U.S. Fish & Wildlife Service

Stillwater National Wildlife Refuge Complex

Draft Environmental Impact Statement for the Comprehensive Conservation Plan and Boundary Revision

Summary

SUMMARY OF
DRAFT ENVIRONMENTAL IMPACT STATEMENT

for the

STILLWATER NATIONAL WILDLIFE REFUGE COMPLEX

COMPREHENSIVE CONSERVATION PLAN and BOUNDARY REVISION

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Draft Environmental Impact Statement for the
STILLWATER NATIONAL WILDLIFE REFUGE COMPLEX
COMPREHENSIVE CONSERVATION PLAN and
BOUNDARY REVISION
Churchill and Washoe Counties, Nevada

Type of Action:	Administrative
Lead Agency:	U.S. Department of the Interior, Fish and Wildlife Service
Responsible Officials:	Anne Badgley, Regional Director, Region 1 Michael Spear, California/Nevada Operations Manager
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Abstract: The draft environmental impact statement (Draft EIS) summarize in this document describes and evaluates four alternative comprehensive conservation plans and boundary scenarios for the Stillwater National Wildlife Refuge (NWR) Complex, which is comprised of Stillwater NWR, Fallon NWR, Stillwater Wildlife Management Area, and Anaho Island NWR. The No Action Alternative (Alternative A) would retain the existing boundaries and entails baseline management as outlined in the 1987 Management Plan for Stillwater WMA and modified by the U.S. Fish and Wildlife Service's (Service's) water-rights acquisition program. Alternative B would result in the lands within Stillwater WMA reverting back to U.S. Bureau of Reclamation or public land status, and would focus on providing fall and winter habitat for waterfowl and opportunities for waterfowl hunting on Stillwater NWR and breeding habitat for waterbirds on Fallon NWR. Under Alternative C (Service's Preferred Alternative), Stillwater NWR would be expanded to include most of Stillwater WMA and Fallon NWR and to include additional riparian and dune habitat. This alternative would emphasize the approximation of natural biological diversity, with adjustments to enhance breeding habitat for waterbirds and fall and winter habitat for waterfowl, and would provide enhanced opportunities for wildlife observation and environmental education. Alternative D, in which Stillwater NWR would be expanded to include all of Stillwater WMA and Fallon NWR and to include additional riparian and dune habitat, would focus on restoring natural hydrologic patterns and other ecological processes. Public use management would focus on providing opportunities for wildlife observation and environmental education. In all alternatives, Anaho Island NWR would be managed much as it has in the past, with a continued emphasis on protecting the nesting colony of American white pelicans and other colony-nesting birds that use the island.

The issues addressed in the Draft EIS include the potential effects of the alternatives on populations of fish, wildlife, plants, and their habitat; priority public uses of the National Wildlife Refuge System; other public uses; cultural resources; Newlands Irrigation Project Operations; Naval Air Station-Fallon training; and the local economy. An insufficient volume of water inflow, nonnative species (including livestock), and contaminants are the major factors limiting achievement of refuge purposes of Stillwater NWR and Fallon NWR. Compatibility of public uses is also a major issue addressed in the Draft EIS.

Commenting: Reviewers should provide the Service with their comments during the review period of the Draft EIS. This will enable the Service to analyze and respond to the comments at one time and to use this input in the preparation of the final impact statement and the comprehensive conservation plan, thus avoiding undue delay in the decision-making process. Reviewers have an obligation to structure their input so that it is meaningful and alerts the agency to the reviewer's position and contentions. Environmental objections that could have been raised at the draft stage may be waived if not raised until after the completion of the final environmental impact statement. Comments on the Draft EIS should be specific and should address the adequacy of the EIS and the merits of the alternatives discussed (40 CFR 1503.3).

All comments received from the public will be placed in the Service's record for this action. As part of the record, comments will be made available for inspection by the general public, and copies may also be provided to the public. For persons who do not wish to have their names and other identifying information made available, anonymous comments will be accepted.

Comments on the Draft EIS should be mailed to Stillwater NWR **no later than June 12, 2000**

SUMMARY

INTRODUCTION

The U.S. Fish and Wildlife Service (Service) began the process of developing a comprehensive conservation plan for the Stillwater National Wildlife Refuge (NWR) Complex in early 1997. The draft environmental impact statement (Draft EIS) summarized in this document identifies and provides an evaluation of four alternative management approaches for managing the Stillwater NWR Complex for the next 15 years. Each alternative consists of two main parts: (1) a boundary revision for Stillwater NWR, and (2) the framework of a potential comprehensive conservation plan, including refuge goals, objectives, and strategies for achieving the purposes for which each refuge was established and for contributing toward the mission of the National Wildlife Refuge System (Refuge System). The Stillwater NWR Complex currently includes Stillwater NWR, Stillwater Wildlife Management Area (WMA), Fallon NWR, and Anaho Island NWR, which are located in west-central Nevada (Maps 1 and 2).

Together, these refuges and the wildlife management area contribute substantially to the conservation of wildlife and their habitat in the western Great Basin. They encompass a great diversity of habitats, from freshwater marshes and river habitats to brackish-water marshes and alkali playas, and extensive saltdesert shrublands and a 25-mile long sand dune complex to a small island in a desert lake. These habitats attract nearly 400 species of vertebrate wildlife (more than 260 bird species) and countless species of invertebrates. Waterfowl, shorebirds, and other waterbirds are abundant, especially during migration.

This immense richness and abundance of wildlife and habitats in a desert environment provides a striking setting for hunting, observing, and learning about wildlife in the Great Basin. Waterfowl hunting has a long history at Stillwater Marsh and this tradition will continue. In recent years, birdwatching and environmental education have been growing in popularity.

Map 2 Truckee and Carson River Watersheds

In addition to obtaining immense enjoyment from Stillwater NWR Complex's wildlife and habitats, individuals partaking in these activities have been very instrumental in ensuring the long-term viability of the wetlands on Stillwater NWR, as well as other wetlands in the Lahontan Valley. If it were not for the efforts of several Nevada-based conservation groups, it is likely that the Service would not be acquiring much needed water rights for the refuge's wetlands.

The human association with Stillwater Marsh goes back at least 12,000 years. The culture and traditions of the Cattail-eater Northern Paiutes, or *Toedokado*, is embodied in the area's cultural resources. Because Stillwater Marsh was such an ideal place for humans to live over the millennia, Stillwater NWR contains some of the richest cultural resources in the Great Basin.

The contiguous Stillwater NWR, Stillwater WMA, and Fallon NWR are located about 6 miles northeast of Fallon, Churchill County. Stillwater NWR is about 79,570 acres of Federal land, Stillwater WMA about 65,603 acres, and Fallon NWR about 17,848 acres, for a combined total of 163,021 acres of Federal land. Non-Federal inholdings within the approved boundaries make up about 59,708 acres.

Anaho Island NWR is in the Pyramid Lake Indian Reservation and is about 30 miles northeast of Reno, Washoe County. The Paiute name for Anaho Island is "Pai-sa-ka-tu-du" which means roughly "... the dry island sitting out there all by itself.." The refuge encompasses the entire island, which has fluctuated in size from 220 to 745 acres in recent history due to the fluctuating water levels of Pyramid Lake. In the summer of 1999, the size of the island was approximately 490 acres.

Proposed Action

The proposed action is to (1) identify a boundary configuration of Stillwater NWR that would best facilitate the achievement of the purposes for which the refuge was established, and (2) develop a comprehensive conservation plan for the Stillwater NWR Complex that best achieves the purposes of the individual refuges that make up the complex, contributes to the mission of the Refuge System, is consistent with the principles of sound fish and wildlife management, and addresses relevant mandates and the major issues identified during scoping. Any expansion of the approved boundary of Stillwater NWR would allow the Service to negotiate with willing participants within this boundary to acquire land. Lands acquired by the Service would be managed as part of the Refuge System.

The comprehensive conservation plan will emphasize two main factors. The top priority of the plan will be to provide goals, objectives, and strategies aimed at conserving and protecting native wildlife and their habitat. This priority stems from the purposes of Stillwater NWR and the fundamental mission of the Refuge System, which is the conservation of fish, wildlife, plants, and their habitats.

> "To ensure that the Refuge System's fish, wildlife, and plant resources endure, the law of the land now clearly states that their needs must come first."
>
> *U.S. Fish and Wildlife Service (1999)*

Also important will be goals, objectives, and strategies aimed at facilitating opportunities for wildlife-dependent public uses, such as hunting, environmental education and interpretation, wildlife observation and photography, and scientific research. The direction to provide these opportunities is especially clear for Stillwater NWR because this refuge was established in part to provide opportunities for environmental education and wildlife-dependent recreation. Furthermore, continued use of Stillwater NWR for wildlife-dependent recreation provides people with a better understanding and deeper appreciation of wildlife and the importance of conserving their habitat.

> "...We will make refuges welcoming, safe, and accessible, with a variety of opportunities for visitors to enjoy and appreciate America's fish, wildlife, and plants..."
> *U.S. Fish and Wildlife Service (1999)*

Purpose of and Need For Action

The purpose of developing a comprehensive conservation plan for the Stillwater NWR Complex is to provide managers with a 15-year strategy for achieving refuge purposes and contributing toward the mission of the Refuge System, consistent with sound principles of fish and wildlife conservation and legal mandates. The purpose of revising the boundary of Stillwater NWR is to help the Service achieve the purposes of the refuge.

A comprehensive conservation plan, required by the National Wildlife Refuge System Administration Act of 1966, as amended (Refuge System Administration Act), is needed because (1) Stillwater NWR does not have a management plan that provides direction for managing wildlife, habitat, and public uses on the refuge under the management direction established by the Truckee-Carson-Pyramid Lake Water Rights Settlement Act of 1990 (Title II of Public Law 101-618) and the increased volume of water to be delivered to the refuge, as authorized by the Public Law; (2) Fallon NWR does not have a management plan for managing wildlife, habitat, and public uses on the refuge under the management direction established by Executive Order 5606 in 1931; and (3) Anaho Island NWR does not have a management plan. Compatibility determinations have not been completed for any of the public uses occurring on Stillwater NWR and Fallon NWR. A comprehensive conservation plan is needed to resolve several issues with respect to wildlife and public-use management on the Stillwater NWR Complex, including water management priorities, control of noxious weeds, livestock grazing, contaminants, and managing wildlife-dependent recreational activities.

> A **compatible use** is a public use of a refuge that, in the sound professional judgement of the Refuge Manager, will not interfere with or detract from the ability to fulfill refuge purposes and the mission of the Refuge System. A **compatibility determination** is a document signed by the Refuge Manager signifying that a proposed or existing use is either compatible or not compatible.

Decisions to be Made

The decisions to be made by the Pacific Region Director of the U.S. Fish and Wildlife Service are (1) the selection of an alternative to implement as the Stillwater NWR Complex Comprehensive Conservation Plan, and (2) the identification of the alternative boundary revision that would best contribute to achieving the purposes for which the refuge was established.

These decisions would be made in full recognition of the environmental effects of each of the alternatives considered. The decisions will be designated in a Record of Decision (ROD) document no sooner than 30 days after the final EIS is filed with the Environmental Protection Agency (EPA) and distributed to the public. The selected boundary-revision alternative will then be submitted to the U.S. Congress as the Service's recommended boundary revision for Stillwater NWR. Implementation of the comprehensive conservation plan will begin immediately upon publishing a summary of the ROD in the *Federal Register*.

BACKGROUND INFORMATION

Establishment History and Purposes of the Stillwater NWR Complex

Anaho Island NWR was established in 1913 by Executive Order 1819 as a " . . . preserve and breeding ground for native birds." Public Law 101-618 (§210(b)(2)) more narrowly defined the purpose of Anaho Island NWR, stating that it was to be managed and administered " . . . for the benefit and protection of colonial-nesting species and other migratory birds." The Public Law also recognized that Anaho Island is part of the Pyramid Lake Indian Reservation, but it is to be managed and administered by the Service as a component of the Refuge System. A memorandum of understanding between the Service and the Pyramid Lake Paiute Tribe was signed in March 1992 that outlined the terms of the Service's management and administration of the island.

Fallon NWR is about 17,850 acres of Federal land and was established in 1931 by Executive Order 5606 "as a refuge and breeding ground for birds and other wild animals." It has been managed as part of the Stillwater WMA.

Stillwater WMA and Stillwater NWR were established through a 50-year agreement (1948 Tripartite Agreement) signed in 1948 by the Truckee-Carson Irrigation District (TCID), Nevada State Board of Fish and Game Commissioners (Nevada Division of Wildlife), and the Service. Although the agreement expired in November 1998, the Service continues to cooperatively manage the Stillwater WMA with the Bureau of Reclamation under most provisions of the 1948 Tripartite Agreement (U.S. Bureau of Reclamation 2000). When Stillwater WMA was established, it encompassed about 200,000 acres of land, of which about 140,000 acres were Public Land that was originally withdrawn by the Bureau of Reclamation for Newlands Irrigation Project purposes. Stillwater WMA was established in 1948 for the purposes of conserving and managing wildlife and their habitat, and for public hunting. Under the Tripartite Agreement,

livestock grazing and muskrat production were to be managed commensurate with wildlife conservation and management. Adjacent to the public hunting area located in Stillwater WMA, Stillwater NWR was established in 1949 as a wildlife sanctuary (closed to hunting). It encompassed about 24,200 acres of Federal land, and comprised the southern end of the existing boundary of Stillwater NWR.

In 1990, the approved boundary of Stillwater NWR was expanded, under subsection 206(b)(1) of the Truckee-Carson-Pyramid Lake Water Rights Settlement Act (Title II of Public Law 101-618), to encompass Stillwater Marsh, most of which was previously in the Stillwater WMA. Map 3 identifies the existing boundary of Stillwater NWR. In addition to the boundary expansion, Public Law 101-618 also outlined four purposes for which the Service must manage Stillwater NWR: (1) maintaining and restoring natural biological diversity within the refuge; (2) providing for the conservation and management of fish and wildlife and their habitats within the refuge; (3) fulfilling international treaty obligations of the United States with respect to fish and wildlife; and (4) providing opportunities for scientific research, environmental education, and fish and wildlife oriented recreation.

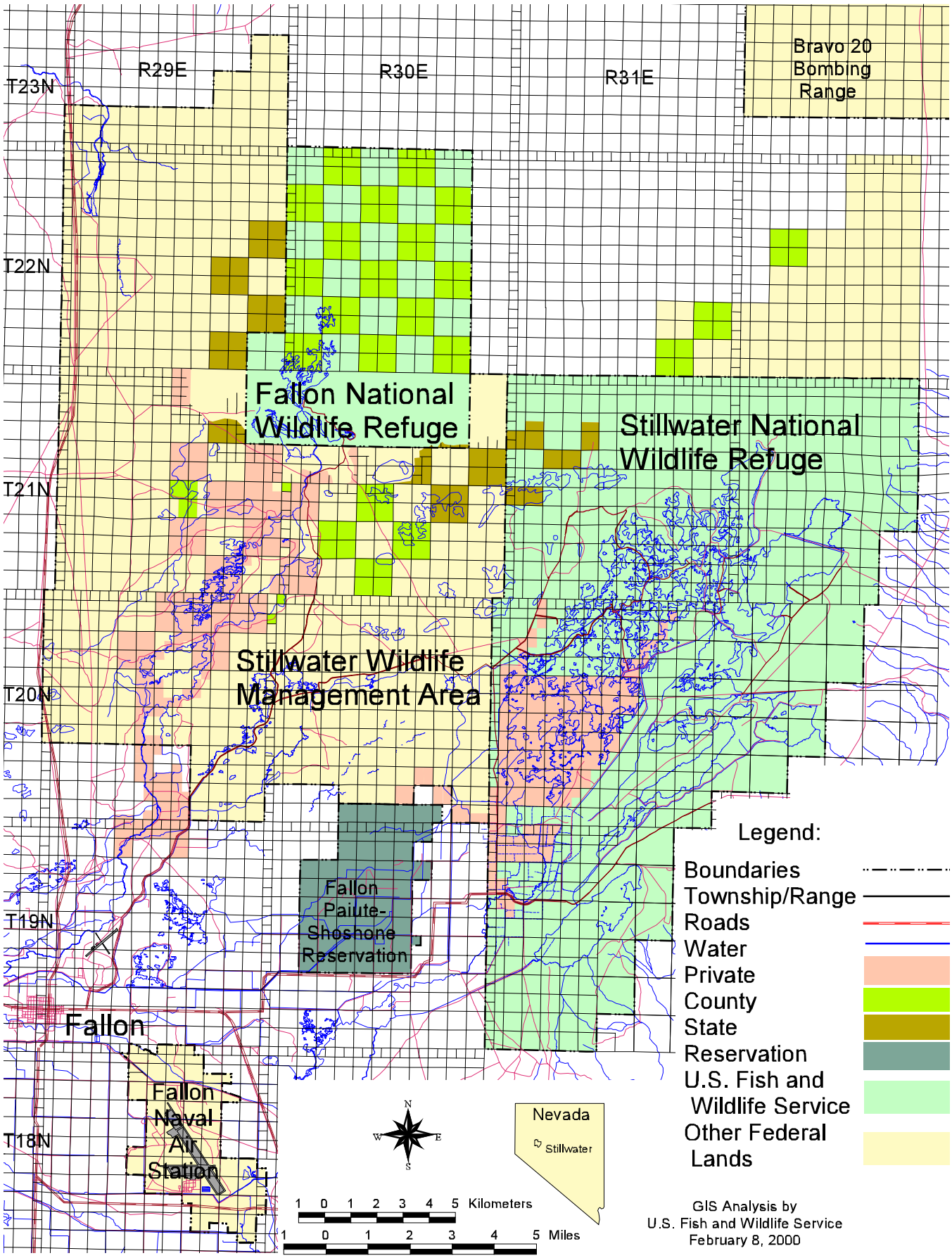
The **natural biological diversity** of the Stillwater area refers to the variety within and among biological communities that evolved in the area under geological, evolutionary, and other ecological processes.

Enactment of Public Law 101-618 shifted the legal authority for managing the lands now within Stillwater NWR from the Tripartite Agreement to the Refuge Administration Act and the refuge purposes identified in Public Law 101-618. Four of the most marked changes in legal directives are as follows. The Public Law enacted a shift in priorities whereby wildlife conservation became the single highest priority. It directed that all wildlife-dependent public uses be given equal emphasis in planning and management, that these priority public uses be given higher consideration than all other public uses, and that all uses must be shown to be compatible with refuge purposes before they can be allowed to occur on the refuge. Livestock grazing and muskrat trapping are only to be permitted to the extent they can help in achieving refuge purposes. The Public Law also mandated that the Service make recommendations to Congress on any boundary revisions that may be needed to help carry out refuge purposes and other provisions of the law.

Status of the Wetlands Water-Rights Acquisition Program

In partnership with the State of Nevada, The Nature Conservancy, and the Nevada Waterfowl Association, the Service has been acquiring water rights for the protection and enhancement of Lahontan Valley wetlands. The first water rights for the wetlands were purchased in 1989 by the Nevada Waterfowl Association. To date, approximately 28,080 acre-feet of water rights in the Carson Division had been acquired, including 19,650 acre-feet by the Service for Stillwater Refuge, 8,150 acre-feet by the State of Nevada and Nevada Waterfowl Association for Carson Lake, and 280 acre-feet for the Bureau of Indian Affairs for the Fallon Paiute-Shoshone Indian Reservation wetlands.

Map 3. Land Ownership



The ongoing water-rights acquisition program for Stillwater NWR and other designated Lahontan Valley wetland areas was authorized and directed by Public Law 101-618. Specifically, subsection 206(a) of Public Law 101-618 directs the Secretary of the Interior to acquire enough water and water rights, in conjunction with the State of Nevada and other parties, to sustain a long-term average of 25,000 acres of primary wetland-habitat in the Lahontan Valley. The *Final Environmental Impact Statement for Water Rights Acquisition for Lahontan Valley Wetlands* (WRAP EIS; U.S. Fish and Wildlife Service 1996a) describes a water-rights acquisition program that was implemented by the Service in November 1996 when the record of decision was signed for the WRAP EIS decision (U.S. Fish and Wildlife Service 1996b) . The WRAP EIS estimated that 125,000 acre-feet of water would be needed to sustain 25,000 acres of wetland-habitat. Water sources include agricultural drainwater, spill-water, water rights from the Carson Division and from the Middle Carson River just above Lahontan Reservoir, leased water from the Carson Division, and groundwater. Spill-water refers to water that is released or spilled from Lahontan Reservoir during high-water conditions to minimize flood potential.

Of the 25,000-acre target identified in Public Law 101-618, an average of 14,000 acres of wetland-habitat would be sustained over the long term on Stillwater NWR, which is estimated to take about 70,000 acre-feet of the 125,000 acre-feet for the Lahontan Valley wetlands. Another 10,200 acres would be sustained on Carson Lake Wildlife Management Area, and the remaining 800 acres would be sustained on the Fallon Paiute-Shoshone Indian Reservation. In the comprehensive conservation planning process for Stillwater NWR, the Service examined four alternative strategies for managing the water being acquired for the refuge.

PLANNING ISSUES

Summary of Public Involvement

In March 1997, three public scoping meetings were conducted in Fallon, Fernley, and Reno, Nevada. The Service subsequently conducted six open-house workshops, three each in Fallon and Reno, in March, April and July. Prior to the open-house workshops, the Service sent letters to all individuals, organizations, and agencies that were on the Lahontan Valley Wetlands Water Rights Acquisition EIS mailing list to ask if they would like to be placed on the comprehensive conservation plan/boundary revision mailing list. The Service also sent letters to the landowners within the boundaries of Stillwater NWR and Stillwater WMA, and adjacent areas, summarizing the boundary revision assessment, inviting them to the workshops, and encouraging input on issues and alternatives to consider.

The Service also met with a variety of other Federal agencies, the Nevada Division of Wildlife, Tribes, municipal governments, and several private groups on a number of occasions. A total of five planning updates were sent to people on the mailing list.

Summary of Major Issues

Six major issues were identified during the internal and public scoping process. Each of the major issues described below identify potential effects that a revised boundary or comprehensive conservation plan could have on a particular resource area. They were considered during the development of alternatives and evaluation of potential impacts.

- **Potential Effects on Populations of Fish, Wildlife, and Plants.** Wildlife management at Stillwater NWR, Stillwater WMA, and Fallon NWR has traditionally focused on game species, especially waterfowl. Thus, concern was raised that any changes to this traditional focus, such as any changes in water management strategies, controlling or not controlling certain nest predators, and fisheries management, may affect waterfowl. In recent years, other migratory birds such as shorebirds and colonial-nesting species have been receiving more management attention. Given the directive to manage Stillwater NWR to conserve the natural biological diversity within the refuge, which includes all native species of fish, wildlife, and plants, there is interest in the effects that future management may have on these other groups of organisms. Continued protection of colony-nesting birds at Anaho Island is the main issue with respect to Anaho Island NWR.

  Boundary revisions within the Stillwater NWR Complex can also affect populations of animals and plants, primarily through increased protection and restoration of sensitive habitats such as riparian and dune habitats. Other potential effects of a boundary revision include the enhanced protection afforded to reptile populations from commercial collection in Churchill County.

  Another issue of concern, given the high importance of providing wildlife-dependent recreational uses on Stillwater NWR, is the potential adverse impacts to wildlife resulting from people walking, driving, boating, hunting, and approaching wildlife in wildlife habitat.

- **Potential Effects on Habitat and Ecosystem Functioning.** Methods of managing water and vegetation can have major effects on animal and plant populations, positive and negative. Therefore, the effects of the comprehensive conservation plan on habitat management, including the selection of management methods and intensity of use, is of concern to many people. Most public comments on habitat management addressed the management of water and livestock, and their effects on habitat quality. Another important habitat issue on the Stillwater NWR Complex is the effect that different management strategies have on the distribution and abundance of several nonnative invasive plant species, such as saltcedar, perennial pepperweed, and cheatgrass. This issue applies to all units in the complex. Several water-born contaminants are also of concern. There is much interest in the effects that managing newly acquired water rights will have on wetland-habitat on Stillwater NWR. The major habitat areas that could be affected by a boundary revision are the Carson River corridor, the sand dune complex, a vast expanse of saltdesert shrub habitat, and the southwestern portion of the Carson Sink.

- **Potential Effects on Recreational, Educational, and Interpretive Opportunities.** Many people, including Service personnel, recognize the great potential that the Stillwater NWR Complex has for providing high-quality opportunities for wildlife-dependent recreational uses. The Service has clear direction to facilitate compatible wildlife-dependent recreational uses on Stillwater NWR. Two main issues surfaced during scoping: (1) members of the hunting public and others have asked that the waterfowl hunt program remain much as it is today, including no change in the boundary of the hunt zone; and (2) people representing a variety of interests have asked that the Service provide better facilities and information for birdwatchers, environmental educators, wildlife photographers, and other people interested in learning about the refuge's wildlife, habitats, and cultural resources. Although many issues were brought to the attention of the Service, these appear to be the central issues. Interest was also expressed in raising the limit on motorboats to 15 horespower during the hunting season.

  Other issues include the potential effects on opportunities for horseback riding, camping, access to desert areas, and hunting in upland habitats. For example, in contrast to some people envisioning additional opportunities created by expansion of Stillwater NWR's boundary (e.g., for birdwatching along the Carson River), others expressed concern that it would diminish opportunities by restricting road access and disallowing certain activities (e.g., coyote and jackrabbit hunting, and off-road vehicles).

- **Potential Effects on Cultural Resources.** Habitat management activities, facilities maintenance, recreational use on the refuge, and a variety of environmental factors have the potential to affect cultural resources on the refuge. Cultural resources on Stillwater NWR and WMA are essential elements of individual and group identity for members of the Fallon Paiute-Shoshone Tribe. The cultural resources on Stillwater NWR and WMA are some of the most important cultural resources in Nevada, and the entire Stillwater Marsh has been placed on the National Register of Historic Places. Although cultural resources, especially archeological sites, pervade Stillwater Marsh, they are fragile, easily disturbed and destroyed, and are nonrenewable. Cultural resources are small and subtle compared to the surrounding landscape and contemporary features like roads, ditches, and visitor facilities.

  The most critical issue with respect to the comprehensive conservation plan being prepared and potential boundary revision revolves around the basic question: How should cultural resources be protected and interpreted, given the need to manage wildlife habitat and public use of Stillwater NWR? Specific issues that need to be addressed include, (a) providing adequate protection of cultural resources from inadvertent disturbance by the public, while still allowing the public to enjoy a wildlife and cultural experience on the refuge; (b) reducing illegal artifact collecting and looting, while still allowing hunters and other recreationists to access the most archaeologically sensitive areas of the marsh; (c) implementing an environmental education program that incorporates accurate archaeological and cultural information including appropriate consultation with the Fallon Paiute Shoshone Tribe; and

(d) the effects of manipulating water levels, and the replacement and construction of necessary infrastructure on cultural resources, and the potential mitigation of these activities.

- **Potential Effects on the Local Agriculture and Socio-Economy, and the Newlands Irrigation Project.** The Service was encouraged to look into ways to explore the use of spill-water and to reassess the volume and water quality of drainwater and groundwater reaching Stillwater NWR. Another suggestion was to reevaluate water-rights acquisitions based on recent adjustments to the 1988 Operating Criteria and Procedures (OCAP) for the Newlands Irrigation Project. Because the Service will have a considerable portion of water rights in the Carson Division, changes in the seasonal water-delivery pattern has the potential to affect Newlands Project operations and Truckee River resources. Any changes to livestock grazing management on Stillwater NWR and Fallon NWR, in combination with any revisions to the boundary of Stillwater NWR could potentially affect the local economy. The most direct economic effects of changes would be on livestock grazing permittees. Changes in recreational opportunities could also affect the local economy.

- **Potential Effects on Naval Air Station-Fallon Operations.** The U.S. Navy expressed concern that a boundary revision of Stillwater NWR could potentially affect their tactical training at the Bravo-20 Bombing Range. A 3,000-foot ceiling currently exists over Stillwater NWR, Fallon NWR, and Stillwater WMA, meaning that aircraft are not permitted to fly lower than 3,000 feet over this area. The 3,000-foot ceiling would not apply to any northward extension of Stillwater NWR.

Further Analysis of Issues

The National Environmental Policy Act (NEPA) requires that all major issues identified during scoping be identified and described, but it does not specify which particular issues should be addressed in any given situation. The Refuge System Administration Act, however, does specify two issues that are to be addressed in the comprehensive conservation planning process: (1) identification and description of significant problems that may adversely affect populations and habitats of fish, wildlife, and plants within the planning unit, and the actions necessary to correct or mitigate such problems; and (2) identification, description, and facilitation of opportunities for wildlife-dependent recreation and a determination that allowed levels and distribution of these uses will be compatible with refuge purposes. Of the issues identified during scoping, these two issues provided the primary guidance in developing objectives and strategies to achieve refuge goals and purposes, and are therefore described in a little more detail on the following pages. The compatibility determination process was incorporated into the comprehensive conservation planning effort and draft compatibility determinations are included in the Draft EIS.

Significant Problems Adversely Affecting Fish, Wildlife, and Plants

To ascertain significant problems within the Stillwater NWR Complex, existing conditions were compared with desired, future conditions as reflected by refuge purposes and provisions

of the Refuge System Administration Act (such as the directive to ensure the maintenance of biological integrity and environmental health). For the purposes of the Draft EIS and this summary, significant problems were defined as the underlying factors impeding the achievement of wildlife and habitat-related purposes of Stillwater NWR and Fallon NWR. The underlying factors hindering achievement of these purposes are:

- Reduced volume and altered timing of inflows, and flow restrictions in Stillwater Marsh, and along the lower Carson River and its delta, as compared to natural conditions;

- Prevalence and spread of nonnative plant and animal species in wetlands, riparian areas, and uplands;

- Altered chemistry of wetland inflows.

The first two are the major habitat issues that must be resolved or otherwise addressed in order to meet statutory requirements. Because several contaminants have been found to exceed thresholds associated with adverse effects to wildlife, they are also of concern. In addition to management implications, they also have implications to the potential boundary revision.

Several other factors have the potential to limit the Service's ability to achieve wildlife-related purposes. One of these is the effects of human activity on wildlife and their habitat. Other problems that will continue to have adverse effects on wildlife on the refuges are land-use practices and human activities that occur outside the refuges and throughout North, Central, and South America. Included are alterations to Carson River flow caused by agricultural, municipal, and industrial activities and Lahontan Reservoir, and habitat destruction, pollution, and pesticide use throughout the Western Hemisphere. These off-refuge problems cannot be addressed through refuge management, but need to be recognized when setting wildlife and habitat objectives. Even though they cannot be addressed on-refuge, the effects that these off-refuge problems have on refuge resources highlights the need for the Service to continue its involvement in water allocation and management issues in the Truckee-Carson River basins, development and implementation of international bird conservation initiatives, and other large scale efforts.

Opportunities for Compatible Wildlife-Dependent Recreation

The Refuge System Administration Act requires the Service to (1) facilitate high-quality and safe opportunities for wildlife-dependent recreation and (2) ensure that this is done in a way that is compatible with refuge purposes and the Refuge System mission.

These two requirements may at first seem to oppose each other because one involves facilitation of uses and the other involves constraints on uses, one viewed as positive and the other viewed as negative. However, a closer examination reveals that they complement each

other. One of the dominant principles of refuge management is that, taken together, high-quality wildlife-dependent recreational experiences depend on a rich diversity and abundance of wildlife and habitat. Without this resource, traditional uses of refuges could not be sustained. Additionally, continued use of refuges for wildlife-dependent recreation provides people with a better understanding and deeper appreciation of wildlife and the importance of conserving their habitat, which ultimately contributes to the conservation mission of the Refuge System through increased public support.

The direction provided in the Refuge System Administration Act and the Stillwater NWR purposes (Public Law 101-618) is very clear: opportunities for scientific research, environmental education, and other wildlife-dependent recreational uses are to be facilitated on Stillwater NWR. "The term 'facilitate' was deliberately chosen [for the Refuge System Improvement Act] to represent a strong sense of encouragement, but not a requirement, that ways be sought to permit wildlife-dependent uses to occur if they are compatible" (House Report 105-106). The Refuge System Administration Act also specifically requires that the priority general public uses of the Refuge System (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) receive enhanced consideration over other general public uses in planning and management.

Conversely, high levels of human activity on refuges can diminish the benefits the refuge can potentially provide to wildlife, and this is the reason why compatibility determinations are such an important part of refuge management. A quote from the first Refuge Manual (U.S. Fish and Wildlife Service 1943) shows that examining and attempting to resolve potential conflicts between wildlife and public uses is not a new issue for national wildlife refuges: "Public use of refuge areas will in varying degrees result in disturbances to wildlife populations, but this adverse effect will be offset on many refuges by the public relations value of limited public use." To make sure that the fundamental mission of the Refuge System is not materially impaired, some constraints need to be imposed on uses.

With these factors in mind, the ultimate aim of this planning process for public use management is to create a plan that truly facilitates and promotes an array of wildlife-dependent recreational opportunities, the combined effects of which the Service can confidently demonstrate are compatible and consistent with refuge purposes. This has proven to be a challenge given the limited amount of relevant site-specific biological data and the controversy that has resulted from exploring this issue. What is known from the available information is that hunting is generally compatible with refuge purposes and that boating has the greatest potential to hinder achievement of refuge purposes. Boating is not a priority public use of the Refuge System and tends to be more restrictive on refuges. An estimated 20 percent of hunters used boats during the 1999-2000 hunting season. The main impacts caused by boating stem from their noise, speed, and easy access to all open habitats.

ALTERNATIVES BEING CONSIDERED

Four alternatives were developed by the Service for the boundary of Stillwater NWR and the comprehensive conservation plan for the Stillwater NWR Complex. Thus, each alternative consists of: a potential boundary, refuge goals, objectives, and management strategies. Major program areas are wildlife and habitat management, public-use management, and cultural resource management.

Factors Considered in Alternative Development

Alternative boundary revisions and management approaches were shaped by a number of factors, including:

- Legal requirements for refuge management;
- Resource management principles and philosophies, including those identified during scoping;
- Existing plans and agreements;
- Assessments of existing and natural ecological conditions;
- Problems impairing the achievement of refuge purposes;
- Other comments and recommendations from the public during scoping;
- Future funding and staffing.

Differences between alternatives stem from differing management approaches identified during the scoping process, and thus the alternative selected for implementation will define the broad management approach to be carried out for the life of the plan. Alternatives also differed in the way that public use would be managed on in the Stillwater NWR Complex.

A priority system for managing the Stillwater NWR Complex and other refuges (e.g., refuge purposes provide the primary direction for managing national wildlife refuges) is spelled out in laws and executive orders. It is this priority system that guided alternative development for the Draft EIS. According to pertinent laws and policy, the focus of the comprehensive conservation plan, in order of priority, must be to:

1. Conserve fish, wildlife, plants, and their habitat in the manner specifically outlined in the purposes of Stillwater NWR, Fallon NWR, and Anaho Island NWR, the Refuge System Administration Act, international treaties, and other management authorities;

2. Provide opportunities for compatible wildlife-dependent recreational activities; and

3. Resolve other issues identified during scoping.

The Stillwater NWR boundary-revision effort focused on delineating alternative boundaries that would, in order of priority:

1. Contribute to achieving the purposes of Stillwater NWR and provisions of section 206(a) of Public Law 101-618, which addresses the maintenance of a long-term average of 25,000 acres of primary wetland-habitat in designated Lahontan Valley wetland areas; and

2. Resolve other issues identified during scoping.

Alternatives Considered in Detail

The four alternatives that are considered in detail in the Draft EIS are summarized on the following pages and in Table 1 (which starts on page 26). All of the alternatives would have several features in common, including:

- The status and management of private, county, and state inholdings that are within the approved boundaries of Stillwater NWR and Stillwater WMA, or within the proposed expansion of the approved boundary of Stillwater NWR, would not be affected by any boundary changes.

- The water-rights acquisition program would continue until a long-term average of 14,000 acres of wetland-habitat is being sustained on Stillwater NWR. It is anticipated that this will require an average of 70,000 acre-feet/year of wetland inflows from all sources of water, including acquired water-rights, drainwater, leased water, groundwater, spill-water.

- Anaho Island NWR would be managed much as it has been in the past, with an emphasis on protecting the nesting colony of American white pelicans and other colony-nesting birds that use the island and monitoring the annual production of colony-nesting bird production and trends in their populations.

Alternative A (No Action Alternative)

Boundaries of Stillwater NWR, Stillwater WMA, and Fallon NWR would remain the same as they are today. The Bureau of Reclamation has the primary withdrawal on lands within Stillwater WMA and Fallon NWR for Newlands Irrigation Project drainage purposes. The Service has extended provisions of the Tripartite Agreement, with respect to managing and administering these lands, through a cooperative agreement with the Bureau of Reclamation (U.S. Bureau of Reclamation 2000). The combined acreage of Stillwater NWR, Stillwater WMA, and Fallon NWR is 222,729 acres, of which 163,021 is under Federal ownership.

This alternative represents baseline management as outlined in the 1987 Management Plan for Stillwater WMA and modified by the Service's water-rights acquisition program. Stillwater NWR, Fallon NWR, and Stillwater WMA would continue to be managed according to the 1987 Management Plan for Stillwater WMA and provisions of the 1948 Tripartite Agreement and, therefore, this alternative represents the No Action Alternative. It provides a baseline from which to evaluate changes proposed by any of the other alternatives. The focus of habitat management at Stillwater NWR, Stillwater WMA, and Fallon NWR

under Alternative A would be on providing nesting, migration, and wintering habitat for waterfowl and other waterbirds. The water-delivery schedule would approximate agricultural delivery pattern as specified in the WRAP EIS. Revegetation of former farmland to native vegetation would continue. Other management practices permitted under this alternative, such as prescribed burning, saltcedar control, and predator control would be implemented on a limited basis.

Hunting would continue to be the priority public use of the area, although muskrat trapping would also be an emphasized use. The hunt area would comprise up to 72 percent of the available wetland-habitat during October-January (Map 4). Opportunities would also be provided for other uses such as fishing, camping, wildlife observation, wildlife photography, environmental education, and horseback riding. Very few facilities are provided for these other activities, including the tour loop which is only passable in fair weather. The environmental education program would continue to grow and increase in emphasis to some degree. Livestock grazing would continue to be phased out in some areas, especially on Stillwater NWR, but within the boundaries of Stillwater WMA and Fallon NWR, livestock grazing would continue to be weighted more heavily than wildlife conservation. Livestock grazing and muskrat trapping opportunities have been managed more as commercial uses than as wildlife and habitat management tools, which is consistent with the 1948 Tripartite Agreement and subsequent amendments.

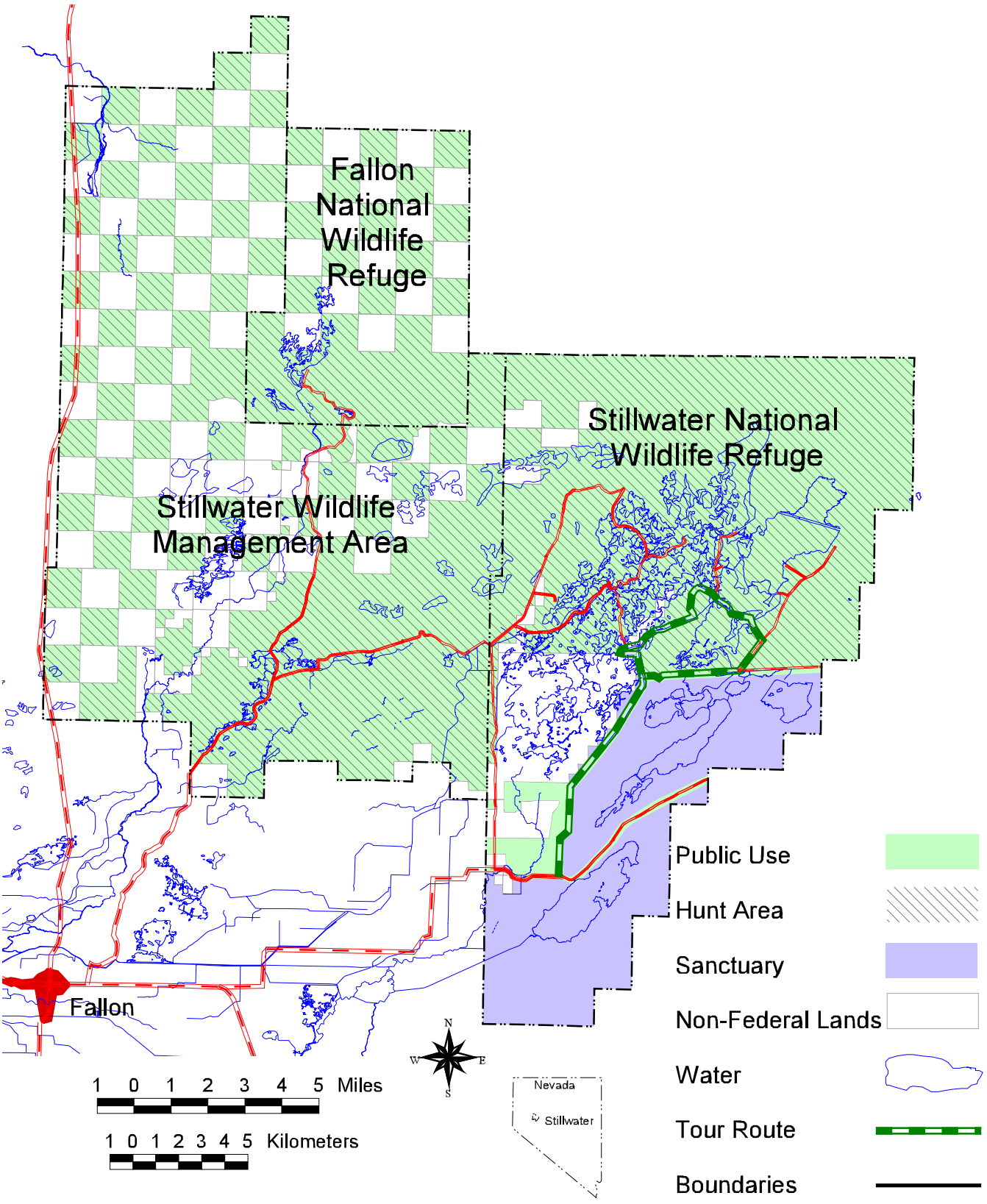
Cultural resources would remain a basic component of land management at the Stillwater NWR complex. The Service, in consultation with the Fallon Paiute-Shoshone Tribe, would continue to manage cultural resources so they are preserved, and the strong tradition of archaeological and ethnographic research would continue.

Alternative B

Under this alternative, only Stillwater NWR and Fallon NWR would be retained. The management and operation of the area within the Stillwater WMA would be conveyed to the jurisdiction of Bureau of Reclamation[1] or Public Land status, with the possible exception of the Indian Lakes area which may be transferred to Churchill County and ultimately to the City of Fallon or another entity (U.S. Fish and Wildlife Service 1996c). The Bureau of Reclamation's primary withdrawal on lands within Fallon NWR would be rescinded and replaced with a primary withdrawal by the Service. The acreage of Federal lands managed primarily for wildlife in the Lahontan Valley would decline by about 66,000 acres (40 percent). Under this proposal, the approved boundaries of Stillwater NWR and Fallon NWR, combined, would be about 107,954 acres, of which about 97,418 acres would be Federal. The acreage of nonFederal inholdings within the boundaries of Federal wildlife areas in the Lahontan Valley would decline by about 80 percent.

[1] Bureau of Reclamation currently holds the primary withdrawal on Federal lands within Stillwater WMA and Fallon NWR.

Map 4 Stillwater Public Use Zones
Alternative A



GIS Analysis by
U.S. Fish and Wildlife Service

This alternative focuses on providing fall and winter habitat for waterfowl and opportunities for waterfowl hunting on Stillwater NWR and breeding habitat for waterbirds on Fallon NWR. Much of the same management emphasis of Alternative A would be maintained in this alternative, except that fall and winter habitat for waterfowl would be emphasized over breeding habitat on Stillwater NWR. Water deliveries would be managed to create peak acreage in the fall and early winter to enhance waterfowl habitat and maximize the amount of wetland-habitat during this season. On Fallon NWR, greater emphasis would be placed on providing breeding habitat for waterfowl and other waterbirds during years when adequate water is available, such as during precautionary releases or spills from Lahontan Reservoir. Control of saltcedar and noxious weeds would receive more attention, including on Fallon NWR, as would prescribed burning. Livestock grazing would be used as a management tool and would be reduced considerably from the level of livestock grazing that has occurred in recent years.

Hunting would continue to be the focal point of the public use program, except improvements would be made in providing opportunities for other wildlife-dependent recreational uses such as environmental education and wildlife observation. The hunt area would remain where it is under existing conditions (Map 5), but additional boating restrictions would be imposed. An exception would be Fallon NWR, on which up to 40 percent of the available fall wetland-habitat would be open to hunting. Due to the effects of boating on wetland wildlife, several changes to boating regulations would be implemented. Under both options, a 15 horsepower limit would be enforced for motorboats (higher than the existing 10 horsepower regulation) and airboats would not be permitted. These restrictions would minimize adverse effects on wetland wildlife while still allowing motorboat access to the marsh.

A visitor center, containing an environmental education center, would be constructed, the existing tour loop would be improved, and observation points and towers would be constructed. Opportunities for muskrat trapping would continue much as they were provided in the past, except that trapping would be used more as a management tool.

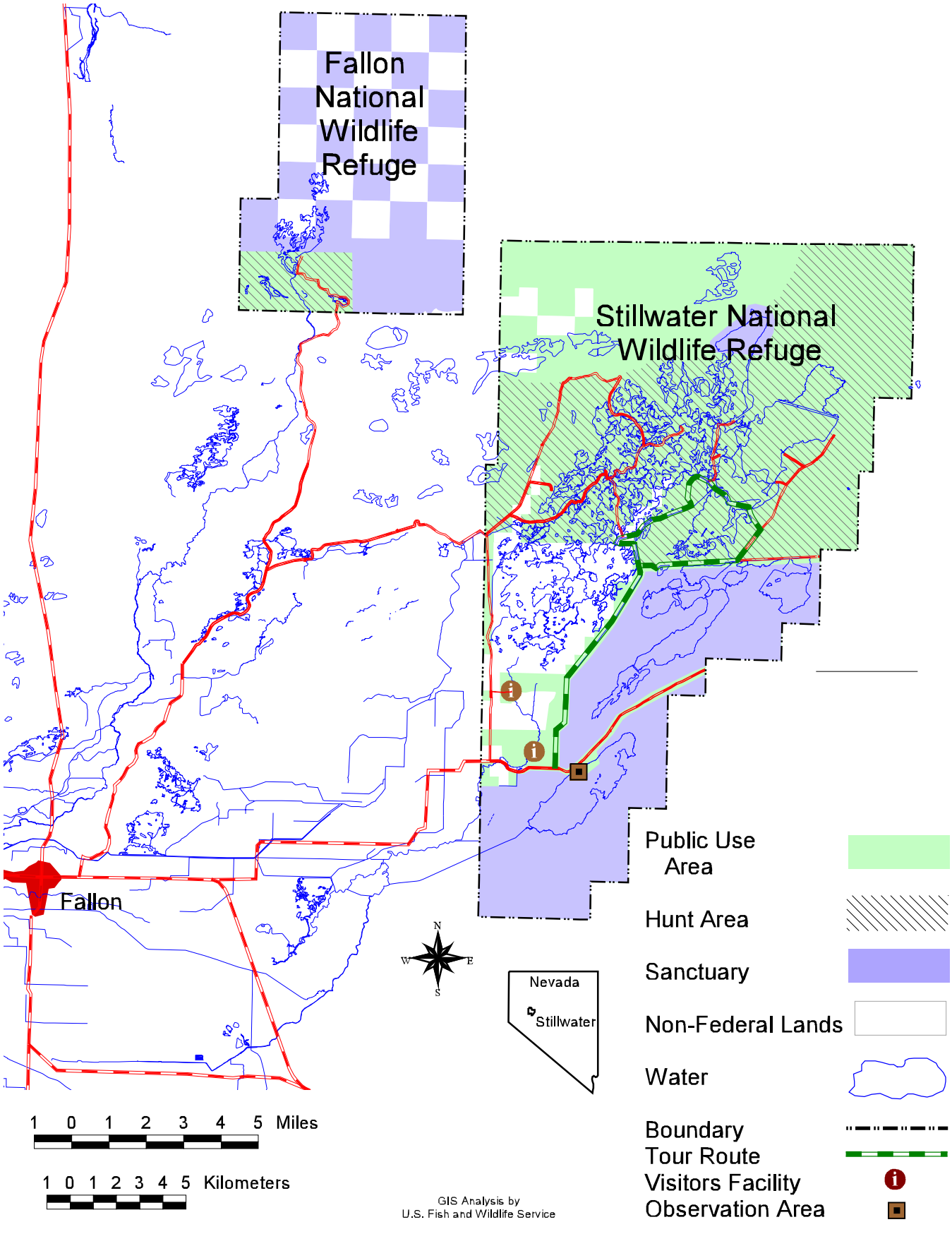
Fishing would not be permitted, primarily due to the high level of mercury contamination in the Lahontan Valley, for which an advisory was issued by the State of Nevada noting that eating any fish caught in the Lahontan Valley is not safe. If the health advisory is lifted, fishing would be reevaluated.

Cultural resources would continue to be managed as under Alternative A.

Alternative C

This is the Service's preferred alternative. Under this boundary-revision alternative, the approved boundary of Stillwater NWR would be expanded to most of the lands that are now inside Stillwater WMA and Fallon NWR. Major habitats added to Stillwater NWR would be the lower Carson River and its delta marsh, the sand dunes along the southern edge of the

Map 5 Stillwater Public Use Zones
Alternative B



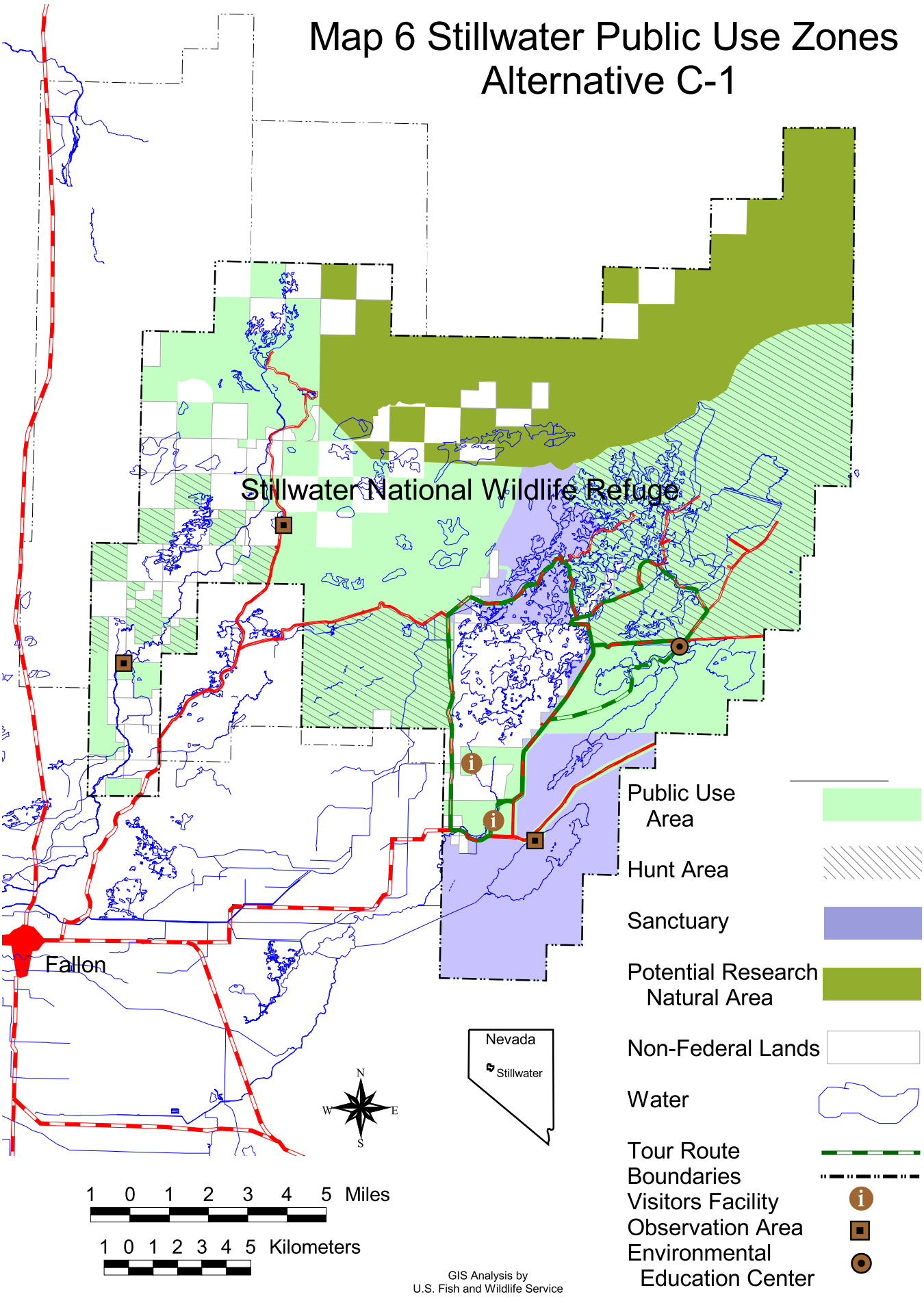
Carson Sink, and the stabilized dunes and salt desert shrub habitat between the Carson River and Stillwater Marsh. In addition to lands already in Stillwater WMA and Fallon NWR, the boundary would expand to include six sections of land along the lower Carson River and 26 sections north of the existing Stillwater NWR. Although the size of Stillwater NWR would increase, the acreage of Federal lands managed primarily for wildlife in the Lahontan Valley would decline by about 25,517 acres. The most important lands with respect to refuge purposes and wetlands protection would be retained. Under this proposal, the approved boundary of Stillwater NWR would be about 172,254 acres, of which about 137,504 acres would be Federal. The acreage of nonFederal inholdings within the boundaries of Federal wildlife areas in the Lahontan Valley would decline by about 40 percent.

Under this alternative, the Service would manage the wetlands to approximate the area's natural biological diversity, as outlined in refuge purposes, which would greatly benefit breeding and migrating waterfowl, shorebirds, and other waterbirds as well as wintering waterfowl. Habitat objectives would focus on providing a range of habitat conditions in the marshes, with an emphasis on breeding habitat, as well as restoring and protecting riparian, wet meadow, and sensitive upland areas such as the dunes. An emphasis of water management would be placed on mimicking the natural seasonal pattern of inflow, modified somewhat to minimize nest flooding and to provide fall and winter habitat for waterfowl and waterfowl hunting. Second to water management, control of saltcedar and noxious weeds would be a focal point of management in meeting habitat objectives. Management would recognize the important role that muskrats play in marsh ecology, but trapping would be used to minimize damage to water-control facilities and roads. Livestock grazing would be curtailed substantially on refuge lands, and would only be used as a habitat management tool.

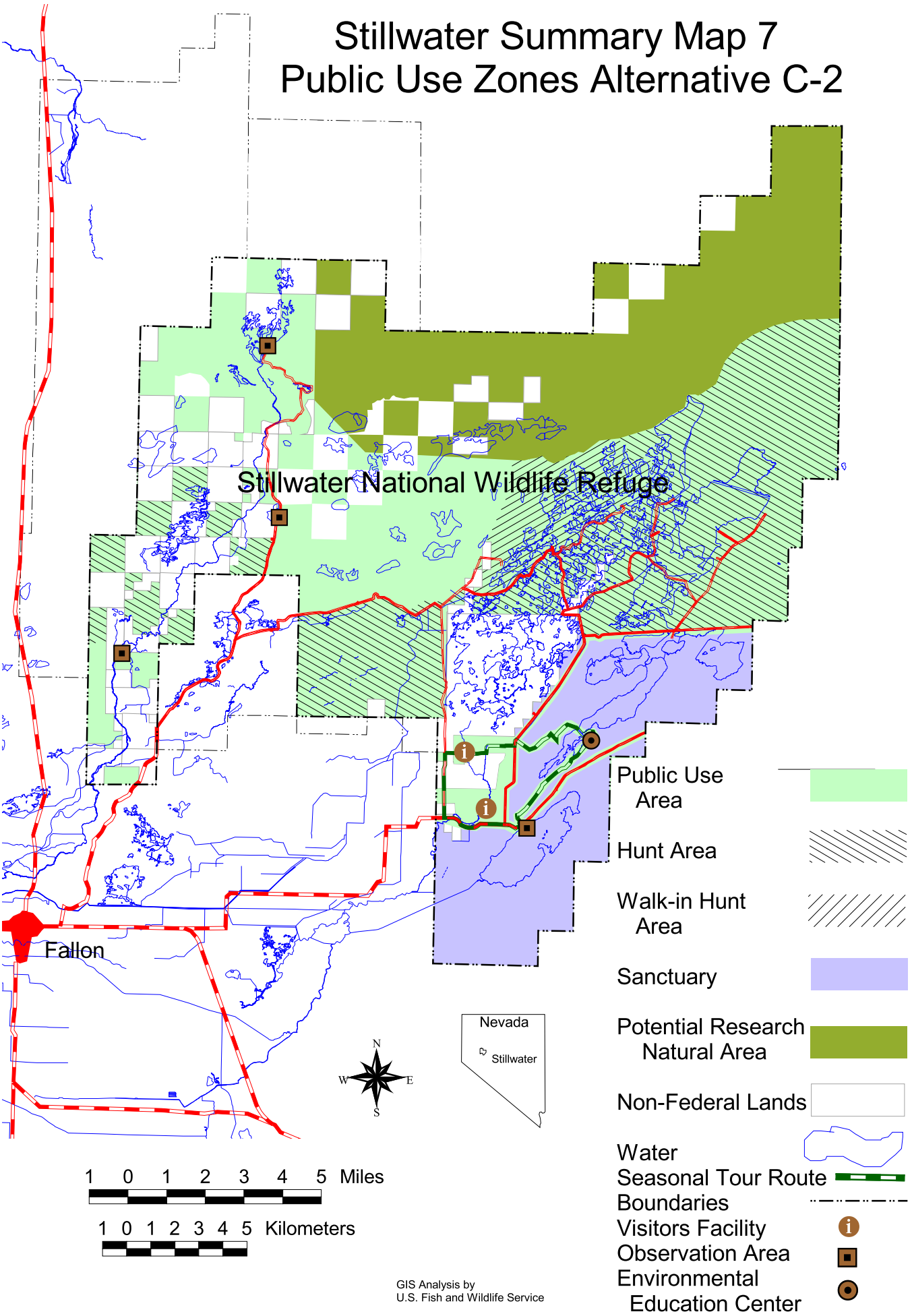
In addition to maintaining hunting as an integral part of the public use program, this alternative would provide enhanced opportunities for a range of wildlife-dependent public uses such as environmental education and interpretation, and wildlife observation and photography. Two options are being considered under this alternative for public use. Under both options, the auto tour route would be located closer to the entrance of Stillwater NWR than it is now, allowing quicker access to wetland-habitats (Maps 6 and 7). Under Option 1, the tour route would allow birdwatchers, educators, and others to view wildlife outside the hunt area during the hunting season. The tour loop would be an all-weather road, equipped with pullouts, wildlife viewing sites, and interpretive facilities. A visitor center, containing an environmental education center, would be constructed under both options, and environmental education would be an added focal point of the public use program.

The hunt area under both options would be in the same location as it is today, with one exception under Option 1. Under Option 1, two wetland units (Lead Lake and Willow Lake) that are now within the hunt area would be converted to sanctuary in large part to make up for the sanctuary converted to the general public use area (nonhunted area) noted above (Map 6). Under Option 2, the hunt area boundary in Stillwater Marsh would remain as it now exists (Map 7). To provide a range of hunting experiences on Stillwater NWR and in the Lahontan

Map 6 Stillwater Public Use Zones Alternative C-1



Stillwater Summary Map 7
Public Use Zones Alternative C-2



GIS Analysis by
U.S. Fish and Wildlife Service

Valley and to ensure that hunting remains compatible with refuge purposes, several changes to boating regulations would be implemented. Under both options, a 15 horsepower limit would be enforced for motorboats (higher than the existing regulations), airboats would not be permitted, and a 5 mile-per-hour speed limit over the water would be imposed to minimize adverse effects on wetland wildlife while still allowing access to the marsh using this form of transport. Under Option 2, a walk-in-only area would be provided, consisting of two wetland units (West Marsh and Swan Lake). As under Alternative B, fishing would not be permitted.

Under Alternative C, the cultural resource program would become more proactive than under Alternatives A and B. The goal of the cultural resource management program would be to manage cultural resources for the benefit of present and future generations, and an archaeologist would be added to the staff to help support this program.

Alternative D

Under this alternative, the boundary of Stillwater NWR would be expanded to include all of Stillwater WMA and Fallon NWR, except the Indian Lakes area, as well as the six sections of land along the lower Carson River and 26 sections north of the existing Stillwater NWR identified under Alternative C. Major habitats added to Stillwater NWR would be the lower Carson River and its delta marsh, the sand dunes along the southern edge of the Carson Sink, and the stabilized dunes and salt desert shrub habitat between Highway 95 and Stillwater Marsh, and the southwestern part of the Carson Sink, including the inlet of the Humboldt Slough. In addition to lands already in Stillwater WMA and Fallon NWR, the boundary would expand to include six sections of land along the lower Carson River and 26 sections north of the existing Stillwater NWR. Under this proposal, the approved boundary of Stillwater NWR would be about 231,731 acres, of which about 167,806 acres are Federal, which would increase the amount of Federal lands managed primarily for wildlife in the Lahontan Valley by about 3 percent. The acreage of nonFederal inholdings within the boundaries of Federal wildlife areas in the Lahontan Valley would increase by about 7 percent.

Under this alternative, the Service would focus on approximating natural ecological processes as the primary means to restore the area's natural biological diversity. The aim of habitat management would be to approximate a natural seasonal pattern of water inflow into the refuge's wetlands, assuming that habitat and wildlife would respond accordingly. Considerable emphasis would also be placed on restoring riparian habitats and protecting sensitive upland areas. Noxious weed control would be limited to nonintrusive methods and would not include chemicals or nonnative biological controls. Management would recognize the important role that muskrats play in marsh ecology, and trapping would be limited to minimize damage to water-control facilities and roads. Livestock grazing would not be permitted on refuge lands.

As compared to the other alternatives, Alternative D would emphasize nonconsumptive public uses. Environmental education and wildlife observation would become the focal point of public use management, as conditions would not be as favorable for waterfowl hunting as under other alternatives (lesser amount of wetland-habitat acreage in the fall) except in spill years. A visitor facility, containing an environmental education center, would be constructed, the existing tour loop would be improved, and observation points and trails would be constructed. The tour loop would be an all-weather road, equipped with pullouts, wildlife observation points, and interpretive facilities.

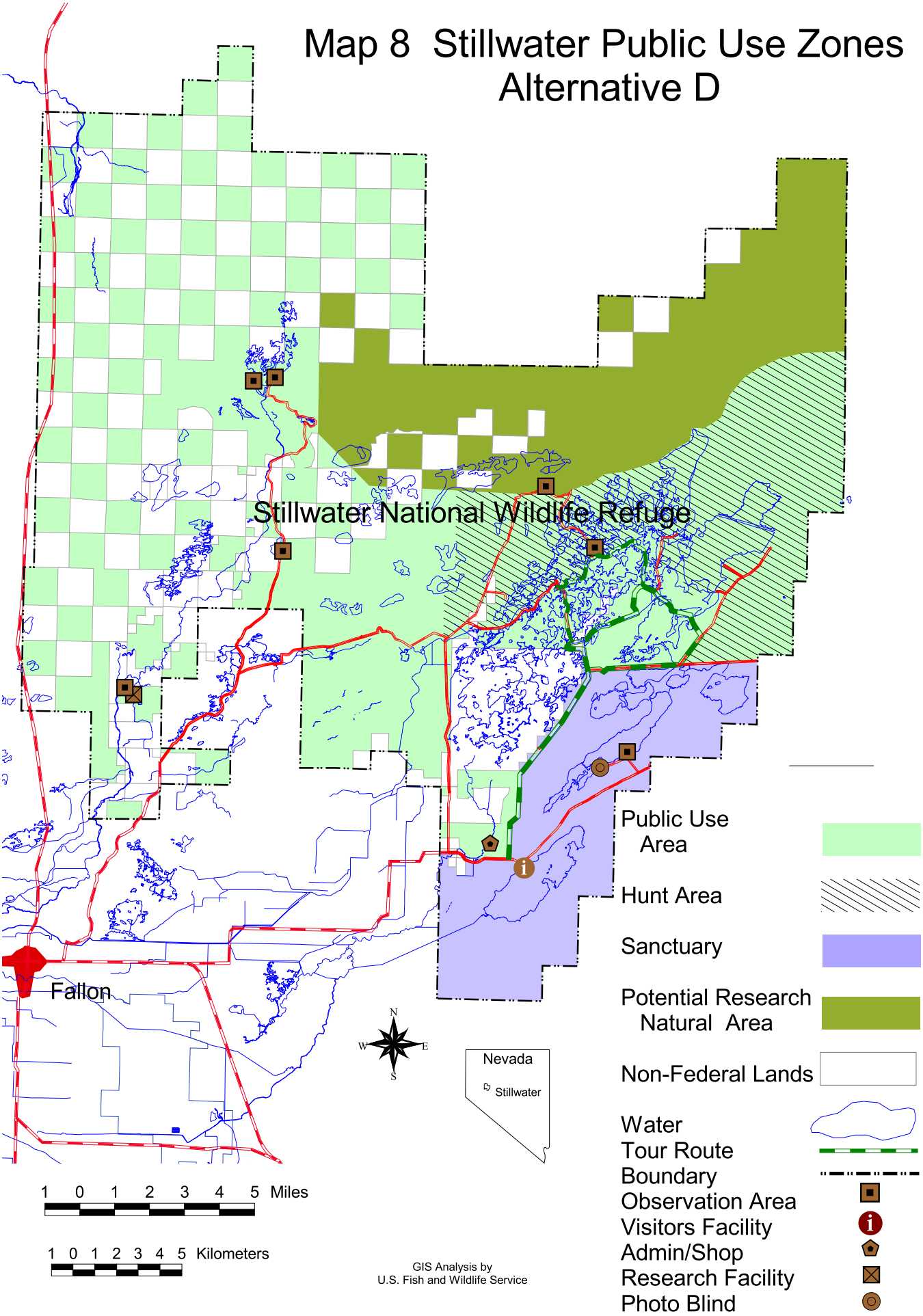
During years when adequate water exists during October-January, opportunities for hunting would be provided. In these years of high water, hunting would be provided in the northern wetland units of the refuge (Map 8). To minimize impacts from boating, restrictions would be placed on boat use and some wetland units in the hunt area would be closed to boating. As under Alternative C, a 15 horsepower limit would be enforced for motorboats, airboats would not be permitted, and a 5 mile-per-hour speed limit would be imposed to minimize adverse effects on wetland wildlife while still allowing access to the marsh using this form of transport. As under Alternatives B and C, fishing would not be permitted.

The cultural resource management program of this alternative would be similar to that of Alternative C.

Summary of Alternatives Considered in Detail

Table 1 provides a summary of the alternatives considered in the Draft EIS.

Map 8 Stillwater Public Use Zones Alternative D



GIS Analysis by
U.S. Fish and Wildlife Service

Table 1. Summary of the alternatives considered in detail.

	Alternative A (No Action)	Alternative B	Alternative C (Preferred Alternative)	Alternative D
Boundary (acres of Federal land) Stillwater NWR	79,570 ac.	79,570 ac.	137,504 ac.	167,806 ac.
Stillwater WMA	65,603 ac.	0 ac.	0 ac.	0 ac.
Fallon NWR	17,848 ac.	17,848 ac.	0 ac.	0 ac.
Total	163,021 ac.	97,418 ac.	137,504 ac.	167,806 ac.
Ave. Wetland Habitat Acreage	14,000 ac.	14,000 ac.	14,000 ac.	14,000 ac.
Ave. Annual Water Supply	70,000 AF	70,000 AF	70,000 AF	70,000 AF
WILDLIFE/HABITAT MGT.				
Biological Focus	Key Species	Key Species	Natural Biodiversity	Natural Biodiversity
Focus of Habitat Mgt.	Needs of Key Species in the breeding season (primary) and fall/winter (secondary)	Needs of Key Species in fall/winter (primary) and breeding season (secondary)	Approximation of Natural Habitat Conditions (primary) and needs of key species (secondary)	Approximation of Natural Ecological Processes
Hydrology				
Hydrology - Pattern of Inflow	Agricultural (imposed by Wetlands Water Rights EIS)	Fall Emphasis (and assumes carryover to spring)	Modified Natural (modified to minimize nest flooding, and to ensure that wetland-habitat is provided in the fall/winter)	Natural
- Inflow Rate Operational	up to 175 cfs	up to 150 cfs	up to 450 cfs	up to 350 cfs
Maximum	up to 450 cfs (existing capacity)	up to 450 cfs	800-1,000 cfs	≥1,000 cfs
- Diking	Existing	Additional diking	Evaluate existing for possible targeted additions/reductions	Reductions to simulate a more natural flow & geom.
- Riparian Restoration	None	Limited - Stillwater Slough	Moderate to high level	Moderate to high
- Contaminants	Minimize	Minimize	Minimize	Minimize
Average Wetland Habitat Acres in Stillwater Marsh, Nonspill Year				
- Spring	12,000-13,100	11,100-13,500	15,800-18,400	13,000-26,300
- Fall/Winter	12,300-13,100	12,400-14,600	10,000-11,500	5,200-7,000

	Alternative A	Alternative B	Alternative C	Alternative D
Prescribed Burning	Very Limited (<100 wetland acres/5 years)	Moderate (for key spp.;100-400 acres/year)	Limited (to provide for needs of key species;75-100 acres/ year)	No prescribed burning
Livestock Grazing	5,500-11,000 AUMs/yr - throughout Stillwater WMA - throughout Fallon NWR - Stillwater NWR sanctuary - no habitat objectives	500-1,000 AUMs/yr - agricultural areas for geese - reduce emergent vegetation	0-500 AUMs/yr - agricultural areas for geese - very limited to reduce emergent vegetation - goats & sheep in IPM - no cattle in riparian & uplands	0 AUMs/yr
Revegetation	Continued on former farmland, & limited in riparian	Former farmland, & limited in riparian	Former farmland, & increased effort in riparian	Former farmland & riparian, w/ emphasis on natural revegetation
Farming for Waterfowl	None	300-400 acres (non-Service water rights needed)	200-300 acres (non-Service water rights needed)	None
Nonnative Vegetation Control	Limited	Moderate, cont'd use of mechanical & herbicides	IPM – mechanical, biological (goats, sheep, insects), water management, mechanical, fire, & herbicides	IPM – no herbicides, & limited mechanical
Nuisance Animal Management				
- Raven & Coyote Control	None to limited, to increase waterfowl production	Moderate, to increase waterfowl production	Limited (e.g., if demonstrated to limit natural production rates)	None
- Muskrat Control	Not currently managed as a control measure (muskrat trapping provides recreation and commercial opportunities)	Similar to Alternative A	Minimize damage to water-control facilities and roads (and rarely to reduce grazing of emergent vegetation)	None
- Carp Control	None to limited	Moderate, use of water management and chemicals	Limited to mod., use of water control and limited chemicals	None
- Mosquito Control	None	None, but contingency plan would be developed incase of disease outbreak	None, but contingency plan would be developed incase of disease outbreak	None

	Alternative A	Alternative B	Alternative C	Alternative D
Human Disturbance - Apportionment of Wetland-habitat	1st 500 acres to sanctuary then the amount of sanctuary would be maintained as follows: Total Acres / Amount in Sanctuary <4,000 / 55-75% >4,000-11,000 / 35-40% >11,000 / ≤30%	1st 4,000 acres to sanctuary then all remaining wetland-habitat could be produced in the hunt area (except that an additional 500-1,000 acres of wetland habitat could be produced in the sanctuary)	1st 4,000 acres to sanctuary *Option 1:* next 3,000 acres to hunt area each additional 2,000 acres to: 1) general public use (500 ac.) 2) sanctuary (500 ac.) 3) hunt area (1,000 ac.) *Option 2:* each additional 5,500 acres to: 1) general hunt area (2,500 ac.) 2) primitive hunt area (2,500 ac.) 3) sanctuary (500 ac.)	1st 4,000 acres to sanctuary each additional 3,500 acres to: 1) gen. public use (1,000 ac.) 2) hunt area (2,000 ac.) 3) sanctuary (500 ac.)
- Wetland Units in Sanctuary	All units south of Division Road	All units south of Division Road	*Option 1:* Stillwater Point Reservoir, Upper Foxtail Lake, West Marsh, & Lead Lake *Option 2:* All units south of Division Road, except Cattail Lake	All units south of Division Road
- Wetland Units in Restricted-Access Areas	None	None	*Option 1:* None *Option 2:* West Marsh & Swan Lk.	None
- Boating	Few restrictions (airboats & outboards permitted year-round)	No boating April 1 to August 1. No Airboats. Boats with outboards motors (up to 15 hp) permitted during hunting season (but regulate more closely)	No boating March 1 to August 1, except non-motorized in Goose Lake. Boat operation during remainder of the year would be restricted to 15 hp motors, and a 5 mph speed limit in open wetland units, except: *Option 1:* no boating in one unit *Option 2:* no boating in West Marsh & Swan Lake	No boats March 1 to August 1. Boat operation during remainder of the year would be restricted to non-motorized boats & boats with electric motors
- Camping	few restrictions	camping limited to designated areas	camping would be limited to designated areas, and only in fully contained units	no camping
- Road Closures	existing	existing	existing closures, plus closure of North Road & Willow Dike Road	existing, plus limited additional closures

	Alternative A	Alternative B	Alternative C	Alternative D
PUBLIC USE MGT. Hunting - Wetland Units Open to Waterfowl Hunting	All units north of Division Road, Indian Lakes, along D-Line Canal, & Battleground Marsh (occasional)	All units north of Division Road, & 40% of wetland-habitat in Fallon NWR (on rare occasions).	*Option 1:* All units north of Div. Road (except Lead Lake & West Marsh), & along D-Line Canal (Indian Lakes not in boundary) *Option 2:* All units north of Div. Road & along D-Line Canal (Indian Lakes not in boundary)	All units north of Division Road (except Goose Lake, South Nutgrass, Swan Check, and Tule Lake)
- Days/Times	7 days/week, all day	7 days/week, all day	7 days/week, all day	7 days/week, until noon
- Special Features	Few restrictions, airboats & other boats permitted in open area; camping opportunities would abound	Similar to Alternative A, except that additional regulations would be imposed; camping available, but restrictive	*Option 2:* Addition of a primitive hunt area (remote location, walk-in only); limited camping available	Enhanced opportunities for hunters willing to walk-in or use non-motorized craft
Environmental Education/Interpretation & Wildlife Observation/ Photography				
- Facilities	Dirt roads, boat ramps, 2 portable toilets	Same as Alternative A and: - visitor contact station & environmental educ. center - outdoor classroom - all-weather tour route - constructed wetlands - boardwalks and towers - trail at visitor contact station - modern restrooms - interpretive signs	Same as Alternative B and: - outdoor classroom in Stillwater Marsh - interpretive kiosks - wildlife observation trails (in marsh and along Carson River)	Same as Alternative C, and: - enhanced visitor facility at Stillwater Point Reservoir - additional trails
- On-site Environmental Education & Interpretation Program and Opportunities	Moderate, but limited by lack of facilities & from no separation from hunting	Enhanced, but only limited separation from hunting (none in Stillwater Marsh)	Much enhanced by facilities and designated site for environmental education outside of the hunt area	Greatly enhanced by facilities, designated area for non-hunting activities
- Off-site Environmental Education Program	Moderate	Improved over Alternative A	Same as Alternative B	Improved over Alternative C
- Observation & Photography Opportunities	Opportunistic (roads and a crude map are provided)	Enhanced by improved facilities	Greatly enhanced by facilities & a designated area for non-hunting activities (under Option 1)	Greatly enhanced by facilities & a designated area for non-hunting activities
Fishing	Permitted	Not permitted	Not permitted	Not permitted
Cultural Resources Mgt.	Basic protection measures	Basic protection measures	Basic protection measures, goals and objectives for cultural resources, & a staff archeologist	Same as Alternative C
Anaho Island NWR	Monitoring of colony nesters	Same as Alternative A	Same as Alternative A	Same as Alternative A

POTENTIAL IMPACTS OF THE ALTERNATIVES BEING CONSIDERED

This section, including Table 2, presents a summary of impacts that could potentially result from implementing the alternatives. Assessments were made of the potential effects of alternatives on existing and baseline conditions. Existing conditions are those conditions that exist now and that existed in the recent past, or that could happen in the near future with the continuation of existing management on the Stillwater NWR Complex and land-use practices outside the complex. Existing conditions assume that the 20,000 acre-feet of water rights acquired for Stillwater NWR have been transferred to wetlands and that 17,000 acre-feet are available for wetland use on the refuge. However, at present, only about 7,900 acre-feet of water rights are permitted for delivery to the wetlands. The other acquired water rights are either under protest, recently filed, or pending application. Therefore, the existing conditions identified in this Draft EIS are overstated with respect to actual existing conditions. Due to the high year-to-year variability and the early stages of the water-rights acquisition program, the existing hydrologic conditions presented in this Draft EIS are modeled conditions and are used to estimate changes in environmental conditions due to changes in management that would occur under different alternatives.

Baseline conditions refer to those conditions that would result from continued management under Alternative A (No Action Alternative), including the completion of the ongoing water-rights acquisition program, which may take another 15 years or more to complete. More specifically, baseline conditions assume that existing management of Stillwater NWR, Stillwater WMA, and Fallon NWR continue as it has in the recent past and as generally outlined in the 1987 Management Plan for Stillwater WMA, and that sufficient water is available to maintain a long-term average of 14,000 acres of wetland-habitat (i.e., completion of the water-rights acquisition program), and that the efficiency targets identified in the Newlands Project OCAP (U.S. Bureau of Reclamation 1997) are being achieved.

Because baseline conditions will not be achieved for another 15 years or more, the changes from existing conditions to each alternative are presented. For each action alternative, this percent change is compared with the percent change estimated to occur under the No Action Alternative (Alternative A). This is done to give readers an indication of the difference in change that would occur under the No Action Alternative as compared to the action alternatives. The effects of the ongoing water-rights acquisition program (the same program under all alternatives) have already been analyzed in the WRAP EIS (U.S. Fish and Wildlife Service 1996a).

Environmental consequences are direct and indirect adverse and beneficial effects that would result from the action alternatives. Direct consequences are those that are caused by the action, and occur at the same time and place. Indirect consequences are also caused by the action, but occur later in time or are further removed from the action. In addition to assessing the potential impacts on the environment, an assessment is also made of the effects of alternatives on the Service's capability to meet relevant legal mandates.

The assessment of environmental consequences includes the potential consequences of alternatives on the Newlands Project operations and other environmental resources in the EIS

study area; physical components of the refuge complex environment (for example, water resources); fish, wildlife, plants, and their habitats; public uses on the refuge complex; cultural resources and Indian trust assets; Naval Air Station-Fallon operations; and the local socio-economy. Also assessed is the Service's ability to meet relevant legal and policy mandates under each alternative and potential limitations of the alternatives on a refuge manager's ability to manage. The following resources were examined during scoping and the impact analysis process and found not to be affected by any of the alternatives: geology, climate and meteorology, groundwater, and secondary wetlands.

Physical Environment

Newlands Project Operations and Infrastructure

Because of the large amount of water rights that will eventually be acquired for Stillwater NWR wetlands, altering the seasonal delivery pattern of acquired water has the potential to affect several components of Newlands Project Operations. For the parameters assessed in a computer model (Below Lahontan Reservoir model, Bureau of Reclamation), all of the alternatives would have nearly the same effects as would Alternative A, the No Action Alternative. An exception is the estimated change in hydroelectric power generation, for which Alternative C would have greater adverse impacts than would Alternatives B and D in the long term.

For the actions being considered in the Draft EIS, headgate demand would remain unchanged between all of the alternatives. Under Alternatives A, B, and C, headgate delivery in the Carson Division of the Newlands Project would decline over the long term from existing conditions by an estimated 1.7 to 1.9 percent, with Alternative B being at the higher end of this estimate and Alternative C at the lower end. This compares with Alternative D, which would result in a decline of an estimated 1.4 percent over the long-term compared to estimated existing conditions. Project efficiency would increase under all alternatives compared to existing conditions (an estimated 64.8 percent). Under Alternatives A, B, and C, Project efficiency would improve to about 67.4 percent by the completion of the water-rights acquisition program. It would improve to an estimated 67.7 percent under Alternative D.

As compared to estimated existing conditions, June 30 storage volumes in Lahontan Reservoir would remain nearly the same under Alternative C, increase slightly under Alternative A (1 percent) and slightly more under Alternative B (2.3 percent), but would decline under Alternative D (3.7 percent). November 30 storage volumes, as compared to estimated existing conditions, would increase slightly under Alternative B, somewhat more under Alternative A (4 percent) and C (6.9 percent), and especially under Alternative D (15.4 percent).

Hydropower generation, according to the Below Lahontan Reservoir model, would also decline under all alternatives over the long-term. Under Alternatives A and B, hydroelectric power generation would decline by nearly 9 percent and under Alternatives C and D, it would

decline by about 11 percent. Changes to revenues associated with hydroelectric power generation would be slightly higher than these percentage reductions, except under Alternative C in which there would be an estimated 22 percent reduction from existing conditions.

Lower Truckee River and Pyramid Lake

As with Newlands Project operations, modifications in the seasonal inflow pattern to Stillwater NWR has the potential, in the long term, to alter lower Truckee River flows and Pyramid Lake elevations, although effects would be slight under Alternatives B and C. Alternative B could result in slightly lesser flow volumes in the lower Truckee River and slightly lower water levels in Pyramid Lake, as compared to Alternative A. Conversely, Alternative C could result in slightly higher flow volumes in the lower Truckee River and slightly higher water levels in Pyramid Lake, as Alternative A. Effects of Alternative D would be similar to Alternative C, except effects would be slightly more beneficial to the lower Truckee River and Pyramid Lake.

Air Quality

Only minor, short-duration, and localized reductions in air quality would be anticipated under Alternatives B and C related to prescribed burning. Slight, immeasurable improvements could result from Alternative D due to no prescribed burning.

Refuge Land Base

Each of the action alternatives (Alternatives B, C, and D), would result in considerable changes to the land base of the Stillwater NWR Complex. Alternatives B and C would result in a reduction in the acreage of Federal wildlife areas in the Lahontan Valley. Alternative B would result in about 65,000 acres being shifted from a Service and Bureau of Reclamation-administered wildlife management area to Bureau of Reclamation lands being administered by their contractor. Under Alternative C, nearly 40,000 acres of Federal lands would shift from Federal lands set aside for wildlife management to lands generally administered by the Bureau of Reclamation. This would be counteracted by more than 15,000 acres of Bureau of Reclamation lands (currently outside the Stillwater NWR Complex boundary) being incorporated into Stillwater NWR, for a net reduction of about 24,000 in Federally-owned lands dedicated to wildlife management in the Lahontan Valley. Indian Lakes would not be included in Stillwater NWR Complex under any of the action alternatives. The size of Anaho Island would not be measurably affected under any of the alternatives, except possibly Alternative D which could result in the water level of Pyramid Lake rising by an estimated 0.4 feet more than would occur under Alternative A. However, this would only result in less than an estimated ten fewer acres of land on Anaho Island.

Refuge Wetlands and Waters

None of the alternatives would affect the 14,000-acre wetland-habitat target for the Stillwater NWR Complex, although Alternatives B and D could affect the Service's ability to achieve

this target. Alternative B would enhance efforts by reducing the annual wetland demand to sustain 14,000 acres of wetland-habitat, whereas Alternative D would make it more difficult to achieve the targeted acreage. Alternative D might ultimately require additional water to be acquired above the amount specified in the WRAP EIS. This summary and the Draft EIS for the Stillwater NWR Complex comprehensive conservation plan and boundary revision assumes that 70,000 acre-feet of water rights would be needed in average per year. Alternative C's annual water demand for 14,000 acres of wetland-habitat would be similar to that of Alternative A and would not require any additional water as compared to the amount specified in the WRAP EIS. Water chemistry would not be affected markedly by the alternative selected. An estimated average of 12,500 acres of wetland habitat would be sustained in Stillwater Marsh during nonspill years, and this would be supplemented by an estimated average of 16,500 acres of wetland habitat in the marsh during spill years. A spill year refers to a year in which water is released or spilled from Lahontan Reservoir to minimize the potential of downstream flooding.

Because the water-rights acquisition program would be a component of all alternatives, they would all result in increased acreages of wetland-habitat in all seasons of the year, except possibly during the fall and winter for Alternative D (Figure 1). Differences from the effects of the No Action Alternative would be as follows. Spring wetland-habitat would be highest under Alternative D, with Alternative C also producing more wetland-habitat during the spring than would be produced under Alternatives A and B. During the fall and winter, Alternative B would produce the most wetland-habitat, followed by Alternative A, then C, with Alternative D producing the least amount of fall wetland-habitat.

Biological Communities

Because biological communities of wetland systems are integrally related to the seasonal dynamics of wetland inflow and other factors affecting wildlife habitat, each alternative would provide for higher quality habitat for some communities and species at particular times of the year, while habitat for other communities and species would be of lesser quality compared to baseline conditions. After presenting each alternative's effects on the Service's ability to approximate natural biological diversity, the effects of each alternative on each major component of biological diversity are summarized.

Vegetation

As compared to existing conditions, all types of wetland vegetation would increase in amount and diversity through additional water-rights acquisitions under all of the alternatives considered in the Draft EIS. The effects that each alternative would have on marsh vegetation would vary depending on a variety of factors, including differences in timing of water inflow, rate and timing of wetland subsidence, acreages and depths by season, and water chemistry. Some alternatives would result in closer approximations than others to the natural vegetative diversity.

The water inflow scenario and water management strategies of Alternative B would, as compared to baseline conditions, provide deep and shallow emergent vegetation and moist

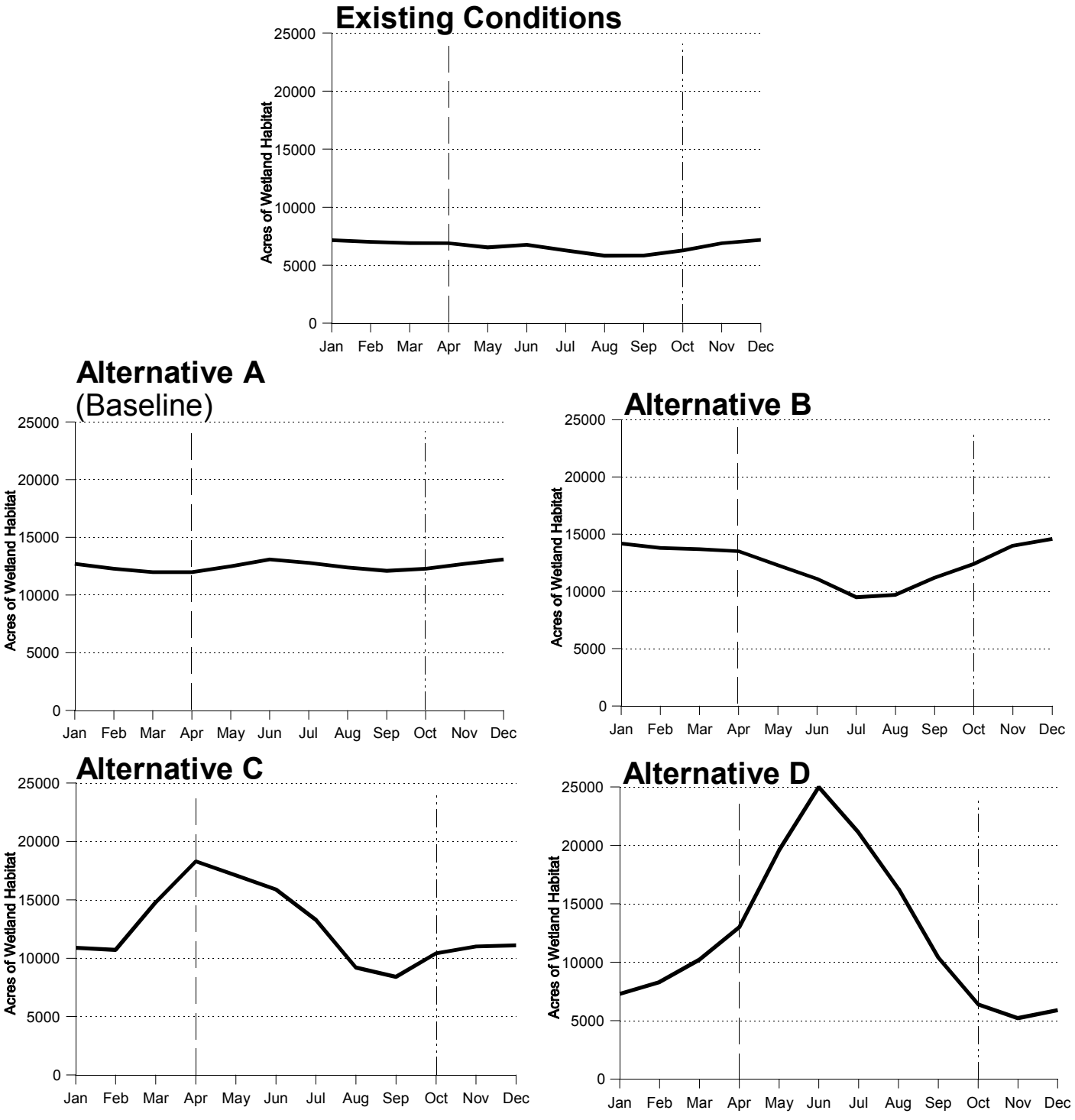


Figure 1. Estimated average wetland-habitat acreages in Stillwater Marsh during nonspill years resulting from existing conditions (i.e., assumes that all existing water rights are available for use in the wetlands) and alternative water-delivery schedules that assume completion of the ongoing water-rights acquisition program, Stillwater National Wildlife Refuge, Nevada. The verticaldashed line represents the onset of the nesting season for waterbirds, and the vertical dashed and dotted line represents the fall migration and wintering season for waterfowl and the onset of the waterfowl hunting season. Average annual acreage in the top graph is 6,600 acres and is 12,500 acres in all of the other graphs.

soil vegetation that is flooded in the fall. As compared to baseline conditions, Alternative C would tend to produce more shallow emergent vegetation, wet meadow vegetation, spring flooded moist soil vegetation, possibly more fall-flooded moist soil vegetation, and slightly lesser amounts of submergent aquatic vegetation. Alternative D would tend to produce more shallow emergent vegetation, wet meadow vegetation, and spring-flooded moist soil vegetation than Alternative C, but would result in less submergent aquatic vegetation and no fall-flooded moist soil vegetation would be produced.

Riparian vegetation would be enhanced to the greatest extent under Alternative C through the expansion of Stillwater NWR's boundary to include the lower Carson River (an additional three miles of riverine habitat) and increased restoration emphasis, including an integrated program to reduce saltcedar and other invasive exotic vegetation and elimination of cattle grazing along riparian corridors. Several plant communities now absent or in low distribution would be produced or their distribution increased. Restoration efforts under Alternative D would provide similar benefits to riparian vegetation, but would be slightly impaired by restrictions on biological and chemical controls. Riparian vegetation under Alternative B would continue in a degraded condition, as only four miles of the 27 miles now within the Stillwater NWR Complex would be retained.

Upland vegetation would be enhanced to the largest degree under Alternative D because this alternative would protect the largest amount of upland vegetation. Alternative C would protect slightly less, but would still result in restoration of some upland plant communities through the elimination of livestock grazing in upland areas. Alternative B would protect the least amount of upland vegetation.

The connection between the Humboldt River System and the Carson River system, a unique ecological area, which occurs where the Humboldt Slough flows into the Carson Sink, would be provided long-term protection under Alternative D, but would be foregone under Alternatives B and C.

Wildlife

Overall, as compared to baseline conditions, Alternative C would provide the most benefits for marsh and riparian wildlife during the breeding season and Alternative B would provide the most benefits for fall migrating and wintering birds using Stillwater Marsh. The amount and quality of wetland-habitat for an array of breeding waterbirds would be considerably higher under Alternative C as compared to existing and baseline conditions. Greater protection of the lower Carson River and more attention on restoring riparian habitat under Alternative C would benefit migratory birds, small mammals, and other wildlife associated with this habitat. Under Alternative B, the amount of breeding habitat would be slightly higher than it would be under baseline conditions, although the amount and diversity of habitats would not be as high as under Alternative C. Even though the acreage of springtime wetland-habitat would be significantly higher under Alternative D, the peak would occur well after most birds have started nesting, and the acreage would decline rapidly during the summer months, thereby markedly reducing the quality of the habitat produced.

Alternative D would be the most favorable alternative for fall migrating shorebirds due to the vast expanse of wetland-habitat experiencing declining water levels throughout the shorebird migration period. Alternative C would be the next most favorable for similar reasons, followed by Alternative B and A, respectively. Alternatives A and B would be the least desirable for shorebirds because water levels during the migration period would not fluctuate substantially and, where water levels change, they would generally be rising (Alternative B).

Alternative B would be the most favorable to fall migrating and wintering waterfowl. The highest concentrations of waterfowl on Stillwater NWR occur during September through November, and Alternative B would provide the highest amount of wetland-habitat during this period, of the alternatives being considered. Alternatives A and C would also improve habitat conditions for fall and winter waterfowl markedly compared to existing conditions. Alternative A would eventually provide more wetland-habitat during the fall and winter, but management under Alternative C would provide higher-quality habitats, which would tend to equalize the benefits to waterfowl during this period. Alternative D would have few benefits to fall and winter waterfowl, as compared to existing conditions.

Alternative D would be the most favorable alternative for upland species, and the benefits of Alternative C would be close to this level. Both alternatives would protect, within one contiguous jurisdiction, a 25-mile-long sand dune system at the southern edge of the Carson Sink. This dune system provides habitat for several species of endemic dune beetles and other species associated with dune habitats. Under Alternatives A and B, the dune system would extend through different jurisdictions.

No adverse impacts to endangered or threatened species, as compared to baseline conditions, would be anticipated under any of the alternatives being considered. Bald eagles, Federally listed as threatened, would benefit under all of the alternatives, except Alternative D. As compared to existing conditions, all of the alternatives would benefit cui-ui (an endangered species) and Lahontan cutthroat trout (a threatened species), both inhabiting the Truckee River and Pyramid Lake. Although differences in effects would be slight, cui-ui would benefit most from the implementation of Alternative D, followed by Alternatives C, A, and B, respectively. Similarly, Lahontan cutthroat trout would benefit most from Alternatives C and D, followed by Alternatives A and B, respectively.

Natural Biological Diversity

In general, Alternative C would most approximate the natural biological diversity of any of the alternatives. A majority of the water being delivered to Stillwater NWR wetlands in late winter or early spring would emulate a spring pulse of water followed by summer drawdown. This would contribute toward habitat and associated biological communities that this hydrologic regime produced under natural conditions. Fall and winter habitat was also a major component of the Lahontan Valley wetland system under natural conditions and would be provided under Alternative C. Relatively low volume and flow rate of springtime flows would continue to be a limiting factor under Alternative C.

Each of the other alternatives would highlight other aspects of the natural biological diversity and would diminish other aspects. For example, Alternative A would simulate year-round wetland-habitat, which existed at times under natural conditions during periods when the Carson River flowed directly into Stillwater Marsh. However, the biological communities produced by flushing flows that occurred during spring and by the seasonal fluctuations in water levels characteristic of the Lahontan Valley wetlands in most years, would be poorly simulated. Alternative B would enhance biological diversity during the fall and winter, but this would be a tradeoff with early season flushing flows, breeding habitat, and other conditions that would be produced through a spring pulse of water. Alternative D highlight the habitat conditions making Great Basin wetlands ideal for shorebirds, that is, declining water levels during August and September. It would also to some extent enhance biological diversity during the late spring and early summer, but because of lower-than-natural winter flows, wetland-habitat acreage would increase sharply during the nesting season, thereby flooding nests.

Recreation

Hunting

The size and location of the hunt area was a major concern to waterfowl hunters. The amount of area open to hunting varies by alternative. The amount of wetland-habitat open to hunting under the different alternatives is a function of the boundary of the hunt area, the acreage of wetland-habitat on the entire refuge during the hunting season, and the allocation of wetted acres among the hunt area, wildlife sanctuary, and general public use area (for alternatives including this zone). Nonspill and spill years are treated separately because of the vastly different conditions they can produce. Compared to existing conditions, the amount of wetland-habitat available for hunting during nonspill years would increase under all alternatives, except Alternative D. In the long term (at the completion of the water-rights acquisition program), Alternative B would result in the most wetland-habitat available during the hunting season—more than twice the amount anticipated with the existing water rights in a full-allocation nonspill year (up to an estimated 9,500 acres compared to 4,100 acres), and slightly higher than what is estimated under Alternative A at the completion of the acquisition program (an estimated 8,900 acres).

Of the two options being considered under Alternative C, Option 2 would provide the greatest benefits to hunters in the long term, with an estimated increase in huntable fall and winter wetland-habitat of about 50-80 percent over the amount of wetland-habitat available for hunting under existing conditions in a full-allocation, nonspill year (an estimated 6,000 to 7,400 acres). Increases under Option 1 of Alternative C would be an estimated 10 to 20 percent over existing conditions. In spill years (about one of four years), the amount of wetland-habitat available for hunting would be similar for Alternatives A, B, and Option 2 of Alternative C. Available hunting opportunities would decline from existing conditions under Alternative D. Additional boating restrictions under Alternatives C and D could enhance the hunting experience for some hunters while it would impair the opportunity for other hunters.

The year-to-year reliability of Stillwater NWR for providing suitable hunting conditions, compared to existing conditions and past conditions, would continue to increase under all of the alternatives, except Alternative D. In the past, the amount of wetland-habitat available for hunting varied tremendously from year to year, from less than 1,000 acres in some years to over 10,000 acres in other years. This resulted in the number of hunter visits fluctuating widely, from less than 800 in some years to over 10,000 in other years. Under Alternatives A and B, it is estimated that the amount of wetland-habitat open to hunting would exceed 8,000 acres in 8-9 out of 10 years, with the remaining 1-2 years having more than half this amount. Under Option 2 of Alternative C, it is estimated that wetland-habitat open to hunting would exceed 6,000 acres in 8-9 out of 10 years, with the remaining 1-2 years having at least half this amount. In all of these alternatives, the amount of wetland-habitat open to hunting would be as high as 10,000 or more acres in 2-3 years out of 10, as has occurred in the past due to spills. Under Option 1 of Alternative C, the amount of wetland-habitat open to hunting would be at least 4,500 acres in 8-9 out of 10 years, with acreages reaching 7,000 or more in spill years. In most years under Alternative D, it is estimated that there would be less than 1,500 acres in most years, with up to 6,000 acres of open habitat in 2-3 years out of 10.

Environmental Education and Interpretation

Alternatives B, C, and D would enhance environmental education opportunities as compared to baseline conditions (Alternative A). Option 1 of Alternative C and Alternative D would enhance the environmental education and interpretation program to the largest degree. For example, Option 1 of Alternative C would provide a higher quality, year-round tour loop closer to the entrance of Stillwater NWR and would provide wetland-related environmental education opportunities outside the hunt area. Option 2 of Alternative C would also provide a high-quality tour loop close to the refuge entrance, but it would not be open during the hunting season, except on a limited basis, and it would not access as much wetland-habitat as would the tour loop of Option 1. Alternative D would provide additional opportunities, especially during spring and early summer. However, wetlands along the tour loop would be further from the refuge entrance, and less wetland-habitat would be available for viewing during the late summer, fall, and winter.

Wildlife Observation and Photography

Alternatives B, C, and D would enhance wildlife observation and photography opportunities above those provided under baseline conditions (Alternative A). Option 1 of Alternative C and Alternative D would enhance wildlife observation opportunities to the largest degree. Option 1 of Alternative C would provide a higher quality tour loop closer to the entrance of Stillwater NWR and would provide wildlife observation opportunities outside the hunt area. Alternative D would provide additional opportunities, but wetlands along the tour loop would be further from the refuge entrance. Option 2 of Alternative C would also provide a high-quality tour loop close to the refuge entrance, as would Option 1, but it would not be open during the hunting season, and it would not access as much wetland-habitat as would the tour loop of Option 1. Alternatives C and D would provide the best viewing opportunities during the spring (breeding waterbirds) and late summer (shorebirds).

Construction of an all-weather tour route and viewing towers would enhance wildlife viewing opportunities under Alternative B, but other parts of the alternative would offset some of these additional opportunities. For example, viewing opportunities during the spring would be reduced because portions of Stillwater Marsh would be closed to public access during the breeding season and viewing opportunities during the fall and winter would continue to be hampered due to hunting throughout the portion of the marsh open to public access.

Fishing

Fishing would not be permitted under any of the action alternatives. This would slightly reduce fishing opportunities in the Lahontan Valley because little fishing presently occurs on Stillwater NWR, Stillwater WMA, and Fallon NWR at present. Of major concern is the health advisory against eating fish in the Lahontan Valley, due to mercury contamination, and conflicts with wetland management and waterbird production.

Camping and Boating

Opportunities for camping in the Stillwater Marsh area would be highest under Alternative A, and would be reduced considerably under Alternatives B and C, and would be completely eliminated under Alternative D. Under Alternative B, overnight stays would only be permitted during the hunting season at designated sites and, under Alternative C, would be permitted year-round in designated areas. Reductions in camping could result in increased camping in other nearby areas, possibly including the Indian Lakes area, private entities and adjacent Bureau of Land Management lands.

Alternative A would similarly provide the most boating opportunities during the hunting season and throughout the year. Under Alternative B, boating opportunities would be reduced somewhat because airboats would not be permitted, motorboats would be limited to 15 horsepower, and boating by the public would not be permitted from the end of the hunting season through July 31. Alternative C could reduce boating opportunities further through the implementation of a 5 mile-per-hour speed limit, and one to three units closed to motorized boating. Boating opportunities would be significantly reduced under Alternative D because boating would be restricted to motorless craft and because of lower acreages of wetland-habitat during the hunting season.

Other Uses

Alternative A would provide the most opportunities for other uses such as horseback riding, picnicking, swimming, and trapping. These are non-priority public uses of the Refuge System. Under all action alternatives, activities occurring on the Indian Lakes area (where most of the "other uses" occur) would presumably continue as they have in the recent past. Actions being considered in the Draft EIS would not affect these activities, as the boundary revision alternatives would not include the Indian Lakes area. Because Alternative B would include the least amount of land in national wildlife refuge status, it would have the least impact to the other uses, whereas Alternatives C and D would have the most impact. In the latter two alternatives, horseback riding, mountain bike riding, and street-legal vehicles would be permitted, but would only be allowed on open roads.

Cultural Resources and Indian Trust Assets

Under Alternative A, the Service would continue to provide a required level of protection of cultural resources for its cultural resource management program, except as funds become available for additional work. Alternative B would be similar except that the addition of a law enforcement officer would enhance protection of these resources. Under Alternatives C and D, the Service would place additional emphasis on cultural resources and they would be more effectively protected. No adverse impacts to Indian trust assets would occur under any of the alternatives

Socio-Economics

With respect to anticipated changes in hunting, other recreation, livestock grazing, and muskrat trapping on Stillwater NWR, Stillwater WMA, and Fallon NWR, implementation of Alternative C would result in a net benefit to the local economy of an estimated $88,000 to $200,000, which is a 5-12 percent increase above the contribution estimated for Alternative A at the completion of the water-rights acquisition program. Although revenues from livestock grazing and muskrat trapping would be reduced on the Federal lands now encompassed within the Stillwater NWR Complex, revenues from general recreation would be anticipated to increase. Implementation of Alternatives B and D would result in an anticipated reduction in contributions to the local economy, and estimated 1-2 percent reduction (Alternative B) and 2-10 percent reduction (Alternative D). Benefits associated with general recreation would be highest under Alternative D, but these benefits would be more than offset by reductions in hunting, livestock grazing, and muskrat trapping. Benefits under Alternative C would be offset and reductions under Alternatives B and D would be worsened by reductions in hydroelectric power generation at the New Lahontan Power Plant.

Naval Air Station-Fallon Operations

Alternatives C and D would result in the northern boundary of Stillwater NWR moving six miles closer to the Bravo-20 Bombing Range. This bombing range is used by the Naval Air Station-Fallon for tactical combat training and the Navy had expressed concerns about the effects of revising Stillwater's boundary on these operations. Because the boundary of the 3,000-foot ceiling that now exists over Stillwater NWR and Fallon NWR would not be moved with any northward expansion of Stillwater NWR, the boundary revision and ensuing management of these lands would not impair Naval Air Station-Fallon operations. An existing memorandum of understanding would be modified to formalize this agreement between the Navy and the Service.

Ability of the Fish and Wildlife Service to Meet Legal Mandates

Alternative C would, compared to the other alternatives being considered, provide the best framework for the Service to meet legal mandates. This would include the highest potential for approximating natural biological diversity, fulfilling international treaty obligations with respect to wildlife, otherwise conserving wildlife, and providing opportunities for scientific research, environmental education, and other wildlife-dependent recreation. Alternative B would hold equally high potential for conserving wildlife, although toward different goals, except that a

considerable amount of important habitats would not be protected within the refuges. Alternatives A and D would hold the least potential for meeting legal mandates.

A concern was raised that placing limitations on certain management tools could hinder a refuge manager's ability to achieve refuge goals and objectives. Alternatives A and B would provide managers with the most flexibility and Alternative D would provide the least. Alternatives A and B would place few restrictions beyond those established through laws and Service policy. Although Alternative C would impose more restrictions on the use of some management tools, such as livestock grazing and prescribed burning, the constraints were designed as part of the strategy to emphasize management practices that mimic ecological processes and the conditions they naturally produced. Regarding the examples given in the preceding sentence, grazing and browsing by large herbivores, other than mule deer (still present), and fire shaped the habitats of the Lahontan Valley only to a limited degree under natural conditions.

Table 2. Summary of potential impacts of Alternatives A, B, C, and D.

Resource/Issue		Existing Conditions	Alternative A	Alternative B	Alternative C	Alternative D
			Long-term Average Change from Existing Conditions[1,2]			
PHYSICAL ENVIRONMENT (EIS Study Area)						
Newlands Project (acre-feet)						
Irrigated Acreage Base (acres)		59,075	similar[1]	similar	similar	similar
Headgate	Demand	174,500	2.5% lower	2.5% lower	2.5% lower	2.5% lower
	Deliveries	169,290	1.8% lower	1.9% lower	1.7% lower	1.4% lower
Project Efficiency (%)		64.8	2.6% higher (67.4%)	2.6% higher	2.6% higher	2.9% higher (67.7%)
Lahontan Reservoir	Releases	261,100	5.5% lower	5.6% lower	5.4 lower	5.6% lower
	June 30 Storage	216,160	1% higher	2.3% higher	0.1% higher	3.7% lower
	November 30 Storage	108,070	4.0% higher	1.0% higher	6.9% higher	15.4% higher
Hydropower Resources	Power (GWh)	21,660	8.6% lower	8.6% lower	11.0% lower	11.5% lower
	Revenue ($)	875,010	8.9% lower	11.0% lower	22.0% lower	12.2% lower
Newlands Project Canal Capacities		EC[2]	increase needed	similar	similar-MH	SH-MH
Truckee Canal at Derby Dam		88,250	15.7% lower	15.0% lower	16.3% lower	19.9% lower
Lower Truckee River at Derby Dam		475,660	2.8% higher	2.7% higher	2.9% higher	3.1% higher
Pyramid Lake Elevation (feet)		3,836.9	3.1 ft. higher	2.6 ft. higher	3.2 ft. higher	3.6 ft. higher
Air Quality (micrograms/meter^3)		EC	111	similar	similar	similar
PHYSICAL ENVIRONMENT (ON REFUGE)						
Service Lands Acreage Base						
Stillwater NWR/WMA and Fallon NWR (acres)		163,021	no change	40% lower	16% lower	3% higher
Anaho Island NWR (acres)		EC (490 ac. in 1999)	245	<1% lower	<1% higher	2% lower
Refuge Wetlands						
Average Wetland-Habitat Acreage	overall	8,000	75% higher (14,000)	75% higher	75% higher	75% higher
	nonspill year, Stillwater Marsh only	6,600	90% higher (12,500)	90% higher	90% higher	90% higher
Wetland deliveries and incidental inflows (ave.)		39,900	75% higher (70,000)	75% higher	75% higher	75% higher
Seasonal Wetland-Habitat	Apr-Jun	6,700	87% higher	95% higher	153% higher	183% higher
(Stillwater Marsh, nonspill year)	Oct-Dec	6,800	87% higher	100% higher	55% higher	15% lower
Flushing Action		limited	limited	similar	SH-MH[1]	SH-MH
	Total Dissolved Solids	EC	BC[1]	similar	similar	similar
	Mercury	potential problem	similar	similar	SH	SH

[1] The estimated changes from baseline presented in this matrix were calculated for the sole purpose of illustrating differences in potential effects of each of the alternatives being considered.. The numbers are estimates only and are used as indices for assessing broad differences among alternatives.

[2] EC = existing conditions; BC = baseline conditions, SH = slightly higher than baseline conditions, MH = moderately higher than baseline, CH = considerably higher than baseline, SL = slightly lower than baseline, ML = moderately lower than baseline, CL = considerably lower than baseline.

Table 2 (cont'd). Summary of potential impacts of Alternatives A, B, C, and D.					
Resource/Issue	**Existing Conditions**	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**
		Conditions Resulting from Each Alternative			
BIOLOGICAL COMMUNITIES					
VEGETATION					
Marsh Plant Communities (Peak acreage / Season of Peak Acreage)[3]					
Submergent Vegetation	660-2,640 / similar	2,500-5,080 / similar	1,320-4,110 / similar	2,100-3,675 / similar	2,900-3,920 / similar
Deep Emergent Vegetation	990-1,980 /similar	1,875-3,750 / similar	1,980-5,010 / similar	2,550-4,200 / similar	2,610-2,850 / spring
Shallow Emergent Vegetation	660-2,310 / similar	1,250-3,125 / similar	1,320-4,110 / fall	1,050-5,100 / spring	0-6,860 / spring
Moist-Soil Vegetation	670-2,040 / fall	625-1,900 / fall	1,980-4,110 / fall	1,050-4,250 / spring	0-3,920 / spring
Wet Meadow Vegetation	0-1,360 / spring	0-1,250 / spring	660-2,060 / fall	1,050-4,250 / spring	0-5,700 / spring
Wetland Shrub Vegetation	0-330 / similar	0-625 / similar	0-411 / fall	0-850 / spring	0-980 / spring
Unvegetated Alkali Mudflat Habitat	330-660 / similar	625-1,250 / similar	660-1,370 / fall	525-2,550 / late spring	0-2,940 / late spring
Deep, Open-Water Habitat	0-67 / spring	0-125 / spring	0-132 / spring	105-680 / spring	116-980 / spring
Playa Habitats (excl. Carson Sink)	0-8,900 / spring	0-8,900 / spring	0-4,520 / spring	0-6,450 / spring	0-8,470 / spring
Riverine/Riparian Plant Communities	27 miles protected No restoration	27 miles protected Minimal restoration	4 miles protected Minimal restoration	30 miles protected Maximum restoration	30 miles protected High-level of restoration
Desert Shrub Plant Communities	57,400 acres protected Depleted understories	57,400 acres protected Depleted understories	20,900 acres protected Depleted understories	44,600 acres protected Enhanced understories	53,900 acres protected Enhanced understories
Agricultural Vegetation	0 acres	0 acres	300-400 acres alfalfa, small grains	200-300 acres alfalfa, small grains	0 acres
Composition of Plant Communities	65 % native species	65-70 % native species	similar proportion, but different species	moderately higher	moderately higher
Invasive Exotic Vegetation	Abundant and increasing distribution of saltcedar and tall whitetop in wetlands and along riparian corridors	similar	slightly to moderately lower distribution of saltcedar and tall white top in marsh and meadows, but similar in riparian	moderately lower distribution of saltcedar and tall whitetop in marsh, meadow, and riparian habitats	slightly to moderately lower distribution of saltcedar and tall whitetop in marsh, meadow, and riparian habitats

[3] Seasonal ranges in vegetation acreages are a component of vegetation dynamics. This table considers only an estimated average peak acreage and the season when the peak would occur.

Table 2 (cont'd). Summary of potential impacts of Alternatives A, B, C, and D.

Resource/Issue		Existing Conditions	Alternative A	Alternative B	Alternative C	Alternative D
			Changes from Existing Conditions[1,2]			
WILDLIFE (all estimates are for nonspill years)						
Birds						
Waterfowl	Waterfowl Use Days Waterfowl Produced	8 - 10 million 3,000 - 5,000	75 -125% higher similar to 150% higher	125-175% higher similar to 200% higher	75-125% higher 100-200% higher	10-20% lower similar
Shorebirds	Peak Spring Population Breeding Population Fall Migration	50,000 EC 25,000-50,000	MH-CH MH-CH 100% higher	MH-CH MH-CH 100% higher	CH CH 100-125% higher	CH CH 125-150% higher
Wading Birds	Migratory Population Breeding Population	EC EC	MH-CH MH-CH	MH-CH MH-CH	CH (spring) MH (fall) CH	CH (spring) similar (fall) CH
White pelicans nests/year on Anaho Island		2,000 - 5,000	similar	similar	similar	similar
Other Waterbirds	Spring Fall	EC EC	MH MH	MH MH	CH MH	CH similar
Passerines	Riparian Upland	EC EC	similar similar	similar similar	SH- MH similar to SH	SH-MH similar to SH
Raptors	Bald Eagles (winter) Marsh Raptors Riparian/Upland Raptors	up to 30 EC EC	SH MH similar	SH-MH MH similar	SH MH-CH SH-MH	similar to SL CH-MH SH-CH
Other Bird Species		EC	similar	similar - SH	SH	SH
Avian Diseases	number birds lost /year	1,000 - 10,000	similar	similar	similar	similar - SL
Mammals	Marsh Riparian Upland	EC EC EC	SH-MH similar similar	SH-MH similar similar	M H MH SH	SH-MH SH-MH SH
Reptiles		EC	similar	similar	SH	SH
Amphibians		EC	similar	similar	similar - SH	SH-MH
Fish	Native Game Fish (non-native) Carp and Mosquito Fish (non-native)	EC EC EC (common-abund't)	MH-CH CH MH	MH-CH MH-CH SH(carp), MH(m. fish)	CH MH-CH SH(carp), MH(m. fish)	SH-MH similar similar
Invertebrates	Aquatic (Diversity/Abundance) Riparian (Diversity) Dune (Abundance)	Moderate/High EC EC	SH/similar to SH similar similar	SH/similar to SH similar similar	SH-MH/similar to SH SH - MH similar	MH/similar SH - MH similar
Endangered/Threatened Species	On-refuge Truckee River basin (cui-ui index[4]) Truckee River basin (Lahontan cutthroat trout)	EC 692,200 EC	similar 75% higher SH	similar 74% higher SH	similar 84% higher SH	similar 97% higher SH
Fish and Wildlife Toxicity		EC	similar	similar	similar	similar
Natural Biological Diversity		EC	SH-MH	similar - MH	MH	similar to SH

[4] The cui-ui index is a modeled estimate that refers to the number of adult female cui-ui at the end of a 95-year simulation period.

Table 2 (cont'd). Summary of potential impacts of Alternatives A, B, C, and D.

Resource/Issue	Existing Conditions	Alternative A	Alternative B	Alternative C	Alternative D
		Changes from Existing Conditions[1,2]			
RECREATIONAL OPPORTUNITIES					
Hunting	EC	MH-CH	MH-CH	Option 1: SH than EC Option 2: MH than EC	similar to ML
Environmental Education and Interpretation	600-800 individuals reached/year through leader-cond'd activities	similar	SH	MH	CH
Wildlife Observation and Photography	EC	SH-MH	SH	SH-MH	MH
Fishing — Stillwater Marsh Indian Lakes	EC (very few anglers) EC	SL BC (similar to EC)	SL similar	SL similar	SL similar
Camping	EC	similar to SH	ML	ML	ML
Other Uses — Stillwater Marsh/Fallon NWR area Stillwater WMA area	EC EC`	similar similar	ML similar	SL ML	SL ML
CULTURAL RESOURCES/INDIAN TRUST ASSETS					
Cultural Resources	Cultural resources adequately protected	similar	SH (increased law enforcement)	MH (law enforcement, education, and more info)	MH (law enforcement, education, and more info.)
Indian Trust Assets					
Fallon Paiute-Shoshone Indian Reservation	EC	similar	similar	similar	similar
Pyramid Lake (refer to Truckee River, Pyramid Lake and cui-ui resources addressed earlier	EC	SH	SH	SH	SH
COMMERCIAL HARVEST OF RESOURCES					
Livestock Grazing — On lands retained by Service Total (incl. lands not retained by Service)	7,200 AUMs 7,200 AUMs	similar similar	60-80% lower 20-30% lower	90-95% lower 37-47% lower	100% lower 40-50% lower
Muskrat Trapping (number trapped annually)	4,000 - 40,000	similar	similar	90% fewer	100% fewer
Commercial Fishery (Indian Lakes area)	Carp and Blackfish	similar	similar	similar	similar
SOCIOECONOMIC RESOURCES					
Commercial Use Revenues	$68,200-124,000/year	$68,200-124,000/year	10-25% lower	40-65% lower	45-75% lower
Outdoor Recreation Expenditures	EC	$740,000/year	1% higher	17% higher	5% higher
Total Contribution to Local Economy[5]	EC	$1,675,000/year	0.9-1.7% lower	5.2-11.8% higher	2.3-9.5% lower
NAVAL AIR STATION-FALLON OPERATIONS	EC	similar	similar	similar	similar
EFFECTS ON REFUGE MANAGEMENT					
Habitat Management Tools — Tools available Frequency of use Constraints on use (beyond laws and policy)	Large number Low-moderate Few	Large number Low-moderate Few	similar SH - MH SH	similar SH - MH MH	ML SL - similar MH
Ability of the Service to Meet Legal Mandates	Limited	Limited	SL	CH	MH

[5] Does not include factors such as reductions in revenues from hydroelectric power generation.

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