Terms and Conditions (include but are not limited to):***

1. All scientific specimens are the property of the U.S. and collections are required to comply with Service regulations and policy as donations or loans to the permittee. Donations or loans of collected specimens would be managed in accordance with Title 50 of the CFR, sections 12.35-12.38, FWS Manual 701 FW 5, Director's Order No. 109 (as amended), and any other applicable Service or Department of the Interior regulation or guidance. Collections shall not be shared or distributed beyond the permittee without the expressed permission of the Service. Any loan remains the property of the U.S. and the Service may require its return at any time. The Service reserves the right to require the permittee to enter specimen data and metadata into a national, open-access database.
2. All research permit holders would be required to submit an annual report to the Refuge Manager that summarizes their activities for a given year and a final report when the project is completed. The report would include at a minimum the following: study title, SUP number, fiscal year, progress, important findings, and problems encountered, proposed resolution to problems, disposition of any collected samples, preparer, and date prepared. Final project reports are due in January following at least 1 year after expiration of the SUP.
3. All publications and products derived from the SUP would appropriately acknowledge the Service and state the activities were conducted under National Wildlife Refuge System SUP. Appropriate acknowledgement should also be given to NOAA when applicable. All reports, publications, or products would reference the Rose Atoll National Wildlife Refuge and Rose Atoll Marine National Monument.
4. Researchers are required to provide Refuge staff with the following:
  - a. An opportunity to review and comment on draft manuscripts prior to their submittal to a scientific journal for consideration for publication.
  - b. At least two copies (reprints) of all publications articles, or other product created as a result of information gained or work completed under this permit, including materials generated at any time in the future following expiration of this permit.
  - c. At the conclusion of the project, raw data (preferably in an electronic database format) or unrestricted access to the raw data upon request.
5. Upon completion of the project or annually, the researcher is required to remove all equipment and physical markers (unless required for long-term projects) and restore sites to the Refuge manager's satisfaction. The SUP would specify conditions for removal and clean up.

6. The SUP does not remove the permittees' obligation to obtain all additional permits, authorizations, or regulatory compliance, including but not limited to local, Territorial, and Federal permits for collections, or ESA or MMPA consultation.
7. To reduce impacts, the minimum number of samples (e.g., water, soils, vegetative litter, plants, macroinvertebrates, vertebrates, and artifacts) adequate for addressing the question in a credible manner would be collected for identification or experimentation.
8. If the proposed research methods would materially impact, or cause appropriation, injury, destruction, or removal of any Refuge resource, the permittee must identify the issues in advance. Highly intrusive or manipulative research is generally not permitted. As much of this work would be experimental due to the extreme environment, any non-anticipated disturbance would immediately be brought to the attention of the Refuge Manager.
9. Where possible, researchers would be required to coordinate and share collections with other investigators. This could reduce sampling needed for multiple projects and any associated mortality and disturbance. For example, if one investigator collected fish for a diet study and another researcher was examining otoliths, then it could be possible to accomplish sampling for both projects with one collection effort.
10. To minimize the introduction of pests, sampling equipment as well as researcher's clothing and vehicles (e.g., boats) need to be thoroughly cleaned (free of marine fouling organisms, dirt and plant material) before being used on the Refuge. Depending on the project, quarantine protocols may be necessary.
11. Researchers are required to secure approval from the Service prior to use of any pesticides (including uses of herbicides, fungicides, and insecticides) on the Refuge. This would involve researchers submitting to the Refuge Manager a completed Pesticide Use Proposal (PUP) for each proposed pesticide use. These PUPs would need to be submitted at least 90 days prior to proposed use of the pesticide to allow adequate time for evaluation and processing.
12. At any time, Refuge staff could accompany researchers in the field, with the researcher required to provide transportation unless other arrangements are made prior to the trip. The Refuge Manager or designee can suspend or modify a SUP or its conditions or terminate research, surveys, or collections that are already permitted and in progress should unacceptable, unforeseen, or unexpected impacts or issues arise or be noted.
13. Violation of any of these stipulations could result in temporary or permanent withdrawal of official permission to continue research, surveys, or scientific collections on the Refuge. The SUP could be revoked by the Refuge Manager immediately for non-compliance with these stipulations.

### ***Monitoring, Adaptive Management, and Enforcement***

1. The Refuge has the right to add to or otherwise modify the stipulations listed herein in order to ensure the continued compatibility of this use.
2. Failure to complete administrative and reporting requirements may be used as a reason to deny future permit requests.

**Justification:**

Most all research, surveys, and scientific collections on refuges are inherently valuable to the Service because they expand scientific information available for resource management decisions about fish, wildlife, plants, and their habitats; cultural resources; or public use. In many cases, if it were not for the refuge staff providing access to refuge lands and waters along with some support, the project would never occur and less scientific information would be available to aid the Service in managing and conserving refuge resources.

By allowing the use to occur under the stipulations described above, it is anticipated that wildlife which could be disturbed by this use would find sufficient food resources and resting places so their abundance and use would not be measurably lessened on the Refuge. Additionally, it is anticipated that monitoring, as needed, would prevent unacceptable or irreversible impacts to fish, wildlife, plants, and their habitats; cultural resources; and public use. Where this was not the case, the proposed project would likely not be compatible and would not be authorized for implementation. The Refuge staff would also monitor habitat quantity and quality, wildlife use and productivity, water quality, cultural resources, and other relevant endpoints to determine if stipulations associated with research, surveys, and scientific collections were resulting in expected and desirable outcomes. In consultation with researchers, the Refuge staff would apply adaptive management principles to modify stipulations or adjust objectives, as necessary, to achieve desirable results.

As a result, potential research, surveys, and scientific collections, consistent with the stipulations described herein, would not materially interfere with or detract from maintenance of the Refuge's biological integrity, diversity, and environmental health; fulfillment of the Rose Atoll NWR purposes; or the Refuge System mission.

**Mandatory 10- or 15-Year Re-evaluation Date:**

\_\_\_\_\_ Mandatory 15-year reevaluation date (for wildlife-dependent public uses)

2022 Mandatory 10-year reevaluation date (for all uses other than wildlife-dependent public uses)

**NEPA Compliance for Refuge Use Decision: (check one below)**

\_\_\_ Categorical Exclusion without Environmental Action Statement

\_\_\_ Categorical Exclusion and Environmental Action Statement

X Environmental Assessment and Finding of No Significant Impact

\_\_\_ Environmental Impact Statement and Record of Decision

This CD has been developed and issued concurrent with the CCP/EA for Rose Atoll NWR.

**Refuge Determination:**

Prepared by: \_\_\_\_\_  
(Signature) (Date)

Approved by  
Refuge Manager  
Rose Atoll  
National Wildlife  
Refuge  
\_\_\_\_\_  
(Signature) (Date)

**Concurrence:**

Project Leader  
Pacific Reefs  
National Wildlife  
Refuge Complex:  
\_\_\_\_\_  
(Signature) (Date)

Refuge Supervisor  
Hawaiian and  
Pacific Islands  
National Wildlife  
Refuge Complex:  
\_\_\_\_\_  
(Signature) (Date)

Regional Chief,  
National Wildlife  
Refuge System  
Pacific Region:  
\_\_\_\_\_  
(Signature) (Date)

**References Used and Cited, and Glossary of Acronyms and Terms:**

Adaptive Management (522 DM 1).

Administration of Specialized Uses (5 RM 17).

Appropriate Refuge Uses (603 FW 1).

National Historic Preservation Act of 1966, as amended (16 U.S.C. 470).

National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd-668ee).

(NEPA) National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321-4347).

Prohibited Acts (50 CFR 27).

Refuge Compatibility (603 FW 2).

Solid Waste (Nonhazardous) (561 FW 5).

## High-Priority Research, Surveys, and Scientific Collections

Following are examples of high-priority research, survey, and scientific collection topics for Rose Atoll NWR. They are not listed in priority order.

Work with partners to deploy an Ecological Acoustic Recorder (EAR) in the ava to collect biological data that may improve monitoring of behavior and abundance of marine organisms
Within 5 years, begin to monitor climate change variables and responses including: sea level, temperature, water quality (pH, conductivity, dissolved oxygen, nitrogen, photosynthetically available light (PAR), phosphorus, iron) and the frequency and duration of extreme storm events
Work with partners to monitor status and trends of focal communities (hard corals, algae), including the incidence and severity of coral and algal disease and bleaching
Within 5 years, monitor the growth and survival rate of coral colonies at different depths
Work with partners to conduct REA to document habitat associations and species distribution, density, and diversity in marine habitats
Work with NOAA's CRED and other partners to collect oceanographic and water quality data in order to track changes that could affect the reef or wildlife
Within 5 years, develop and implement monitoring protocols to track populations of focal lagoon species including: fish, corals, giant clams (faisua), other invertebrates, and marine pests to determine abundance, density, and biomass of each at selected sites
Work with partners to collect bathymetry data every 10 years in order to document changes in the lagoon, reef, or ava that could affect hydrography or habitat characteristics
Within 5 years, develop and implement monitoring protocols to track abundance and distribution of focal perimeter reef species including eels and urchins to determine abundance, density, and biomass of each at selected sites
Continue monitoring abundance and distribution of the cyanobacterial community which became dominant on a section of the southwest arm of the atoll due to elevated iron levels following a 1993 shipwreck
Monitor benthic succession of the reef which was damaged due to the 1993 shipwreck
Within 5 years, work with partners to develop and implement reef monitoring program, including rate of growth, elevation change, chemical composition, and other variables related to reef growth and the atoll's ability to maintain itself in an anticipated environment of climate change and ocean acidification
Within 5 years, work with partners to monitor water flow rate and direction in the ava using archival pressure and flow rate instruments that can be downloaded at every visit in order to document any changes in flow through the ava
Within 5 years, develop and implement monitoring protocol to track abundance and biomass of fish, including predatory and prey fish species, around the opening of the ava to detect any changes in structure or function of this important geological feature for large predators in the Refuge
Within 2 years, working with NOAA/NMFS and other partners, develop and implement monitoring protocol to track turtle abundance and movements using field counts, tagging, remote sensing and satellite telemetry

Rose Atoll National Wildlife Refuge  
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Within 2 years, use GPS to map the perimeter of the islands at high and low tide on each visit to the Refuge and obtain any available satellite imagery for incorporation into GIS in order to document changes in island size and location
Monitor survivorship, growth, and maturation of outplanted tamole
Within 2 years, prepare and implement a monitoring plan and rapid response program for terrestrial non-native species and respond immediately if detected
Within 2 years, review existing vegetation community distribution data and develop GIS database of terrestrial and marine habitats and update them every 5 years
Within 4 years, review available vegetation data and develop and implement a monitoring protocol to track changes in numbers, cover, and basal area of different species
Within 3 years, develop and implement a monitoring protocol to track seabird abundance, nesting rates, and feeding territories. Include remote sensing observations to improve future monitoring efforts
Within 2 years, develop and implement a monitoring protocol to track changes in numbers, cover and basal area of different plant species
Within 10 years, characterize nutrient budgets and dynamics at Rose Atoll and evaluate them relative to data from other similar reef sites to identify possible stressors and the positive effects of healthy seabird colonies adjacent to living reefs
Within 5 years, work with universities and other partners to evaluate the geomorphology, hydrology, and sediment budget of Rose Atoll to understand the processes that have maintained the islands as dynamic units
Within 10 years, investigate the ecological relationships between marine gastropods such as turban shells ( <i>Turbo</i> spp.), and land hermit crabs ( <i>Coenobita perlatus</i> and <i>C. brevimanus</i> ). Evaluate factors affecting crab populations, including observed reduction in availability of shells to crabs at the Refuge and what management may improve mollusk shell availability to the <i>Coenobita</i> spp. which are important scavengers and herbivores on both islands
Within 3 years, work with universities and other partners to investigate composition and structure of terrestrial communities on Rose Island prior to the introduction of rats to inform ecological restoration activities

## Compatibility Determination

**Use:** Environmental Education.

**Refuge Name:** Rose Atoll National Wildlife Refuge, Manu'a District, American Samoa.

**Establishing and Acquisition Authority(ies):** Fish and Wildlife Act of 1956.

**Refuge Purpose(s):**

“... for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” 16 USC § 742f(a)(4); “... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...” 16 USC § 742f(b)(1) (Fish and Wildlife Act of 1956, 16 U.S.C. §742(a)-754, as amended).

**National Wildlife Refuge System (Refuge System or NWRS) Mission:**

“The mission of the [National Wildlife Refuge] System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Improvement Act).

**Other Management Direction:**

***Presidential Proclamation 8337***

“... for the purposes of protecting the objects identified in the above preceding paragraphs ...” “For the purposes of protecting the objects identified above, the Secretaries of the Interior and Commerce, respectively, shall not allow or permit any appropriation, injury, destruction, or removal of any feature of this monument except as provided for by this proclamation or as otherwise provided for by law.”

***Secretarial Order 3284***

“... For each of the areas subject to this delegation, the [Fish and Wildlife Service] Director shall provide for the proper care and management of the monument, including all objects of scientific and historic interest therein; the conservation of fish and wildlife; and the development of programs to assess and promote national and international monument-related scientific exploration and research.” (Section 4.a.(2). “... The Director shall manage the emergent and submerged lands and waters out to 50 nautical miles from the mean low water line at Rose Atoll as the Rose Atoll Marine National Monument. The Director shall continue to manage the existing wildlife refuge at Rose Atoll within the boundaries set forth in the Notice of Establishment, 71 FR 13183 (April 5, 1974). Those areas beyond such mean low water line for which NOAA has the primary management responsibility for fishery-related activities are not included in the National Wildlife Refuge System.” (Section 4.c).

**Description of Use(s):**

Environmental education is a wildlife-dependent general public use and is to be given special consideration in refuge planning and management when compatible. When determined compatible on a refuge-specific basis, a wildlife-dependent use becomes a priority public use for that refuge and is to be facilitated (see 16 U.S.C. 668dd-668ee).

Service policy defines environmental education (EE) to be “a process designed to teach citizens and visitors the history and importance of conservation and the biological and the scientific knowledge of our ... natural resources. Through this process ... [the Service] ... can help develop a citizenry that has the awareness, knowledge, attitudes, skills, motivation, and commitment to work cooperatively towards the conservation of our ... environmental resources. Environmental education within the Refuge System incorporates onsite, offsite, and distance learning materials, activities, programs, and products that address the audience’s course of study, refuge purpose(s), physical attributes, ecosystem dynamics, conservation strategies, and the Refuge System mission” (605 Fish and Wildlife [FW] 6).

Environmental education is a formal, structured program that incorporates measurable learning objectives and uses audience-appropriate curricula to satisfy Territorial or other standards. Environmental education activities can be provided by Refuge personnel, a volunteer(s), or other Service-authorized agent(s); or through partnerships with groups that share similar goals (e.g., a new Refuge friends group, partners, or others). For purposes of this compatibility determination (CD), EE includes education regarding natural, historic, and cultural resources and values.

Although there were some activities in the past, the U.S. Fish and Wildlife Service (Service) currently offers no EE program for the Rose Atoll National Wildlife Refuge (NWR or Refuge). It is proposed that the Service provide EE, with an objective of eventually serving EE once every 3 years for on-site opportunities in small groups less than 10 people. These visits would be led by a Refuge-authorized agent with the stipulations identified to ensure compatibility with this activity.

Other EE opportunities would be provided offsite in the form of materials developed, classroom instruction and curriculum, student intern programs, satellite transmissions to schools, and partnering.

This CD has been developed and made publicly available concurrent with the Draft Comprehensive Conservation Plan (CCP) and associated Environmental Assessment (EA) for Rose Atoll NWR. Much of the information and some of the analyses contained in this CD are addressed in greater detail in the CCP/EA, which are incorporated through reference herein.

**Availability of Resources:**

Following is an estimate of costs associated with administering this use on the Refuge.

Tasks	Estimated Costs per Year <sup>1</sup>
Oversight of program by Refuge Manager GS-12 (5%);	\$5,870
Biological monitoring by Biologist GS-12 (1%)	\$1,260
Supplies and equipment	\$500
Refuge overhead costs associated with the above-listed work <sup>2</sup>	\$1,000
<b>Total Costs</b>	<b>\$8,630</b>

<sup>1</sup> Annual costs. Annual personnel costs include salary, locality pay and COLA, and benefits.

<sup>2</sup> Overhead costs include overhead expenses such as support personnel and do not include salary-related benefits.

The Refuge does not currently have adequate budget and staff to support the annual costs associated with the full proposed EE program for the Refuge. Smaller components of it are feasible with the existing budget, however it would be necessary to recruit, train, and utilize the assistance of volunteers, an intern, or other partners to fully support all the proposed activities.

Additional funding for specialized telepresence technology would need to be made available (either through the Service budget system or from an outside source) in order to allow this use to occur in a compatible manner. Should internal funding not materialize, the Service would seek outside funding (e.g., from other agency partners or private conservation organizations).

Transportation costs to reach the Refuge, costs of upkeep and replacement of Refuge special equipment, and costs of activities on the Refuge are paid for by the participant or covered through grants or partners.

**Anticipated Impacts of the Use(s):**

***Refuge Goals and Refuge System Mission***

Environmental education would support Refuge Goal 7.

***Fish, Wildlife, Plants, and Their Habitats***

The Refuge purpose is for the development, advancement, management, conservation, and protection of fish and wildlife resources. The focus of management is on supporting the unique habitats and species found at Rose Atoll (e.g., *Pisonia* forest, lagoon habitat, perimeter reef, aua, seabirds, faisua, turtles, corals, fishes, etc.).

On-site EE activities would be expected to cause some wildlife disturbance. Disturbance to nesting and resting seabirds and other migratory birds can include flushing of birds or even raising their alert levels, creating stress and requiring animals to expend energy that would otherwise be invested in essential life-history activities such as foraging, mating, nesting, brood-rearing, and predator avoidance. Such stress reactions (elevated heart rate, elevated levels of corticosterone, and behavioral responses) have been documented in several species of nesting seabirds at several ecotourism locations as a result of human activities in nesting colonies (Jungius and Mirsch 1979, Fowler 1995, Nimon et al. 1995, Kitaysky et al., 2003). Disturbance can cause nest desertion; reduce survival of individual birds, eggs, nestlings, or broods; and alter behavior of non-breeding birds (Trulio 2005). Kitaysky et al. (2003) showed that limited duration disturbance, however, has only minor, short-term effects. Observation periods for any particular bird or group of birds would be kept to 15 minutes or less for this reason. Bright lights from the ship may cause birds returning to the island at night to collide with the vessel.

Sea turtles coming ashore to dig nests and lay eggs are highly focused on their reproductive behavior and are not easily deterred from this ancient imperative. Hatchlings may have difficulty emerging from the nest, however, if the overlying sand has been compacted by considerable human trampling. Artificial light from night activities on shore or ship lights offshore may disorient hatchlings as they make their way to the ocean from their nest. Disturbance to fish, marine invertebrates, and corals may result during snorkeling, swimming, or diving activities (Hawkins et al. 1999).

As educators and students walk on the islands, trampling of native plants, benthic marine biota, erosion, and introduction or spread of exotic species, including microbes, invertebrates, plants, algae, and other pest species could occur. All of these impacts would adversely affect native wildlife, plants, and their habitats; and would be of special concern in Refuge areas struggling with re-establishment of native plant communities. The degree of actual effects upon reproduction, survival of individuals, and diversity and abundance of native species (community health) would depend on specific circumstances.

Improper boat operation could result in localized impacts to the coral reef from anchoring, touching, or other avoidable physical disturbance to the benthos including coral and CCA.

Inexperienced or inattentive snorkelers and divers can also cause localized damage by standing on the reef, flushing sediment onto living reef biota, and breaking coral and CCA with hands or fins.

Spread of non-native or pest plants, invertebrates, or pathogens is possible from ground disturbance or transportation of equipment and personnel. These effects would be minimized or eliminated by requiring proper cleaning of investigator equipment and clothing as well as adhering to quarantine methods and possibly restoration or mitigation plans, where appropriate.

Due to the very limited nature of this activity (<once every 3 years), the small group size (<10 people), accompaniment by Refuge-authorized personnel, selection of terrestrial and marine viewing areas based on limiting wildlife and habitat disturbance; and instruction and training provided prior and during the trip (including biosecurity protocols), we do not expect any additional short-term, long-term, or cumulative and indirect or secondary impacts from this use.

**Public Review and Comment:**

Public availability of this CD has been widely announced together with announcement of the availability of the Refuge's Draft CCP/EA. The review and comment period has also been the same as for the Draft CCP/EA.

**Determination: (check one below)**

Use is Not Compatible

Use is Compatible with following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

Permission to use the Refuge for EE would be officially authorized through issuance of a SUP. Generally, SUP would be issued on a year-to-year basis. The SUP would cover use by a specified individual or organization and could not be assigned or sub-permitted to others. These permits may stipulate more detailed access restrictions and regulations to protect wildlife or Refuge integrity from anticipated site-specific negative effects caused by the EE project. At the discretion of the Refuge manager, Refuge-approved staff may be assigned to accompany EE participants.

The Refuge staff would supply EE participants with information about the Refuge; its purpose and goals; natural and cultural resources of concern; rules and regulations; and any hazardous conditions. Participants are responsible for reviewing and understanding this information and ensuring that any people entering the Refuge also received, reviewed, understood, and complied with this information.

**General**

1. In addition to the stipulations listed here, the general SUP conditions and requirements, and the special SUP conditions, EE participants are required to comply with Refuge System-related and other applicable laws, regulations, and policies including "Prohibited Acts" listed in 50 Code of Federal Regulations (CFR) 27.
2. Only activities specifically authorized in a SUP would be permitted. Other activities are prohibited, for example (but not limited to):

- a. Rose Atoll NWR is closed to general public use, so the SUP would include maps clearly depicting the areas educators and students are authorized to access and use, including the Refuge entry point(s). Permittees are prohibited from straying outside the areas depicted on the maps and would be accompanied by a Refuge-authorized agent during their stay.
  - b. Educators and students are prohibited from constructing new or maintaining existing structures on the Refuge without specific, prior written approval of the Refuge Manager.
  - c. Consistent with Service policy regarding management of non-hazardous solid waste on refuges (561 FW 5), permittees are prohibited from littering, dumping refuse, abandoning equipment or materials, or otherwise discarding any items on the Refuge.
  - d. Unless it was an element included in their approved project proposal, educators and their students are prohibited from collecting and removing any archaeological or historic artifacts, abiotic or biological specimens or samples, or mementos from the Refuge.
3. Only educators who had successfully participated in an EE Refuge program would be allowed to lead EE groups at the Refuge. For activities at the Refuge, EE group size (including students, educators, parents, and others participating in the activity) would be limited to no more than 10 individuals in the group per visit.
  4. To minimize the introduction of pests, equipment as well as educator's and student's clothing and vehicles (e.g., boats) need to be thoroughly cleaned (free of marine fouling organisms, dirt and plant material) before being used on the Refuge. Depending on the activity, quarantine protocols may be necessary.
  5. No changes could be made to any of these stipulations without specific, prior written approval of the Refuge Manager.

### ***Monitoring, Adaptive Management, and Enforcement***

1. The Refuge Manager has the right to add to or otherwise modify the stipulations listed herein in order to ensure the continued compatibility of this use.
2. Violation of any of these stipulations could result in temporary or permanent withdrawal of official permission to continue EE on the Refuge. The Refuge Manager may also suspend or revoke the SUP if unacceptable impacts were occurring to native wildlife, plants, or their habitats, cultural resources, or other Refuge visitors. The SUP could be revoked by the Refuge Manager immediately for non-compliance with these stipulations.

### **Justification:**

Service policy states that EE programs can "... promote understanding and appreciation of natural and cultural resources and their management on all lands and waters in the Refuge System" (605 FW 6). Service policy strongly encourages refuge managers to provide quality, compatible EE programs.

There would be some potential for wildlife disturbance at the on-site location. Effects would be mitigated through timing of visits, instruction of participants, Refuge-authorized attendant, and other measures as identified previously. Proposed stipulations would ensure that any other effects of EE would be minor or not measurable.

### **Mandatory 10- or 15-Year Re-evaluation Date:**

2027 Mandatory 15-year reevaluation date (for wildlife-dependent public uses)

\_\_\_\_\_ Mandatory 10-year reevaluation date (for all uses other than wildlife-dependent public uses)

**NEPA Compliance for Refuge Use Decision: (check one below)**

\_\_\_ Categorical Exclusion without Environmental Action Statement

\_\_\_ Categorical Exclusion and Environmental Action Statement

X Environmental Assessment and Finding of No Significant Impact

\_\_\_ Environmental Impact Statement and Record of Decision

This CD has been developed and issued concurrent with the CCP/EA for Rose Atoll NWR.

**Refuge Determination:**

Prepared by: \_\_\_\_\_  
(Signature) (Date)

Approved by  
Refuge Manager  
Rose Atoll  
National Wildlife  
Refuge \_\_\_\_\_  
(Signature) (Date)

**Concurrence:**

Project Leader  
Pacific Reefs  
National Wildlife  
Refuge Complex: \_\_\_\_\_  
(Signature) (Date)

Refuge Supervisor  
Hawaiian and  
Pacific Islands  
National Wildlife  
Refuge Complex: \_\_\_\_\_  
(Signature) (Date)

Regional Chief,  
National Wildlife  
Refuge System  
Pacific Region: \_\_\_\_\_  
(Signature) (Date)

**References Used and Cited, and Glossary of Acronyms and Terms:**

Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544).

Environmental Education (605 FW 6).

Fowler, G.S. 1995. Ecotourism, field studies and stress: behavioral and hormonal responses of Magellanic penguins to nest site disturbance. In: Abstracts to Pacific Seabird Group Annual Meeting, 1995.

Hawkins, J.P., C.M. Roberts, T.V.T. Hof, K.D. Meyer, J. Tratalos, and C. Aldam. 1999. Effects of recreational scuba diving on Caribbean coral and fish communities. *Conservation Biology* 13(4):888-897.

Jungius, H. and U. Mirsch. 1979. Changes in heartbeats in nesting birds at Galapagos by human disturbance. *Journal of Field Ornithology* 120:299-310.

Kitaysky, A., M. Benowitz-Fredericks, Z. Kitaiskaia, M. Shultz, and B. Zaun. 2003. Effects of tourist disturbance on stress physiology of wedge-tailed shearwaters (*Puffinus pacificus*) chicks at Kilauea Point National Wildlife Refuge, Kauai, Hawaii. Unpublished report. Kilauea Point National Wildlife Refuge. Kauai, HI.

National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd-668ee).

Nimon, A.J., R.C. Schroter, and B. Stonehouse. 1995. Heart rate of disturbed penguins. *Nature* 374:415. Prohibited Acts (50 CFR 27).

Refuge System-authorized agents: Include "... contractors, cooperating agencies, cooperating associations, refuge support groups, and volunteers" (603 FW 2).

Trulio, L. 2005. Science syntheses for Issue 9: understanding the effects of public access and recreation on wildlife and their habitats in the restoration project area. Available at:  
[http://www.southbayrestoration.org/pdf\\_files/Issue%209%20Public%20Access%20&%20Wildlife.pdf](http://www.southbayrestoration.org/pdf_files/Issue%209%20Public%20Access%20&%20Wildlife.pdf).

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