

CHAPTER 3

ALTERNATIVES

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CHAPTER 3

ALTERNATIVES

3.1 INTRODUCTION

The purpose of comprehensive conservation planning at the Stillwater NWR Complex is to develop the best possible plan for achieving the purposes for which each refuge was established, and to delineate a boundary for the Stillwater NWR that would be most conducive to achieving the Stillwater NWR purposes. As in making any decision, a key element in developing and selecting the best possible approach is to evaluate a reasonable range of options before deciding on which approach to use. The National Environmental Policy Act, under which this EIS is being prepared, requires that a reasonable range of alternatives be rigorously explored and evaluated for all major Federal actions.

Each alternative presented in this Final EIS consists of a boundary revision option for Stillwater NWR, goals for managing each refuge in the complex, objectives to achieve these goals, strategies to accomplish objectives, and a monitoring program to track progress in implementing strategies and achieving objectives and goals. The Service's preferred alternative (Alternative E) describes the goals, objectives, and strategies that would be incorporated into a CCP for Stillwater NWR if this alternative were selected for implementation. Also identifies the Service's preferred boundary revision for Stillwater NWR.

The Draft CCP EIS evaluated the no action Baseline (Alternative A) along with three Action Alternatives (Alternatives B, C, and D) which portrayed three very different approaches to achieve refuge purposes and the Refuge System mission. Based on receipt of 1004 comments from 54 contributing agencies, organizations, or individuals, the Service decided to develop a new preferred Alternative E which is a composite of elements from all draft action Alternatives, modified to reflect the comments received. Many elements of Draft Alternative C (option 2) have been retained for this Final CCP EIS; however, several sections have been modified slightly based on the comments, and our conversations with several comment contributors to clarify management strategies.

This chapter starts with a description of the alternative development process, including a discussion of factors and criteria that were considered in developing the alternatives. Following this discussion is a detailed description of each of the alternatives, including mitigation. Also presented in this chapter is a brief discussion of the alternatives considered but not studied in detail.

3.2 ALTERNATIVE DEVELOPMENT PROCESS

Comprehensive conservation planning at the Stillwater NWR Complex integrated the processes of delineating a boundary revision for Stillwater NWR and developing a CCP for the Stillwater NWR Complex, as well as NEPA . National Environmental Policy Act and Service policy require that alternative management approaches and alternative boundary revisions, and their potential consequences be examined before a CCP and boundary revision are implemented.

Alternatives were developed to address statutory and policy requirements governing refuge management as well as other scoping issues.

In the context of this Final EIS, an alternative is one of several possible approaches to revising the boundary of Stillwater NWR and for managing the Stillwater NWR Complex to achieve refuge purposes and the Refuge System mission. With respect to management of the Stillwater NWR Complex, each alternative identifies a different approach to managing populations and habitat of fish, wildlife, and plants; recreation, education, and interpretation; cultural resources; facilities; and law enforcement; and for administering the complex. Each alternative contains refuge goals, objectives, strategies, and a monitoring program. Although some of the goals, objectives, and strategies are the same among different alternatives, each alternative takes a different approach overall.

Identifying mitigation measures required component of alternative development. One of the purposes of such a plan is to resolve environmental problems to improve the quality of the environment on refuges. However, through the process of restoring and enhancing a refuge's environment under any given management approach, adverse impacts could result to resources that are not a focus of that particular approach. Adverse impacts could also occur on off refuge resources and economies. Thus, in addition to management approaches designed to improve the quality of the refuge environments, other mitigation measures are identified where appropriate. Mitigation measures are defined as actions taken to minimize, avoid, or eliminate significant adverse impacts on the affected environment from proposed management activities.

3.2.1 SOURCES OF DIRECTION

Alternative boundary revisions and management approaches were shaped by a number of factors, including legal requirements of refuge management, management philosophies, existing plans, ecological conditions, and other issues identified during scoping. The direction of refuge management can differ, depending on which of these factors receives the highest priority and how each particular factor is viewed and interpreted.

A priority system has been defined in laws and executive orders for the Service with respect to managing the Stillwater NWR Complex. This priority system guided the development of the alternatives for this Final EIS. The focus of the CCP, in order of priority, would be to:

1. Conserve fish, wildlife, plants, and their habitat in the manner specifically identified in the purposes of Stillwater NWR, Fallon NWR, and Anaho Island NWR, as well as the Refuge System Administration Act, as amended, and other management authorities;
2. Facilitate 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 toward the achievement of the purposes of Stillwater NWR and provisions of subsection 206(a) of P. L. 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.

This section summarizes the legal and policy requirements, international treaties and other agreements, and existing plans and programs that govern refuge management.

The following laws, executive orders, policy, international treaties, plans, and other documents are those that provide direction (targets) for refuge management. There are many other laws and executive orders that provide additional guidance for managing national wildlife refuges, a compilation of these can be found in Appendix A.

3.2.1.1 LEGAL AND POLICY REQUIREMENTS OF REFUGE MANAGEMENT

One of the major objectives of comprehensive conservation planning is to ensure that management of refuges reflects Service policy, the Refuge System mission, and the purposes for which individual refuges were established (U.S. Fish and Wildlife Service 2000). Management direction for any given national wildlife refuge, expressed in goal statements, is primarily determined by its purposes as defined in the refuge's establishing authority (either in legislation or executive order). It is further clarified and delineated by the Refuge System mission and other provisions of the Refuge System Administration Act, as amended, other legislation, executive orders, Service policy, and international treaties.

Ensuring that goals accurately reflect the management direction of refuge purposes and other legal authorities is important because goals are stepped down to objectives, which are further stepped down to the strategies that are carried out on the ground. If goals do not accurately reflect the management direction spelled out in legal authorities, on the ground management stemming from these goals will not reflect this direction either. Likewise, expanding the scope of refuge goals to include issues and resources that are outside the purposes for which the refuge was established could, for example, result in refuge management proceeding in a different direction than is identified in the establishing authorities. In addition to review during the development of refuge goals, the following laws, executive orders, and Service policy were also considered during the development of objectives, strategies, and alternative boundaries.

3.2.1.1.1 Laws and Executive Orders Governing all National Wildlife Refuges

There are several laws and executive orders that directly pertain to refuge management. The principal Federal laws affecting refuge planning and management are summarized in Appendix A. Regulations developed to guide implementation of applicable laws are codified under Title 50 of the U.S. Code of Federal Regulations (50 CFR). Provisions of some of these are highlighted below.

The Refuge System Administration Act is the primary law governing management of national wildlife refuges. The act was amended by the National Wildlife Refuge System Improvement Act of 1997 (Refuge System Improvement Act). One of the main provisions of the Refuge System Improvement Act is that it clearly defined conservation of fish, wildlife, and plants as the overarching mission of the Refuge System. It requires the Service to ensure that the biological integrity and diversity, and environmental health of the Refuge System are maintained.

In recognizing that the conservation mission of the Refuge System is being facilitated by providing people with opportunities to participate in compatible wildlife-dependent recreation on refuges, the Refuge System Improvement Act provides for the continued use of refuges by hunters, anglers, birdwatchers, and other wildlife enthusiasts. The Refuge System Improvement Act identified hunting, fishing, wildlife observation and photography, and environmental education and interpretation as the priority public uses of refuges when they are shown to be compatible with refuge purposes and the Refuge System mission. The Refuge System Improvement Act requires that CCPs be completed for all refuges within a 15 year period, and requires that refuges be managed according to these plans. The act also requires public involvement in the development of the plans.

Although the Refuge System Improvement Act encourages wildlife-dependent recreation on refuges and highlights the benefits that this has to the conservation mission of the Refuge System, the law also recognizes that recreational uses on refuges, if not properly managed, can detract from this mission. As such, the Refuge System Improvement Act requires that all uses, including wildlife-dependent recreational uses, must be shown to be compatible with refuge purposes and the Refuge System mission before they can be allowed on a particular refuge. Compatibility determinations are to be based on sound professional judgement, which means determinations must be consistent with principles of fish and wildlife management, available science and resources, and applicable laws. Other laws and executive orders are summarized in Appendix A.

3.2.1.1.2 International Treaties

Fulfillment of international treaty obligations with respect to fish and wildlife is one of the purposes for which Stillwater NWR is to be managed. These international treaties call for the establishment of reserves, sanctuaries, preserves, and other areas for the protection, conservation, and management of migratory birds and their habitat, wetland dependent birds and wetland habitat, biological diversity, species threatened with extinction, other plants and animals otherwise of national significance, and natural areas and ecosystems.

A common theme running through the treaties, with respect to managing areas set aside for the protection of fish and wildlife, is the restoration and protection of natural habitats and ecosystems. International treaties stress protection from pollution and detrimental alteration of habitats, controlling undesirable invasive species that can threaten ecosystems, and restoring degraded ecosystems. Another common theme is the management of public uses in a way that sustains the resources being used.

3.2.1.1.3 Service Policy

The Fish and Wildlife Service Manual (Service Manual) contains Service policy on managing national wildlife refuges. Because it addresses all aspects of refuge management, no attempt is made here to provide a comprehensive overview. Of primary importance to comprehensive conservation planning on refuges is that the Service Manual outlines policy on developing CCP's and compatibility determinations, and provides policy on managing fish, wildlife, habitat, and public uses and controlling undesirable invasive species through integrated pest management procedures. Service policy was written within the sideboards established by applicable laws and executive orders and Department of the Interior policy, and provides greater detail than these overriding authorities.

Goals of the Refuge System, set by Service policy, further define the mission of the national network of refuges. It is the policy of the Service that they are to be used as a guide for developing individual refuge unit goals — all refuge goals must support the Refuge System goals. The goals of the Refuge System (602 FW 1.4.M) are:

1. To preserve, restore, and enhance in their natural ecosystems (when practicable) all species of animals and plants that are endangered or threatened with becoming endangered;
2. To perpetuate the migratory bird resource;
3. To preserve a natural diversity and abundance of fauna and flora on refuge lands; and
4. To provide an understanding and appreciation of fish and wildlife ecology and man's role in his environment and to provide refuge visitors with high quality, safe, wholesome, and enjoyable recreation experiences oriented toward wildlife to the extent these activities are compatible with the purposes for which the refuge was established.

3.2.1.1.4 Establishing Authorities

Stillwater Wildlife Management Area was established through a 50 year agreement the 1948 Tripartite Agreement signed by the Service, Nevada State Board of Fish and Game Commissioners (now Nevada Division of Wildlife), and the Truckee-Carson Irrigation District on November 26, 1948. According to the agreement, Stillwater WMA was to be managed for the purposes of conserving wildlife and for public hunting. The agreement also specifies that the management of livestock grazing and muskrat production are to be managed commensurate with wildlife conservation and management. Although the agreement expired in November 1998, the Service continues to co-operatively manage the Stillwater WMA with the Bureau of Reclamation under most provisions of the 1948 Tripartite Agreement. Under the action alternatives in this Final EIS, the extension of the 1948 Tripartite Agreement would not be renewed again, which would result in the termination of Stillwater Wildlife Management Area. Administration of lands not included within a new boundary of Stillwater NWR would revert back to the Bureau of Reclamation and its contractor (Truckee-Carson Irrigation District). Stillwater NWR was originally established, within the Stillwater WMA, on October 21, 1949 for the purpose of providing a sanctuary for game birds and game mammals. This was done as outlined in the 1948 Tripartite Agreement.

Public Law 101-618, which expanded the size of Stillwater NWR and set it apart from the Stillwater WMA to the west, requires that Stillwater NWR, be managed for the purposes of:

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.
4. Providing opportunities for scientific research, environmental education, and fish and wildlife oriented recreation.

However, P. L. 101-618 also directed that any activity being permitted on the refuge under the 1948 Tripartite Agreement continue until the expiration of the 1948 Tripartite Agreement, the terms of which have been extended U. S. Bureau of Reclamation 2000. Until the ROD is signed for this Final EIS, managing the refuge toward the establishing purposes of Stillwater NWR will not be fully undertaken. The potential effects on wildlife, habitat, public uses, and socio economics that result from the change in management direction and administration instituted by P. L. 101-618 and the National Wildlife Refuge System Administration Act, as amended, are evaluated in Chapter 4 of this Draft EIS.

Fallon NWR, which is at the north end of Stillwater WMA (part of the refuge is within the WMA), was established in 1931 by Executive Order 5606 as a "...refuge and breeding ground for birds and wild animals..." The Executive Order expressly delineated the meaning of refuge as being a sanctuary.

Anaho Island NWR was established in 1913 by Executive Order 1819 as a "...preserve and breeding ground for native birds." P. L. 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 that it is to be managed and administered by the Service. The terms of the Service's management and administration of the island were outlined in a March 1992 Memorandum of Understanding (MOU) between the Service and the Pyramid Lake Paiute Tribe.

3.2.1.1.5 Boundary Revision Authorization

Public Law 101-618 authorized the reevaluation of the boundary of Stillwater NWR for possible revision. The law specifically authorized the Department of the Interior to submit recommendations to Congress concerning: (a) revisions of Stillwater NWR boundaries as may be appropriate to carry out the purposes of Stillwater NWR and subsection 206(a) of the law, which identifies the 25,000 acre target for Lahontan Valley wetland habitat; (b) transfer of any other U.S. Bureau of Reclamation withdrawn public lands within existing wildlife use areas in the Lahontan Valley to the Service for addition to the Refuge System; and (c) identification of lands currently under the jurisdiction of the Service in the Lahontan Valley that no longer warrant continued status as units of the Refuge System.

3.2.1.2 BIRD CONSERVATION PLANS AND CONSERVATION DESIGNATIONS

3.2.1.2.1 Western Hemispheric Shorebird Reserve Network

The Lahontan Valley Western Hemispheric Shorebird Reserve, comprising Stillwater NWR, Stillwater WMA, Carson Lake, and Fernley WMA, is one of 15 Hemispheric Sites of the Western Hemispheric Shorebird Reserve Network (Map 2.1). Western Hemispheric Shorebird Reserve Network, which is a voluntary collaboration of more than 80 governmental and private organizations, provides international recognition to critically important shorebird habitats. Western Hemispheric Shorebird Reserve Network recognizes that shorebirds do not know national and international boundaries and that shorebird conservation requires an international approach. Participation in the network is voluntary and does not bind participants to any obligation or treaty, but it does promote cooperative management and protection of the sites as part of an international network. The Lahontan Valley Western Hemispheric Shorebird Reserve was dedicated on August 20, 1988. Its nomination, and acceptance, as a Hemispheric Site was based on the fact that the area supports up to half of the North American population of long-billed dowitchers and hundreds of thousands of various shorebird species during migration.

A National Shorebird Conservation Plan was prepared to address **objectives and strategies** for shorebird population recovery, habitat management, and public outreach (Oring and Neel 1999). The plan contains a section on the Intermountain west region.

3.2.1.2.2 Other International Bird Conservation Initiatives

The following four bird conservation initiatives are now being coordinated under the North American Bird Conservation Initiative, an initiative developed to facilitate “all bird conservation” throughout North America:

1. North American Waterfowl Management Plan
2. Intermountain West Joint Venture
3. Partners in Flight
4. North American Waterbird Conservation Plan
5. U.S. Shorebird Conservation Plan

3.2.1.2.2.1 North American Waterfowl Management Plan

The North American Waterfowl Management Plan, adopted in 1986, established a cooperative effort between the United States, Canada and Mexico to reverse declines in waterfowl populations and their habitat throughout North America.

The 1986 plan established continental breeding population goals for all North American species of ducks and habitat objectives to achieve these goals. It also established winter population goals

for all species of geese. Breeding population goals were based on 1970-1979 population levels of ducks. Habitat objectives, expressed in numbers of acres of wetland habitat to be protected, restored, and enhanced, are based on the assumption that “Restoring waterfowl populations to the levels of the 1970s would require continental habitat characteristics [acreages] similar to those present during the 1970s.” This generally parallels one of the building blocks used to derive the 25,000 acre target of the Lahontan Valley wetlands water rights acquisition program; i.e., the amount of primary wetland habitat acreage present in the Lahontan Valley from 1972 to 1975. The 1994 Update to the North American Waterfowl Management Plan documents the progress made toward achieving population goals and habitat objectives, and lists additional recommendations to achieve them.

3.2.1.2.2.2 Intermountain West Joint Venture

The Intermountain West Joint Venture is a partnership between government and private organizations formed to meet objectives of the North American Waterfowl Management Plan. The Lahontan Valley wetlands, of which Stillwater NWR is a major component, are a focus area of this joint venture. As a focus area of the Intermountain West Joint Venture, Stillwater NWR Complex contributes toward achieving the primary goal of the joint venture, which is to “provide for the long-term conservation of wetland habitats and their associated wildlife” in the intermountain west (Intermountain West Joint Venture 1995). Another major goal of the joint venture is to restore and maintain migratory bird populations at 1970 levels. Specific population objectives, for years of average climatic conditions, include:

1. Providing habitat to accommodate a breeding population of at least 2.5 million ducks, emphasizing the ten most common species.
2. Providing migration and staging habitat to support a fall migration of at least 20 million ducks.
3. Provide habitat to support a midwinter population of at least 2.5 million ducks.
4. Provide adequate habitat to maintain a migrational population of 60,000 tundra swans and 700 trumpeter swans.
5. Continue to cooperate in conducting midwinter surveys.
6. Provide nesting, migrational, and wintering habitat to maintain a midwinter population of 90,000 Canada geese.
7. Identify the status of key breeding and staging habitats for certain non-waterfowl waterbirds (e.g., white pelican nesting colonies, Wilson’s phalarope staging areas).
8. Establish more specific population objectives for non-waterfowl species as populations are determined.

The Concept Plan for the Preservation of Wetland habitat of the Intermountain West (USFWS 1995c) identified wetland protection goals for the Intermountain West Joint Venture area. In

Nevada, the goal was to provide for the permanent protection of 96,500 acres of additional wetland habitat. In addition, several habitat protection strategies were identified. Those applicable to the Stillwater NWR Complex include:

1. Secure adequate water supplies for existing and newly acquired wetland.
2. Improve management of habitat on public and private wetlands (e.g., develop wildlife management plans, promote water use efficiency, manage wetlands as self-sustaining natural systems).
3. Promote efforts to improve water quality (e.g., secure supplies of good quality water to dilute contaminated sources).
4. Maintain wetland wildlife diversity, giving endangered species and other species of concern priority in habitat management.
5. Support and encourage efforts to alleviate losses of wildlife from carp, toxins, and diseases, especially botulism. Potential exists for the Stillwater NWR Complex to contribute further toward these population and habitat objectives to the extent that needed actions are consistent with the purposes for which the refuges are to be managed.

3.2.1.2.2.3 Partners in Flight

Partners in Flight, formed in 1990 in response to mounting evidence of long-term population declines among several groups of landbirds. It is a voluntary collaboration of governmental and private organizations in North, Central, and South America, recognizing the need to address migratory bird conservation at an international level. The primary goal of Partners in Flight is to “keep common birds common”, with the objectives of improving the monitoring, research, management and education programs regarding native, non game landbirds and their habitats. The Partners in Flight program identified priority species and developed Bird Conservation Plans for every physiographic region (in the east) or State (in the west), which outline habitat specific conservation measures setting population acreage goals for priority species and habitats. The Nevada Partners in Flight Bird Conservation Plan was finalized in 2000 (Neel 2000). The emphasis now is on implementation of these plans; Executive Order 13186 (Responsibilities to Federal Agencies To Protect Migratory Birds) requires land use planning documents, such as this CCP, to incorporate, and as much as practicable, adopt the conservation goals and strategies in this and similar plans for shorebirds, waterfowl, and waterbirds.

3.2.1.2.2.4 North American Colonial Waterbird Plan

This plan is in the initial stages of development. A Draft National Plan was prepared in 2001 and a regional conservation plan for waterbirds of the intermountain west is scheduled for completion during summer 2003. This plan will identify species in need of conservation attention in the intermountain west, outline strategies to achieve stable or increasing populations of these birds, and identify critical sites and habitat conditions.

In addition to the four primary bird conservation initiatives, programs supporting important area designations for shorebirds and partnerships developed to implement initiative goals and objectives are described in the following sections.

3.2.1.2.2.5 U.S. Shorebird Conservation Plan

The U.S. Shorebird Conservation Plan is a collaborative effort between researchers, land managers, and education specialists to advance effective conservation of North American shorebird species through cooperation with colleagues from Mexico and Canada (Manomet Center for Conservation 2000). The plan, which has three main components (habitat management, research and monitoring, and education and outreach), has three main objectives:

1. Develop a standardized, scientifically sound system for monitoring and studying shorebird populations, which will provide practical information to researchers and land managers for shorebird habitat conservation.
2. Identify principles and practices upon which all levels of management plans (local, State, Federal) can effectively integrate shorebird conservation with multiple species strategies.
3. Design an integrated approach for increasing public education about shorebird and wetland conservation. The national plan is divided into several regions, and the one applicable to Stillwater NWR Complex is the Intermountain West Region (Oring and Neel 1999). The United States Shorebird Conservation Plan, 2nd Edition, was released in May 2001 and updates the regions and species involved in planning efforts (Brown et al. 2001).

3.2.1.3 POLICY AND LEGAL DIRECTION REGARDING TRIBAL CONSULTATION

3.2.1.3.1 April 29, 1994 Presidential Memorandum to the Heads of Executive Departments and Agencies

The memorandum identifies six principles clarifying the responsibility of executive departments and agencies to ensure that the Federal Government operates within a government to government relationship with federally recognized Native American Tribes. These principles include consultation, to the greatest extent practicable and permitted by law, with tribal governments prior to taking actions that affect federally recognized tribal governments, and assessment of the impact of Federal plans, projects, programs, and activities on tribal trust resources and assurance that tribal government rights and concerns are considered during development of plans, projects, programs, and activities.

3.2.1.3.2 Secretary of the Interior Order Number 3175

This order clarifies the responsibility of the Department of Interior agencies to ensure that the trust resources of federally recognized Indian tribes that may be affected by the activities of the agencies are identified, conserved, and protected. The agencies are required to consult with the recognized tribal government with jurisdiction over the trust property that the action may affect,

the appropriate office of the Bureau of Indian Affairs, and the Office of the Solicitor if their evaluation reveals any impacts on Indian trust resources. When planning any proposed project or action, the agencies will ensure that any anticipated effects on the Indian trust resources are explicitly addressed in the planning, decision, and operational documents that are prepared.

3.2.1.3.3 Part 512 of the Department of Interior Departmental Manual

This section establishes the policy of the Department of the Interior to recognize and fulfill its legal obligations to identify, protect, and conserve the trust resources of federally recognized Indian tribes and tribal members, and to consult with tribes on a government to government basis whenever plans or actions affect tribal trust resources, trust assets, or tribal health and safety. Department officials shall establish procedures to ensure that the activities of departmental organizations impacting upon Indian trust resources are explicitly addressed in planning, decision, and operational documents; and ensure that bureaus and offices consult with the recognized tribal government whose trust resource, asset, or health and safety is potentially affected by the proposed action, plan, or activity.

3.2.1.3.4 Fish and Wildlife Service National Policy #94-10: Native American Policy

This policy articulates the general principles that will guide the Service's government to government relationship with Native American governments in the conservation of fish and wildlife resources.

3.2.1.3.5 Fish and Wildlife Service Implementation Plan

This plan ensures the intent of Secretary of Interior Order Number 3175 is fully met and develops a step down of the Fish and Wildlife Service's Native American Policy. The Service recognizes that the United States Government has a unique legal relationship with Native American tribal governments as set forth in the Constitution of the United States, treaties, statutes, and court decisions. The Service is committed to operate within a government to government relationship with federally recognized Native American tribes. The Service supports the rights of Native Americans to be self governing and further supports the authority of Native American governments to manage, co manage, or cooperatively manage fish and wildlife resources, and to protect their federally recognized authorities. The Service is committed to inform, consult, and involve Native American governments in fish and wildlife matters of mutual interest and concern from initiation to completion of Service related activities.

3.2.1.3.6 Secretary of the Interior Order Number 3206

This Order clarifies the responsibilities of the component agencies, bureaus, and offices of the Department of the Interior, when actions taken under authority of the Endangered Species Act of 1973 as amended, and associated implementing regulations affect, or may affect Indian lands, tribal trust resources, or the exercise of American Indian tribal rights.

3.2.1.3.7 Protocol for Implementation of Secretarial Order No. 3206.

These protocols provide guidance to the Fish and Wildlife Service in implementing Secretarial Order 3206. The Service shall communicate all relevant issues directly with affected tribes consistent with government-to-government protocols. The Service shall make available to an Indian Tribe all information held by the Service which is related to its Indian lands and tribal trust resources. The Service shall protect, to the maximum extent practicable, tribal information which has been disclosed to or collected by the Service. The Tribes shall determine if they are affected by the proposed action, communicate their determinations to the Service, and identify how they will coordinate with one another to make the ESA processes as efficient as possible, so as to ensure that statutory time lines under ESA can be met.

3.2.1.3.8 Executive Order 13175 of November 6, 2000.

This Executive Order establishes regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribal governments. This order revokes Executive Order 13084.

3.2.1.4 EXISTING SERVICE PLANS AND PROGRAMS

3.2.1.4.1 U.S. Fish and Wildlife Service Strategic Plan, 1997-2002

Nationwide, the Service has committed to conserving an ecologically diverse network of lands and waters by conserving migratory bird populations, stabilizing or improving populations of threatened and endangered species, and by protecting, restoring, or enhancing 64.7 million acres of uplands, 28.4 million acres of wetlands, 15.5 million acres of deep water and riverine habitat, and 3,250 miles of riparian habitat by the year 2002 (USFWS 1997). Another strategic goal is to increase opportunities for participation in uses of fish and wildlife resources by 3 percent from 1996 levels, and to increase the public's understanding of the relationship between healthy fish and wildlife resources and sound management practices. The Service also seeks to enhance the diversity and technical capability of its workforce. The Stillwater NWR Complex currently contributes to all of these strategic goals, and any modification to the boundary of Stillwater NWR would affect the level of contribution to several goals and adjustments in management and administration could contribute to others.

3.2.1.4.2 Region One's Ecosystem Management Strategy

Goals of the Service's *Ecosystem Management Strategy* for Region One are to:

1. Provide leadership to conserve ecological systems within Region One at all landscape levels for present and future generations.
2. Restore, conserve, and protect the health of ecological systems.

3. Foster and perpetuate a land stewardship ethic in cooperation with other agencies, organizations, businesses, and the general public. Some of the pertinent objectives include:
 - a. Maintaining viable populations of native plants and animals well distributed throughout their geographic range.
 - b. maintaining genetic variability within and among populations of native species.
 - c. restoring and maintaining representative examples of the full spectrum of natural ecosystems, biological communities, and habitats.
4. Restoring and maintaining soil productivity, water quality, and air quality.
5. Restoring and maintaining the fundamental patterns and processes that operate within each system.
6. Increasing scientific understanding of biological diversity and ecological processes.
7. Increasing public awareness, understanding, and support for conserving biological diversity and ecosystem management.
8. Maximizing the extent to which production and maintenance of consumptive and non consumptive resources are carried out in an environmentally sensitive manner at levels that ensure a high probability that long-term human and economic well being can be maintained. Strategies include the establishment and management of reserves and other protected areas throughout Region One.

3.2.1.4.3 Interior Basin's Ecoregion Plan

Although the Interior Basin's Ecoregion plan has not been completed, it provides an unofficial view of the priorities identified during this ecoregion wide Service planning effort. In the most recent draft (February 1995), the highest priority for the Interior Basin's Ecoregion was to protect and restore Lahontan Valley wetlands. Objective 3 was to prepare an EIS and comprehensive plan for Stillwater NWR and the Lahontan Valley wetlands. Objectives 1 and 2 were to complete the Water Rights Acquisition EIS and secure water rights for Lahontan Valley Wetlands.

Priority 2 of the draft plan was to protect and restore Pyramid Lake and Lower Truckee River, Nevada. Objective 1 was to secure adequate water to support a healthy Pyramid Lake ecosystem. Priority 8 was to protect and restore Great Basin streams and riparian systems in Nevada, Utah, Oregon, and Wyoming. Objective 2 of Priority ten (sensitive, rare, and candidate species) was to inventory and conserve sensitive sand dune ecosystems. Public education was identified as Priority 13.

3.2.1.4.4 1987 Management Plan for Stillwater Wildlife Management Area

The *1987 Management Plan for Stillwater Wildlife Management Area*, including (as per the 1948 Tripartite Agreement) Stillwater NWR and Fallon NWR, was consulted during the development of the Draft and this Final EIS (USFWS 1987). This forms the basis of, and is described in, Alternative A, the No Action Alternative.

3.2.1.4.5 Water Rights Acquisition Program

A water rights acquisition program for Stillwater NWR and other designated Lahontan Valley wetland areas was initiated in 1990. The acquisition program is authorized and directed by P. L. 101-618. Specifically, subsection 206(a) of P.L. 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; USFWS 1996a) describes a water rights acquisition program implemented by the Service in November 1996 when the ROD (USFWS 1996b) was signed for the WRAP EIS. The WRAP EIS estimated that 125,000 acre-feet of water would be needed to sustain 25,000 acres of wetland habitat.

Key elements of the selected alternative include the continued use of irrigation drainwater and periodic excess water released from Lahontan Reservoir, acquisition of 75,000 acre-feet of water rights in the Carson Division of the Newlands Irrigation Project, acquisition of water rights from the middle Carson River, leased water rights in the Carson Division, water conserved at the Naval Air Station Fallon, and groundwater pumping. Together, these sources of water are anticipated to provide a long-term average of 125,000 acre feet of water for the wetlands. As of September 2001, approximately 30,650 acre-feet of water rights in the Carson Division had been acquired, including 21,116 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 1,334 acre-feet for the Bureau of Indian Affairs for the Fallon Paiute Shoshone Indian Reservation wetlands. When the ineligible portion is factored out and water is transferred to the wetlands at 2.99 acre-feet per acre, this results in a net of 24,144 acre-feet deliverable to the Lahontan Valley wetlands.

Of the 25,000 acre target, 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.

The WRAP EIS and ROD noted that a long-term average of 125,000 acre-feet per year demand was an estimate, and could be revised. In the WRAP EIS, the Service pointed out that the amount of water needed to manage wetlands on Stillwater NWR to achieve refuge purposes would be reevaluated, but the Service agreed not to exceed a long-term average of 125,000 acre-feet per year, unless monitoring at the end of the acquisition program reveals that additional water is needed to sustain a long-term average of 25,000 acres of primary wetland habitat. Thus, for the purposes of this Final EIS, it is assumed that the maximum amount of water available to the primary wetland areas in the Lahontan Valley is a long-term average of 125,000 acre-feet per

year. It is also assumed, for this Final EIS, that Stillwater NWR's portion would be a maximum of 70,000 acre-feet per year.

3.2.1.5 COMPONENTS OF REFUGE PURPOSES AND BOUNDARY REVISION CRITERIA

This section provides a detailed listing of the individual components of natural biodiversity, wildlife dependent recreation, and other key parts of refuge purposes for use in developing management objectives and strategies, and formulating boundary alternatives for Stillwater NWR.

3.2.1.5.1 Components of Refuge Purposes

The many components of refuge purposes were considered during the formulation of management objectives and strategies. The following list is one of several ways that the components of refuge purposes can be categorized. The list is organized by refuge purposes and identifies only those components applicable to the management of the refuges, not those that are addressed at a higher level (e.g., waterfowl hunting regulations established at the flyway level).

3.2.1.5.2 Boundary Revision Criteria

For the boundary assessment effort, refuge purposes were divided in a somewhat different way. Subsection 206(b)(5) of P.L. 101-618 specifies two sets of criteria upon which to base revisions to Stillwater NWR's boundary: (1) extent to which a boundary revision would facilitate the Service's ability to carry out the purposes of Stillwater NWR, and (2) the extent to which a boundary revision would facilitate efforts to carry out provisions of subsection 206(a) of the law. These criteria and other considerations are identified below.

3.2.1.5.2.1 Refuge Purposes

Areas being studied for potential inclusion into Stillwater NWR were evaluated against several specific measures under each of the refuge purposes listed in subsection 206(b)(2) of P.L. 101-618. These measures are based on the Refuge System Administration Act, Service policy, international treaties, and principles of natural resource management. Refuge purposes are listed below, followed by specific boundary revision criteria for each. The questions refer to the areas that were considered for inclusion into Stillwater NWR.

3.2.1.5.2.2 Subsection 206(a) of Public Law 101-618

Subsection 206(a) authorizes and directs the Service to acquire, in conjunction with the State of Nevada and other parties that may provide water, sufficient water and water rights to sustain a long-term average of 25,000 acres of primary wetland habitat in four designated areas in the Lahontan Valley: Stillwater NWR, Stillwater WMA, Carson Lake, and the Fallon Paiute Shoshone Indian Reservation. This subsection lays the foundation for restoring and providing long-term protection to the Great Basin wetland ecosystem in the Lahontan Valley. A criterion for evaluating lands for potential inclusion into Stillwater NWR, therefore, was the extent to

which the area would contribute toward achieving the 25,000 acre wetland habitat objective for Lahontan Valley wetlands.

Components of Refuge Purposes

STILLWATER NWR

Natural Biological Diversity

- Richness of native species (identity and number of native species)
- Relative abundance of each native species
- Richness of native biotic communities and guilds
- Relative abundance and size of native communities and guilds
- Natural structural complexity of plant communities (e.g., patterns, vertical structure)
- Richness of native biotic processes (e.g., succession, herbivory, predation, migration)
- Extent, level, and rates of native biotic processes

Fish, Wildlife, and their Habitat

- All species, taxonomic groups, and guilds of animals (vertebrates and invertebrates)
- High quality and secure habitat for wildlife, especially:
 - habitat for breeding, feeding, resting, and wintering, including escape and thermal cover
 - habitat for threatened and endangered species
- Vegetative elements of habitat
- Physical elements of habitat (e.g., water quantity, geologic features)

International Treaty Obligations

- All species of native animals and plants, especially:
 - migratory birds (all native bird species except upland gamebirds)
 - threatened and endangered species
 - other species of national or global significance
 - all other native species of animals and plants
- Habitats for above species; emphasis on natural habitats and ecosystems
- Prevalence and spread of noxious weeds
- Sanctuary areas for hunted species
- Natural features of the landscape

Scientific Research, Environmental Education, and Wildlife-oriented Recreation

- Scientific Research
- Environmental Education
- Environmental Interpretation
- Hunting
- Fishing
- Wildlife Observation
- Wildlife Photography

FALLON NWR

- Sanctuary for birds and other wildlife, including:
 - habitat for breeding, feeding, resting, and wintering, including escape and thermal cover
- Secure, high quality breeding habitat for waterfowl and other migratory birds, especially:
 - nesting and brood rearing habitat
- Secure, high quality breeding habitat for other wildlife

ANAHO ISLAND NWR

- Secure breeding habitat for colonial nesting birds
- Secure breeding habitat for other migratory birds

3.2.1.5.2.3 Other Considerations

Although the boundary revision criteria identified above were the main factors guiding the development of the alternative boundaries, they were weighed against other factors such as administrative complexity and costs, law enforcement, operation and maintenance of facilities, and other issues identified during scoping.

Boundary Revision Criteria: Stillwater NWR Purposes

Purpose: Restore and maintain natural biological diversity within Stillwater NWR.

1. Representativeness. Does the area contain native species or biotic communities not already effectively represented within the existing boundary of Stillwater NWR?
2. Sensitive and Rare Species. Does the area contain sensitive or rare species, especially those listed as endangered, threatened, or candidates under the Endangered Species Act (1973) as amended; and USFWS Birds of Conservation Concern.
3. Naturalness. Is the area in a relatively natural state and is it in a relatively healthy ecological condition, or does it have potential to be restored as such?
4. Refuge Size and Shape. Would addition of the area contribute to making Stillwater NWR of a size and shape that would enhance the ability to conserve natural biological diversity over the long term?

Purpose: Conserve and manage fish, wildlife, and their habitat within Stillwater NWR.

1. Habitat for Key Species. Does the area provide important breeding, wintering, or migration habitat for key species or groups of wildlife, especially those dependent on marsh and riparian habitat?
2. Endangered Species Protection. Does the area contain habitat for species threatened with extinction?
3. Protection from Harvesting and Collection. Does the area or a portion of the area provide high quality sanctuary for animal and plant species that are harvested or commercially collected (e.g., reptiles)?

Purpose: Fulfill international treaty obligations with respect to fish and wildlife.

1. Migratory Bird Habitat. Does the area contain habitat important for migratory birds such as waterfowl and neotropical migratory birds?
2. Sanctuary Potential. Could the area or portions of the area provide additional sanctuary (non-hunted area) for migratory birds?
3. Biodiversity Conservation. Does the area contain or have the potential to contain components of biological diversity not effectively represented in the existing boundary of Stillwater NWR?
4. Natural Area Protection. Does the area contain a geographic feature of regional/national significance?

Purpose: Provide opportunities for scientific research, environmental education, and fish and wildlife oriented recreation.

1. Scientific Research. To what extent would the area enhance or increase opportunities on Stillwater NWR for scientific research, especially research related to achieving refuge purposes?
2. Wildlife-Dependent Recreation. To what extent would the area enhance opportunities on Stillwater NWR for wildlife-dependent public use (hunting, fishing, wildlife observation and photography, and environmental education and interpretation), especially those that are oriented towards families?

3.2.2 OTHER FACTORS CONSIDERED DURING ALTERNATIVE DEVELOPMENT

3.2.2.1 FEDERAL LAWS AND MEMORANDUMS OF UNDERSTANDING

Below are the some of the Federal Laws and Memorandums of Understanding (MOU's) that were reviewed during the development of alternatives.

3.2.2.1.1 1948 Tripartite Agreement and Amendments

The 1948 Tripartite Agreement is an agreement between the Service, Nevada State Board of Fish and Game Commissioners (now NDOW), and the Truckee-Carson Irrigation District that outlines the establishment of Stillwater WMA and Stillwater NWR and broad direction for managing the area. 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 agreement (USBOR 2000).

According to the 1948 Tripartite Agreement, Stillwater WMA is to be managed for the purposes of conserving wildlife and for public hunting. The agreement also specifies that the management of livestock grazing and muskrat production are to be managed commensurate with wildlife conservation and management. The agreement covers a number of other issues, including use of the area for discharging "waste water" not used by the irrigation project, the construction and operation of canals and other water control facilities, and staffing the area.

3.2.2.1.2 Management and Administration of Anaho Island NWR

According to P.L. 101-618 (subsection 210(b)(2)), Anaho Island NWR, which is located within and is part of the Pyramid Lake Indian Reservation, is to be managed and administered under the primary jurisdiction of the Service as an integral component of the Refuge System. The public law also authorized the Service to enter into cooperative agreements with the Pyramid Lake Paiute Tribe with respect to the management of Anaho Island. Such an agreement was signed by both parties in 1992. The MOU outlines general guidance for managing the island and for continued cooperation between the Service and the Tribe.

3.2.2.1.3 Naval Air Station Fallon Overflights

A MOU was signed in 1987 by the Service, Bureau of Land Management, Department of the Navy, and the State of Nevada for the Naval Air Station Fallon's special air space. Stillwater WMA, which included the area now within Stillwater NWR, Stillwater WMA, and Fallon NWR, was recognized as overflight sensitive. As part of the agreement, Naval Air Station flights will not, under any circumstances, fly over Stillwater WMA lower than 3,000 feet above the ground. As part of its training communications network the Navy maintains a Tactical Aircrew Combat Training System (TACTS) relay station in the Wildlife Management Area. This site is included in the proposed boundary of preferred Alternative E. The TACTS station has been authorized

under a Special Use Permit which may continue; however, it could also be designated as a reservation to the Navy in boundary expansion legislation.

3.2.2.1.4 Cultural Resource Management

The management of a national wildlife refuge like Stillwater NWR invokes the cultural resource legislation listed in Appendix A, on a continuing, almost daily, basis. Almost all activities that disturb the ground at Stillwater NWR invoke the National Historic Preservation Act. The Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and Section 110 of the National Historic Preservation Act call for an active cultural resource program.

It is the policy of the Service to take no action that would diminish the ability of American Indians, specifically the Fallon Paiute Shoshone Tribe, to carry on their traditional culture. Indeed, many laws, including the National Historic Preservation Act, the Native Americans Graves Protection and Repatriation Act, the Sacred Sites Executive Order imply that the Service would take steps to ensure the cultural legacy of the Fallon Tribe. If the trust responsibility of the Service involves cultural resources, the Service would take steps to manage such resources so that they are preserved and enhanced in consultation with the Tribe.

Much of the cultural resource management at Stillwater NWR has been conducted in response to the land, habitat, wildlife, and public use management of the refuge. However, given the compliance with Federal legislation, that tailor cultural resource management to the specific needs of the refuge. These agreements include:

1. Stillwater Marsh National Register Archaeological District (1974) a 42,000 acre area roughly
2. Memorandum of Understanding concerning human remains between the U.S. Fish and Wildlife Service, Nevada State Historic Preservation Office, and the Fallon Paiute Shoshone Tribe, 1988.
3. Programmatic Agreement for cultural resource management at Stillwater Wildlife Management Area between the U.S. Fish and Wildlife Service, Bureau of Reclamation, Nevada State Historic Preservation Office, and the Advisory Council on Historic Preservation, 1988.
4. Programmatic Agreement between the U.S. Fish and Wildlife Service Region One, Nevada State Historic Preservation Office, and the Advisory Council on Historic Preservation regarding the Administration of Routine Undertakings by the U.S. Fish and Wildlife Service, 1997.

The refuge would carry out the terms of these agreements and the basic compliance responsibilities of Federal cultural resource legislation regardless of the alternative chosen and the CCP that is implemented.

3.2.2.1.5 Wilderness Study

In December 1974, a bill was presented to Congress (House Document No. 93-403, Part 29) proposing to add the Anaho Island National Wildlife Refuge to the National Wilderness Preservation System. This bill was neither enacted nor was it dismissed. Anaho Island retains its essential wilderness character as a roadless island, and in accordance with Service policy, is managed as if it has been designated. Finalization of the wilderness designation proposal would require extensive updating of the documents to accurately reflect current conditions. Considerable changes in the environmental and political arena have occurred since 1974 that were not anticipated or considered in the original wilderness review and environmental documents accompanying the proposal. In 1974, Anaho Island was not considered to be part of the Pyramid Lake Paiute Indian Reservation. P. L. 101-618 formally recognized Anaho Island as part of the Pyramid Lake Indian Reservation, although management and administration of the island remains under the primary jurisdiction of the Service, as a part of the Refuge System. The Pyramid Lake Paiute Tribal Council's Resolution 19-90 acknowledged the continuing management jurisdiction of the Service and, in 1992, the Service entered into a Cooperative Agreement with the Tribe regarding the management of Anaho Island NWR. The consent and cooperation of the Pyramid Lake Paiute Tribe would be necessary to reinstate a wilderness review and update the proposal to designate Anaho Island as wilderness.

Upon the establishment of a new approved refuge boundary for Stillwater NWR, or a determination that the existing boundaries of Stillwater NWR and Fallon NWR will remain in effect, a wilderness review would be conducted (see Section 3.3.1.2). The Wilderness Act of 1964 (16 U.S.C. 1131-1136, 78 Stat. 890) – Public Law 88-577 (Wilderness Act), was enacted *“To establish a National Wilderness Preservation System for the permanent good of the whole people, and for other purposes.”* In the Wilderness Act, wilderness is defined as an area where “man himself is a visitor”. Wilderness areas are absent of “permanent improvements or human habitation” and (1) affected primarily by nature; (2) possess opportunities for solitude; (3) are generally over 5,000 acres; (4) are managed to allow natural processes to operate; (5) may contain scientific, educational, scenic or historical features; and (6) formally designated by Congress.

Wilderness conservation was listed as the first goal under the Action Plan for the National Wildlife Refuge System in the Service Director's Priorities (Fiscal year 1999-2000)(USFWS 1999b). This document articulated the importance of this designation: “Wilderness, due to its very nature, is extremely important to the conservation of biodiversity within the System. Wilderness is a reservoir of biological diversity and natural ecological and evolutionary processes. Wilderness is also a way of perceiving and valuing; it is as much about a relationship with the land as the condition of it. Wilderness is a symbolic landscape, encompassing values and benefits that extend beyond its boundaries.”

3.2.2.1.6 Accessibility for Disabled Persons

The Service is required to comply with section 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act of 1990. Section 504 of the Rehabilitation Act, as amended, prohibits discrimination on the basis of disabilities in programs and activities

that receive Federal financial assistance or are conducted by Federal agencies. The Americans with Disabilities Act of 1990 provides standards for addressing discrimination against individuals with disabilities in employment, transportation, telecommunications, public accommodations, and services operated by private entities.

3.2.2.2 ISSUES

Issues identified during the internal and public scoping process were considered during the development of alternatives. Six key issues were identified with respect to revising the boundary of Stillwater NWR and the development and implementation of a CCP for the Stillwater NWR Complex:

1. Potential effects on wildlife of Stillwater NWR, Stillwater WMA, Fallon NWR, and Anaho Island NWR.
2. Potential effects on wildlife habitat and ecosystem functioning on Stillwater NWR, Stillwater WMA, Fallon NWR, and Anaho Island NWR.
3. Potential effects on public use of Stillwater NWR, Stillwater WMA and Fallon NWR.
4. Potential effects on the socioeconomics of Churchill County.
5. Potential effects on cultural resources of Stillwater NWR, Stillwater WMA and Fallon NWR.
6. Potential effects on Naval Air Station Fallon operations.

These issues are discussed in more detail in Chapter 1 and the Scoping Report (Appendix H; USFWS 1998).

3.2.2.3 SIGNIFICANT PROBLEMS AFFECTING FISH, WILDLIFE AND PLANTS

As required by the Refuge System Administration Act, as amended, and other management authorities, CCP's must identify actions necessary to correct, or mitigate, significant problems that adversely affect populations and habitats of fish, wildlife, and plants within the planning unit. Because refuges are managed first and foremost for the conservation of fish, wildlife, plants, and their habitat, the alternative development process focused on the formulation of objectives and strategies to resolve issues in a way that would most effectively accomplish this fundamental mission, according to specific direction provided in refuge purposes. Especially important in developing objectives and strategies to achieve Stillwater NWR purposes was the

need to address significant problems that are negatively affecting, or have the potential to negatively affect, the natural diversity of fish, wildlife, and plants, such as:

1. Insufficient water volume and altered timing of inflows, and flow restrictions;
2. Prevalence and spread of nonnative plant and animal species, including cattle; and
3. Altered chemistry of wetland inflows.

Two key components of the natural biodiversity of the Stillwater area, which are affected by the same core problems, especially the first two, are waterfowl and shorebirds. Similarly, most of the species identified as threatened or species of special concern are likewise affected by inadequate water supplies. To effectively provide high quality habitat for waterfowl, shorebirds, and other wetland birds, these problems must be addressed.

3.2.2.4 OTHER PLANS THAT WERE CONSIDERED

3.2.2.4.1 Churchill County Master Plan

The 1995 update of the Churchill County 1990 Master Plan was reviewed during the development of alternatives. Lands within Stillwater NWR, Stillwater WMA, and Fallon NWR were identified in the 1995 update of the Churchill County 1990 Master Plan were designated as public in the Land Use and Transportation Plan map (Map #24 in the Master Plan). This land use designation indicates that the lands should remain in public use for the 20 year planning horizon.

The Policy Plan for Public Lands, included in the updated Master Plan, outlines Churchill County policies on the management of Federal lands. Because the plan was developed in response to the Federal Land Policy and Management Act, most policies pertain to Bureau of Land Management lands. Policies that apply to the planning unit include those on land disposals, retention of public lands in public ownership, access, recreation, geothermal areas, wilderness, agriculture, and wildlife. Many, but not all, of these policies are consistent with the Refuge System Administration Act and other laws governing the management of national wildlife refuges. The policies were interpreted in the context of the plan's specific policy with respect to the planning unit: Stillwater NWR should be managed primarily for wildlife values.

3.2.2.4.2 Lahontan Valley Trails System

The Churchill County Planning Department is continuing to develop a multipurpose trail system to connect the existing parks and schools within the city and provide alternative recreational opportunities to the residents of the county through the provision of a trail system for bicyclists, joggers, hikers, and equestrians. The goals of the project are (1) to provide additional recreational opportunities that residents of Churchill County identified as a priority (Churchill

County Master Plan 1990, 1997); (2) to develop a multipurpose trail system for bicyclists, joggers, hikers, and equestrians between Lahontan Reservoir and Stillwater NWR by the year 2007; and (3) to provide an alternative transportation system in and around the City of Fallon. Several sections have been developed and signed to date.

3.2.2.5 FUNDING CONSIDERATIONS

Because all alternatives must be equally analyzed for implementation, funding considerations must be addressed. The cost to implement each alternative is presented based on typical staff and projects expected for each alternative. Projections are based on normal and predicted budgets. The management activities and projects outlined would be implemented as funds become available. The level of funding required to implement the plan is considered "reasonable" over the next 15 years. However, there may be periods when budgets are lower and it is difficult to obtain funding for even high priority projects. Funding constraints may influence the priority of implementation.

3.2.2.6 MANAGEMENT PHILOSOPHY

The alternatives that were developed and presented in this Final EIS outline different ways to address refuge purposes and the Refuge System mission. Each alternative reflects a different management philosophy, or school of thought, with respect to managing the Stillwater NWR Complex toward a desired end. In some cases, the desired end conditions are different. In other cases, the means to reach the desired conditions are different.

One way that alternatives differ is the level at which wildlife and habitat objectives were developed. Objectives can be developed at several points along a continuum (Figure 3.1) from objectives pertaining to the physical environment and ecological processes to objectives pertaining to the diversity (e.g., richness, abundance, distribution) of species of plants, animals, and microorganisms. Figure 3.1 is a simple illustration of some of the main hydrologic factors that affect biological resources and the different levels at which objectives can be developed to ultimately address biological goals (e.g., natural biological diversity, high waterfowl numbers).

Anchored in different sets of assumptions, each approach represents a different management philosophy. For example, setting objectives based on natural environmental conditions and operation of ecological processes is a logical choice because our understanding of these conditions and processes is relatively high. However, establishing objectives at this level assumes that desired habitat conditions would automatically result from achieving these objectives and, what is more important, that the desired diversity of animals and plants would result from these habitat conditions. Given markedly changed conditions — including significantly reduced water supply, highly altered water chemistry, and the introduction of numerous nonnative species — replicating natural environmental conditions and ecological processes would not be a simple feat, nor would it guarantee the desired levels of natural biological diversity. If objectives are met, it does not necessarily mean that the goals will be

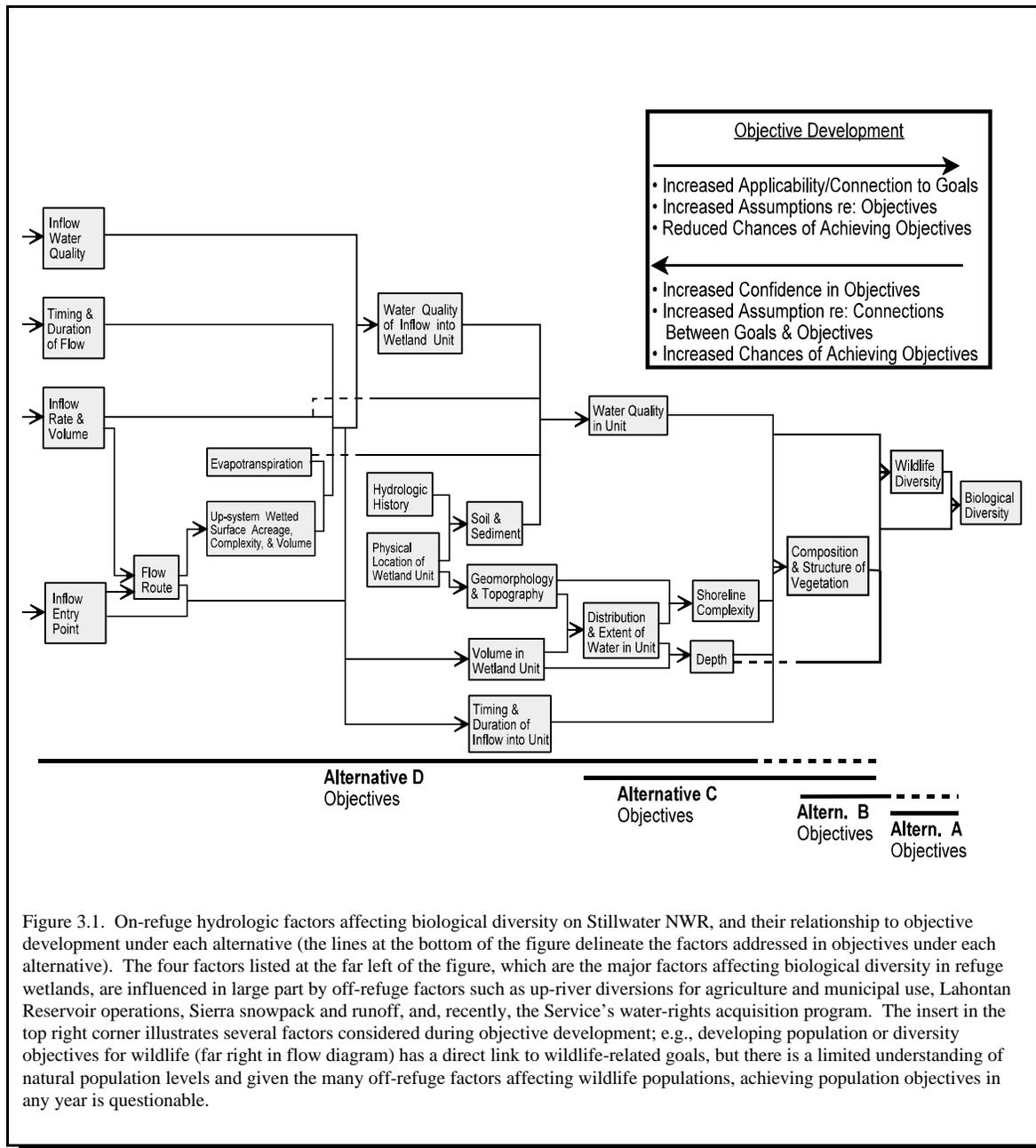


Figure 3.1. On-refuge hydrologic factors affecting biological diversity on Stillwater NWR, and their relationship to objective development under each alternative (the lines at the bottom of the figure delineate the factors addressed in objectives under each alternative). The four factors listed at the far left of the figure, which are the major factors affecting biological diversity in refuge wetlands, are influenced in large part by off-refuge factors such as up-river diversions for agriculture and municipal use, Lahontan Reservoir operations, Sierra snowpack and runoff, and, recently, the Service’s water-rights acquisition program. The insert in the top right corner illustrates several factors considered during objective development; e.g., developing population or diversity objectives for wildlife (far right in flow diagram) has a direct link to wildlife-related goals, but there is a limited understanding of natural population levels and given the many off-refuge factors affecting wildlife populations, achieving population objectives in any year is questionable.

achieved At the other end of the spectrum, establishing objectives that specify the natural richness, abundance, distribution, and structural complexity of animal and plant species and communities, and the richness, distribution, rates, and levels of biotic processes (i.e., natural biological diversity) assumes that these parameters can be estimated relatively accurately. If objectives could be established at this level, it would provide managers with a much more discernable target and would provide more management flexibility in terms of strategies to achieve objectives. However, as opposed to estimating natural environmental conditions, the natural diversity within and among biotic communities can only be roughly approximated and would require many assumptions. Even estimating the natural diversity of representative species and communities could only be done roughly and with many assumptions. Thus, achievement of objectives would only result in goal attainment if objectives correctly reflect natural biological diversity, and this would be difficult to determine. Another consideration is that refuge managers have much less control over populations of wildlife than they do over their habitat (e.g., water, topography, vegetation).

There are several places between these two end points at which objectives can be developed Also, one particular set of objectives can address parameters at several different points along the continuum, depending on the conditions ultimately desired, level of information available, comfort level with respect to assumptions, among other factors.

3.3 OVERVIEW OF ALTERNATIVES

This section presents an overview of the alternatives considered in detail, including features and assumptions that are common to various alternatives, and describes several other alternatives that were considered but not studied in detail.

3.3.1 COMMON FEATURES OF ALTERNATIVES

The five alternatives that are considered in detail in this Final EIS are summarized in the Summary document and in Table 3.1, and are described in more detail in section 3.4.

3.3.1.1 FEATURES AND ASSUMPTIONS COMMON TO ALL ALTERNATIVES

All alternatives contain several common features and assumptions, which would be part of the CCP regardless of alternative selected for implementation. Such features and assumptions are presented below to reduce redundancy of the individual alternative descriptions.

Table 3.1. Summary of the alternatives considered in detail.

		Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (preferred Alternative)
Boundary (acres of Federal land)	Stillwater NWR Stillwater WMA Fallon NWR Total	79,570 ac. 65,603 ac. <u>17,848 ac.</u> 163,021 ac.	79,570 ac. 0 ac. <u>17,848 ac.</u> 97,418 ac.	137,504 ac. 0 ac. <u>0 ac.</u> 137,504 ac.	167,806 ac. 0 ac. <u>0 ac.</u> 167,806 ac.	137,504 ac. 0 ac. <u>0 ac.</u> 137,504 ac.
Ave. Wetland Habitat Acreage		14,000 ac.	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	70,000 AF
WILDLIFE/HABITAT MGMT.						
Biological Focus		Key Species	Key Species	Natural Biodiversity	Natural Biodiversity	Natural Biodiversity with Adaptive Management
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	Adaptive Management Approach based on a combination of simulating Natural ecological processes, the needs of key wetland dependent wildlife guilds, and the potential of existing wetland habitats
Hydrology - Pattern of Inflow - Inflow Rate - Diking - Riparian Restoration - Contaminants	Operational Maximum	Agricultural (imposed by Wetlands Water Rights EIS) # 175 cfs # 450 cfs (existing capacity) Existing None Minimize	Fall Emphasis (and assumes carryover to spring) # 150 cfs # to 450 cfs Additional diking Limited - Stillwater Slough Minimize	Modified Natural (modified to minimize nest flooding, and to ensure that wetland-habitat is provided in the fall/winter) # 450 cfs 800-1,000 cfs Evaluate existing for possible targeted additions/reductions Moderate to high level Minimize	Natural # 350 cfs >1,000 cfs Reductions to simulate a more natural flow & geomorphology Moderate to high Minimize	Modified Natural with Adaptive Management Approximately 400 cfs TCID System capacity Evaluate existing for possible targeted additions Moderate to high level Minimize

	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (preferred Alternative)
Average Wetland Habitat Acres in Stillwater Marsh - Spring - Fall/Winter	11,600 - 14,400 13,600 - 15,100	10,600 - 12,100 15,200 - 16,300	13,900 - 16,900 11,400 - 14,500	14,300 - 24,500 8,400 - 8,900	14,700 - 17,500 12,800 - 13,900
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	Moderate (to provide for needs of key species; 150 - 2000 acres/year)
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	0-500 AUMs/yr - agricultural areas for geese - very limited to reduce emergent vegetation - goats & sheep in IPM - no cattle in riparian & uplands
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	Former farmland, & increased effort in riparian
Farming for Waterfowl	None	300-400 acres (non-Service water rights needed)	200-300 acres (non-Service water rights needed)	None	200-300 acres (non-Service water rights needed)
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	IPM – mechanical, biological (goats, sheep, insects), water management, mechanical, fire, & herbicides
Nuisance Animal Management - Raven & Coyote Control - Muskrat Control	None to limited, to increase waterfowl production Not currently managed as a control measure (muskrat trapping provides recreation and commercial opportunities)	Moderate, to increase waterfowl production Similar to Alternative A	Limited (e.g., if demonstrated to limit natural production rates) Minimize damage to water-control facilities and roads (and rarely to reduce grazing of emergent vegetation)	None None	limited to moderate (e.g., if demonstrated to limit key species production rates) Minimize damage to water-control facilities and roads, to reduce grazing of emergent vegetation, and to prevent disease outbreak

	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (preferred Alternative)								
Nuisance Animal Management - Carp Control	None to limited	Moderate, use of water management and chemicals	Limited to mod., use of water control and limited chemicals	None	Limited to mod., use of water control and limited chemicals								
- Mosquito Control	None	None, but contingency plan would be developed in case of disease outbreak	None, but contingency plan would be developed in case of disease outbreak	None	None, but contingency plan would be developed in case of disease outbreak								
Human Activity Impacts - Apportionment of Wetland habitat	1 st 500 acres to sanctuary then the amount of sanctuary would be maintained as follows: <table border="0"> <tr> <td style="text-align: right;"><u>Total Acres</u></td> <td style="text-align: right;"><u>Amt in Sanct</u></td> </tr> <tr> <td><4,000</td> <td>55-75%</td> </tr> <tr> <td>>4,000-11,000</td> <td>35-40%</td> </tr> <tr> <td>>11,000</td> <td>#30%</td> </tr> </table>	<u>Total Acres</u>	<u>Amt in Sanct</u>	<4,000	55-75%	>4,000-11,000	35-40%	>11,000	#30%	1 st 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)	1 st 4,000 acres to sanctuary <i>Option 1:</i> 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.) <i>Option 2:</i> each additional 5,500 acres to: 1) general hunt area (2,500 ac.) 2) primitive hunt area (2,500 ac.) 3) sanctuary (500 ac.)	1 st 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.)	1 st 3,000 acres to sanctuary 2 nd 3,000 acres to hunt area Additional acreage will be apportioned equally between the hunt area and sanctuary until the full 5,000 acres of sanctuary habitat is hydrated.
<u>Total Acres</u>	<u>Amt in Sanct</u>												
<4,000	55-75%												
>4,000-11,000	35-40%												
>11,000	#30%												
- Wetland Units in Sanctuary	All units south of Division Road	All units south of Division Road	<i>Option 1:</i> Stillwater Point Reservoir, Upper Foxtail Lake, West Marsh, & Lead Lake <i>Option 2:</i> All units south of Division Road, except Cattail Lake	All units south of Division Road	All units south of Division Road and east of Hunter Road								

	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (preferred Alternative)
Human Activity Impacts (cont.) - Wetland Units in Restricted- Access Areas	None	None	<i>Option 1:</i> None <i>Option 2:</i> West Marsh & Swan Lk.	None	No Boats allowed on Swan Lake, the north 1/3 of North Nutgrass, and the North 1/3 of Pintail Bay.
- 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: <i>Option 1:</i> no boating in one unit <i>Option 2:</i> 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	No boating March 1 to August 1, except non- motorized in Swan Check. No wake, speed, or engine size restrictions unless a need is shown through monitoring Non-motorized boating on all units except as described above. Outboard motorized boating on all units except as described above and Willow Lake, West Nutgrass, and Swan Check. Airboats allowed on Goose Lake, the south 2/3 of North Nutgrass, and the south 2/3 of Pintail Bay. A new boat ramp will be established at the northern portion of North Tule Lake
- Camping	Few restrictions	Camping limited to designated areas	Camping would be limited to designated areas, and only in fully contained units	No camping	Overnight stays would be limited to designated areas subject to time restrictions. No unattended camp sites allowed.
- Road Closures	Existing	Existing	Existing closures, plus closure of North Road & Willow Dike Road	Existing, plus limited additional closures	Existing closures, plus closure of North Road & the southern 2/3 of Willow Dike Road

	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (preferred Alternative)
VISITOR SERVICES MGMT. Hunting - Wetland Units Open to Waterfowl Hunting - Days/Times - Special Features	All units north of Division Road, Indian Lakes, along D-Line Canal, & Battleground Marsh (occasional) 7 days/week, all day Few restrictions, airboats & other boats permitted in open area	All units north of Division Road, & 40% of wetland-habitat in Fallon NWR (on rare occasions). 7 days/week, all day Similar to Alternative A, except that additional regulations would be imposed	<i>Option 1:</i> All units north of Div. Road (except Lead Lake & West Marsh), & along D-Line Canal (Indian Lakes not in boundary) <i>Option 2:</i> All units north of Div. Road & along D-Line Canal 7 days/week, all day <i>Option 2:</i> Addition of a primitive hunt area (remote location, walk-in only);	All units north of Division Road (except Goose Lake, South Nutgrass, Swan Check, and Tule Lake) 7 days/week, until noon Enhanced opportunities for hunters willing to walk-in or use non-motorized craft	All units north of Div. Road and all Federally owned properties in the existing Stillwater WMA to be included in the Alternative C boundary excluding Timber Lakes and portions of the Alves Property 7 days/week, all day Enhanced opportunities for hunters desiring different forms of hunting access
Environmental Education/Interpretation & Wildlife Observation/Photography - Facilities - On-site Environmental Education & Interpretation Program and Opportunities - Off-site Environmental Education Program - Observation & Photography Opportunities	Dirt roads, boat ramps, 2 portable toilets Moderate, but limited by lack of facilities & from no separation from hunting Moderate Opportunistic (roads and a crude map are provided)	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 Enhanced, but only limited separation from hunting (none in Stillwater Marsh) Improved over Alt. A Enhanced by improved facilities	Same as Alternative B and: - outdoor classroom in Stillwater Marsh - interpretive kiosks - wildlife observation trails (in marsh and along Carson River) Much enhanced by facilities and designated site for environmental education outside of the hunt area Same as Alternative B Greatly enhanced by facilities & a designated area for non-hunting activities (under Option 1)	Same as Alternative C, and: - enhanced visitor facility at Stillwater Point Reservoir - additional trails Greatly enhanced by facilities, designated area for non-hunting activities Improved over Alt. B Greatly enhanced by facilities & a designated area for non-hunting activities	Same as Alternative C and: - additional tour loop located around Upper Foxtail Lake (Development will be phased in over three years with monitoring initiated to assess human activity impacts impacts to wildlife) No Change from Alternative C Same as Alternative B Same as Alternative C
Fishing	Permitted	Not permitted	Not permitted	Not permitted	Not permitted

	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Alternative E (preferred Alternative)
Cultural Resources MgMt.	Basic protection measures	Basic protection measures	Basic protection measures, goals and objectives for cultural resources, & a staff archeologist	Same as Alternative C	Basic protection measures, goals and objectives for cultural resources, & a staff archeologist
Anaho Island NWR	Monitoring of colony nesters	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative

Water Rights Acquisition Program

1. A long-term average of 14,000 acres of primary wetland habitat would be sustained on Stillwater NWR, and the Service would continue to explore the possibility of a coordinated approach to managing Lahontan Valley wetlands.
2. The water rights acquisition program would continue according to the program outlined in Alternative 5 of the WRAP EIS and ROD (USFWS 1996a,b). Stillwater NWR is anticipated to eventually have an average of 70,000 acre-feet of water available to sustain a long-term average of 14,000 acres of primary wetland habitat. This would include about 35,880 acre feet/year from the acquisition of 42,000 acre-feet of water rights (acquired at 3.5 acre feet/acre of water rights and transferred to the wetlands at the rate of 2.99 acre feet/acre).
3. The land disposal program that is being developed will be incorporated into the CCP. P. L. 105-277, the Omnibus Consolidated and Emergency Supplemental Appropriations Act of 1999, established a permanent authorization for the Service to sell land and interests in lands (other than surface water rights) acquired through the Service's water rights acquisition program for Lahontan Valley wetlands pursuant to Section 206 of P. L. 101-618. The sales proceeds must be deposited into the Lahontan Valley and Pyramid Lake Fish and Wildlife Fund and used for additional wetland water purchases.

The Service is currently considering whether to sell acquired lands that are outside the refuge boundary. In December 1998, through a series of meetings with interested organizations and agencies, the Service began a scoping process to develop and analyze a proposed land sales action and alternatives. The proposed land sales program is separate from the actions analyzed in this Final EIS, would not affect any lands acquired within the Stillwater NWR boundary, and would only be implemented after the appropriate environmental analysis and decision document have been completed. A Land Disposal Plan Environmental Assessment is currently being prepared and will be implemented upon approval.

4. Projected annual expenditures related to the water rights acquisition program would be the same for all alternatives. According to estimates provided in the WRAP EIS (USFWS 1996a), Stillwater NWR's portion of the annual operation and maintenance costs, and costs of groundwater pumping and leasing water rights would be an estimated average of \$1.6 to \$1.8 million/year. This includes an estimated annual operation and maintenance (O&M) cost for delivering 42,000 acre-feet per year of water (i.e., completion of the water rights acquisition program) of about \$410,000 per year, assuming the 1999 rate of \$33.90/water righted acre. This is a conservative estimate. In reality, operation and maintenance costs have increased from \$21.40 per water righted acre in 1990 to \$35.00 per water righted acre in 2000. At that rate, a reasonable projection of operation charges at the completion of the water rights acquisition program (an estimated 15 to 20 years) would be in excess of \$1.1 million. Other projected costs do not include adjustments for inflation. Also, leasing costs could range from \$0 up to as high as \$3.9 million in any given year. The projected annual costs identified above assumed an average of \$1.9 million per year.

Laws, Regulations, and Policy

1. Threatened and endangered species of plants and animals would be protected under the Endangered Species Act of 1973, as amended.
2. In compliance with the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act of 1990, any retrofitting of existing facilities or new construction for public use would include assessment of and adherence to specific guidance outlined in these mandates.
3. Cultural and historic resources would be managed in accordance with applicable laws and memorandums of understanding (see earlier sections).
4. The Service would comply with all applicable Federal laws and regulations.
5. Terms would be used as defined in the Glossary, except as modified through Service policy and further evaluations of the definitions.

3.3.1.2 FEATURES AND ASSUMPTIONS COMMON TO ALL ACTION ALTERNATIVES

Boundary Revision

1. The Indian Lakes area would not be added to Stillwater NWR (USFWS 1996c).

Wildlife Conservation

- 1.. The focus of refuge management would be conserving native fish, wildlife, and plants, and providing opportunities for compatible wildlife-dependent recreation. Other uses may be provided if the Service finds them to be an appropriate use of the refuge and ensures that they are compatible with refuge purposes, including assurances that their management would not divert funding and staff away from the first and second priorities listed above (see Appendix O).
2. Introduction of species not native to any refuge would be prohibited, except for biological control agents that may, after proper testing and approval by the U.S. Department of Agriculture - Technical Advisory Group for the Biological Control of Weeds, be released to control other, nonnative invasive species and limited agricultural crops may be planted for wildlife use. To the extent possible, local (i.e., Lahontan Valley) sources of plant material would be used and out of state sources would be avoided.

Visitor Services Management

1. Fishing would not be permitted primarily because 1) Fishing would generally occur in delivery canals and more permanently wetted units that are also preferred waterbird nesting sites. 2) Management strategies to maintain productive marsh habitat and to sustain sport fisheries are in conflict, including controlling nonnative fish populations such as carp. 3) Fish in the Lahontan Valley contain high mercury concentrations. A

health advisory recommending no fish consumption in the lower Carson River is in effect. 4) Currently the primary fish available is the European carp. Other nonnative game fish such as largemouth bass, catfish, Sacramento perch and many others enter refuge wetlands from Lahontan Reservoir but long term survival may be limited due to widely fluctuating water levels, high salinity and reduced oxygen of Stillwater marsh waters. 5) There are other locations (including Indian Lakes, irrigation reservoirs, and Lahontan Reservoir) in Lahontan Valley where fishing opportunities are available. In the event that the health advisory is lifted and strategies to minimize adverse impacts to wildlife can be assured, fishing would be reevaluated.

2. Bicycles and horses would be permitted only on roads open to vehicular traffic.

Changes in Road Status in the Area now within Stillwater WMA and Fallon NWR

Roads that are on Federal lands within Stillwater WMA and Fallon NWR will be evaluated based on a number of criteria to determine if there is sufficient justification to keep certain roads or segments of roads open for vehicular use (this would not apply to Alternative B). For some roads remaining open to vehicular use, seasonal or periodic closures may be necessary (e.g., during inclement weather to protect road beds). To maintain the remote and rugged nature of the area now encompassed within Stillwater WMA and Fallon NWR, all open roads (except the Indian Lakes Road and the road accessing Battleground Point) would be two track roads, and a maximum road density would be determined for this area. To the greatest extent possible, only one road would provide access to a given area of the refuge.

Roads may remain open to public vehicular use if the following criteria are met:

1. Vehicle access to a particular site is needed to support a wildlife-dependent recreational use, based on previously determined needs. Providing access for non-wildlife-dependent recreation will generally not warrant keeping a road open.
2. Traffic has minimal disturbance to wildlife populations.
3. Road has minimal impact on wildlife and fish habitat (e.g., sedimentation, transport of noxious weed seeds).
4. Road meets basic safety standards for road type.
5. Benefits of keeping a road or portion of a road open is outweighed by potential adverse impacts to reptiles (e.g., commercial and other collecting), unique and sensitive habitats (e.g., access to dunes, roads in riparian areas), and cultural resources (e.g., looting).
6. Funding and staffing is available to make periodic repairs and to provide adequate law enforcement needed to minimize adverse impacts to wildlife, habitat, and cultural resources (e.g., impacts of roads on riparian habitats, off road vehicle impacts to dunes, collection of artifacts).
7. Road is needed to access a private, county, or state inholding. If this criterion is met for a particular road, but one or more of the above criteria are not met for the same road, the Service will work with the appropriate parties to minimize the potential adverse impacts that may result from keeping the road open.

Wilderness Review

1. Anaho Island was proposed for wilderness designation as a roadless island in 1974. Therefore, it will be managed to preserve its wilderness character, which is consistent with its current management. Although the Service exercises primary jurisdiction over the island, no major deviations from current management practices will occur without the consent of and coordination with the Pyramid Lake Paiute Tribe, as per Resolution No. 19-90 of the Pyramid Lake Paiute Tribal Council and P. L. 101-618. (see also Section 3.2.2.1.6)
2. Upon the establishment of an approved refuge boundary following this planning process, the wilderness potential of the lands within the new Stillwater NWR/Fallon NWR boundary would be studied further. The northern and central part of the boundary revision study area meets the criteria for potential wilderness (Section 3.2.2.1.6). The chain of sand dunes along the northern part of the study area is over 14,000 acres and apparently formed by wind action blowing sediments deposited by the Carson River at its terminus. These dunes are unvegetated and unstable, meaning that they are currently active and mobile. A recent inventory revealed the possibility that two species of dune beetles may be endemic to this unique sand formation (Rust 1998). There are few roads through this area, no improved roads, and they are only occasionally used by Service personnel, researchers, and refuge visitors. Conducting a wilderness review during this planning process was premature because the boundaries of the refuges could potentially change.

Adaptive Management

A three tiered approach to monitoring would be implemented under any of the action alternatives selected. The first level would involve tracking the implementation of strategies outlined under the alternative selected for implementation. This is important because evaluating the effectiveness of strategies in achieving objectives assumes that the prescribed strategies, as a program, are carried out. If strategies are not implemented as prescribed, this would be considered in assessing the effectiveness of the particular alternative's management program.

For the strategies that are implemented, periodic analysis of monitoring data would be used to evaluate the effectiveness of these strategies in achieving objectives. This second level of monitoring is the traditional focus of monitoring programs and would be the most detailed. If, through monitoring, it is found that a particular objective or set of objectives is not being achieved by carrying out a prescribed strategy, it may be necessary to adjust the strategy or identify a different strategy. In some cases, this may require additional NEPA analysis.

Achievement of objectives would also be evaluated against the refuge goals and purposes under which they were developed to ascertain the appropriateness of the objectives. Under each alternative, it is assumed that achievement of objectives would result in the accomplishment of refuge goals and purposes. Because this involves assumptions based on professional judgement, resource management principles, and scientific information, Refuge staff must periodically evaluate these assumptions. If a particular set of objectives are determined to be achieved through monitoring (previous paragraph), yet they do not appear to be contributing to refuge goal accomplishment, adjustments to the objective may be needed. If changes to objectives are substantive and outside the scope established by the alternative's guiding principles, this Final

EIS may have to be modified through further NEPA analysis and public involvement. Substantive changes to goals, subgoals, and definitions of key terms would be outside the scope of adaptive management, and such changes may require a new plan to be developed.

Step down Management Plans

Detailed, step down management plans would be developed for the following, each of which would be reviewed every 3 to 5 years unless otherwise noted:

1. Habitat management
2. Water management (prepared annually)
3. Fire management
4. Integrated pest management plan
5. Biological monitoring program
- 6.. Visitor Services management
7. Hunt plan (prepared annually)
8. Contingency/emergency plan for mosquito abatement

3.3.2 ALTERNATIVES CONSIDERED, BUT NOT STUDIED IN DETAIL

The Service considered several other approaches to managing wildlife and habitat on Stillwater NWR. However, because these approaches were not found to be appropriate or realistic, they were not evaluated in detail.

3.3.2.1 BOUNDARY REVISION TO INCLUDE CARSON RIVER AND SAND DUNE COMPLEX

One of the other boundary revisions that was considered in addition to those identified and considered in detail in this Final EIS was a boundary of Stillwater NWR that would have included the Carson River corridor and the entire sand dune complex along the southern edge of the Carson Sink, similar to Alternatives C, D, and E. However, the lands between the Carson River corridor and the existing western boundary of Stillwater NWR south of the sand dune complex would not be included under this alternative. It was not considered in detail for a combination of reasons. It is very similar to alternatives C and E, the only difference being the 21,000 acre block of primarily salt desert shrub and playa habitat between Indian Lakes and the Stillwater Marsh was excluded. The primary reason for including this 21,000 acres of habitat in the proposed boundary alternatives is that it comprises a major component of the natural biological diversity in the Lahontan Valley. Furthermore, none of this habitat is currently managed primarily for wildlife or native plant species. The final reason for including the area in the proposed boundary is that it is already in federal ownership and has been managed in part by the Service since 1948.

3.3.2.2 CUSTODIAL MAINTENANCE

One interpretation of natural biological diversity is the biological diversity that would result from abandoning all active management of Stillwater NWR and disallowing any public use on the refuge (i.e., absence of any current human influences within the boundaries of Stillwater NWR). This view of natural, as it pertains to requirements of P.L. 101-618 and other management authorities, is flawed for several reasons. First, the major human influences that affect the animal and plant communities on Stillwater NWR occur well outside the boundaries of the refuge (closing the refuge would not resolve these factors). For instance, the water that reaches the refuge is highly controlled and otherwise affected by people throughout the Carson River watershed. Secondly, existing conditions on the refuge are a consequence of past human activities on and off the refuge, including dike construction, mining that resulted in substantial deposits of mercury on the refuge, and the introduction of salt cedar which is now prevalent on the refuge. Therefore, the assumption that a hands off approach would result in natural biological diversity is unrealistic.

3.3.2.3 FULL RESTORATION OF THE NATURAL HYDROLOGY OF STILLWATER MARSH

The most direct approach to restoring natural biodiversity within Stillwater NWR would be to restore the hydrology of the wetlands to natural conditions. An assumption of this alternative is that a natural biological diversity in Stillwater Marsh would result from restoring natural water flow volumes, timing, patterns, and chemistry.

A major requirement would be to restore Stillwater Slough and to increase the canal capacity leading into Stillwater Slough so that the system could accommodate a flow of at least 4,000 cubic feet per second (cfs), but ideally up to 10,000 cfs or more. This would require major reconfiguration and construction of the canals below Lahontan Reservoir as well as major modifications to the Lahontan Reservoir dam.

Water delivery under this alternative would require a long-term application of 2 to 40 acre-feet per acre per year (AF/acre/year) of water to Stillwater Marsh. An estimated long-term average application rate of about 15 AF/acre/year would be needed, or a long-term average of 210,000 acre-feet per year to sustain a long-term average of 14,000 acres of wetland habitat. This strategy would be necessary to maintain water quality in the marsh similar to that which occurred under natural conditions, which ultimately is necessary to restore and sustain a natural composition and structure of the plant communities. To attain these flow rates, additional water rights would have to be purchased. As a consequence of this strategy, most of the water applied to Stillwater Marsh would flow through the marsh into the Carson Sink.

Restoring the natural shoreline configuration and geomorphology of Stillwater Marsh to natural conditions would require the removal of all dikes, canals, and water control structures, to the extent needed to sustain a long-term average of 14,000 acres of wetland habitat in the historic marsh under this approach. The 1937 topographic map, created prior to any development, could be used to determine the extent of the historic marsh. Deep water areas, including the natural path of Stillwater Slough through the marsh, would have to be restored. This may require some excavation, but flood flows would assist in this effort. Some of the roads associated with dikes could be replaced with bridges.

This approach would be impractical and unreasonable for several reasons, including: (1) major reconstruction of Lahontan Reservoir and other infrastructure of the Newlands Project does not appear to be reasonable; (2) the town of Stillwater would have to be moved, as flooding would be a regular occurrence; (3) without major reconstruction to address flooding in the City of Fallon and surrounding areas, Fallon area residents would regularly be flooded; (4) needed agreements with the Canvasback Gun Club are probably unattainable; (5) restoration of the natural hydrology without addressing other factors limiting the achievement of natural biological diversity in Stillwater Marsh (e.g., introduced species, a great many off-refuge factors affecting migratory bird populations and movements) would not result in the full achievement of natural biodiversity; (6) a significant increase in water rights purchases would conflict with the water rights acquisition EIS; (7) sufficient water rights would likely not be available for acquisition.

3.3.2.4 REDUCED WETLAND WATER DEMAND

Consideration was given to developing an alternative that would lower the annual wetland water demand considerably below 5 acre-feet/acre/year. Alternative B provides an alternative that could potentially reduce the wetland water demand by a small amount. Examining an alternative water management scenario that would reduce the demand far below 5 acre-feet per acre, per year, was not considered in detail for the following reasons. The restoration of natural biological diversity is a major purpose for which Stillwater NWR wetlands are to be managed. This mandate is consistent with the fulfillment of international treaty obligations, which is another purpose of Stillwater NWR. The native biotic communities of Stillwater Marsh evolved under a wetland hydrologic regime that entailed large volumes of water flowing into and through the marsh.

Using estimates provided in Kerley et al. (1993), the average amount of water flowing into Stillwater Marsh would have been in the neighborhood of 15 to 20 acre-feet per acre, per year, or more, which would have resulted in an average of two-thirds to three-quarters of the inflow water passing through the marsh and out into the Carson Sink. This estimate is based on the following assumptions derived from Kerley et al. (1993): an average inflow into Stillwater Marsh of 270,000 acre-feet, (2) an average of 15,000 acres of wetland habitat in Stillwater Marsh, and (3) an estimated evapotranspiration rate of 5 acre-feet per acre, per year. Rarely would the annual flow into Stillwater Marsh have been less than 100,000 acre-feet per year, and under this situation, the volume of inflow per acre of wetland habitat would have exceeded 5 acre-feet per acre, per year. Thus, it would be unreasonable to design a water management program with a wetland inflow demand that was less than the annual evapotranspiration rate (i.e., less than 5 acre-feet per acre, per year).

3.3.2.5 CLOSURE OF STILLWATER MARSH DURING THE BREEDING SEASON

Because of concerns about the effects that people have on wildlife during the breeding season, it was suggested that the entire Stillwater Marsh be closed to public access during the breeding season. However, most people that visit the refuge for purposes of birdwatching, environmental education, and touring the refuge use the refuge during the spring and summer. Excluding people from the marsh at this time would forego a tremendous opportunity to share with people

the diversity and abundance of wildlife of the refuge and the importance of conserving wetland habitat in Nevada.

3.3.2.6 SANCTUARY IN THE HIGHEST QUALITY WETLAND UNITS

In evaluating potential configurations of a sanctuary, general public use area, and hunting area, numerous scenarios were delineated on maps. Given the Refuge System's fundamental mission of wildlife conservation and directive to consider the needs of wildlife first in all decisions, several scenarios were developed that would dedicate the best available wetland habitat on the refuge to wildlife as a sanctuary. Alternative locations for a sanctuary were considered in part because the current sanctuary encompasses less than optimum wetland habitat. The wetlands were constructed in the 1950s and the largest wetland unit is the refuge's primary regulating reservoir. These wetlands have different characteristics than the natural marsh.

One configuration was delineated that represented a near ideal situation for wildlife. Under this scenario, Nutgrass Lake, Goose Lake, and Pintail Bay would be designated as sanctuary. A slightly different scenario would be to close Nutgrass Lake, Swan Lake, and Pintail Bay, which would provide the greatest protection for cultural resources of any of the scenarios considered. However, because an estimated 60 to 70 percent of the waterfowl hunting occurs in Nutgrass Lake, Goose Lake, and Pintail Bay, this alternative was not studied in detail. Several other alternatives were studied in detail that would ensure at least some high quality habitat would be available to birds in the historic marsh but that would have relatively few effects to hunting opportunities (e.g., Alternatives C and D).

3.3.2.7 WALK IN ONLY HUNT AREA AT THE NORTHEAST END OF STILLWATER MARSH

An alternative to Alternative C's Option 2 walk in hunt location was considered as a replacement to the locations proposed under this option. Rather than locate the walk in only hunt area in West Marsh (Willow and Millen Lakes) and Swan Lake, consideration was given to delineating Pintail Bay and the northern part of the North Nutgrass unit. This was deemed a less desirable location for a walk in only hunt area for several reasons. Pintail Bay and the northern end of Nutgrass Lake have fairly simple shorelines (e.g., very few peninsulas and islands) as compared to the complex shorelines of West Marsh and Swan Lake, which could result in a relatively small number of walk in hunters disturbing waterfowl over a large area. The long southern edge of the walk in only boundary in North Nutgrass could be approached by boaters, which would affect waterfowl well into the walk in only hunt area. This would provide fewer opportunities to hunters in the walk in only hunt areas (due to easily flushed birds) than could be provided in West Marsh and Swan Lake. Furthermore, proportionally far less of the area would remain relatively undisturbed, which would have fewer benefits to waterbirds.

After review of comments received on the Draft CCP EIS, the Service has reconsidered this management option and included a combination of this approach and the Draft CCP Alternative C (option 2) approach into preferred Alternative E of this Final CCP EIS. The objective of this combination was to provide for a maximum range of opportunity for Stillwater NWR Complex visitors while maintaining optimal foraging habitat for migrating and wintering waterfowl, free from boat related disturbance.

3.4 ALTERNATIVES CONSIDERED IN DETAIL

3.4.1 CHANGES FROM DRAFT CCP EIS

The structure of this Final CCP EIS is essentially the same as was released in the Draft CCP EIS with the primary exception that a fifth Alternative E has been added to the analysis. Alternative E represents a combination of elements included in Draft Alternatives A through D. Alternative E was prepared in response to comments received on the Draft CCP EIS and does not include elements that were not previously analyzed. It does, however, incorporate the best or most popular elements of the other Alternatives.

The remainder of this chapter will repeat the materials presented in the Draft CCP EIS as modified to include editorial correction or clarification of materials identified in Draft CCP EIS comments. The Alternative E section (3.4.E) will primarily be based on elements presented and evaluated under Draft Alternative C (option 2) as modified by comments received. The goals and subgoals presented in Alternative C (option 2) have not been modified in Alternative E; however, several objectives and strategies have. Where Alternative E has not been modified from Draft Alternative C (option 2), the section will be marked as “same as Alternative C.” Where modifications have been made, the accompanying text for the Objective has been expanded. While duplication of material and redundancy may be evident within this Final CCP EIS, the Service chose to use this strategy to ensure that reviewers could see exactly how Alternative E differs from Draft Alternative C and therefore, easily discern how the comments were incorporated in this Final CCP EIS.

3.4.A ALTERNATIVE A - No Action Alternative

Under this alternative, it is assumed that management of Stillwater NWR, Stillwater WMA, and Fallon NWR would generally follow the goals, objectives, and strategies outlined in the *1987 Management Plan for Stillwater Wildlife Management Area*, published in Volume II of the WRAP EIS (USFWS 1996a). This plan was founded on the 1948 Tripartite Agreement, as amended. Under an extension to the Tripartite Agreement (USBOR 2000), the Service would continue to coordinate management of Stillwater WMA with the Bureau of Reclamation (Section 3.2.2.1.1). A major part of this alternative's program, not covered in the 1987 plan, is the continuation of the Service's water rights acquisition program (Section 3.2.1.3.5). This would be the same for all alternatives.

Management would focus on providing for the needs of key wildlife species. Of particular emphasis under this alternative would be providing high quality breeding habitat for waterfowl and other waterbirds. A considerable amount of wetland habitat would be maintained during the fall and winter as well, to provide habitat for waterfowl and to provide opportunities for waterfowl hunting. The existing boundaries of Stillwater NWR, Stillwater WMA, and Fallon NWR would continue under this alternative, but most of the management emphasis would be given to wetland management on Stillwater NWR.

Hunting would continue as the priority public use of the area. Opportunities for environmental education, wildlife observation, fishing, and other uses would also be offered, but very few facilities would be provided for these other uses. Commercial livestock grazing, muskrat trapping, and fishing would continue as it has in the past.

Anaho Island NWR would continue to be managed much as it has in the recent past, with an emphasis on protecting and monitoring the nesting colony of American white pelicans and other colony nesting birds that use the island.

Because this alternative is based on the 1948 Tripartite Agreement and is not consistent with Public Law 101-618 and the Refuge System Administration Act, it would not be practical to implement this alternative as written. As the No Action Alternative, it provides a baseline for comparing the action alternatives (Alternatives B, C, and D).

3.4.A.1 BROAD MANAGEMENT DIRECTION

3.4.A.1.1 Refuge and WMA Purposes

Stillwater NWR/WMA, and part of Fallon NWR (1948 Tripartite Agreement)

1. Conservation, rehabilitation, and management of wildlife, and its resources and habitat, including the operation and maintenance of a wildlife sanctuary.
2. Operation and maintenance of a public shooting ground.

The following would be managed commensurate with the primary purposes.

1. Fur production, particularly muskrat production.
2. Livestock grazing.

Fallon NWR (Executive Order 5606)

1. Provide a sanctuary and breeding ground for birds and other wildlife.

Anaho Island NWR (Executive Order 1819)

1. Provide a preserve and breeding ground for native birds.

3.4.A.1.2 Refuge Goals and Other Programs

The wildlife management and public use programs are the focus of refuge management. As such, they are the focus of management goals. Other programs provide support to achieve these goals and ensure the protection of other resources, compliance with laws and safety regulations, and the administration of the complex.

Stillwater NWR/WMA and Fallon NWR Goals

- A. Provide an average of 14,000 acres of wetland nesting habitat including stands of hardstem bulrush.
- B. Provide a fall and spring resting, feeding, and staging area of 14,000 wetland habitat acres for migrating waterbirds.
- C. Provide a variety of habitat for wildlife diversity.
- D. Improve the quality of existing wildlife/wildland recreation and enhance opportunities for interpretation and environmental education.

Basis of Goals: The above goals were generally developed under the purposes for which Stillwater NWR and Stillwater WMA were established (1948 Tripartite Agreement). They support the goals of the Refuge System, outlined in Service policy that existed at the time (Section 3.2.1.1.2). The refuge and the management area goals that affect management of Fallon NWR, especially in regards to breeding habitat, generally support the purposes for which this refuge was established.

Anaho Island NWR Goals

- A. Protect and perpetuate colonial nesting birds and other migratory birds.

Basis of Goals: Anaho Island NWR was established to protect the American white pelican nesting colony and other colonies of nesting birds. This goal supports the purposes for which the refuge was established.

Other Programs and Areas of Emphasis

In addition to refuge goals that generally outline how refuges are to be managed to achieve the purposes for which they were established, many refuges have other programs that are peripheral to the core programs (i.e., wildlife and wildlife-dependent recreation). The programs that would be part of this alternative are listed below and described in more detail later. Many of the programs are integrally related to the core programs.

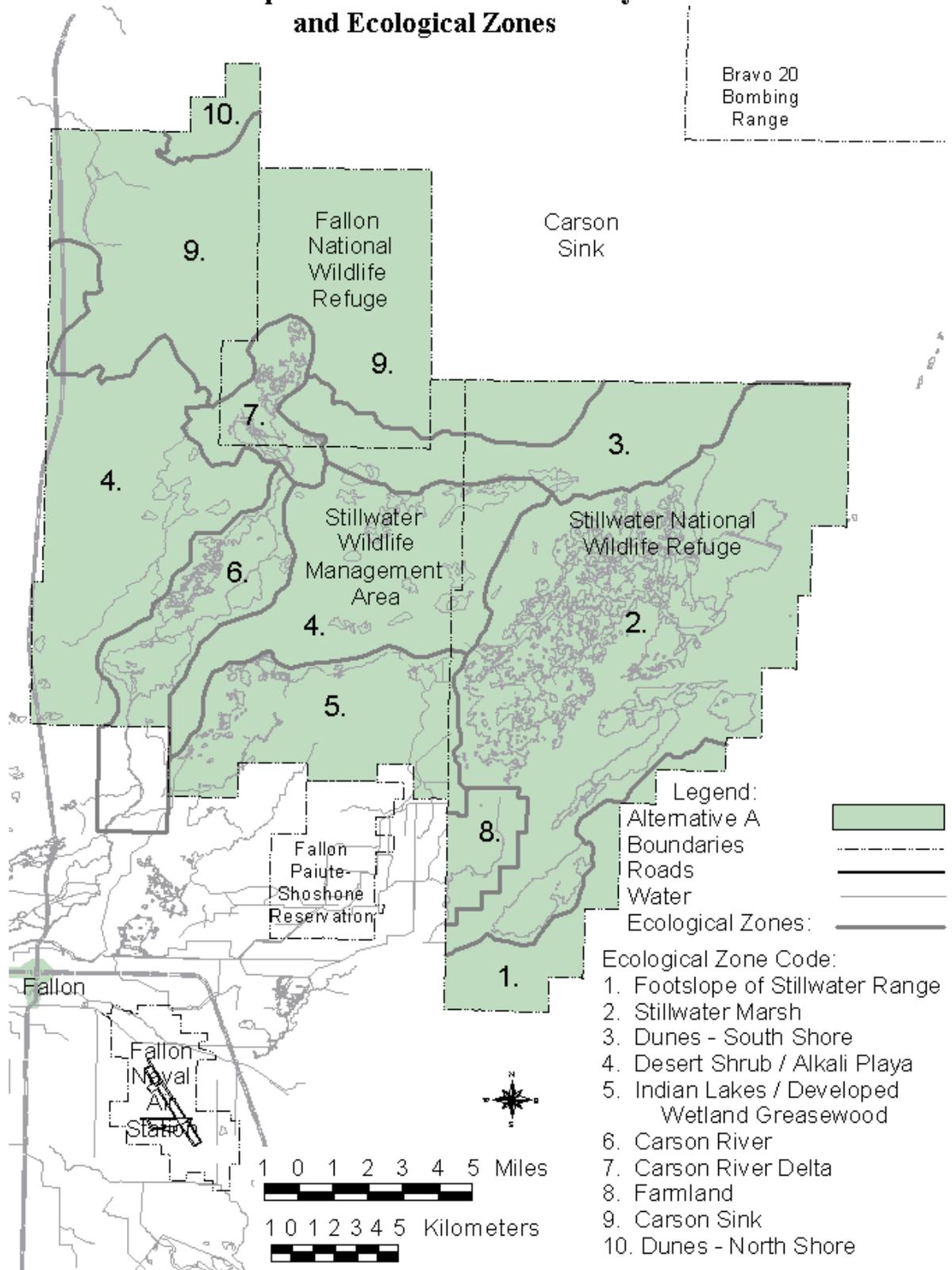
- Commercial Use Program
- Outreach Program
- Partnerships and Other Cooperative Efforts
- Water rights Acquisition and Land Disposal Program
- Fire Management
- Cultural Resource Management
- Monitoring and Research Program
- Facilities Maintenance and Safety
- Law Enforcement
- Administration

3.4.A.2 STILLWATER NWR, STILLWATER WMA, AND FALLON NWR

3.4.A.2.1 Boundaries

Under this alternative, the existing boundaries of Stillwater NWR, Stillwater WMA, and Fallon NWR would continue into the future (Map 3.1). The boundary of Stillwater WMA, according to the Tripartite Agreement, encompasses all the land now within Stillwater WMA, Stillwater NWR, and the contiguous portion of Fallon NWR. Stillwater NWR originally comprised the sanctuary area south of Division Road, but the boundaries of the refuge were expanded in 1990 under P.L. 101-618. The ecological zones depicted in Map 3.1 show the general types of habitat that are encompassed in the existing boundaries of Stillwater NWR, Stillwater WMA, and Fallon NWR.

Map 3.1 Alternative A Boundary and Ecological Zones



3.4.A.2.2 Management Program

This alternative would continue the management strategies that were in place prior to P.L. 101-618. Most of the following guiding principles, objectives and their basis, and strategies were taken directly from the *1987 Management Plan for Stillwater Wildlife Management Area*, which was founded on the 1948 Tripartite Agreement. Because the average of 14,000 acres of wetland habitat targeted in the 1987 plan is consistent with Stillwater NWR/WMA's portion of the 25,000 acre target for primary Lahontan Valley wetlands (subsection 206(a), P.L. 101-618), the water management strategies in the 1987 plan are consistent with the Service's water rights acquisition program outlined in the WRAP EIS/ROD. The 1987 plan (Stillwater NWR files, and printed as Appendix 2 of the WRAP EIS), covers Stillwater NWR/WMA and the contiguous, southern part of Fallon NWR.

3.4.A.2.2.1 Fish, Wildlife, and Habitat Management

Guiding Principles

The following principles would guide the management of fish, wildlife, and habitat under this alternative.

Habitat Conditions. This alternative would focus on providing the habitat needs of key species and groups of species. As such, the Service would maintain a key species approach to managing Stillwater NWR, Stillwater WMA and Fallon NWR. The overall mission for Stillwater NWR, Stillwater WMA and Fallon NWR under this alternative would be to provide habitat for nesting birds, and spring and fall migrants, with an emphasis on waterfowl, and a growing emphasis on shorebirds. Species of special interest would include redheads, canvasbacks, tundra swans, white-faced ibis, white pelicans, bald eagles, and peregrine falcons. In general, wildlife management and public use management would be emphasized on Stillwater NWR, and livestock grazing would be the emphasis on the remainder of the area. Under a 1960 working agreement between the Service and the Nevada Wildlife Commission, lands within the area now within Stillwater WMA and Fallon NWR were to be developed for livestock grazing with collateral benefits to wildlife, as compared to the area now within Stillwater NWR, which was to be managed for wildlife with collateral benefits to livestock grazing (Nevada Wildlife Commission and USFWS 1960).

General Approach to Producing these Habitat Conditions. In developing annual water plans, the order of priority for water use would be to (1) sustain a high survival of emergent vegetation through drought years, (2) provide high quality nesting and brooding habitat and to maintain water levels during the breeding season, (3) provide circulation of water to promote growth of sago pondweed, and (4) refill wetland units after draining them to dump salts or kill carp. With respect to managing for particular species, habitat management priorities would be as follows:

1. Redhead production habitat.
2. Redhead and canvasback maintenance habitat.

3. Production habitat for other waterfowl.
4. Maintenance habitat for other waterfowl, especially tundra swans.
5. Production habitat for other waterbirds.
6. Maintenance habitat for other waterbirds, bald eagles, and peregrine falcons.
7. Maximum habitat diversity for other wildlife.

Parallel with the guiding principles outlined above, habitat management would focus on the management tools that would most effectively produce the habitat conditions to meet the particular needs of the species or species' group of interest. Water management and prescribed burning would be the primary management tools, with a focus on producing submergent aquatic vegetation as well as summer drawdowns to promote moist soil vegetation. Water would also be used to maintain deep emergent vegetation. Other tools could include controlled livestock grazing, and possibly herbicides and explosives.

Monitoring. Long-term data sets would be continued and these would be periodically analyzed.

Goals, Objectives and Strategies

The overall mission of Stillwater NWR, Stillwater WMA and Fallon NWR under this alternative would be to provide habitat for nesting birds, and spring and fall migrants, with an emphasis on waterfowl and shorebirds. Species of special interest would include redheads, canvasbacks, tundra swans, white-faced ibis, bald eagles, and peregrine falcons.

For each objective or series of objectives for Stillwater NWR, Stillwater WMA, and Fallon NWR, the basis for developing the alternative, strategies to meet the alternative, and monitoring elements are identified. The basis of objectives, adopted from the 1987 plan, explain the rationale upon which the objectives were developed.

Goal A: Provide an average of 14,000 acres of wetland nesting habitat including stands of hardstem bulrush.

General Strategies to Achieve Goal: Water management would be the primary means to manage vegetation. A major strategy would be to continue acquiring water and water rights, as outlined in the WRAP EIS, until sufficient water and water rights are obtained. Under this alternative, the Service would call for purchased and leased water within the schedule outlined below, which is based on the hydrograph presented in the WRAP EIS (USFWS 1996a). The delivery schedule would not be influenced by the inflow of drainwater, which would flow into the refuge based on Newlands Project operations, or the inflow of excess water during years of controlled releases or spills from Lahontan Reservoir.

	<u>Dec-Feb</u>	<u>Mar-Jun</u>	<u>Jul-Sep</u>	<u>Oct-Nov</u>
Low water-year	0%	40-55%	40-55%	10-15%
Full water-year	0%	40-50%	40-50%	10-15%
Spill year	0%	20-40%	50-60%	20-40%

In developing annual water plans, the order of priority for water use would be to (1) sustain a high survival of emergent vegetation through drought years, (2) provide high quality nesting and brooding habitat and to maintain water levels during the breeding season, (3) provide circulation of water to promote growth of sago pondweed, and (4) refill wetland units after draining them to dump salts or to kill carp.

Water would be controlled by the existing canals, diking, and other infrastructure. Nesting islands would be constructed. Extremely high or low flows of water through wetland units would be avoided by using bypass canals. Open channels would be maintained by fire or physical means in cattail and hardstem bulrush stands to permit movement of water and wildlife. Movable low lift pumps should be used to move water from one unit to another where lack of elevation prevents drainage. The Refuge Manager would continue to work with the Bureau of Reclamation and TCID, so that the available water would be delivered and used efficiently. Coordination with the Ecological Service branch of the Service would continue to address up river water quality issues and to address impacts to wetlands brought about by Service actions aimed at enhancing endangered species.

Priorities for any excess water would be to (1) flush salts from units with high duck production, (2) flush salts from other impoundments, (3) flood seldom used or abandoned impoundments, and (4) irrigate pastures.

Monitoring Elements: Acreage of wetland habitat during the breeding season, April-August.

Objective A.1: Over a ten year period, provide habitat capable of producing an annual average of 2,500 redhead ducks to flight stage.

Basis of Objective: Stillwater Marsh has historically been a producer of redheads due to the presence of relatively large and deep wetland habitat, for which the infrastructure was developed.

Strategies to Achieve Objective: Strategies for enhancing redhead production in the 1987 plan focused on acquiring additional water and infrastructure improvements (above). The only habitat management strategy was to use available water in drought years to maintain the viability of emergent vegetation until the drought period is over. In scarce water years, attempts to maintain water levels for nesting would be abandoned.

Monitoring Elements: Annual production of redheads to flight stage, and acreage and distribution of hardstem bulrush and other deep emergent vegetation.

Objective A.2: Produce safe nesting habitat of hardstem bulrush and associated feeding areas in to produce, over a five year period, an average of 1,000 white-faced ibis to flight stage.

Basis of Objective: The objective was developed to support regional resource priorities to enhance, protect, and preserve sensitive species and their habitat. Although Carson Lake has traditionally received most of the white-faced ibis use in the Lahontan Valley, due to more attractive habitat at Carson Lake, Stillwater Marsh is an important area for white-faced ibis.

Strategies to Achieve Objective: Strategies would be the same as for redhead production, with a few additional actions. Hardstem bulrush rootstocks would be transplanted to suitable sites. Open water and movement of water would be maintained in colony sites, through the use of fire or physical means. Through the use of law enforcement, posting and road closures, human caused disturbance from boats, vehicles, and foot travel would be discouraged during the nesting season. When excess water is available, it would be used to flood pastures or dry units to create feeding sites adjacent to white-faced ibis nesting colonies.

Monitoring Elements: Numbers of ibis produced and acreage of hardstem bulrush.

Objective A.3: To perpetuate wetland habitat sufficient in size and quality to sustain production of 10,000 shore/marsh/waterbirds per year. This is only slightly below historic numbers. Species included are: coot, long-billed curlew, snowy plover, avocet, black-necked stilt, grebes, herons, egrets, and rails.

Basis of Objective: This objective is in keeping with the Service's goal of providing for a diversity of habitat and species on all units of the Refuge System. Stillwater NWR and Stillwater WMA have traditionally produced large numbers of these birds.

Strategies to Achieve Objective: Under this alternative, an assumption would be that carrying out strategies and meeting production objectives of redhead and white-faced ibis would ensure the retention of the bulk of production for species nesting over water (see above strategies). Meeting objectives for maintaining hardstem bulrush would also perpetuate alkali bulrush. At least one dense, mature stand of hardstem bulrush would be maintained in each wetland unit.

Water would be managed to maintain shallow, nonfluctuating water depths in nesting areas to promote growth of submergent vegetation sufficient in amount and density to support floating nests. Extremely high or low flows through impoundments will be avoided by using bypass canals. Instead of using a single water control structure for inflows into impoundments, all flow structures will be utilized to improve water clarity and circulation. Mudflats would be provided during years of low water in at least one wetland unit to meet shorebird objectives. In most cases, however, the use of water specifically to manage for species using mudflats would be at cross purposes to meeting objectives for over water nesters and could increase the potential for botulism outbreaks. In years of high water inflows, the excess water used to flush salts into alkali flats or the Carson Sink would provide late season nesting habitat for stilts, avocets, snowy plovers, and other shorebirds. Where lacking, cottonwoods would be planted to maintain tree nesting colonies of herons and egrets.

Monitoring Elements: Combined annual production of shorebirds and other waterbirds.

Objective A.4: Provide waterfowl nesting habitat sufficient in size, quantity, and quality to produce 5,300 young ducks and geese to flight stage annually.

Basis of Objective: This objective was based in part on the assessment that, although Stillwater Marsh has traditionally produced more divers than dabblers and although Carson Lake traditionally produces more dabblers than Stillwater Marsh, Stillwater NWR and Stillwater WMA can still contribute to duck production in the Lahontan Valley.

Strategies to Achieve Objective: The strategies for redhead production and water management would be carried out for other ducks as well. The following additional strategies would facilitate nesting by other ducks.

Meeting production objectives for dabbling ducks depends primarily on the management of salt grass, including water management. This alternative would allow for livestock grazing or prescribed burning to be used in cases where it is thought that salt grass is becoming too decadent for nest selection by ducks. Some fencing in the Stillwater Marsh area may be undertaken to control livestock grazing. Nesting islands would also be constructed. Dabbling ducks also nest under upland shrubs such as iodine bush.

Although meeting the production objective would depend primarily on habitat management, raven control may be implemented. Ravens are thought to be the major predator of waterfowl eggs and the population of ravens appears to have increased in recent years. Some roads would be closed to reduce disturbance to birds nesting along roads or dike roads.

Monitoring Elements: Annual production of ducks and geese, except redhead, to flight stage.

Goal B: Provide a fall and spring resting, feeding, and staging area of 14,000 wetland habitat acres for migrating waterbirds.

General Strategies to Achieve Goal: The water management strategies identified under Goal A apply equally to this goal.

Monitoring Elements: Wetland habitat acreage during September through January.

Objective B.1: Provide habitat capable of annually supporting an average of one million redhead and canvasback use-days during a five year period, with peak populations averaging 20,000 redheads and 25,000 canvasbacks.

Basis of Objective: Redheads have been a focus of management at Stillwater NWR and Stillwater WMA. This area has historically attracted migrating redheads due to the presence of deep water ponds containing abundant amounts of sago pondweed. When adequate water is available, Stillwater Marsh has been the major staging area for redheads and canvasbacks, with up to one third of these species' total flyway population on the area between mid-October through mid-November.

Strategies to Achieve Objective: Key strategies, outlined in the 1987 plan, would be the acquisition of additional water, improved water management infrastructure, and efficient use of water, as described in the general strategies under Goal A.

Several actions would be taken to reduce turbidity and increase water circulation as a means to facilitate growth of aquatic vegetation. Larger impoundments would be broken by cross-diking to reduce wave action, and hardstem bulrush and cattail root stocks would be transplanted to further reduce scouring and water turbidity caused by winds. Other measures to reduce turbidity include the use of bypass canals around upper wetland units during high flows and control of carp through periodic drawdowns in conjunction with rotenone. Drawdowns would also aerate pond bottoms, further facilitating aquatic production.

To facilitate feeding by diving ducks, production of aquatic vegetation would initially be optimized through retaining water flow. This would be followed by a gradual lowering of wetland unit water depths during the fall and winter. This could be accomplished as part of drawdown plans for units and to facilitate flushing of salts from lower, more saline units.

Because canvasbacks and redheads are sensitive to disturbance, some additional roads may be closed to reduce access and disturbance, thus increasing duck populations during the hunting season. When flood repairs are made to dikes and access roads, selected routes agreed to by Nevada Division of Wildlife would be left impassable and others closed. The Service would conduct waterfowl identification workshops to reduce the over harvesting of canvasbacks and redheads and the taking of tundra swans without a permit

The existing sanctuary area would be maintained, which means that when all major units are at an ideal level (e.g., about 17,000 acres of wetland habitat), about 30 percent of the wetland habitat would be in sanctuary. The proportional amount to be maintained in sanctuary could be increased to 50 percent as specified in the 1948 Tripartite Agreement. Assuming a long-term average of about 12,700 acres of wetland habitat during the hunting season, an estimated 4,500 acres (about 35 percent) of the marsh would be managed as sanctuary. In some recent years, approximately 40 to 50 percent of wetland habitat has been in sanctuary.

Monitoring Elements: Redheads and canvasback use-days per year, and annual aquatic production. Past receipts, water management, and aquatic production records will be examined to provide management information, to determine how to improve water management.

Objective B.2: Provide habitat capable of supporting an annual average of 660,000 tundra swan use-days over a five year period, with a peak population of 12,000 at least once during this period.

Basis of Objective: Lahontan Valley provides key habitat for tundra swans in Nevada, with an average of over 80 percent of the state's population in Lahontan Valley wetlands.

Strategies to Achieve Objective: Strategies for redhead and canvasback maintenance (Objective B.1) would contribute to this objective, and few separate management strategies designed specifically for tundra swans would be necessary or planned, although minor adjustments may be needed. Because swans tend to stay longer into winter, water flow may have to be maintained through impoundments to prevent ice from covering all food supplies.

Monitoring Elements: Annual use-days of tundra swans.

Objective B.3: Provide habitat capable of supporting, over a five year period, an annual average of 11,810,000 waterfowl use-days (including redheads and canvasbacks), with peak populations averaging 150,000 and exceeding 200,000 at least once during this period.

Basis of Objective: The targeted number of use-days reflect the use of Stillwater NWR and Stillwater WMA during the period 1974-1983 (prior to this, the area supported up to an average of 25,000,000 use-days). Although use of Stillwater Marsh by dabbling ducks can be high at times, this objective is secondary to the prior two objectives because Stillwater Marsh has traditionally held fewer dabbling ducks as compared to Carson Lake where wetland habitat is generally shallower.

Strategies to Achieve Objective: Some management strategies for waterfowl would be identical to and dependent on those planned for redhead and canvasback maintenance, including maintenance of the existing sanctuary. Other strategies would be employed, but strategies for waterfowl maintenance would only be undertaken if there is sufficient water to first meet higher priority objectives (maintaining water elevations during the breeding season, circulation of water to promote sago pondweed and facilitating availability of sago pondweed during the fall and winter, refilling units after draining them, and sustaining high survival of emergent vegetation).

There are some situations in which water could be used to increase use of the area by migratory waterfowl, especially dabbling ducks and geese. After meeting higher priority goals and objectives, water could be managed to increase use of the area by migrant waterfowl, especially dabbling ducks and geese. This would include drawing down of particular wetland units to encourage growth of alkali weed, Russian thistle, and other annual, seed producing plants, followed by reflooding units in fall to provide food for fall and winter waterfowl.

In wetland units providing winter submergent aquatic feed, water depths would be slowly increased during the fall and winter and then allowed to decline during the spring to increase the availability of invertebrates to waterfowl during spring migration. Water levels in units containing little or no submergent aquatic food could be raised to flood bordering saltgrass. This would not be done in units containing sago pondweed or wigeon grass because this would make the submergent vegetation less available to divers. Flows would be managed during the winter to maintain open water for tundra swans and other waterfowl.

East Alkali, Division Pond, and Cattail Lake, and other wetland units can be flooded in the spring (consistent with other objectives) to produce nutgrass stands. This procedure can occasionally produce substantial amounts of food without a large consumption of water during the summer. Teal and other dabblers would be attracted to these areas if reflooded in the fall.

Monitoring Elements: Annual use-days and population peaks of ducks and geese.

Objective B.4: Provide feeding habitat and sanctuary to enhance the suitability of the Stillwater Marsh for nesting white-faced ibis, targeting 210,000 use-days annually on a five year average and population peaks that reach 31,000 individuals in two of five years.

Basis of Objective: This objective was developed to support regional resource priorities to enhance, protect, and preserve sensitive species and their habitat. Five year averages are used instead of annual population goals because annual population targets are unrealistic in a desert environment. Although Carson Lake has traditionally received most of the white-faced ibis use in the Lahontan Valley, due to more attractive habitat at Carson Lake, Stillwater Marsh is still an important area for white-faced ibis.

Strategies to Achieve Objective: Suitable nesting habitat would be maintained as prescribed under the white-faced ibis and redhead production objectives. Carp control and water manipulation would be undertaken in part to enhance productivity of invertebrates. When sufficient water is available, grassy shorelines and pastures would be flooded to provide additional shallow wetland feeding areas. Irrigation turnouts in East and Paiute Pastures would be repaired to facilitate water spreading.

Monitoring Elements: Annual use-days and population peaks of white-faced ibis.

Objective B.5: Provide feeding areas for white pelicans nesting on Anaho Island and those migrating through the Lahontan Valley to sustain an annual of 236,000 white pelican use-days on average over a five year period.

Basis of Objective: Stillwater NWR/WMA and Fallon NWR is the main feeding area for white pelicans nesting on Anaho Island NWR.

Strategies to Achieve Objective: The overall strategy to preserve and manage wetlands to meet the goals for over water nesting birds will contribute, but only partially, to meeting the pelican maintenance objective. Conversely, water and fishery management actions designed specifically to benefit pelicans will, in most instances, conflict with reaching higher priority objectives for redheads and ibis. To enhance foraging opportunities for white pelicans, without hampering achievement of other objectives, several strategies could be employed. Holding water at high levels during spring would be avoided to the extent possible.

Wetland units that historically produce few ducks could be lowered or held below operational levels until June, and could be managed to encourage and sustain forage fish. During spring, moving water attracts carp where they concentrate in canals; excess water could be used to maintain spring flows for this purpose. Flooding abandoned units, especially those that are vegetated, would trigger fish spawning, and if sufficient water is available, these units could be maintained for an additional year.

Monitoring Elements: Annual use-days of white pelicans.

Objective B.6: Provide a variety of habitat capable of supporting, over a five year period, an annual average of 2,600,000 shore/marsh/waterbird use-days.

Basis of Objective: Stillwater NWR, Stillwater WMA and Fallon NWR wetlands have traditionally attracted a variety of wetland dependent bird species.

Strategies to Achieve Objective: In most cases, the use of water specifically to manage for species using mudflats would be at cross purposes to meeting objectives for over water nesters and could increase the potential for botulism outbreaks. However, water should be used to achieve this objective to the extent that the water is not needed to meet the needs of other species.

For example, when flushing saline water as a management effort to promote the retention or establishment of emergent nesting vegetation, as much water as possible should be run through dry impoundments and used in alkali flats. When water is especially abundant, additional impoundments and alkali flats would be shallowly flooded.

Monitoring Elements: Combined annual use-days of shorebird and other waterbirds.

Goal C: Preserve, manage, and protect a variety of wetland habitat and resulting wildlife diversity.

Objective C.1: Provide protection, habitat, and a food source of waterfowl sufficient to maintain, over a five year period, an annual average of 1,100 bald eagle and peregrine falcon use-days.

Basis of Objective: Bald eagles and peregrine falcons, at the time this objective was developed, were a federally listed endangered species.

Strategies to Achieve Objective: Meeting management objectives for wintering waterfowl and other prey species is essential, but will not ensure high bald eagle populations. Other specific actions are needed. Objectives for waterfowl and other waterbirds will be sufficient to increase peregrine falcon use of the area. To the extent possible, water would continue to be moved through wetland units to maintain open water to sustain a wintering population of waterfowl during December-March, which is the main period of use by bald eagles, but the period of lowest waterfowl numbers. Mature cottonwood trees are important for daytime perches and night roosting, and because few are present in the area, a tree nursery of 100 cottonwoods would be maintained. About 20 to 30 trees with a height of 10 to 20 feet would be planted annually in February or March in selected sites away from areas of public use. The 1987 plan calls for young cottonwood trees to be protected from livestock grazing, especially at Timber Lake and wetlands in the Carson River delta (important winter roost sites of bald eagles), but this has not occurred as yet.

Monitoring Elements: Annual use-days and peak populations of bald eagles.

Objective C.2: Maintain or create habitat diversity, within the constraints of other objectives, to achieve maximum wildlife diversity, and increase production and maintenance of key sensitive species that use the area.

Basis of Objective: This alternative was developed under the assumption that, although Stillwater NWR's high altitude, alkaline, semi desert uplands severely limits its habitat diversity, a few individuals of each species uncommon to the area can be maintained and populations of rare species increased. The intent of this objective would be to retain as much diverse habitat as possible by creating temporary or permanent ecosystem "niches." Under this alternative, the number of vertebrate species using an area is a measure of its diversity.

Strategies to Achieve Objective: To meet wildlife diversity objectives in marsh habitat during the breeding season, the strategies for meeting higher priority objectives discussed above should ensure the retention of most species. Other management actions would include the following. Livestock grazing would continue to be adjusted to improve range condition, plant vigor, increase the amount of residual plant material, and to increase the survival of cottonwood seedlings. Saltcedar control efforts would focus on reducing public hazards, such as blind corners on refuge roads, and to facilitate water movement in refuge delivery canals. Law enforcement efforts would be increased to reduce the extent of wood cutting, in to protect litter habitat, snags, and fallen trees.

Limited use of herbicides has been used to control saltcedar on Stillwater NWR. In recent efforts, saltcedar concentrations were located, cut down with either a chainsaw or brush cutter, and then the cut stumps were treated with a 50 percent solution of Rodeo. So far, this technique has been used only on canals and has not been used on any large concentrations of saltcedar.

Monitoring Elements: Number of vertebrate wildlife species using the area (e.g., vertebrate species richness).

3.4.A.2.2.2 Public Use Management

Guiding Principles

Public use management on Stillwater NWR, under this alternative, would be guided by the following principles. Hunting would continue to be the priority public use on Stillwater and Fallon NWR's, and Stillwater WMA, with few restrictions imposed. Public use programs would be developed beyond basic monitoring procedures as staff time allows. Traditional uses, such as birdwatching, camping, horseback riding, and hiking would be continued in all portions of the refuges and WMA with few restrictions. Environmental education and interpretive efforts would be conducted by appointment only, or would be self guided. No additional facilities would be developed and the refuge would remain in a fairly primitive state.

Goals, Objectives and Strategies

Goal D: Improve the quality of existing wildlife/wildland recreation and enhance opportunities for interpretation and environmental education.

Objective D.1: Maintain at least 5,400 waterfowl hunter use-days, with improvements in quality, opportunity, and compliance aspects.

Basis of Objective: Hunting was one of the purposes for which Stillwater WMA was originally established. Targeting 5,400 hunter use-days per year would ensure that the hunt program remains a viable, vigorous program on Stillwater NWR, as per the 1987 Management Plan. At the time the plan was written, regulatory compliance, especially on opening day, was considered low. This objective was written to support the Region 1 Program Management Brief Objective for providing a quality hunt program.

Strategies to Achieve Objective: An important part of meeting this objective would be to achieve the objectives for associated wildlife species. The current boundaries and zones between hunting and nonhunting areas would be maintained in this alternative. Up to 70 percent of fall and winter wetland habitat would be open to hunting during the hunting season (Map 3.2).

The number of hunters would not be limited, and the area would be open to hunting every day during the hunting season. Restricting hunters to permanent, space blinds and shot shell limits would not be required. Numerous access roads, dike roads, and boat ramps make the entire open area readily accessible. Parking and camping would continue to be permitted anywhere along open roads as long as roads and boat ramps are not gated and cross country vehicle travel is not employed. All areas open to hunting would allow watercraft including airboats, with few restrictions. At least one wetland unit would be closed to airboat use. No new launch ramps would be developed and existing ramps would not be improved.

The retrieval zone along Division Road would be maintained, and the use of leaflets and posting would be employed to educate hunters about regulations and waterfowl identification. The Service would conduct waterfowl identification workshops to reduce the potential to overbag canvasbacks and redheads, taking of trumpeter swans, and the taking of tundra swans without a permit. A high level of coordination regarding patrolling and enforcement would be maintained.

Hunting of waterfowl, mourning doves, California quail, turkey, and mule deer would continue to be allowed on federally owned land along the Carson River and D-Line Canal, and in the Indian Lakes area. Hunting throughout the remainder of Stillwater WMA would also be permitted, with the primary target species being coyotes and jackrabbits.

Monitoring Elements: Annual hunter use-days.

Objective D.2: Encourage educators to use Stillwater NWR and Stillwater WMA to conduct environmental education field studies that focus on wetland ecosystems and adjacent uplands, with a target of 100 visits and 400 activity hours annually within a five year period.

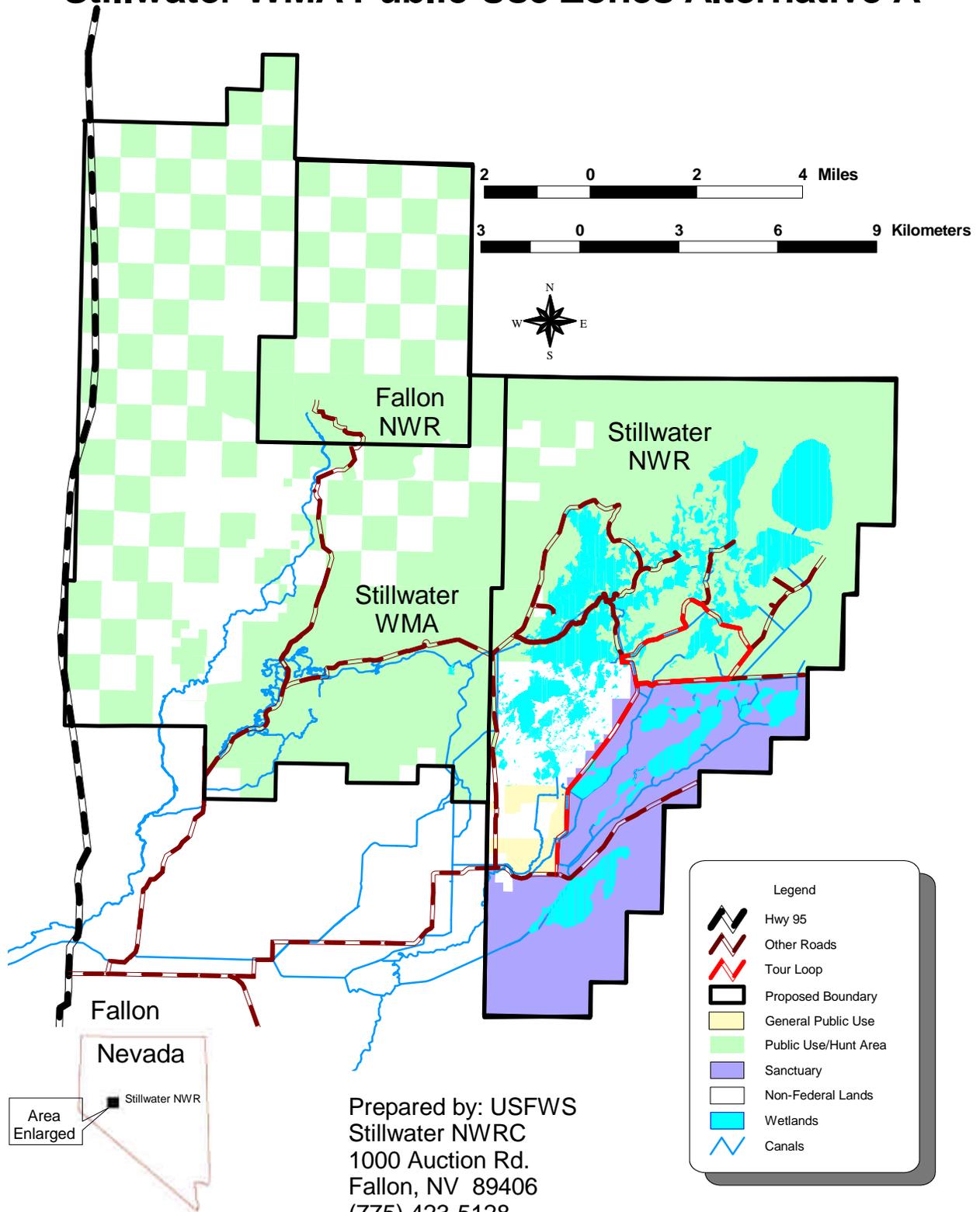
Objective D.2.1: Attain and sustain at least 75 visits per year by outdoor classes for students.

Basis of Objective: This objective was developed to support Visitor Services Management goals to assist teachers engaged in outdoor classroom activities. Environmental education is an important vehicle to increase the public's understanding of wildlife and their habitat needs, and to enhance awareness of what this area has to offer and what the Service and Refuge System missions are.

Strategies to Achieve Objective: The environmental education program would be designed so that it can be taken to schools and agency offices as staff time permits. Traveling audio/visual programs would be designed so that any available refuge employee could give a slide show or school talk. Programs would continue to be upgraded and used prior to field tours. Lesson plans to be developed would focus on local environmental issues. Off-site programs would include environmental education programs coordinated with other Federal, State, and local agencies, educational institutions, conservation organizations, and private landowners and their representative organizations.

Monitoring Elements: Annual visits by outdoor classes.

Map 3.2 - Stillwater NWR, Fallon NWR, and Stillwater WMA Public Use Zones Alternative A



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Objective D.3: Attain and sustain at least 25 visits per year by outdoor classes for teachers.

Basis of Objective: Same as above. Also, achieving this objective would encourage teacher led field trips rather than using refuge staff time, which could alleviate the need to turn away school groups when no staff member is available.

Strategies to Achieve Objective: Teacher workshops would be held to refine plans developed under Objective D.3.1, to introduce curricula to other teachers, and to generate awareness. Liaison work with educational groups would continue.

Monitoring Elements: Number of workshops given per year.

Objective D.4: Provide guided interpretive tours for students and members of interested organizations to develop an awareness of habitat, wildlife, management, basic ecological principles, and resource problems, with a target of sustaining at least 1,410 hours of interpretive tours each year.

Basis of Objective: Achieving this objective would contribute toward increased public awareness of wildlife resources, conservation issues, and activities of wildlife agencies. As pointed out in the 1987 plan, many local people are not aware of the wetlands and for those that are, few realize who manages them, or what is involved in their management.

Strategies to Achieve Objective: As staff time permits, guided tours of the refuge would be provided for groups to develop an awareness of habitat, wildlife, management, and basic ecological principles and resource problems. No additional facilities would be constructed. Supplies of brochures, wildlife lists, handouts, and briefing material would be maintained, and roads would be maintained as needed.

Monitoring Elements: Hours of interpretive tours.

Objective D.5.: Provide opportunities for visitors to view, appreciate, and enjoy wildlife in “natural” settings during all seasons of the year, with a target of attaining and sustaining at least 4,200 visits by wildlife/wildlands observers.

Basis of Objective: Although highly developed, Stillwater Marsh, set against the Stillwater Range, presents a natural appearing scenic vista to the public for improving the quality of visits and visitor’s understanding and awareness of wildlife resources and conservation issues, including problems facing wildlife and wildlands.

Strategies to Achieve Objective: The existing auto tour route would be maintained, and directional signs marking the route would be replaced when needed. Roads would be maintained for safe travel in fair weather conditions, and signs would be replaced and maintained as per the 1982 Stillwater Wildlife Management Area Sign Plan. The main route would begin at Stillwater Point and proceed to Hunter Road, to Division Road, to Nutgrass Road, to Navy Cabin Road and back to Hunter Road and Stillwater Point (Map 3.2).

Sufficient publications would be maintained to inform visitors of wildlife, rules and regulations, and tour routes. These publications would be available at the Refuge office, and would be disseminated from specially designed containers at strategic locations on the refuge, and eventually through the Internet. The media would be used to encourage visits to the refuge during the nonhunting season, especially when roads are dry and migrant waterbirds are present.

Wildlife photography would be encouraged, but no special facilities would be provided.

Monitoring Elements: Number of visits per year.

Objective D.5.1: Manage and maintain a quality public fishing program, as long as it is compatible with other objectives, with a target of attaining and sustaining 9,200 visits by anglers.

Basis of Objective: Although fishing was not mentioned as a purpose or objective in the 1948 Tripartite Agreement, fishing was a popular activity in the area now encompassed by Stillwater NWR and Stillwater WMA.

Strategies to Achieve Objective: Fishing would be allowed, but not encouraged. Facilities for fishing would not be provided. Stocking would not be permitted on Stillwater NWR. Fish resources would be maintained through strategies to meet other, higher priority objectives. Due to the high level of mercury contamination in the Lahontan Valley, an advisory was issued by the State of Nevada noting that it is not safe to eat any fish caught in the Lahontan Valley.

Monitoring Elements: Number of visits by anglers per year.

3.4.A.3 ANAHO ISLAND NWR

3.4.A.3.1.1 Fish, Wildlife, and Vegetation Conservation

Additional information is provided on the management of Anaho Island NWR beyond what was written in the 1987 plan for the Stillwater WMA. This discussion presents how the refuge has been managed in recent years.

Guiding Principles

Under this alternative, Anaho Island NWR would be managed as a bird sanctuary closed to public use to prevent human intrusion and disturbance at one of Nevada's most important breeding sites for colonial nesting birds such as American white pelicans, double-crested cormorants, California gulls, Caspian terns, and great blue herons. Wildlife conservation at Anaho Island NWR would consist of providing a secure breeding habitat for colonial nesting birds, custodial maintenance of the land, and routine monitoring of bird populations. Because Anaho Island has been proposed for wilderness designation as a roadless island (Section 3.2.2.1.6), it will be managed to preserve its wilderness character, which is consistent with its current management.

Goals, Objectives and Strategies

Anaho Island NWR is managed primarily as a sanctuary for colonial nesting species, mainly American white pelicans. The following objectives and strategies were developed to reflect past management of the refuge. Few details were provided in the 1987 plan.

Goal A: Protect and perpetuate colonial nesting birds and other migratory birds.

Objective A.1: Provide a sufficient amount of nesting habitat, free from human disturbance and other threats, for colonial nesting birds during the breeding season.

Basis of Objective: The nesting colony of American white pelicans, which can reach about 10,000 breeding pairs, is one of the largest colonies in the United States, and is important to other colonial nesting birds as well. Colonial nesting birds are sensitive to disturbance during nesting and while chicks are young. Eggs and chicks are left exposed to predation and weather when adults leave the nest due to disturbance. This objective is critical to the accomplishment of the goal.

Strategies to Achieve Objective: The island would remain closed to public access and use, and the Pyramid Lake Paiute Tribe would continue to provide law enforcement in coordination with the Service. Signs would be posted on the island, as well as 500-feet off shore, notifying the public that the island is a closed area.

An outreach program would be implemented to increase public understanding of the need for the closure, emphasizing the importance of Anaho Island to white pelicans and other birds and the detrimental effects of disturbance. This would include maintaining existing interpretive panels, and could also include providing new panels at the Sutcliff marina boat ramps and boat ramps on the eastern shore of the lake near Pyramid Island. Voluntary compliance of the closure is essential.

Monitoring Elements: Acreage of available nesting habitat of suitable quality, level of compliance/noncompliance with the closure, and response by birds (e.g., number of breeding pairs, number of chicks per nest, nest success, number of nest failures or dead nestlings).

Objective A.2: Prevent the formation of a land bridge between the eastern shore of Pyramid Lake and Anaho Island.

Basis of Objective: Formation of a land bridge would introduce mammalian predators to the island, which would have significant adverse impacts to colonial nesting birds.

Strategies to Achieve Objective: The water surface elevation of Pyramid Lake would be monitored to ensure that lake levels are high enough to avoid a land bridge forming from the eastern shore of the lake to the island. Given other efforts that would increase flows in the lower Truckee River, the formation of a land bridge is not anticipated to happen.

Monitoring Elements: Pyramid Lake water level elevation.

Objective A.3: Closely monitor the breeding population of each colonial nesting species (white pelicans, double-crested cormorants, gulls, herons, egrets, and Caspian terns) to track the number of nesting pairs, nestlings, and fledglings each year.

Basis of Objective: Refuge Managers can only determine whether the goal is being attained by obtaining estimates of the breeding population and juveniles successfully reared.

Strategies to Achieve Objective: Monitoring of pelicans and other colonial nesting birds would continue much as it has in the past. At least one count would be conducted each month from April through July, to attain counts of the number of nesting pairs, number of chicks per nest, and the number of fledglings. Additional details would be provided in the refuge's monitoring plan.

Monitoring Elements: Colony counts to include number of adults, nests, and fledglings by species and count period.

Objective A.4: Promote research opportunities that would increase the Service's understanding of colonial nesting bird life history requirements and potential limiting factors.

Basis of Objective: Research conducted by organizations outside the Service is often needed to obtain specific information on colonial nesting bird species life history requirements and factors limiting breeding success, such as food availability and contaminant levels.

Strategies to Achieve Objective: Identify research needs and coordinate with interested universities to establish research projects. All projects would be designed to avoid disturbing breeding birds and their nests, nestlings, and fledglings.

Monitoring Elements: Reports of research results.

3.4.A.3.1.2 Public Use Management

Guiding Principles

Anaho Island NWR is closed to public use to protect colonial nesting birds. Distribution of information about Anaho Island NWR, however, could educate the public on the need for and benefits of national wildlife refuges, including those which cannot be directly used by the public. The benefits of Anaho Island NWR go far beyond the island shore, as white pelicans and other colonial nesting birds reared on the refuge disperse throughout the western United States.

Goals, Objectives and Strategies

No objectives would be developed for public use associated with Anaho Island NWR.

3.4.A.4 OTHER PROGRAM AREAS

3.4.A.4.1 Commercial Use Program

Guiding Principles

Livestock grazing and muskrat trapping would be managed commensurate with wildlife conservation, as outlined in the 1948 Tripartite Agreement.

Strategies

Under this alternative, livestock grazing by existing permittees would continue, up to a maximum use level of 11,000 AUMs on Stillwater NWR, Stillwater WMA, and Fallon NWR. Muskrat trapping would continue as currently managed, with opportunities for up to 40,000 muskrats to be trapped each year, primarily in Stillwater Marsh.

Livestock grazing would continue at present levels on Stillwater WMA, but would be reduced on Stillwater NWR. Livestock would continue to graze lake shore, riparian, meadow, marsh, salt desert shrub, and dune habitat in the Stillwater WMA and Fallon NWR. Internal fences would not be constructed, continuing the communal livestock grazing program. Special use permits would continue to be provided on a bid system. Providing opportunities for muskrat trapping would be based on availability of the resource.

European carp and Sacramento blackfish have periodically been harvested from several lakes in the Indian Lakes area, including Likes Lake, Papoose Lake, and Big Indian Lake. The emphasis of the commercial fishing program is to control carp and blackfish populations. Prior to the drought in the late 1980s and early 1990s, several hundred to several thousand pounds were removed about every one to three years under a special use permit. This would continue as needed.

3.4.A.4.2 Outreach Program

Guiding Principles

A principle that would guide outreach efforts is that public awareness of the Service and the Service's mission and role in wildlife conservation is needed for the effective management of the Refuge System as a whole. The American people cannot appreciate or support what they do not know exists or do not understand. To improve refuge management, the Service must build a strong base of public understanding and support, reaching beyond the public that visit refuges. Outreach is a two way communication between the Service and the public to establish mutual understanding and promote involvement with the goal of improving joint stewardship of our natural resources.

Strategies

Outreach efforts would continue under this alternative. Outreach methods would include continued interactions and relations with congressional entities, local businesses, news media, constituent groups, local community, schools, state and local governments, and agencies, as well as public involvement in planning processes and information products such as brochures, leaflets, and videos (USFWS 1997). These methods would provide ways for the public to be involved with Stillwater NWR Complex during the planning processes and beyond.

Under this alternative, refuge staff would continue to conduct outreach through interactions with the public. Proactive efforts would include involving the public in planning processes, and the Service would participate in special events and programs, public meetings, presentations and speeches, and cooperative outreach partnerships.

Presentations at schools and civic organizations would be conducted by appointment depending on staff schedules and funding. Refuge staff would coordinate with the other Service offices regarding conducting school programs. Some of the special events in which the Service would continue to participate include Refuge Week celebrations and the Spring Wings Bird Festival.

3.4.A.4.3 Other Public Uses

Guiding Principles

Other public uses, those that are not identified in public use objectives and are not identified as a commercial use (above), would be allowed but not promoted.

Strategies

Few restrictions would be imposed on other public uses and opportunities for the following uses would continue much as they have in the past: boating would continue in open wetland units and in the Indian Lakes area; horseback riding would continue with few restrictions; hiking would continue to be permitted throughout the open area but no trails would be developed or maintained; camping would be allowed throughout the year in open areas of Stillwater NWR and Stillwater WMA. Off road vehicle use would not be permitted.

3.4.A.4.4 Partnerships and Other Cooperative Efforts

Guiding Principles

A guiding principle under this alternative is the recognition that conservation organizations, including hunting groups, have contributed significantly toward the conservation of fish, wildlife, plants, and their habitat. Conservation partnerships with other Federal agencies, State agencies, Tribes, organizations, industry, and the general public can make significant contributions to the conservation of biological resources on Stillwater, Fallon, and Anaho Island NWRs, as well as helping the Service provide opportunities for compatible wildlife-dependent recreational uses. Cooperative efforts with other land owners are essential when addressing those problems, such as saltcedar encroachment, that extend, or originate, beyond the boundaries of the refuge. However, conservation partnerships and cooperative efforts are not limited to accomplishing refuge purposes. They can also help achieve goals for wildlife conservation and environmental education outside refuge boundaries.

Strategies

Existing partnerships would continue. The Service would cooperate with other agencies, institutions of higher education, private organizations and individuals. For example, members of the Fallon Paiute-Shoshone Tribe would be allowed periodic access to designated areas, for the purpose of conducting religious ceremonies or teaching their traditional ways.

3.4.A.4.5 Water Rights Acquisition and Land Disposal Program

The ongoing water rights acquisition program for Lahontan Valley wetlands is summarized in Sections 3.2.1.3.5 and 3.3.1.1, and described under Alternative 5 of the WRAP EIS and in the Record of Decision for the WRAP (USFWS 1996a, b). The land disposal program that is being developed, as part of the water rights acquisition program, is addressed in Section 3.3.1.1.

3.4.A.4.6 Fire Management

Guiding Principles

Upon approval of a fire management plan, the focus and major commitment of the fire management program would be ensuring the safety of firefighters and the public. Human life, property, and other resources would be protected from unplanned fires. Fires would also be used as appropriate to accomplish resource management objectives and to accomplish refuge maintenance objectives. Parallel to wildlife and habitat objectives, the emphasis would be on enhancing waterfowl habitat.

Goals, Objectives and Strategies

As outlined in the draft Fire Management Plan (Appendix K), goals of the fire management program would be as follows.

1. Firefighter and public safety is the priority goal of the program. All fire management activities will reflect this commitment.
2. Protect life, property, and other resources from wildfire.
3. Use fire as a tool, where appropriate, to accomplish resource management objectives.
4. Use fire as a tool, where appropriate, to accomplish refuge maintenance objectives.

Objectives of the fire management program would be as follows:

1. Protect all important scientific, cultural, historic, prehistoric, and administrative sites, visitor facilities, and refuge housing from fire.

2. Restore and perpetuate habitat important to migratory and other native wildlife species, by maintaining a diversity of plant communities in various stages of succession.
3. Use fire as a tool to limit the spread and/or facilitate the elimination of noxious weeds.
4. Use fire to facilitate and augment the farm and water management programs..
5. Prevent human caused wildfires.

Strategies can be found in sections of the Fire Management Plan provided in Appendix K.

3.4.A.4.7 Cultural Resource Management

Guiding Principles

Stillwater NWR and the surrounding Lahontan Valley have a strong tradition of archaeological and ethnographic research, and the local Fallon Paiute-Shoshone Tribe has maintained a vital interest in its traditional culture and archaeology. To the extent that funding permits, research would continue. However, the management of cultural resources on Stillwater NWR, under this alternative would be guided by the basic compliance requirements of the cultural resource legislation and agreements described earlier in Section 1 of this chapter. In practice, this means that emphasis would continue with, and be mostly limited to, Section 106 of the National Historic Preservation Act. The Service will continue to carry out the provisions of the 1988 MOU on Human Remains from Stillwater NWR among the Service, the Fallon Paiute-Shoshone Tribe, and the Nevada State Historic Preservation Office. The MOU set forth procedures for the identification, protection, reburial, collection, curation, study, re interment, and consultation on human remains at Stillwater NWR. Cultural resource management would remain a basic component of land management at Stillwater NWR.

With respect to Anaho Island NWR, reconnaissance surveys at Anaho Island NWR have not identified any significant prehistoric cultural resources (archaeological sites). However, Anaho Island figures prominently in the spiritual beliefs of the Pyramid Lake Paiute Tribe. Given the limited access to the island by visitors (it is closed to public access) and the largely passive management of the land and its wildlife, cultural resource management is not a significant issue at Anaho Island NWR.

Strategies

Cultural resource management would remain a basic component of land management at Stillwater NWR as described under the Guiding Principals above and the legislation and agreements described in Section 1. In consultation with the Fallon Paiute-Shoshone Tribe, the Service would continue to manage cultural resources so that they are preserved. Stillwater NWR and the surrounding Lahontan Valley have a strong tradition of archaeological and ethnographic

research. To the extent that funding and staff become available, these efforts would continue on Stillwater NWR. The local Fallon Paiute-Shoshone Tribe has maintained a vital interest in its traditional culture and archaeology.

3.4.A.4.8 Monitoring and Research Program

Guiding Principles

Monitoring would continue to focus on wildlife populations, primarily waterfowl and white pelicans, but with a growing emphasis on other birds including shorebirds, other waterbirds, bald eagles, and mourning doves. Habitat monitoring would continue to focus on overall wetland habitat acreage and aquatic submergent vegetation.

Strategies

Under Alternative A, monitoring wildlife, habitat, public use, and other uses would proceed as it has for the past several years. Wildlife and habitat monitoring is summarized in Table 3.2.

Habitat monitoring would continue to primarily involve the amount and distribution of wetland habitat (an annual aerial survey in August), aquatic vegetation surveys (August), water quality (variable), pan evaporation (monthly), and limited monitoring of livestock grazing effects on vegetation (two exclosures, spring and late summer). Acreage of wetland habitat on Stillwater NWR, Stillwater WMA, and Fallon NWR would also continue to be roughly estimated on a monthly basis, and wetland water flows would continue to be observed on a weekly basis.

Wildlife monitoring would continue to focus on waterfowl (Stillwater NWR) and white pelicans (Anaho Island NWR), but would also include shorebirds, other waterbirds, bald eagles, other raptors, and mourning doves. Ongoing waterfowl surveys would include aerial surveys during the hunting season and breeding season, brood surveys, goose collar observations, and swan age ratios.

Public use monitoring would continue to rely on road counters along Hunter Road, Indian Lakes Road, Division Road, and West County Road. Visitation is assessed by assuming that 10 percent of use is staff and local travel. Because a vehicle could be counted twice, once when entering and again when exiting, the numbers are divided by two. Other assumptions such as hunting and wildlife observation pressures are assessed based on time of year. A visitor log would be maintained, but because it is located at the refuge complex headquarters in Fallon it is not an accurate record. A check station on opening weekend of the waterfowl hunting season would be continued in coordination with the Nevada Division of Wildlife, and information obtained from this ongoing effort would be used. Staff would track the number of visitors attending tours, special events, and environmental education programs.

Table 3.2. List of ongoing biological surveys conducted on Stillwater NWR, and a summary of the frequency of each survey, and the agency conducting the surveys^A.

<u>Survey</u>	<u>Schedule</u>	<u>Surveyor</u>
<i>Habitat</i>		
Aerial survey of wetland acreage ^B	Annual (Aug.)	NDOW/Refuge
Aquatic vegetation surveys	Annual (Aug.)	Refuge
Pan evaporation ^B	Annual (monthly)	Refuge
Livestock exclosure monitoring	Annual (spring/summer)	Refuge
<i>Waterfowl</i>		
Aerial surveys ^{B,D}	Annual (Aug Dec.)	NDOW
Aerial breeding pairs surveys ^{B,D}	Annual (March/May)	NDOW
Mid-winter survey ^{B,D}	Annual (early Jan)	NDOW
Broods surveys ^B	Annual (June/July)	NDOW/Refuge
Trapping/banding	As Requested	NDOW/Refuge
Goose collar observations ^C	Annual (Nov. Feb.)	NDOW/Refuge
Swan age ratios ^B	Annual (Nov. Feb.)	NDOW/Refuge
<i>Colonial Birds</i>		
Ground survey of Anaho Island	Annual (Apr. Aug.)	Refuge
Aerial survey ^C	Annual (May/June)	NDOW
<i>Shorebird</i>		
Fall and spring shorebird surveys ^B	Annual(April/Aug.)	NDOW/Refuge
Snowy plover nesting surveys ^C	Annual(May June)	NDOW/Refuge
<i>Raptors</i>		
Bald eagle roost counts ^B	Annual (Nov. Feb.)	NDOW/Refuge
Raptor routes	Annual (Nov. Feb.)	NDOW/Refuge
<i>Wildlife Disease</i>		
Botulism patrols/pickup ^C	Annual(June Oct.)	NDOW/Refuge
<i>Contaminant Surveys</i>		
Level I surveys ^B	As Requested	Refuge
Assessment of biological samples ^B	Annual(May Oct.)	Refuge/ES

^A Refuge = Stillwater NWR Complex (Service) staff; NDOW = Nevada Division of Wildlife staff; and ES = Ecological Services (Service) staff.

^B Conducted as part of a Lahontan Valley wide effort.

^C Conducted as part of a Western Nevada wide effort.

^D Conducted as part of a State wide effort.

3.4.A.4.9 Facilities Maintenance and Safety

Guiding Principles

Facilities, including roads, structures, grounds, and equipment on the Stillwater NWR Complex would be maintained in a clean and orderly appearance, in an energy efficient condition, and in such condition that protects the health, safety, and convenience of refuge staff and the general public. Facilities and equipment determined to be no longer needed or safe, or too expensive to maintain, would be surveyed and eliminated.

Strategies

Facility maintenance would continue much as it has in the past, with activities being undertaken as needs arise. Muskrats may be controlled along dikes to reduce damage to dikes. Beavers would be removed, through trapping and other means, from water delivery canals and riparian areas of the refuge. The current assumption is that beavers are not native to the Lahontan Valley; but this assumption would be investigated further.

3.4.A.4.10 Law Enforcement

Guiding Principles

The dominant principle under this heading is that the Service would enforce all laws and regulations under its jurisdiction. Although the refuge's law enforcement program would primarily be limited to the refuge, it goes well beyond enforcing the laws, regulations, and refuge policies that pertain to the achievement of refuge purposes and goals. The refuge law enforcement program also includes, the enforcement of State hunting, fishing, and boating regulations; safety regulations; and cultural resource laws.

Strategies

The refuge law enforcement program would continue to be carried out by collateral duty refuge officers, Nevada State game wardens, and, through a MOU, Bureau of Land Management rangers. Assistance to other Federal and state law enforcement agencies would be provided on certain off-refuge operations; particularly in relation to the Migratory Bird Treaty Act and the Archaeological Resources Protection Act violations. The use of posting and leaflets would be continued.

3.4.A.4.11 Budget and Administration

Guiding Principles

Every effort would be made to maintain a sufficient level of staffing and funding to effectively and efficiently accomplish the purposes of the refuges and the wildlife management area in the complex. Stillwater NWR Complex administration includes the managing of staff, budget, and other resources to accomplish refuge goals and other programs.

Strategies

The projected annual costs of managing the Stillwater NWR Complex under Alternative B would be an estimated \$3.1 to 3.4 million per year upon completion of the water rights acquisition program. Projected annual expenditures include salaries; refuge operation and maintenance costs; water delivery and operation and maintenance charges; refuge revenue sharing payments;

and water rights leasing costs. Annual expenditures related to the water rights acquisition program were discussed in Section 3.3.1.1., Features and Assumptions Common to all Alternatives. Refuge salaries and operations and maintenance costs would be an estimated \$1.36 million per year under this alternative. Total capital costs of the water rights acquisition program are presented in the WRAP EIS (USFWS 1996a).

Current refuge staff includes thirteen permanent full-time positions, one term position, two temporary positions, and two seasonal positions, as shown below. Government staffing is usually expressed in units of "full-time equivalents" (FTE). One permanent, full time position represents one FTE. One seasonal position working six months out of the year represents 0.5 FTE. Term and temporary positions are generally 1 FTE.

Staffing required to implement Alternative A is presented below:

Stillwater NWR Complex Staff

Project Leader	GS-13/14
Deputy Project Leader	GS-12/13
Refuge Manager	GS-11
Refuge Manager Trainee	GS-5/7/9
Administrative Officer	GS-9
Office Automation Clerk	GS-5
Wildlife Biologist	GS-11/12
Wildlife Biologist	GS-9/11
Wildlife Biologist (temporary)	GS-5
Geographic Information Specialist (term)	GS-11
Outdoor Recreation Planner	GS-7/9
Supervisory Engineering Equipment Operator	WS-8
Engineering Equipment Operator	WG-9
Heavy Equipment Operator	WG-10
Maintenance Worker	WG-8
Engineering Equipment Operator (temporary)	WG-8
Maintenance Worker (seasonal-vacant)	WG-8
Maintenance Worker (seasonal-vacant)	WG-8
<i>On-site Realty Personnel (supervised and funded out of Regional Office)</i>	
Senior Realty Specialist	GS-13
Senior Appraiser	GS-12
Realty Specialist	GS-9

3.4.B ALTERNATIVE B

As with Alternative A, this alternative would focus refuge management on providing for the needs of key wildlife species. Of particular emphasis under this alternative would be providing high quality fall and winter habitat for waterfowl and waterfowl hunting. Due to low evaporation rates during the fall and winter, extensive wetland habitat would remain available into the spring, which would benefit breeding waterfowl, shorebirds, and other marsh birds. Because this alternative focuses on management of waterfowl, shorebirds, and other marsh birds, only the lands and waters now within Stillwater NWR and Fallon NWR would remain in the Refuge System. This would encompass Stillwater Marsh and the Carson River delta wetlands. Fallon NWR would remain as a separate refuge unit.

Under this alternative, opportunities for wildlife-dependent recreation would be enhanced over existing conditions. Waterfowl hunting would remain an integral part of the program and waterfowl hunting opportunities would increase. The environmental education program would be enhanced to some degree and areas for wildlife observation and environmental interpretation would be developed in the marsh.

Anaho Island NWR would continue to be managed much as it has in the past, with an emphasis on protecting the nesting colony of American white pelicans and other colony-nesting birds that use the island. Monitoring would continue as under Alternative A.

3.4.B.1 BROAD MANAGEMENT DIRECTION

3.4.B.1.1 Refuge Purposes

Stillwater NWR (Public Law 101-618)

1. Restoring and maintaining natural biological diversity within the refuge.
2. Conserving and managing fish and wildlife and their habitat.
3. Fulfilling international treaty obligations of the United States with respect to fish and wildlife.
4. Providing opportunities for scientific research, environmental education, and fish and wildlife oriented recreation.

Fallon NWR (Executive Order 5606)

1. Providing a sanctuary and breeding ground for birds and other wildlife.

Anaho Island NWR (Executive Order 1819 and Public Law 101-618)

1. Benefitting and protecting colonial nesting birds and other migratory birds.
2. Providing a preserve and breeding ground for native birds.

3.4.B.1.2 Refuge Goals and Other Programs

This section outlines the direction of management and the scope of the management program to be carried out under this alternative. The wildlife and public use programs are the focus of management and, as such, are highlighted in refuge goals. Refuge goals, derived primarily from refuge purposes but also written to be consistent with the Refuge System Administration Act and other management authorities, broadly define how the lands and waters of the refuges would be managed under this alternative. The other programs listed after the goals provide support to achieve these goals and the overarching missions of the Refuge System and the Service, as well as ensure protection of other important resources, compliance with laws, safety, and complex administration.

Stillwater NWR Goals

- A. Provide optimal feeding and resting habitat for waterfowl and other waterbirds, especially during fall migration and winter, and secondarily to provide optimal nesting, feeding, and resting habitat for these species during the breeding season.
- B. Restore and maintain natural biological diversity.
- C. Provide opportunities for scientific research, environmental education, and wildlife-dependent recreation that are compatible with refuge purposes.

Basis of Goals: These goals, which are listed in priority order, would maintain the traditional emphasis on waterfowl management, under the premise that providing for the needs of waterfowl and other waterbirds would provide for the needs of all other wildlife in the marsh. This approach focuses on the second purpose of the refuge, to conserve and manage fish, wildlife, and their habitat, and it generally supports the Refuge System mission. Goal B supports the first and third purposes of Stillwater NWR (restoration of natural biodiversity and fulfillment of international treaty obligations, respectively), the Refuge System mission, and directives of the Refuge System Administration Act to maintain the biological integrity, diversity, and environmental health of the Refuge System. Goal C mirrors the fourth listed purpose of Stillwater NWR and supports directives of the Refuge System Administration Act which require the Service to facilitate compatible wildlife-dependent recreational uses in the Refuge System.

Fallon NWR Goals

- A. Provide high quality sanctuary and breeding habitat for migratory birds.
- B. Restore and maintain natural biological diversity.
- C. Provide opportunities for scientific research, environmental education, and wildlife-dependent recreation that are compatible with refuge purposes.

Basis of Goals: Listed in priority order, these goals emphasize the purposes of the refuge (Goal A). Goal B supports the mission of the Refuge System and directives of the Refuge System Administration Act which require the Service to maintain the biological integrity, diversity, and that the environmental health of the Refuge System be maintained. Goal C supports directives of the Refuge System Administration Act which require the Service to facilitate compatible wildlife-dependent recreational uses in the Refuge System.

Anaho Island NWR Goal

- A. Protect and perpetuate colonial-nesting birds and other migratory birds.

Basis of Goal: This goal is directly based on the purposes for which Anaho Island NWR was established. The refuge was originally established to provide a “...*preserve and breeding ground for native birds,*” and this purpose was narrowed in Public Law 101-618 which clarifies that Anaho Island NWR is to be managed for “...*the benefit and protection of colonial nesting species and other migratory birds.*” This goal supports the Refuge System mission.

Other Program Areas

In addition to refuge goals that generally outline how refuges are to be managed to achieve the purposes for which they were established, many refuges have other programs that are peripheral to the core programs (i.e., wildlife and wildlife-dependent recreation). Many of these, which are identified below and described in more detail later, are integrally related to the core programs:

- Outreach Program
- Partnerships and Other Cooperative Efforts
- Water rights Acquisition and Land Disposal Program
- Fire Management
- Other Public Uses
- Cultural Resource Management
- Monitoring and Research Program
- Facilities Maintenance and Safety
- Law Enforcement
- Budget and Administration

3.4.B.2 STILLWATER NWR

3.4.B.2.1 Boundaries

Boundary Alternative B would result in no changes to the existing boundary of Stillwater NWR (Map 3.3). The ecological zones depicted in Map 3.3 show the general types of habitat that would be encompassed within this boundary alternative, as compared to their extent inside the existing boundaries. Ecological zones represented within Stillwater NWR would primarily include Stillwater Marsh, farmland, and one part of the dune system.

3.4.B.2.2 Management Program

If Alternative B were selected for implementation, information in this section would become the main contents of the CCP for Stillwater NWR, although some of the detailed objectives and strategies may be pulled into a habitat management plan or public use plan. These step-down plans would then be appended to the Final CCP.

The overall mission of Stillwater NWR, under this alternative, would be to provide high quality fall and winter habitat for waterfowl and other wetland birds and for wildlife-dependent recreation during this period. Because of low evaporation rates during the winter and early spring, breeding habitat would also be provided to waterfowl, shorebirds, and other wetland wildlife. Hunting would continue to be highlighted, but opportunities for environmental education and interpretation, and wildlife observation and photography would be enhanced.

This section is divided into two main parts: (1) Native Fish, Wildlife, and Vegetation Conservation; and (2) Public Use Management. For each of these parts, guiding principles, the refuge goals (identified earlier), subgoals, objectives, and strategies are outlined. A summary outline of goals, subgoals, and objectives is provided on the next page for reference purposes.

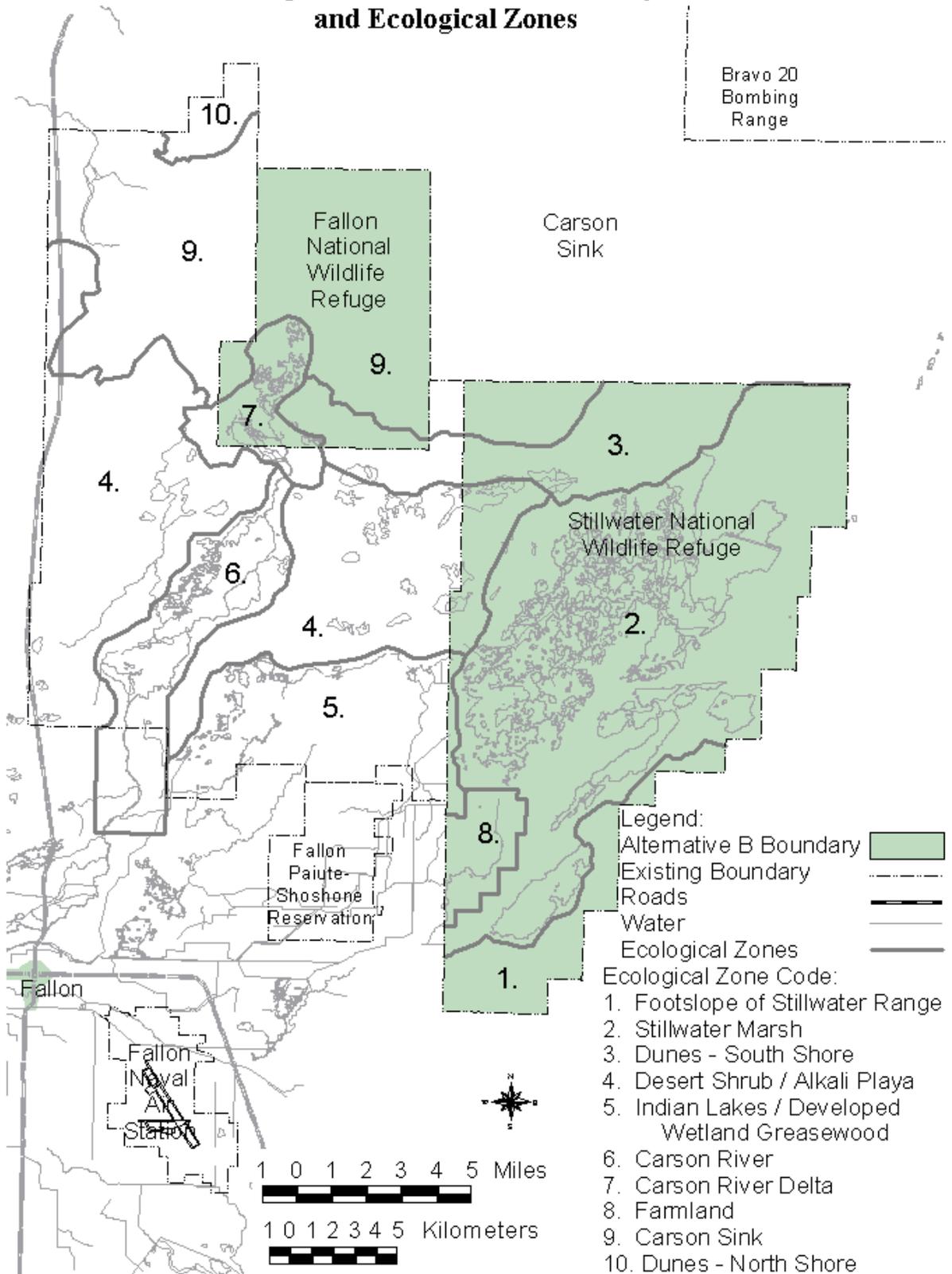
3.4.B.2.2.1 Fish, Wildlife, and Habitat Management

Guiding Principles

Management would be guided by the following principles under this alternative.

Habitat Conditions. This alternative would focus on providing for the habitat needs of key species and groups of species, thus maintaining a key species approach to managing Stillwater NWR. Key species would be similar to those identified under Alternative A (redheads, canvasbacks, tundra swans, white-faced ibis, and bald eagles) and would emphasize waterfowl. Shorebirds would be added to this list.

Map 3.3 Alternative B Boundary and Ecological Zones



Priorities identified in the *1987 Management Plan for Stillwater Wildlife Management Area* would be modified somewhat to shift management emphasis to fall and winter waterfowl habitat, (primarily submergent aquatic and moist soil vegetation), as compared to emphasizing breeding habitat. Although both would be produced under Alternative B, higher importance would be placed on producing submergent aquatic vegetation as a food for fall-migrating and wintering waterfowl, as compared to seeds of annual plants (moist soil vegetation). This stems from the fact that both diving and dabbling ducks feed on submergent vegetation, whereas moist soil vegetation only feeds dabbling ducks. Nonetheless, moist soil vegetation would be made available to dabbling ducks because they prefer this food when given the choice. Furthermore, invertebrate communities in flooded moist soil units are generally more diverse than drawn down units containing aquatic submergent vegetation, thus providing greater benefits to spring migrants. An increased emphasis on moist soil vegetation would represent a shift from management under the 1987 plan.

An assumption under this alternative is that the biotic integrity and environmental health would be enhanced by providing high quality habitat for waterfowl during the fall and winter and high quality habitat for breeding waterbirds. In so doing, all wetland wildlife species would be enhanced.

General Approach to Producing these Habitat Conditions. In developing annual water plans, the order of priority for water use would be to (1) provide high quality fall and winter habitat for waterfowl and waterfowl hunting; (2) provide seasonal drawdown and circulation of water to promote growth of sago pondweed; (3) sustain a high survival of emergent vegetation through drought years; (4) refill wetland units after draining them to dump salts and kill carp, and (5) provide breeding habitat for waterbirds. Figure 3.1 illustrates one of the ways in which the objectives of this alternative differ from the objectives developed for other alternatives.

Parallel with the guiding principles outlined above, habitat management would focus on the management tools that would most effectively produce the habitat conditions to meet the particular needs of a species or species group of interest. Water management and prescribed burning would be the primary management tools, with a focus on producing submergent aquatic vegetation as well as summer drawdowns to promote moist soil vegetation. Water would also be used to maintain deep emergent vegetation. Other tools would include controlled livestock grazing, mechanical treatments, and possibly herbicides and explosives.

Compatibility. Under this alternative, compatibility determinations would evaluate the potential effects of public uses on wildlife species richness, key wildlife parameters (e.g., production, nutritional status), regional and flyway populations of migratory birds, and habitat diversity. Because no measurable adverse impacts to wildlife have been demonstrated for the existing public use program, it would be assumed that existing public uses are compatible.

Under this alternative, problems associated with human disturbance would be resolved as they arise. When a problem occurs for which limited site specific information exists and solutions

could involve cutting back on a particular use, a management study would be designed to investigate the cause and effects relationship between the particular use and the wildlife that appear to be impacted. Upon collecting and analyzing a sufficient amount of information, the public use program would be modified accordingly. If the behavior of a particular wildlife species changes in response to human activities to compensate for potential losses (e.g., increased nighttime feeding), the potential effects of the activity would be considered a nonissue and would not affect the compatibility determination for the use being evaluated.

Monitoring. Recognizing the importance of a sound monitoring program in a successful management program, increased emphasis would be placed on monitoring the status and trends of fish, wildlife, and plant populations and their habitat on each refuge (Refuge System Administration Act, Sec. 5(3)(N)). Priority in the monitoring program would be given to tracking long-term wetland habitat acreage, and long-term waterfowl and shorebird data sets.

Goals, Objectives and Strategies

Goal A: Provide optimal feeding and resting habitat for waterfowl and other waterbirds, especially during fall migration and winter, and secondarily to provide optimal nesting, feeding, and resting habitat for these species during the breeding season.

Subgoal A.a: Provide wetland habitat conditions that are generally beneficial to waterfowl and other wetland wildlife throughout the year, with an emphasis on fall/winter wetland habitat. (This subgoal primarily supports wildlife habitat needs identified under Subgoal A.b, but also supports wildlife needs identified under Goal B.)

Objective A.a.1: Sustain a long-term average of 13,500 acres of wetland habitat in Stillwater Marsh, in a way that attains the following seasonal targets (see table below for actual acreages for representative inflow volumes):

- 80-100% of annual-peak acreage during October-March;
- 75-90% of annual-peak acreage during April-June, with highest acreage on April 1;
- 60-75% of annual-peak acreage during July-September.

Basis of Objective: Maintaining a long-term average of 13,500 acres of wetland habitat in Stillwater Marsh would contribute toward the target of 14,000 acres for the refuge. The objective also generally contributes toward goals and objectives of the Intermountain West Joint Venture Plan (Intermountain West Joint Venture 1995), as well as the Nevada Partners in Flight Bird Conservation Plan (Neel 1999), and U.S. Shorebird Conservation Plan, Intermountain West Region (Oring and Neel 2000).

Strategies to Achieve Objective: A major strategy would be to continue acquiring water rights and securing other sources of water as outlined in the 1996 WRAP EIS and ROD. At the completion of the water rights acquisition program, deliverable water (acquired water rights and lease water rights), would be delivered to Stillwater NWR in the following proportions of the annual volume (until completion of the acquisition program, low water-year proportions would be used).

	<u>Dec-Feb</u>	<u>Mar-Jun</u>	<u>Jul-Sep</u>	<u>Oct-Nov</u>
Low water-year	0%	0-20%	50-70%	20-40%
Full water-year	0%	20-40%	40-60%	10-30%
Spill year	0%	0-40%	50-70%	20-40%

In a full-water year, under this alternative, water would be delivered to attain peak wetland habitat acreage in November (the end of the irrigation season), leading into a period of minimal evapotranspiration (<1 to 3 inches per month during November-February). Because a relatively small amount of water is needed to sustain wetland habitat during these months (an estimated 4,000-8,000 acre-feet to sustain 16,000 acres), a large proportion of the peak acreage can be carried over to spring using only drainwater.

At the start of the irrigation season, usually in the later half of March, a small amount of fresh water would be delivered to fill desired units, which would be maintained through May. At this time, water levels would be permitted to decline until about September when wetland units would again be filled leading into fall and winter. Therefore, in addition to providing the maximum amount of wetland habitat for migrating and wintering waterfowl, a large amount of wetland habitat would be available for the breeding season.

In developing annual water plans, the order of priority for water use on Stillwater NWR would be to (1) sustain a high survival of emergent vegetation through drought years, (2) provide high quality feeding and resting habitat for waterfowl and other waterbirds during the fall and winter, (3) provide high quality nesting and brooding habitat, and (4) refill wetland units after draining them to dump salts or kill carp.

Water management would be enhanced by enlarging and extending the West Canal to West Marsh, and possibly to Pintail Bay, which would greatly enhance independent management of wetland units. Other improvements to the system would include enlarging East Canal and Center Canal and enlarging existing water control structures. Some of the larger wetland units could be subdivided by additional diking. Extremely high or low flows of water through wetland units would be avoided by use of bypass canals. Open channels would be maintained by fire, physical means, or explosives in cattail and hardstem bulrush stands to permit movement of water and wildlife.

Monitoring Elements: Water receipts, wetland habitat acreage by season.

Objective A.a.2: At a broad scale, provide a mix of wetland habitat types throughout the marsh to provide for a wide spectrum of habitat needs of waterfowl and other water birds, with an emphasis on feeding habitat during the fall and winter and breeding habitat during the spring, by targeting the following mix of habitat.

Low-Water Conditions (seasonal range = 3,000 - 5,500 acres of wetland habitat^A)

Habitat Type (and annual-peak depth)	Annual	Apr-Jun	Jul-Sep	Oct-Mar
Submergent marsh (1-3 ft)	20-45%	20-35%	30-45%	20-35%
Deep emergent marsh (1-3 ft)	20-45%	30-45%	30-45%	20-35%
Shallow emergent marsh (0.1-2 ft)	10-35%	10-25%	10-30%	20-35%
Wet meadow (0.1-1 ft)	0-10%	0-5%	0%	0-10%
Moist-soil (0.1-1 ft)	0-10%	0-5%	0%	5-10%
Unvegetated mudflat (0.1-0.5 ft)	5-10%	5-10%	7-10%	5-7%

^A Assumes a full-water year with about 17,000 acre-feet of water available for wetland delivery (20,000 acre-feet of water rights acquired), or a shortage year at a later stage of the acquisition program, equivalent of this annual volume of water.

Moderate Water Conditions (seasonal range = 8,000 - 13,000 acres of wetland habitat^B)

Habitat Type (and annual peak-depth)	Annual	Apr-Jun	Jul-Sep	Oct-Mar
Submergent marsh (1-3 ft)	20-40%	20-35%	25-40%	20-35%
Deep emergent marsh (1-3 ft)	20-40%	25-40%	30-45%	20-40%
Shallow emergent marsh (0.1-2 ft)	15-45%	15-35%	25-35%	25-45%
Wet meadow (0.1-1 ft)	0-10%	0-5%	0-2%	5-10%
Moist-soil (0.1-1 ft)	0-20%	5-15%	0-3%	5-20%
Unvegetated mudflat (0.1-0.5 ft)	5-10%	5-10%	5-10%	5-10%

^B Assumes a full-water year with about 30,000 acre-feet of water available for wetland delivery (35,000 acre-feet of water rights acquired), or a shortage year at a later stage of the acquisition program, equivalent of this annual volume of water.

High-water Conditions (seasonal range = 8,000 - 15,000 acres of wetland habitat^C)

Habitat Type (and annual peak-depth)	Annual	Apr-Jun	Jul-Sep	Oct-Mar
Submergent marsh (1-3 ft)	15-40%	15-30%	30-40%	25-40%
Deep emergent marsh (1-3 ft)	15-45%	15-35%	30-45%	15-35%
Shallow emergent marsh (0.1-2 ft)	10-30%	10-25%	10-25%	20-30%
Wet Meadow (0.1-1 ft)	0-15%	5-10%	0-5%	0-15%
Moist-soil (0.1-1 ft)	5-30%	10-25%	5-10%	15-30%
Unvegetated Mudflat (0.1-0.5 ft)	5-15%	5-10%	5-15%	5-10%

^C Assumes a full-water year with about 47,000 acre-feet of water available for wetland delivery (completion of water rights acquisition program)

Objective A.a.3: On a finer scale, within each type of wetland habitat, manage for plant species composition that best meets the needs of the representative species, according to season, by providing a mix of plant associations dominated by one or more of the following species:

<u>Habitat Type</u>	<u>Dominant Species</u>
(a) <u>Shallow emergent marsh:</u>	alkali bulrush, Baltic rush, common reed, and smooth scouring rush, and common threesquare;
(b) <u>Deep emergent marsh</u>	hardstem bulrush, southern cattail, and broad-leaf cattail;
(c) <u>Submergent marsh:</u>	chara, coontail, horned pondweed, long-leaved pondweed, narrow-leaf pondweed, sago pondweed, western pondweed, widgeon grass, water hyssop, and duckweed;
(d) <u>Seasonal marsh:</u>	bassia, swamp timothy, smartweed, watergrass, and other annuals; salt grass; and cattail, alkali bulrush, hardstem bulrush, common threesquare, and other perennial emergents;

- (e) Playa wetland: no vegetation to sparse vegetation, water depths of less than one foot at peak water levels, but usually drying by summer's end.

Basis of Objectives: Objectives A.a.2 and A.a.3 generally support the objectives under Subgoals A.b and A.c, as well as other objectives, by maintaining a high level of wetland habitat diversity for a range of waterfowl and other waterbird species. They would generally support objectives outlined in the Intermountain West Joint Venture Plan.

Strategies to Achieve Objectives: Stillwater Marsh would be managed to provide a mix of wetland habitat within relatively close proximity, which may require additional dikes to break up larger units. The following strategies, in addition to water management actions described above, would be undertaken to achieve Objectives A.a.2 and A.a.3.

To reduce turbidity, which can hinder growth of submergent marsh vegetation, (1) larger impoundments may be broken up by cross-diking to reduce wave action, (2) carp would be controlled through strategic drawdowns and rotenone, (3) hardstem bulrush and cattail root stocks could be transplanted to further reduce scouring caused by wind (and would also contribute to breeding habitat), and (4) bypass canals would be used, rather than sending water through upper wetland units, because high flows could increase the amount of suspended matter.

In addition to water management, prescribed burning, livestock grazing, muskrat management, herbicides, mechanical methods, and explosives would be used to manage marsh vegetation. Prescribed burning and livestock grazing are discussed further under Objective A.c.1. When muskrat grazing begins to reduce emergent vegetation below the desired levels of this alternative, muskrat numbers would be reduced through a permit trapping system. Muskrat trapping may be extensive at times (up to an estimated 40,000 animals trapped per year).

European carp would be controlled, primarily through drawing down wetland units, to reduce the deleterious effects of high water turbidity on aquatic plant survival and production. Pesticides may be used on occasion. An integrated weed management plan and integrated saltcedar management plan would be completed and would include: (1) continued control of saltcedar, perennial pepperweed (tall whitetop), and other noxious weeds, highest priority being based on importance of the area for achieving priority objectives; and (2) continued promotion of Stillwater NWR as a test site of the Chinese leaf beetle. Integrated pest management is defined as *“the control of pests utilizing a practical, economical, and scientifically based combination of biological, physical, cultural, and chemical control methods”* (30 AM 12.5). It is a balanced approach which considers hazard to the environment, efficacy, costs, and vulnerability of the pest. *“The ultimate goal is to eliminate pesticide use on Service lands and facilitate, where possible, pest management programs that benefit trust resources and provide long-term, environmentally sound solutions to pest management problems on sites off of Service lands”* (30 AM 12.3).

Control tactics may include: flooding or dessication; mechanical treatments, such as chainsawing, rooting, disking; prescribed burning (also to be addressed in a Fire Management Plan); introducing of host-specific insects, such as the Chinese leaf beetle; grazing or browsing by goats or sheep; and herbicides. Efforts would be made to form partnerships with adjacent landowners, other Federal and nonfederal agencies, and organizations to control undesirable vegetation at a landscape level. Noxious weeds would be controlled according to priorities identified in noxious weed control-zones.

Chemical control methods would be necessary during initial phases of control efforts and with broadly distributed species, but chemicals would be used only when it is determined that they are the most appropriate management tool available. For example, tall whitetop is sporadically distributed at low densities. The control technique currently used is hand pulling individual plants as they are located. However, chemical control has been more effective as wider distribution of tall whitetop has occurred. No control methods are currently practiced for Russian olive or purple loosestrife. All of these species and other potential invasive species will be covered in the stations integrated pest management plan which will be completed concurrent with the CCP.

Monitoring Elements: Seasonal acreage of each wetland habitat type, within community plant species composition, distribution and undesirable invasive vegetation, progress on release of the Chinese leaf beetle.

Objective A.a.4: Provide a range of water conditions throughout the marsh, from freshwater areas (less than 1,000 milligrams per liter (mg/L) total dissolved solids (TDS) to areas of highly alkalinity/salinity (e.g., up to 50,000 mg/L or more)).

Basis of Objective: Different plant and animal communities form in different water conditions. Providing a wide range of these conditions would maximize biodiversity.

Strategies to Achieve Objectives: The following strategies would be carried out to attain and sustain objective levels of TDS, and reduce and minimize contamination. Drainwater and water from groundwater pumping would be mixed with irrigation quality water. Flushing flows through the marsh would be maximized during precautionary releases and spills from Lahontan Reservoir by implementing strategies described previously to flush salts and other dissolved solids.

Monitoring Elements: Monthly concentrations of TDS through measurements of specific conductance, at inflow points and various locations throughout marsh.

Objective A.a.5: Manage wetlands water on Stillwater NWR to maintain concentrations of potentially toxic trace elements below effect levels, identified below, while recognizing that maintaining concentrations below these levels in the refuge’s wetlands is not attainable in all wetland units (e.g., wetlands lower on the hydrologic gradient) at all times of year (e.g., later in the summer when wetland habitat acreage shrinks), or during all time periods (e.g., regional drought conditions) and recognizing that water chemistry characteristics of wetland inflows are largely a product of off-refuge conditions.

Fish and wildlife concern and effect concentrations for contaminants of concern on Stillwater National Wildlife Refuge, Churchill County, Nevada.

constituent	effect concentration ^a	concern concentration ^a	reference ^b
ammonia (mg/L)	0.4	0.04	1
arsenic (: g/L)	40	-	2
boron (: g/L)	1,016	200	3, 4
copper (: g/L)	10	5	6
lead (: g/L)	3.5	1.0	7, 8
mercury (: g/L)	0.1	0.0006	9
molybdenum (: g/L)	790	28	5
selenium (: g/L)	3.0	1.0	10
zinc (: g/L)	32	-	11

^a Effect were identified as such in literature or were associated with a major adverse effect (i.e., mortality), concern concentrations were identified as such in literature or were associated with non-lethal effects (i.e., reduce growth).

^b 1, Russo (1985); 2, USEPA (1985a); 3, Birge and Black (1977); 4, Birge et al. (1979); 5, Eisler (1997); 7, USEPA (1985b); 8, Wong et al. (1981); 9, Schwarzbach (1998); 10, Skorupa (1998); 11, USEPA (1987)

Basis of Objectives: A variety of environmental contaminants have been identified in water, sediment, and biological tissues on Stillwater NWR, as identified above. Elevated contaminant concentrations have the potential to compromise attainment of other refuge objectives, including restoration of natural biological diversity, maintenance of high quality habitat, and production of waterbirds. Effect concentrations were so noted in published literature or were associated with significant toxic effects to fish and wildlife, such as substantial mortality, reduced production, or teratogenesis (i.e., birth defects, deformity). Concern concentrations were so noted in published literature or were associated with less severe observable effects, such as low level mortality or decreased growth for limited time periods. The attainment of objectives for water chemistry, sediment, and biological tissues, as provided in the above table, would minimize the potential for contaminants to compromise other refuge objectives.

Strategies to Achieve Objectives: As discussed under Objective A.a.5, the acquisition of water, the management of drainwater, and regular flushing of marshes are expected to reduce concerns with dissolved solids. As such, it is anticipated that concerns with trace elements closely associated with dissolved solids, such as arsenic and boron, would also be reduced.

Previous sampling has demonstrated that the chemical quality of water varies with water delivery routes. The Service would continue to monitor water quality parameters in delivered water and review water quality data collected by other entities to identify those routes through which the water with the lowest concentrations of TDS and trace elements can be delivered. Use of routes providing the lowest concentrations of these elements would be emphasized, while use of routes providing water with higher concentrations of these elements would be de-emphasized.

Pesticides have been identified as a concern on Stillwater NWR. The Service (Nevada Fish and Wildlife Office) would conduct a review of pesticide use in Lahontan Valley and continue to review water quality data to determine extent and severity of concerns with pesticides. If deemed necessary, pesticide residues in major water delivery routes and drains would be monitored. If it is determined that pesticides have the potential to impair the achievement of refuge purposes, the Service would work with TCID and other entities to reduce pesticide transport to the refuge.

The Service would collect additional data to evaluate concerns with nutrients (including ammonia) and bacteria. If nutrients continue to be of concern, the Service would pursue source identification and work with appropriate entities (i.e., Natural Resource Conservation Service, University of Nevada Cooperative Extension, and Nevada Division of Environmental Protection) to identify measures to reduce concerns with nutrient and bacteria transport to the refuge.

In some cases, exposure to contaminants in sediment and food chains represents the greatest hazard to fish and wildlife on Stillwater NWR. The acquisition of water is expected to reduce the risk with at least some of these contaminants. However, the degree to which concerns may be reduced is uncertain. The Service would continue to monitor contaminant concentrations in sediment and biological tissues to evaluate contaminant risk in wetlands and associated wildlife. Additional measures to reduce risk may be developed if warranted.

Monitoring Elements: Monthly concentrations of TDS through measurements of specific conductance, pH, turbidity, and dissolved oxygen. Water samples would be collected quarterly from major water delivery routes for analysis of total dissolved solids, major ions, nutrients, trace elements, and bacteria. To the extent possible, water quality data collected by other agencies would be used. If warranted, samples would be collected for pesticide analyses during periods of peak pesticide use. Monitoring of trace element concentrations in water, sediment, and biological tissues from selected Stillwater NWR wetlands every three years.

Objective A.a.6: Minimize the amount of mercury entering Stillwater NWR wetlands and reduce mercury levels in wetland sediments and biological tissues to non-hazardous levels.

Basis of Objective: Mercury has the potential to impair the Service’s ability to achieve refuge goals and purposes.

Strategies to Achieve Objectives: The amount of mercury entering the Stillwater NWR wetlands would be minimized and mercury in wetland sediments and biological tissues would be reduced to non-hazardous levels. Through cooperation with EPA and the Ecological Services office of the Fish and Wildlife Service in Reno, the most appropriate means to reduce mercury concentrations and avoid any increased distribution of mercury contamination would be determined, and an operational plan would be developed and implemented. To assist in these efforts, the Service and EPA anticipate the development of a model to increase the understanding of mercury dynamics in Lahontan Valley wetlands. Some potential remedial considerations that would be considered include: (1) avoiding the use of certain water delivery routes to the refuge; (2) further evaluate the benefits and possible detriments of using precautionary releases and spills from Lahontan Reservoir; (3) using cattail stands to filter water entering the refuge; (4) de-emphasize management of contaminated wetlands; (5) working with Bureau of Reclamation, TCID, and EPA to identify and explore options of conducting releases from Lahontan Reservoir for deliveries and for precautionary releases that would minimize transport of mercury from Lahontan Reservoir; and (5) implement measures to reduce the biological availability of mercury.

Monitoring Elements: Monthly concentrations of TDS through measurements of specific conductance, at inflow points and various locations throughout marsh, mercury loading at designated sites.

Objective A.a.7: Minimize the occurrence, spread, and severity of botulism and cholera outbreaks.

Basis of Objectives: Waterbird diseases such as type C botulism and fowl cholera have the potential to impact populations of waterbirds using the Stillwater NWR Complex. These diseases occur seasonally. Cholera typically occurs during winter and botulism during hot summer months. Past die-offs have been as high as 55,000 birds, which resulted from a suspected combination of botulism and cholera. This diminishes the contribution of Stillwater NWR wetlands to achieving Intermountain West Joint Venture goals and objectives. In addition to direct mortality, waterbird use of refuge wetlands can be severely impacted at this level of effect because control efforts (e.g., use of airboats) tend to push remaining birds into isolated, and often, less desirable habitat. Botulism and fowl cholera can diminish the contribution of Stillwater NWR wetlands to achieving Intermountain West Joint Venture goals and objectives.

Strategies to Achieve Objectives: Botulism and cholera monitoring and cleanup would be continued as it has in the past, with botulism patrols initiated by mid-June and continuing into early fall. Wetland units with a history of botulism problems would be identified and targeted for regular airboat patrols, with more frequent patrol efforts initiated as outbreaks are discovered. Fall, winter, and early spring patrols would be conducted in more remote areas such as the Carson Sink and where large concentrations are identified through aerial surveys. Carcasses would be immediately removed from wetland units and sick birds would be transported to the refuge “duck hospital” where rehabilitation would be conducted using fresh uncontaminated water in the holding pen.

Water management would be used to minimize the severity of botulism outbreaks by minimizing water level fluctuations during summer months. Under this alternative, sufficient water would be available to reduce the risk of botulism outbreaks; not only would water levels not be dropping during late summer months, water levels in many wetland units would be rising during this period.

Where outbreaks occur, wetland unit flushing or draining could be used to either dilute contaminated units (through flushing) or to reduce the desirability of the unit to susceptible waterbirds (e.g., through draining the unit). Portable Cristafulli pumps would be used to facilitate wetland unit draining.

Monitoring Elements: Botulism and cholera occurrence by wetland unit, annual number of waterbirds, by species, that die annually due to botulism and cholera.

Subgoal A.b: Enhance, develop, and maintain high quality fall and winter feeding and loafing habitat for waterfowl and other species using Stillwater NWR. (*The following objectives and strategies are in addition to those outlined for Subgoals A.a and A.d.*)

Objective A.b.1: Annually produce dense stands of submergent aquatic vegetation in 20 to 35 percent of the available fall/winter wetland habitat (up to 40 percent at the completion of the water rights acquisition program), and make this readily available to provide a high quality food source for migrating and wintering waterfowl, especially diving ducks and tundra swans.

Basis of Objective: Aquatic submergent vegetation (in the “submergent marsh” zone of Objective A.a.3) is the most important food source at Stillwater NWR, and one that traditionally has attracted migrating redheads, canvasbacks, and other diving ducks, as well as tundra swans, which are key species under this alternative and species that have been the focal point of management at Stillwater NWR. This food source is also used by dabbling ducks. Therefore, producing extensive stands of this vegetation is critical to achieving Goal A.

Strategies to Achieve Objectives: To facilitate feeding by diving ducks and swans, production of aquatic vegetation would initially be optimized by elevating water levels before the end of the growing season and retaining water flow. Maintaining relatively high water levels would reduce access by coots, which can considerably deplete aquatic vegetation prior to the waterfowl migration. Maintaining high elevations would be followed by a gradual lowering of unit wetland depths during the period when waterfowl are at peak numbers during the fall. This could be accomplished as part of drawdown plans for units and to facilitate flushing salts from wetland units that are lower down in the system. Because swans tend to stay longer, water flow through impoundments may have to be maintained to prevent ice from covering all food supplies.

Monitoring Elements: Acreage within community and density of submergent vegetation dominated habitat, and response by waterfowl (e.g., waterfowl use-days).

Objective A.b.2: Annually provide up to 25 percent of the available fall/winter wetland habitat acres (up to 30 percent at the completion of the water rights acquisition program) as shallowly flooded areas dominated by annual, seed producing plants to provide a high quality food source for migrating and wintering dabbling ducks.

Basis of Objective: Although submergent aquatic vegetation can be heavily used by dabbling ducks, shallowly flooded areas of annual, seed producing plants (in the “seasonal marsh” zone of Objective A.a.3) are preferred by these ducks. Producing a sufficient amount of this food is important to achieving Goal A.

Strategies to Achieve Objectives: Flooding areas dominated by seed producing annuals would provide carbohydrates and fat for higher maintenance requirements of dabbling ducks during the winter and for migration. To obtain the desired feeding habitat, water levels in certain wetland units would be drawn down during the summer to promote germination of annual weeds. These units would then be slowly flooded during the fall and early winter, ensuring that water depths in areas with annual weeds does not exceed eight inches in the majority of the habitat zone. Slow staging of water levels would provide a continual supply of new habitat at optimal levels. Previously exploited food resources would become unavailable (in deeper water) while unexploited food becomes available. Then, during the late winter and spring, these units could be drawn down, which would create a concentration of invertebrates at a time when waterbirds are actively attempting to acquire protein. East and West Pastures in the sanctuary would be key areas for this practice.

Monitoring Elements: Acres of moist soil vegetation available, and response by waterfowl (e.g., waterfowl use-days).

Objective A.b.3: Annually produce winter forage in the farmland area sufficient to supplement the diet of arctic-nesting Canada geese.

Basis of Objectives: The Intermountain West Joint Venture Plan generally calls for wintering and migration habitat to be provided for Canada geese in the focus areas of the Intermountain West, of which Stillwater NWR is a component.

Strategies to Achieve Objectives: The Service would work to provide forage crops for Canada geese (e.g., alfalfa, wheat, oats) in the area by Stillwater NWR providing these crops on the refuge. Up to 400 acres of alfalfa, wheat, oats, or other crops would be provided as forage for wintering Canada geese on the refuge. However, water and water rights acquired under subsection 206(a) of P.L. 101-618 would not be used to irrigate crops in the farmland area, except possibly after water rights have been acquired but before they have been transferred to the wetlands. Because the Service would not acquire additional water rights for use on farmlands or for other agricultural purposes, other sources of water would be needed for these crops, such as temporary transfers by farmers in a cooperative farming program.

Before the arrival of Canada geese, the crops would be harvested, grazed by cattle, or both to ensure that vegetation is at an optimal height for goose browsing. Cattle grazing would also be used to control weeds along fields and ditches in the farmland area. Although cattle grazing may be used to enhance goose browse and control weeds in the farmland area of the refuge, it would not be used for these purposes outside the farmland area.

Monitoring Elements: Acres of farmland cultivated for the purpose of providing goose forage and the number of geese using the fields.

Objective A.b.4: Provide high quality shorebird habitat during spring and fall migration, based on best management practices for shorebirds.

Basis of Objectives: Stillwater Marsh and other wetlands in the Lahontan Valley are components of the Western Hemispheric Shorebird Reserve Network, stressing the importance of contributing to the international effort to conserve shorebird populations. In some years the Lahontan Valley wetlands provide stopover habitat for about half of North America's population of long-billed dowitchers. Providing high quality habitat for shorebirds would also contribute toward accomplishment of goals and objectives in the U.S. Shorebird Management Plan.

Strategies to Achieve Objectives: Under this alternative, shorebird feeding and loafing habitat would be provided during spring and fall migrations through water management practices identified under Subgoal A.a. Under this alternative's water management strategy, mudflat habitat would be provided in several areas of the refuge, associated with declining water levels in the spring and rising water levels in the late summer and fall. Monitoring would be undertaken to determine whether adequate habitat is provided for migrating shorebirds at appropriate times. Planning, monitoring, and other aspects of wetland management would be coordinated with the National Shorebird Conservation Plan, Intermountain West Region. As recommended in the Nevada Partners in Flight Plan for avocets, at least one wetland unit would be managed to ensure that there are mature invertebrates by April 1 each year, followed by gradual drawdown from April 1 through May 10.

Monitoring Elements: Acreage of mudflat and other shorebird migration habitat, and number of shorebirds during spring and fall migrations.

Subgoal A.c: In the wetland habitat that is available during the breeding season, maximize nesting success and production of waterfowl and other waterbirds. *(The following objectives and strategies are in addition to those outlined for Subgoals A.a and A.d.)*

Objective A.c.1: At a broad scale, enhance, develop, and maintain feeding, loafing, nesting, and brooding habitat by distributing water to produce and maintain the following proportions of wetland habitat to support a diversity of migratory birds and resident wildlife (see representative species below) using these habitat:

Proportion of Marsh	Type of Wetland habitat	Representative Wildlife
30%	deep-water emergent marsh	coots, grebes, ibis, egrets, herons, and, Canada geese
35%	shallow emergent, seasonal, and playa wetland habitat	mallards, green-winged teal, rails American avocets, and snowy plover
35%	hemi-marsh (50% submergent marsh and 50% deep and shallow emergent marsh)	redheads, canvasbacks, bitterns

Objective A.c.2: Within each habitat type, produce the habitat conditions that would best meet the needs of representative species of waterfowl and other waterbirds (redheads, mallards, green-winged teal, white-faced ibis, American avocets).

Objective A.c.2(a): In the hemi-marsh, produce and maintain an interspersed of open water and cover at a ratio of 50:50, and:

- (i) Ensure that dense, residual emergent vegetation is available near open water for nesting redheads (and other species such as ruddy ducks and white-faced ibis).
- (ii) Ensure that sufficient openings are provided in emergent vegetation near the shoreline to facilitate dabbling duck nesting in adjacent uplands.

Basis of Objective: Both open water and emergent vegetation are needed for several species of breeding waterfowl and other waterbirds. With too little of one or the other, or with too large a homogeneous block of one or the other, the density of nesting pairs can be diminished. A mosaic of both is ideal for redheads and other species that nest in emergent vegetation.

Strategies to Achieve Objective: The following strategies would supplement those outlined under Objectives A.a.2-3. To enhance and sustain redhead production and production of other birds, including herons, egrets, bitterns, white-faced ibis, and rails, retaining emergent vegetation would be emphasized. At least one dense, mature stand of hardstem bulrush would be maintained in half the wetland units. Although providing high quality nesting and brooding habitat for redheads would be a major objective of water management, attempts to maintain water levels for production would be abandoned in scarce water years. In low water years, available water would be used to provide migration and wintering habitat, which would provide an additional boost for the following nesting season. To the extent that hemi-marsh habitat is not sustained in the desired mosaic of emergent vegetation (50 percent) and open water (50 percent) through water management differences in soil and water depths, and muskrat grazing, the following techniques would be used in order of priority, (1) prescribed burning, (2) livestock grazing, (3) mechanical treatment, and (4) muskrat trapping (if muskrat grazing begins to reduce emergent vegetation below desired levels). Herbicides and explosives would only be used to reduce vegetation in canals and to facilitate water flow through wetland units.

When prescribed burning or cattle are used to create hemi-marsh habitat in extensive stands of dense emergent vegetation, the prescription would be designed to ensure that emergent vegetation survives in mosaics. Additional fencing may be required around some units to facilitate the use of cattle to create openings in dense emergent vegetation. Prescribed burning may also be used to remove accumulations of dead plant material over extensive areas of the marsh when such residual vegetation is inhibiting new growth or when new vegetation is desired. In these cases, prescriptions would be designed to not kill any vegetation (e.g., by burning over shallow water). In some cases, particular areas of the marsh may be burned every three to five years. Habitat management zones would be created.

During the breeding season, water would be managed to maintain shallow, nonfluctuating water depths in nesting areas to promote growth of submergent vegetation sufficient in amount and density to support floating nests. A major part of providing high quality habitat for dabbling ducks would be the management of water to promote dense stands of salt grass. Nesting islands would be constructed.

Monitoring Elements: Acres of seasonal wetland habitat types, measure emergent: open water ratio and mosaic, and/or waterbird response (e.g., number of nesting pairs, number of ducklings, annual production).

Objective A.c.2(b): Enhance and maintain dense nesting cover for mallards, green-winged teal, gadwall, and other waterfowl in areas close to brooding habitat.

Basis of Objectives: Waterfowl nesting studies have repeatedly shown that higher nest success in dabbling ducks is associated with dense nesting cover.

Strategies to Achieve Objectives: When salt grass becomes decadent under this alternative, it would be burned through prescription or grazed by cattle. This practice could be done every five to ten years. Desired levels of cattle grazing on Stillwater NWR would be achieved over a period of three years.

Nesting islands may also be constructed to facilitate by dabbling ducks.

Monitoring Elements: Acres of dense nesting cover available for nesting, and/or response by waterfowl (e.g., number of ducklings, annual production).

Objective A.c.2(c): Construct up to ten nesting islands for upland nesting waterfowl species within the next five years.

Basis of Objectives: Studies have demonstrated that nests on islands are more successful than nests in nearby uplands.

Strategies to Achieve Objectives: Nesting island design criteria would be explored and a design completed. After nesting islands are constructed, nesting success would be monitored to assess whether additional islands should be constructed.

Monitoring Elements: Number of islands constructed, frequency of use of nesting islands for nesting and nest success, as compared to nest success in uplands.

Objective A.c.3: Provide high quality nesting and brood rearing habitat for shorebirds, especially American avocets (targeting 1,500 pairs in full-water years), and snowy plovers (to contribute significantly to the State-wide target of 900 adults). Targets are based on the Nevada Partners in Flight Plan.

Basis of Objectives: Stillwater Marsh and other wetlands in the Lahontan Valley are components of the Western Hemispheric Shorebird Reserve Network, stressing the importance of contributing to the international effort to conserve shorebird populations. The Lahontan Valley wetlands provide important breeding habitat for American avocets and snowy plovers, key species identified in the Nevada Partners in Flight Plan. The snowy plover is a species of special concern. Providing high quality habitat for shorebirds would also contribute toward accomplishment of goals and objectives in the U.S. Shorebird Management Plan, in particular, the habitat goal for “marshes and lakes.”

Strategies to Achieve Objective: Water management prescribed under Objectives A.a.1 would be adjusted to contribute to objectives, strategies, and actions in the Nevada Partners in Flight Plan for snowy plover and American avocet. Particular attention would be paid to flooding at least one major alkaline playa (or similar habitat) for snowy plover nesting each year (an action in the Nevada Partners in Flight Plan). The nesting habitat needs of snowy plovers would be studied, and periodic censuses would be coordinated with other agencies and groups involved in snowy plover recovery efforts.

For American avocets, at least one extensive area of salt grass would be flooded to a constant depth of two to six inches from April 15 through August 1. The location where this habitat produced would vary by year to ensure that emergent vegetation did not become established. Predation of chicks and eggs would be monitored, and remedial action would be taken if predation levels exceed 50 percent. (Nevada Partners in Flight Plan)

Providing an average of 13,500 acres of wetland habitat in Stillwater Marsh as prescribed under this alternative, including the above strategy for snowy plovers and American avocets, would provide a considerable amount of breeding habitat for other shorebirds. Other shorebird species may be added to the key species list after further examination.

Monitoring Elements: Acres of habitat provided during the breeding season, and response by shorebirds (e.g., breeding population, annual production), shorebird breeding population survey to be coordinated with other agencies (Nevada Partners in Flight Plan).

Objective A.c.4: Ensure that suitable wetland habitat is provided for other marsh dependent species, particularly, white-faced ibis, black tern, American white pelican, Clark’s grebe, and short-eared owl, during the breeding season.

Basis of Objective: This objective generally falls under the umbrella of contributing to the goals and objectives of the Nevada Partners in Flight Plan, in which white-faced ibis, American white pelican, Clark's grebe, and short-eared owls are identified as key species.

Strategies to Achieve Objectives: This objective should be met in large part through the accomplishment of objectives under Subgoal A.a and Objectives A.c.1-3 above. For example, some of the specific objectives and strategies identified in the Nevada Partners in Flight Plan include (a) maintaining constant water levels (12 to 24 inches) in certain hardstem bulrush units from April 15 through August 15 for white-faced ibis nesting; (b) providing foraging habitat at Stillwater NWR for white pelicans; and (c) maintaining semi-permanent marsh with well developed emergent and submergent plant communities, abundant populations of small fish, and relatively stable water levels from May 1 through November 15 for Clark's grebes. These conditions would be provided by implementing of the aforementioned strategies, but monitoring would be undertaken to determine whether adequate habitat is provided for these species.

Other actions, identified in the Nevada Partners in Flight Plan, to provide for the needs of waterbirds are as follows. Nongame fish in Stillwater Marsh would be actively managed for white pelicans to the extent that this does not conflict with other objectives. Holding water at high levels during the spring would be avoided to the extent possible.

Wetland units that historically produce few ducks could be lowered or held below operational levels until June, and could be managed to encourage and sustain forage fish. During spring, moving water attracts carp where they concentrate in canals; excess water could be used to maintain spring flows for this purpose. Flooding abandoned units, especially those that are vegetated, would trigger fish spawning, and if sufficient water is available, these units could be maintained for an additional year.

Although wetland units would not be managed to enhance tui chub populations, it is assumed that tui chub would prosper in most units. To the extent that this is found not to be true, management of one or more wetland units could be tailored to encourage tui chub. Tui chub may be stocked occasionally to supplement existing populations. European carp and other introduced fish species would be controlled primarily through drawing down wetland units. Nonnative fish species would not be stocked or otherwise introduced into Stillwater NWR.

To ensure that foraging areas are provided for short-eared owls, residual stands of emergent marsh vegetation would be periodically dried, for an extended period in some wetland units, to build up the vole population so that it is high during the period March 1 through July 1.

Habitat needs of the species listed above would be examined further to determine other appropriate management actions to meet their needs. A review would be conducted to determine if other key species should be added to the list for Stillwater NWR.

Monitoring Elements: Distribution and acreage of wetland habitat types, and response by waterbirds (e.g., breeding populations, annual production).

Objective A.c.5: Minimize the effects of nest depredation on nesting success of waterfowl, shorebirds, and other waterbirds.

Basis of Objectives: Waterfowl, redheads and canvasbacks in particular, are a primary management focus under this alternative. Depredation of nests appears to be having a marked effect on the production of waterfowl and other waterbirds.

Strategies to Achieve Objectives: A predator control program would be designed and implemented to enhance nest success and production of waterfowl, shorebirds, and other waterbirds. The main target species would be common ravens, although other nest predators could be included. Methods could include trapping, shooting, and in extreme cases, poisoning.

Monitoring Elements: Waterfowl and shorebird breeding pair numbers compared with waterfowl brood counts.

Subgoal A.d: Ensure that recreational and other uses do not adversely impact nesting waterbirds, and that opportunities for recreational and other uses are managed to minimize impacts to waterbirds and other wildlife during the remainder of the year.

Objective A.d.1: Provide high quality feeding and resting habitat for waterfowl and other waterbirds in a sanctuary area (minimum of 4,000 acres of the refuge's wetland habitat), to ensure that food is available to waterbirds outside the hunt area, and manage access in the hunt area to minimize human disturbance to waterfowl, while still meeting objectives for hunting.

Basis of Objective: An important part of high quality habitat in an area that is used for recreational activities is sufficiently low levels of human disturbance to allow waterfowl to use the food that is produced. It generally supports Subgoal A.b and habitat objectives (e.g., A.b.4, A.c.2, A.c.3). One way to accomplish this is to provide a sanctuary containing high quality feeding and resting habitat.

Strategies to Achieve Objective: During the hunting season, roads that are now closed would continue to be closed to reduce access and disturbance (Map 3.4). The sanctuary area south of Division Road would remain intact, and dabbling duck foraging habitat would be enhanced by flooding East and West Pastures during fall and winter. The northern one-third of Pintail Bay and a 100-yard wide band at the north end of North Nutgrass would be closed under this alternative (strategy under objective C.a.1), and this would provide some additional sanctuary for waterfowl. A minimum of 4,000 acres of wetland habitat would be provided in the sanctuary. If total wetland habitat acreage for Stillwater NWR is less than 4,000 acres, hunting would not be permitted that year.

Additional boating regulations would be imposed under this alternative. During the waterfowl hunting season, the maximum horsepower (hp) of boats would be set at 15, which is higher than existing boating regulations, and airboats would not be permitted.

Monitoring Elements: Wetland habitat acreage inside and outside sanctuary by season; distribution and use of habitat by waterbirds; coordinated research effort to elucidate human/waterfowl interactions during hunting season; and distribution and density of refuge visitors, by activity and season (from public use monitoring program).

Objective A.d.2: Minimize the adverse effects of human disturbance to waterbirds during the nesting and brooding seasons, while still providing opportunities for environmental education, wildlife observation, and other wildlife-dependent recreational uses.

Basis of Objectives: Many waterbird species are particularly sensitive to disturbance during the breeding season and desire nest sites which are remote and relatively disturbance free. Human activities (whether public use or research related) tend to compound natural levels of disturbance to which these species have adapted. In accordance with the Refuge System Administration Act, the basis of this objective would be to ensure that wildlife comes first while still providing opportunities for wildlife-dependent recreation.

Strategies to Achieve Objectives: All of Stillwater NWR, except designated tour routes, would be closed to all public uses from April 1 through July 31 each year to protect nesting birds from disturbance. The wildlife viewing areas at Stillwater Point Reservoir and the Kent and Weishaupt sites would remain open, as would a tour loop through part of Stillwater Marsh. The existing tour route and East and West County Roads would be the only access available to the public during this period.

Except at designated locations, visitors would not be permitted off the roads. All other roads of the refuge would be closed to the public during this period. From August 1 through the beginning of waterfowl hunting season, boating would be limited to nonmotorized craft. At all times of the year, Service personnel would minimize boating in the marsh while still completing necessary efforts to accomplish the goals and objectives under this alternative.

Monitoring Elements: Public use monitoring (use levels, distribution, density), and response by birds.

Subgoal A.e: Design and conduct monitoring programs, management studies, and research to fill information gaps, assess the effectiveness of management actions and to ascertain needed modifications to the management program. An initial set of objectives is as follows.

Objective A.e.1: Design a monitoring program and management studies that would address limiting factors associated with production, feeding, and resting habitat for waterfowl and other wildlife.

Objective A.e.2: Research ways to provide wetland unit drawdowns during July-September in ways that accomplish habitat objectives, but do not contribute to significant avian botulism outbreaks (from Nevada Partners in Flight Plan).

Objective A.e.3: Participate in the comprehensive state-wide survey of potential nesting sites of black terns using professional and volunteer personnel, as well as conduct an assessment of the role that Stillwater Marsh played in black tern ecology in the Great Basin (from Nevada Partners in Flight Plan).

Objective A.e.4: Provide research opportunities for universities and other educational institutions.

Basis of Objectives: Additional information is needed to achieve refuge goals, subgoals, and objectives, and to assess the effects of Alternative B on particular species. Some of the objectives were adopted from the Nevada Partners in Flight Plan.

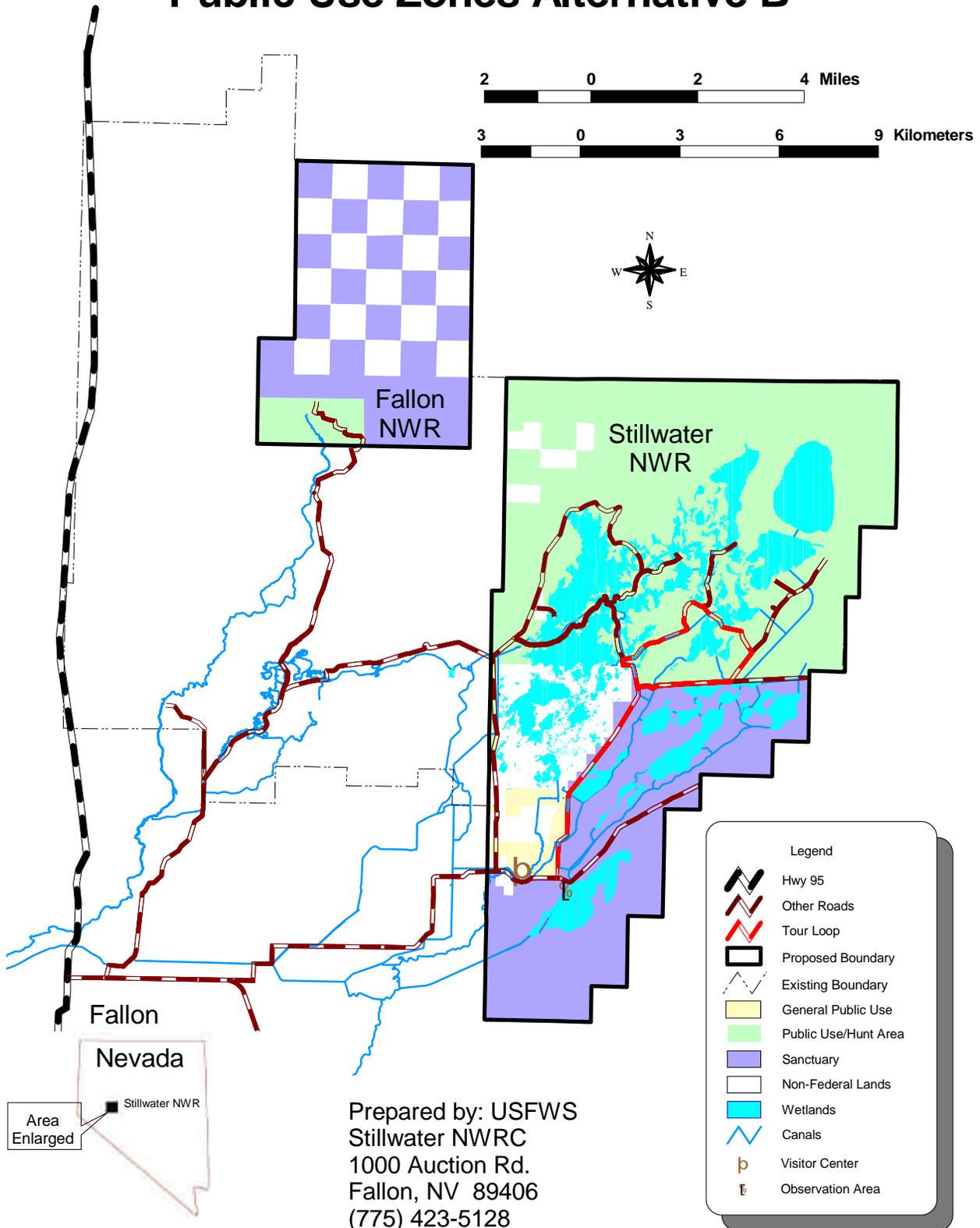
Strategies to Achieve Objectives: Specific strategies would be outlined in a biological monitoring program.

Monitoring Elements: Completion of investigations and tracking of monitoring efforts.

Goal B: Restore and maintain natural biological diversity.

Under Alternative B, it would be assumed that the achievement of subgoals and objectives under Goal A would generally address the goal to restore and maintain natural biological diversity in Stillwater Marsh. The following subgoals and objectives would address the biological diversity in other ecological zones (e.g., riparian areas and uplands), with an emphasis on native species richness. The following subgoals, objectives, and strategies were developed in consideration of the objectives, strategies, and actions outlined in the Nevada Partners in Flight Bird Conservation Plan (Neel 1999).

Map 3.4 - Stillwater And Fallon NWR Public Use Zones Alternative B



Subgoal B.a: Provide suitable habitat for migrating and breeding birds (including threatened and endangered species) in riparian areas and salt desert shrub communities in ways that are consistent with the overall approach prescribed under Goal A.

Objective B.a.1: Provide suitable habitat for yellow-billed cuckoos, ash-throated flycatchers, blue grosbeaks, yellow-breasted chats, western bluebirds, and other riparian birds.

Basis of Objectives: This objective generally falls under the umbrella of contributing to the goals and objectives of the Nevada Partners in Flight Plan, in which yellow-billed cuckoos, ash-throated flycatchers, blue grosbeaks, yellow-breasted chats, and western bluebirds were identified as key species pertinent to Stillwater NWR.

Strategies to Achieve Objectives: The main strategy would be to restore riparian habitat along the Stillwater Slough. A baseline survey of the slough would be conducted to determine the geomorphology and riparian habitat that could be supported. Based on this assessment, objectives and more specific actions would be determined, and an operational plan would be prepared. Native vegetation would be reestablished through practices such as seeding, planting seedlings and cuttings, in addition to fostering and allowing natural colonization and recruitment. Revegetation objectives and strategies for riparian habitat would be detailed in the operational plan. The plan would specify that local sources of native species (e.g., seeds and cuttings collected locally) would be emphasized and species not native to the Lahontan Valley would be avoided in all revegetation efforts and other plantings. Seedlings and cuttings would be protected from mule deer, beaver, and other herbivores, and beaver may need to be trapped or other means may be used to reduce tree loss.

Management actions under this alternative to restore riparian habitat along the Stillwater Slough would be consistent with the major strategies in the Nevada Partners in Flight Plan, which are to (1) maintain and increase large contiguous blocks of multi-storied cottonwood/willow forests; (2) maintain and enhance mature stands of cottonwood/willow and buffaloberry, and (3) maintain thriving buffaloberry stands mixed with cottonwood and/or willow stands on lowland river floodplains.

Monitoring Elements: Amount (acres/miles) and quality (composition, structure) of restored riparian habitat, and bird response to available habitat (e.g., species richness, relative abundance of representative species).

Objective B.a.2: Within the next five years, reestablish, in a way favorable for future roosting by bald eagles (including a suitable distance from areas accessible by the public), cottonwood trees at the southern end of Stillwater NWR.

Basis of Objectives: Bald eagles are a federally listed threatened species and Stillwater NWR would, under Alternative B, no longer contain one of their most important roost sites (i.e., Timber Lakes).

Strategies to Achieve Objectives: Cottonwood trees would be reestablished along Stillwater Slough and other suitable locations for bald eagles, both as daytime perch trees and for night roosts. As part of the effort to reestablish cottonwood communities, emphasis would be placed on reestablishing cottonwoods in areas that would provide suitable roosting habitat for bald eagles. (Foraging habitat needs would be provided as a consequence of achieving objectives under Goal A.)

Monitoring Elements: Acres of initiated restoration, riparian habitat acreage suitable as bald eagle roost sites, and bald eagle response (e.g., number of roosting bald eagles).

Objective B.a.3: Provide suitable habitat for loggerhead shrike, burrowing owls, and other upland wildlife.

Basis of Objectives: This objective generally falls under the umbrella of contributing to the goals and objectives of the Nevada Partners in Flight Plan, in which loggerhead shrike and burrowing owls were identified as key species.

Strategies to Achieve Objectives: The Nevada Partners in Flight Plan also calls for loggerhead shrike habitat to be protected. Although no active management would be undertaken to enhance or manage upland habitat (other than restoration efforts in former farm fields and fire suppression efforts), this habitat would be maintained for the benefit of loggerhead shrikes, burrowing owls, and other wildlife.

Native upland vegetation would continue to be reestablished in some former farmland through practices such as seeding and planting seedlings, in addition to fostering and allowing natural colonization and recruitment.

Revegetation objectives and strategies for previously farmed areas would be detailed in an operational plan. The plan would include the provision that local sources of native species (e.g., seeds and cuttings collected locally) would be emphasized and species not native to the Lahontan Valley would be avoided in all revegetation efforts and other plantings. An exception would be in the farmland zone where agricultural crops could be planted. While the operational plan is being developed, acquired farmland within the refuge would continue to be revegetated to native vegetation and the ground would be recontoured where possible.

Monitoring Elements: Acres of upland habitat types.

3.4.B.2.2.2 Public Use Management

Guiding Principles

The management of public use under this alternative would be guided by the following principles. As in Alternative A, hunting would continue to be emphasized over the other priority wildlife-dependent public uses. However, facilities for other uses would be developed to provide more balance among recreational opportunities. This balance recognizes that compatible wildlife-dependent recreation is important for developing an appreciation of fish and wildlife by the American public. Wildlife-dependent public uses would be encouraged, as clearly spelled out in the Service’s vision document “Fulfilling the Promise”(USFWS 1999) and the Refuge System Administration Act. Programs would only be provided to the extent that funding and staffing is available, but efforts would be made to enhance environmental education and interpretive efforts through the developing of additional programs and remodeling of existing structures, as well as constructing of informational kiosks and observation sites. Traditional uses of the area, such as camping, horseback riding, and hiking would be allowed to continue, but would not be encouraged.

Goals, Objectives and Strategies

Goal C: Provide opportunities for environmental education and wildlife-dependent recreation that are compatible with refuge purposes and Refuge System mission.

Subgoal C.a: Provide opportunities for high quality hunting experiences.

Basis of Subgoal: Hunting is a wildlife-oriented recreational activity, and one of the purposes of Stillwater NWR is to provide opportunities for wildlife-oriented recreation. As one of the priority general public uses of the Refuge System, hunting must receive enhanced consideration during the planning process. The Service is encouraged under the Refuge System Administration Act to find ways to allow wildlife-dependent recreation on refuges. Hunting is recognized as a traditional, family-oriented form of recreation, and important in the development of an appreciation for fish and wildlife.

Objective C.a.1: Provide hunting opportunities where hunters would have a reasonable chance of success.

Basis of Objective: Having a reasonable chance of success is a major criterion for a high quality hunt by many people.

Strategies to Achieve Objective: This alternative would continue to maintain hunting as an integral part of the recreation program. At the completion of the water rights acquisition program, it is anticipated that up to about 9,200 acres (about 65 percent) of the fall and winter wetland habitat in Stillwater Marsh would be open to waterfowl hunting under this alternative (Map 3.4). All wetland units north of Division Road would be open to waterfowl hunting during the hunting season, except that the northern one-third of Pintail Bay and a 100-yard wide strip along the north edge of North Nutgrass unit would be closed to enhance hunting opportunities at the northern end of Stillwater NWR.

Nonmotorized watercraft, boats with electric motors, and boats with motors up to 15 horse power would be allowed in all open areas during the waterfowl hunting season. Overnight stays, in association with hunting activities, would be allowed on-site, such as at boat launches and parking areas, and would only be allowed during the hunting season.

Monitoring Elements: Numbers of hunters, quality of the hunting experience.

Objective C.a.2: Ensure that hunting experiences are safe.

Basis of Objective: Beyond being a vital consideration in the management of any public use, the Refuge System Administration Act requires that wildlife-dependent recreation be allowed only to the extent that it is consistent with public safety.

Strategies to Achieve Objective: If hunter densities begin to approach unsafe levels, hunter density thresholds may be established. Otherwise, such thresholds would not be established.

Monitoring Elements: Number and types of reported and observed injuries per hunting season, observations by staff of unsafe practices and law enforcement violations.

Subgoal C.b: Provide opportunities for an experience in environmental education and interpretation that generally meet the needs of users.

Basis of Subgoal: Providing opportunities for environmental education was specifically identified as one of the purposes of Stillwater NWR. Furthermore, the Refuge System Administration Act encourages the Service to provide opportunities for the priority wildlife-dependent public uses of the Refuge System. Environmental education and environmental interpretation are two of the six priority public uses. These opportunities are provided in the Refuge System to advance public awareness, understanding, and appreciation of the functioning of ecosystems and the benefits of their conservation to fish, wildlife, and people. This ultimately contributes to the mission of the Refuge System.

Objective C.b.1: Develop adequate facilities and equipment for environmental study and interpretation within the nonhunting, general public use area of the refuge.

Basis of Objective: There are currently no facilities on-site at Stillwater NWR. The development of such would greatly enhance the capability of the Service to administer its public use programs, and ultimately achieve the public use goal of the refuge.

Strategies to Achieve Objective: A visitor contact station and environmental education site would be located on Stillwater NWR at a site yet to be determined. Property formerly owned by the Kent family is being considered. The facility at the selected location would include an administrative office, visitor contact station, environmental education site, and a maintenance shop capable of housing refuge maintenance vehicles and boats.

The adjacent agricultural fields would be restored to wetland habitat to provide for environmental education and interpretation needs and enhance natural aesthetics.

Boardwalks or trails would be designed and constructed to allow access into the restored marsh. Agricultural fields may be maintained in adjacent areas (see Objective A.b.3), which would provide food for species such as white-faced ibis in the spring and summer and Canada geese in the fall and winter.

Parking areas would be improved to accommodate a number of busses and private vehicles simultaneously. The road to this complex would be designed for all weather accessibility.

The environmental education program would be mobile and would include a traveling audio/visual program designed to interest a wide range of people. Off-site programs would include environmental education programs coordinated with other Federal, State, and local agencies, educational institutions, conservation organizations and private landowners and their representative organizations. On-site, the environmental education program would provide all services from the visitor facility and adjacent marsh, few tours would be conducted in the historic marsh and these would be discouraged during the hunting season.

Monitoring Elements: Number, type, and location of facilities, and response by refuge visitors (e.g., number and type of visitor/group using each facility or location).

Objective C.b.2: Provide for the needs of students and teachers and make refuge and Service programs available to them.

Basis of Objective: Refuges are “learning laboratories” and Service programs are designed to show students and teachers the value of fish and wildlife resources.

Strategies to Achieve Objective: Staff will accommodate as many field trips and tours as possible. All other hands-on activities will take place at the visitor facility or the Stillwater Point observation area.

Monitoring Elements: Number of student and teacher groups per year, assessment of how well their needs and expectations were met.

Subgoal C.c: Provide opportunities for wildlife viewing and photography.

Basis of Subgoal: Providing opportunities for wildlife-oriented recreation is one of the purposes of Stillwater NWR. The Refuge System Administration Act identified wildlife viewing and photography as two of the six wildlife-dependent recreational uses to be facilitated in the Refuge System, and the act encourages the Service to provide opportunities for these uses. By providing the public with opportunities to view and photograph wildlife, plants, and wildlands, public awareness, understanding, and appreciation of ecosystem functioning and the benefits of ecosystem conservation to fish, wildlife, and people will increase. This ultimately contributes to the mission of the Refuge System.

Objective C.c.1: Provide adequate viewing and photography opportunities through portions of the distinctive habitat of the refuge.

Basis of Objective: Achieving this objective would provide the public with the opportunity to view the relationships between resource management, wildlife and habitat, and people.

Strategies to Achieve Objective: An all-weather auto tour route would be developed throughout the refuge to guide visitors who prefer independent tours. The route would be paved to Stillwater Point where observation facilities, including an interpretive trail and a wildlife observation structure, would be developed. The route would continue, as an improved graveled road, to Hunter Road, to Nutgrass Road, to Navy Cabin Road and back to Hunter Road and Stillwater Point (Map 3.4).

A turnout with an accessible tower would be constructed at Doghead Pond. A second tower, complete with sanitation facility and shaded picnic tables, would be placed between the Goose and Nutgrass units. The interpretation of the tour route would be accomplished by directional signs with occasional information kiosks depicting natural features and wildlife. Opportunities for photography would exist as described in Alternative A.

A cooperative effort would be sought to provide camping opportunities during the nonhunting season through the Fallon Paiute-Shoshone Tribe, Bureau of Land Management, the city of Fallon, Churchill County, or any number of private organizations with land near or, adjacent to, Stillwater NWR.

Monitoring Elements: Number, type, and location of facilities constructed, and response of refuge visitors, e.g., number of visitors using each of the facilities (e.g., tour loop, Dry Lake wildlife-viewing trail, boardwalk) by season.

Subgoal C.d: Encourage and provide opportunities for research by other agencies (e.g., USGS, Agricultural Research Service), universities, and other institutions, especially as they relate to the management goals and objectives of Stillwater NWR.

Basis of Subgoal: As one of the purposes of Stillwater NWR, it is clear that an importance is placed on the need to provide opportunities for scientific research. Furthermore, it is the policy of the Service to encourage and support research and management studies that provide additional scientific data upon which to base decisions regarding managing of units of the Refuge System (4 RM 6). Research is key to sound resource management.

By providing research opportunities to universities, colleges, and other institutions, the education of students pursuing wildlife, archaeological, or other degrees is enhanced (Subgoal C.b), and the information they provide the refuge on wildlife-habitat relationships, the Cattail-eater culture, and other topics further facilitates environmental education and interpretation (Subgoal C.b) and wildlife conservation (Goals A and B). One of the objectives of supporting research in the Refuge System is to provide students and others with the opportunity to learn the principles of field research (4 RM 6).

Objective C.d.1: Foster relationships with government agencies, conservation groups, and institutions of higher education and communicate the most critical research needs of the refuge.

Basis of Objectives: Subgoal C.d addresses research by non-Service entities, such as other agencies, universities, colleges, and private institutions and organizations. Therefore, communicating this subgoal to these institutions, followed by ongoing coordination, would be important to its achievement.

Strategies to Achieve Objectives: Partnership opportunities would be actively sought, and unsolicited proposals for research in a variety of disciplines would be considered, including wildlife, public use, and cultural resources.

All reports, surveys, and scientific papers generated from such endeavors would be made available to refuge staff and cataloged for future needs. There is a need to communicate to these institutions the priority information gaps that the Service is seeking to fill, such as the effects of human activities on wildlife and habitat on Stillwater NWR and other aspects of human and wildlife interactions; and habitat needs of species of special concern.

In addition to wildlife-oriented research, the Service may also permit the use of the refuge for other investigatory scientific purposes when such use is compatible with the purposes, goals, and objectives of the refuge. Priority would be given to studies that contribute to the enhancement, protection, use, preservation, and management of native wildlife populations and their habitat in their natural diversity (4 RM 6).

Monitoring Elements: Number of research projects conducted, and number of participants for each endeavor.

Objective C.d.2: Facilities, equipment, and refuge lands would be maintained for potential use by researchers.

Basis of Objective: Providing facilities and equipment would facilitate research by non-Service institutions, in support of Subgoal C.d.

Strategies to Achieve Objective: Housing, equipment storage, and use of Service equipment would be provided at the discretion of the Refuge Manager, with priority given to research that furthers the goals and purposes of the refuge.

Monitoring Elements: Inventory of facilities available for researchers, listing of habitat used during research endeavors.

3.4.B.3 FALLON NWR

3.4.B.3.1 Boundaries

Boundary Alternative B would result in no changes to the existing boundary of Fallon NWR (Map 3.3). 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 ecological

zones depicted in Map 3.3 show the general types of habitat that would be encompassed within this boundary alternative, as compared to their extent inside the existing boundaries. Ecological zones represented within Fallon NWR would primarily include The Carson River delta and the westernmost part of the sand dune system.

Guiding Principles, Objectives, and Strategies

The overall mission of Fallon NWR, under this alternative, would be to provide high quality springtime habitat for waterfowl and other wetland birds and year-round sanctuary habitat to the extent that water is available to support these habitat on Fallon NWR wetlands. A secondary mission would be to provide opportunities for wildlife-dependent recreation during this season. Fallon NWR would be managed mostly under custodial maintenance, but, to the extent that drainwater and spill-water supplies allow, breeding habitat would be enhanced. Opportunities for waterfowl hunting would be provided on Fallon NWR when sufficient wetland habitat is available during the hunting season, and other uses including outdoor education and interpretation, wildlife observation, and wildlife photography would be facilitated.

3.4.B.3.1 Fish, Wildlife, and Vegetation Conservation

Guiding Principles

Management of fish, wildlife, and habitat would be guided by the following principles:

Habitat Conditions. This alternative would focus on providing for the habitat needs of waterfowl and other wetland waterbirds during the breeding season, to the extent that spill-water and drainwater allow. An assumption under this alternative is that the biotic integrity and environmental health would be enhanced by providing high quality habitat for breeding waterbirds. In so doing, habitat for all wetland wildlife species would be enhanced.

General Approach to Producing these Habitat Conditions. In developing annual water plans, the priority for water use would be to (1) provide high quality nesting and brooding habitat, (2) provide high quality feeding and resting habitat for waterfowl and other waterbirds during the spring migration, and (3) flush salts from wetlands.

Habitat management would focus on the management tools that would most effectively produce the habitat conditions to meet the particular needs of the species or species' group of interest. Water management and prescribed burning would be the primary management tools. Other tools would include controlled livestock grazing, mechanical treatments, and herbicides.

Compatibility. Under this alternative, compatibility determinations would evaluate the potential effects of public uses on waterbird nest success and production, waterbird behavior during the breeding season and during fall and spring migrations and winter. Given the purposes of Fallon NWR and other provisions of the executive order establishing the refuge (an emphasis on minimizing human disturbance), attempts would be made to proactively manage human

disturbance in a way that avoids future compatibility problems, minimizing the extent to which changes have to be made to public use in response to problems.

Monitoring. Recognizing the importance of a sound monitoring program in a successful management program, increased emphasis would be placed on monitoring the status and trends of fish, wildlife, and plant populations and their habitat on each refuge (Refuge System Administration Act, Sec. 5(3)(N)). Priority in the monitoring program would be given to tracking long-term wetland habitat acreage, and long-term waterfowl and shorebird data sets.

Goals, Objectives and Strategies

Goal A: Provide high quality sanctuary and breeding habitat for migratory birds.

Subgoal A.a: Provide wetland habitat conditions that are generally beneficial to waterfowl and other wetland wildlife during spring and early summer during years when spill-water reaches the Carson River delta.

Objective A.a.1: Sustain a long-term average of 500 acres of wetland habitat at the Carson River delta, which would be maintained through an average, spill-year spring peak acreage of about 2,000 acres, occurring on average one of every four years.

Basis of Objective: Maintaining a long-term average of 500 acres of wetland habitat, at the Carson River delta portion of Fallon NWR, would contribute toward the target of 14,000 acres for Stillwater NWR and [former, under this alternative] Stillwater WMA, as this part of Fallon NWR is within the Stillwater WMA. The objective also generally contributes toward goals and objectives of the Intermountain West Joint Venture Plan (Intermountain West Joint Venture 1995), as well as the Nevada Partners in Flight Bird Conservation Plan (Partners in Flight), and U.S. Shorebird Conservation Plan, Intermountain West Region (Oring and Neel 2000).

Strategies to Achieve Objective: Wetland habitat on Fallon NWR primarily results from precautionary releases and spills from Lahontan Reservoir, and this would continue under this alternative. Depending on spill intensity and duration, it would be possible to retain spill water by closing structures in a recently restored levee separating the Carson River delta wetlands from the Carson Sink. To minimize damage to this levee, structures would remain open during high intensity flows. As flow intensity decreased towards the end of the precautionary release or spill, structures would be closed to retain remaining water.

High evaporation rates occurring through summer months would rapidly deplete wetland habitat acreage, but this strategy should provide up to 3,000 acres of spring migration and breeding habitat in spill years. Priorities for water management at Fallon NWR would be to (1) provide high quality nesting and brooding habitat and (2) provide high quality feeding and resting habitat for waterfowl and other waterbirds during the spring migration.

The Service would explore ways to increase the amount of water flowing into Fallon NWR. For example, input would be provided into the U.S. Army Corps of Engineer's study of the Fallon flood-abatement study and would seek to participate in the development of any subsequent plans based on the study

Monitoring Elements: Use of remote sensing to monitor annual spring acreage of wetland habitat.

Objective A.a.2: On a broad scale, enhance and maintain nesting, brooding, feeding, and resting habitat.

Basis of Objectives: This objective would generally support Goal A of Fallon NWR, by maintaining quality breeding habitat in Carson River delta wet meadow habitat, for a range of waterfowl and other waterbird species and would generally support habitat objectives outlined in the Intermountain West Joint Venture Plan. A numeric objective is not possible because the Service is not in control of timing, volume, duration, or frequency of water inflow.

Strategies to Achieve Objectives: The primary strategy would be to regulate water flows during spills and precautionary releases to minimize nest flooding to maintain brood habitat into early summer months. This would be accomplished through water management strategies identified in Objective A.a.2, but enhanced through eliminate livestock grazing for all but specific habitat management purposes. Unrestricted livestock grazing on the Carson River delta has reduced vegetative structural characteristics, reduced plant species diversity, and facilitated spread of invasive vegetative species (unpublished data on file at Stillwater NWR), which decreases nest site suitability for waterfowl. However, livestock grazing could be used under management prescription, to produce quality foraging and breeding habitat for shorebirds, by opening up areas with dense residual vegetation and providing lightly vegetated uplands for shorebird breeding colony establishment. Livestock grazing would be one tool available for this purpose while controlled burning, mechanical treatment, herbicide application, and release of saltcedar beetles would also be considered.

Monitoring Elements: Analysis of aerial photographs or satellite imagery would be used to determine the extent and relative percentage of wet meadow habitat within the Carson River delta. Additionally, livestock grazing exclosures would continue to be monitored to determine changes in vegetative structure, diversity, and invasive species encroachment.

Objective A.a.3: Provide a range of water conditions throughout the Carson River delta to the Carson Sink, from freshwater areas (less than 1,000 milligrams per liter (mg/L) total dissolved solids to areas of highly saline alkali playa in the Carson Sink (e.g., up to 50,000 mg/L or more)).

Basis of Objectives: Different plant and animal communities tend to form within a specific range of water conditions. Providing a wide range of these conditions would maximize biological diversity and species richness.

Strategies to Achieve Objectives: Because methods to store water distributed to Fallon NWR during precautionary releases and spills are not available, water conditions would primarily be controlled through the structure releasing water from the Carson River delta to the Carson Sink.

Water would be allowed to flow to the Carson Sink unregulated during high intensity portions of the precautionary release (when Carson River flows exceed 800 cfs) which would flush surface salts out to the Carson Sink. Salt removal would tend to freshen the system, which would allow plant species with low salinity tolerance to germinate in the wetlands. By closing the outflow structure when flow intensity decreases, remaining water would be retained and salinity would increase as evapotranspiration began to remove water during early summer months. Therefore, salinity ranges would be regulated by a combination of flow intensity during precautionary releases and spills (with salinity generally increasing with distance from the Carson River), and season as remaining water evaporates during summer.

Monitoring Elements: TDS monitoring of Carson River inflows to the Carson River delta and periodic monitoring at different points along the delta to the Carson Sink when Fallon NWR is hydrated.

Objective A.a.4: Minimize the amount of contaminants entering the Carson River delta and reduce mercury levels in wetland sediments to less than 1.5 parts ppm.

Basis of Objectives: Contaminants have the potential to impair the Service's ability to achieve refuge goals and purposes.

Strategies to Achieve Objectives: Strategies to achieve this objective would be similar to those described for Stillwater NWR. Through coordination with TCID, steps would be taken to ensure that water entering the refuge does not contain herbicides and other pesticides detrimental to aquatic life and other wildlife. Through cooperation with the Environmental Protection Agency (EPA) and the Ecological Services office of the Fish and Wildlife Service in Reno, the most appropriate means to reduce mercury concentrations and avoid any increased distribution of mercury contamination would be determined. With the recognition that few options exist for managing water at Fallon NWR, the Service would work with Bureau of Reclamation, TCID, and EPA to identify and explore options of spilling water from Lahontan Reservoir in a way that would minimize transport of mercury from Lahontan Reservoir.

Monitoring Elements: Coordinate with the Ecological Service office of the Fish and Wildlife Service to periodically assess mercury loading at designated sites.

Subgoal A.b: In the wetland habitat that is available during the breeding season, maximize nesting success and production of waterfowl and other waterbirds.

Objective A.b.1: Within wet meadow and adjacent upland habitat, enhance and maintain dense nesting cover for mallards, green-winged teal, gadwall, and other waterfowl in areas close to brooding habitat.

Basis of Objective: Waterfowl nesting studies have repeatedly shown that higher nest success in dabbling ducks is associated with dense nesting cover.

Strategies to Achieve Objectives: In years where spill water reaches the Carson River delta, a mix of dry and hydrated wet meadow sites would be maintained primarily through water level control described in Objective A.a.1. Other methods to increase quality of dense nesting cover for waterfowl include prescribed burning and exclusion of livestock grazing, except on a limited basis to reduce residual plant material (see objective A.a.1). Cattle grazing on Fallon NWR would be reduced from current levels to desired levels identified in this alternative over a period of three years (a maximum of 500-1,000 AUMs for both Fallon NWR and Stillwater NWR).

Monitoring Elements: Waterfowl brood counts would be used as an index of habitat availability.

Objective A.b.2: Provide high quality nesting and brood rearing habitat for shorebirds, especially American avocets (targeting 1,500 pairs, combined with Stillwater NWR, in spill years), and snowy plovers (to contribute significantly to the Statewide target of 900 adults; targets identified in the Nevada Partners in Flight Plan).

Basis of Objectives: The Carson River delta and other wetlands in the Lahontan Valley are components of the Western Hemispheric Shorebird Reserve Network, which stresses the importance of contributing to the international effort to conserve shorebird populations. The Lahontan Valley wetlands provide important breeding habitat for American avocets and snowy plovers (a species of special concern), which are key species identified in the Nevada Partners in Flight Plan. Providing high quality habitat for shorebirds would also contribute toward accomplishing goals and objectives in the U.S. Shorebird Management Plan.

Strategies to Achieve Objective: To the extent that spill water reaches the Carson River delta and water management strategies prescribed under Objective A.a.1 were implemented, American avocets and other shorebirds would be provided shallowly-flooded wet meadows throughout the Carson River delta, and snowy plovers would be provided flooded alkaline playa in the Carson Sink. This would contribute to the Nevada Partners in Flight Plan during spill years by providing at least one flooded alkaline playa. The nesting habitat needs of snowy plovers would be studied, and periodic censuses would be coordinated with other agencies and groups involved in snowy plover recovery efforts. Predation of chicks and eggs would be monitored, and remedial action would be taken if predation levels exceed 50 percent (Nevada Partners in Flight Plan). Remediation strategies are defined in objective A.b.3.

Monitoring Elements: Coordinate a shorebird breeding population survey with other agencies (Nevada Partners in Flight Plan). Annually accomplish snowy plover and American avocet breeding pair survey on Fallon NWR.

Objective A.b.3: Minimize the effects of nest depredation on nesting success of waterfowl, shorebirds, and other waterbirds.

Basis of Objectives: Upland nesting waterfowl and shorebirds, are a primary management focus under this alternative. Apparent increases in natural predator populations (primarily common ravens) may have surpassed levels commonly associated with the Carson River delta.

Strategies to Achieve Objectives: A predator control program would be designed and implemented to enhance nest success and production of waterfowl, shorebirds, and other waterbirds. The main target species would be common ravens, although other nest predators could be included. Methods could include trapping, shooting, and in extreme cases, poisoning.

Monitoring Elements: In years when the Carson River delta wetlands are flooded, waterfowl breeding pair numbers would be compared with waterfowl brood counts to estimate relative nest success. Common ravens would be censused to determine trends in abundance.

Subgoal A.d: Ensure that recreational and other uses do not adversely impact nesting waterbirds, and that opportunities for priority wildlife-dependent and other uses are managed to minimize impacts to waterbirds and other wildlife during the remainder of the year.

Objective A.c.1: Minimize the adverse effects of disturbance to waterbirds during the nesting and brooding seasons, while still providing opportunities for environmental education, wildlife observation, and other wildlife-dependent recreational uses.

Basis of Objectives: Many waterbird species are particularly sensitive to disturbance during the breeding season and select nest sites that are remote and relatively disturbance free. Human activities (whether public use, research, or staff related) tend to compound natural levels of disturbance to which these species have adapted.

Strategies to Achieve Objectives: Waterbird disturbance would be minimized during the breeding season by limiting visitor use to roads and established parking areas. Research and monitoring activities would be limited to those activities essential to achieving objectives for Fallon NWR, for example, data collection to determine whether objectives under Goal A are being met. Other activities conducted by refuge staff would include prescribed habitat management procedures to achieve habitat objectives and operation of the water control structure to facilitate water distribution between the Carson River delta and the Carson Sink. Habitat Management prescriptions would only be implemented after the breeding season.

Monitoring Elements: Public use monitoring, law enforcement to ensure compliance.

Objective A.c.2: Provide secure feeding and resting habitat for waterfowl and other waterbirds during the hunting season when wetland habitat is available during the hunting season.

Basis of Objective: The purposes of the refuge call for Fallon NWR to be managed, at least in part, as a sanctuary. Therefore, when sufficient water exists in Fallon NWR to provide hunting opportunities, part of the refuge must be closed to hunting to maintain consistency with refuge purposes.

Strategies to Achieve Objective: Waterfowl hunting would be allowed on up to 40% of Fallon NWR during the waterfowl hunting season with the remaining 60% to be retained as sanctuary for fall migratory waterbirds. If less than 500 acres of wetland habitat is available during the hunting season, the refuge would be closed to hunting.

Monitoring Elements: Proportion of wetland habitat that is in the hunted and non hunted areas.

Goal B: Restore and maintain natural biological diversity.

Under Alternative B, it would be assumed that the achieving of subgoals and objectives under Goal A would generally address the goal to restore and maintain natural biological diversity in the Carson River delta wetlands. The following objective would address the biological diversity in the sand dune area, with an emphasis on native species richness.

Objective B.1: Restore, approximate, and maintain the natural distribution and abundance of upland plant communities and habitat types that would exist naturally, according to location, throughout upland portions of the refuge.

Basis of Objectives: Sand dunes located on Fallon NWR add to the overall natural biological diversity of the refuge and represent a unique component of the Great Basin ecosystem. This sand dune system is currently subject to invasive species encroachment (primarily saltcedar), livestock grazing, and off-road vehicle use.

Strategies to Achieve Objectives: Integrity of the sand dune system would primarily be accomplished through a combination of restricting access and controlling invasive species encroachment. Off-road-vehicle use would be eliminated through periodic law enforcement patrols and public use impacts would be minimized to the extent that strategies outlined under Objective A.c.1 were achieved. Invasive species encroachment would be controlled to the extent that funding could be secured to eliminate existing saltcedar stands. Periodic monitoring of invasive species would be used to ensure that other invasive species did not become established.

Additionally, a study design would be considered to determine the importance of Carson River sand deposition as a process contributing to regeneration and movement of the sand dune system. As part of this effort, other agencies such as the U.S. Geological Survey would be considered cooperators.

Monitoring Elements: A combination of public use monitoring strategies, remote sensing to identify saltcedar distribution, and periodic cruising to determine whether other invasive species have become established would be used. A study to determine sand deposition rates and related alluvial process would be conducted to the extent that funding and outside agency expertise could be obtained.

3.4.B.3.2.2 Public Use Management

Guiding principles would be similar to those for Stillwater NWR under this Alternative, except that much more emphasis would be placed on minimizing human activity impacts on Fallon NWR, given the purposes of the refuge.

Goal C: Provide opportunities for environmental education and wildlife-dependent recreation that are compatible with refuge purposes and the Refuge System mission.

Subgoal C.a: Provide opportunities for high quality hunting experiences.

Objective C.a.1: Provide hunting opportunities when sufficient water is available during fall at Fallon NWR, where hunters would have a reasonable chance of success.

Basis of Objective: Hunting has been identified as a primary, wildlife-dependent recreational activity under the Refuge System Administration Act, and while the Fallon NWR establishing authority states that this area will be maintained as a sanctuary and breeding habitat for migratory birds, up to 40% of the area can be opened to waterfowl hunting during the established waterfowl hunting season.

Strategies to Achieve Objective: In years when adequate wetland habitat exist during fall (at least 500 acres), up to 40% of Fallon NWR would be opened to waterfowl hunting. The area available for hunting generally encompasses the southwest corner of the refuge (Map 3.4) and consists of all lands located south of the levee separating the Carson River delta wetlands from the Carson Sink. All lands north of this levee would be maintained as sanctuary in all years. All regulations specific to Stillwater NWR (Objective C.a.1) would also apply to Fallon NWR.

Monitoring Elements: Numbers of hunters, feedback on the quality of the hunting experience.

Objective C.a.2: Ensure that hunting experiences are safe.

Basis of Objective: Beyond being a vital consideration in the management of any public use, the Refuge System Administration Act requires that wildlife-dependent recreation be allowed only to the extent that it is consistent with public safety.

Strategies to Achieve Objective: If hunter densities approach unsafe levels, hunter density thresholds may be established. Otherwise, thresholds would not be established.

Monitoring Elements: Number and types of reported and observed injuries per hunting season, observations by staff of unsafe practices and law enforcement violations.

Subgoal C.b: Provide opportunities for an experience in environmental education that generally meets the needs of a wide range of users.

Objective C.b.1: Provide opportunities and resources for environmental study on Fallon NWR.

Basis of Objective: Opportunities to learn more about sand dune development, functioning of Great Basin riverine systems, and the culture of the northern Paiute people are available at Fallon NWR. This allows for an educational opportunity that encompasses unique components of the Great Basin ecosystem, some of which are not found on Stillwater NWR.

Strategies to Achieve Objective: Considering that no development of environmental education facilities would be constructed at Fallon NWR, the primary strategy to achieve this objective would be to inform visiting educators that this opportunity exists and to make arrangements when a tour group wishes to observe components unique to Fallon NWR. Because no effort would be made to improve access to this area, visits would be dependent on condition of roads and availability of refuge personnel to lead tour groups. To the extent that tour groups desired this educational opportunity, facilities would be considered in future public use step down management plans.

Monitoring Elements: Number of groups receiving tours to Fallon NWR.

Subgoal C.c: Provide opportunities for wildlife viewing and photography.

Objective C.c.1: Provide viewing and photography opportunities through portions of the distinctive habitat of Fallon NWR.

Basis of Objective: The Refuge System Administration Act identified wildlife viewing and photography as wildlife-dependent recreational uses are to be facilitated in the Refuge System, and the Act strongly encourages the Service to provide opportunities for these uses. By providing the public with opportunities to view and photograph wildlife, plants, and wildlands; public awareness, understanding, and appreciation of ecosystem function and the benefits of ecosystem conservation to fish, wildlife, and people will increase.

Strategies to Achieve Objective: Similar to Objective C.b, no additional facilities or roads would be developed at Fallon NWR to fulfill this objective. However, Fallon NWR would provide a unique opportunity for individuals desiring a more primitive wildlife observation and photography experience in a setting with few other individuals present. The road currently accessing Fallon NWR would remain open but would be listed as a primitive road in refuge maps. As with Stillwater NWR, visitors would be restricted to vehicles except at designated pullouts and a primitive parking area located at Battleground Point. No additional construction would be undertaken. However, designated areas would be identified on the refuge brochure. Parameters associated with wildlife education and photography for Stillwater NWR (Objective C.c.1) would apply to Fallon NWR.

Monitoring Elements: Monitoring elements for this objective will primarily be provided to the extent that feedback is received from refuge visitors. Visitation is not anticipated to be at a level which would justify public use monitoring at Fallon NWR. If public feedback suggests that monitoring of Fallon NWR is warranted, monitoring procedures will be incorporated into the Public Use monitoring program.

Subgoal C.d: Encourage and provide opportunities for research by other agencies (e.g., U.S. Geological Survey, Agricultural Research Service), universities, and other institutions, especially as they relate to the management goals and objectives of Fallon NWR.

Objective C.d.1: Foster relationships with government agencies, conservation groups, and institutions of higher education by providing research opportunities and by developing cooperative working programs.

Basis of Objective: While not a stated purpose of Fallon NWR, outside research would be a key element to understanding ecological processes such as sand dune formation and movement; contaminants impacts on plants, fish and wildlife; and cultural resource implications on this refuge.

Strategies to Achieve Objective: At present, this objective would be accomplished through coordination with research related agencies for the identified research needs suggested above. To the extent that these information needs were filled, other proposals submitted by outside agencies would be considered, with priority given to proposals which most closely reflect management objectives outlined under this alternative and which contribute to enhancing, protecting, use, preserving, and managing of native wildlife populations and their habitat in their natural diversity (4 RM 6).

Monitoring Elements: Ongoing and completed research projects would be counted along with the number of participating agencies within each project.

3.4.B.4 Anaho Island NWR

Guiding principles and strategies would be the same as under Alternative A.

3.4.B.5 Other Program Areas

All of the “other program areas” would be managed similar to Alternative A, except the commercial use program, monitoring program, law enforcement, and administration. Under Alternative B, there would not be a commercial use program, as livestock grazing and muskrat trapping would be managed exclusively as habitat management tools, and not to provide commercial revenue. Adjustments to monitoring, law enforcement, and administration are presented below.

3.4.B.5.1 Other Public Uses

Guiding Principles

Nonwildlife-dependent public uses would not be promoted or encouraged on Stillwater NWR, but may be permitted if they are found to be appropriate and compatible with refuge purposes and the Refuge System mission. On Fallon NWR, these other uses would not be permitted until the refuge is specifically open to them.

Strategies

A cooperative effort would be sought to provide camping opportunities during the nonhunting season through the Fallon Paiute-Shoshone Tribe, Bureau of Land Management, the City of Fallon, Churchill County, or private organizations with land near or adjacent to Stillwater NWR

3.4.B.5.2 Monitoring and Research Program

The biological monitoring program would be similar to that of Alternative A. The public use monitoring program (explained in Alternative A, Section 3.4.A.4.8) would be modified to better gauge whether (1) high quality viewing opportunities are being provided, (2) safe, equitable, and accessible opportunities are provided, (3) conflicts between uses are detected and eliminated, and (4) the message of stewardship, conservation, and ethics is being received by the public.

3.4.B.5.3 Facility Maintenance and Safety

Although mosquitos would not be actively controlled on Stillwater NWR or Fallon NWR, a contingency plan would be developed in conjunction with the Churchill County Mosquito Abatement District to identify actions to take in the event of an encephalitis outbreak (M. Wargo, Churchill County Mosquito Abatement District, personal communication, 1998). The Churchill County Mosquito Abatement District was formed in 1985 to provide public health protection to the citizens and visitors of Churchill County from the annoyance and potential disease transmitting mosquitoes occurring in the county. The mosquito abatement district maintains several flocks of sentinel chickens in Churchill County to monitor the incidence of encephalitis in the county. Encephalitis is detected each year in the sentinel chickens, but cases of encephalitis in humans are rare in the county. The Churchill County Mosquito Abatement District's intent is to use those techniques that will cause the least adverse impact to the environment while providing the highest level of mosquito control. (Churchill County Mosquito Abatement District, written communication, Sept. 1, 1995.)

3.4.B.5.4 Law Enforcement

Alternative B would expand on the law enforcement program outlined under Alternative A, including the addition of a full time law enforcement officer. This alternative would highlight the importance of refuge law enforcement while taking some of the burden off collateral duty refuge officers who typically spend most of their time on tasks not related to law enforcement. Law enforcement personnel would attend specific training in cultural resource protection, identification, the Archaeological Resources Protection Act, and Tribal consultations.

Under this alternative, emphasis of the law enforcement program would be on an education program in which refuge officers could be a proactive in of working with refuge visitors and user groups to provide a better understanding of the laws and regulations specific to Stillwater NWR, Fallon NWR, and the Refuge System in general. The program would focus on workshop presentations consisting of waterfowl identification and hunting safety, while identifying key laws and regulations related to the ethical hunting of game species. While these workshops would be open to the general public, younger hunters of late grade school and junior high school age would be specifically targeted to help ensure that future generations of hunters would maintain safe and ethical standards throughout a lifetime of hunting.

Additionally, at least two law enforcement kiosks would be established, one at the intersection of West County Road and Indian Lakes Road and the other at the intersection of Stillwater Road and Hunter Road. A third kiosk could be located at the southern boundary of Fallon NWR. The kiosks would consist of an abbreviated list of refuge specific rules and regulations in large print, and refuge flyers which include Federal and State hunting regulations. Copies of hunting regulations would be provided to hunters in an effort to help to eliminate confusion of hunters, and to maximize safe, ethical, and enjoyable experiences.

Efforts would be increased to adequately post road closures and to ensure that barriers are sufficient to deter travel through or around barriers. Signing efforts would be increased to

provide guidance on refuge traffic rules and regulations to help promote vehicle safety. Additional parking areas would be provided to allow sufficient parking space for refuge visitors and off road vehicle violations would be strictly enforced.

Other law enforcement issues being considered include a self check system where refuge visitors would obtain a free daily use permit (located at the law enforcement kiosks) which would provide the refuge public use program with valuable information, while ensuring that refuge visitors obtain a copy of refuge rules and regulations prior to their visit. Another possibility would be to impose a shotgun shell limit for refuge waterfowl hunters to discourage shooting at waterfowl beyond the capabilities of their shotgun. A shell limit would encourage hunters to select their targets carefully, this would ultimately reduce crippling loss and provide a high quality hunting experience for all refuge visitors.

3.4.B.5.5 Budget and Administration

Several projects have been identified for implementation under Alternative B. The largest would be a refuge administrative complex which would include a visitor facility and maintenance shop (an estimated \$2,441,500 under this alternative). Other projects include developing of additional public use facilities such as auto tour routes, nature trails, observation areas and interpretive signs (an estimated \$4,609,800 under this alternative). Total capital costs of the water rights acquisition program are presented in the WRAP EIS (USFWS 1996a). Funding for these projects varies greatly depending on Congressional appropriations and the refuge's ability to obtain special project funds from sources such as grants, and Transportation Equity Act funds and, therefore, predicting the actual "nonsalary" funding is difficult.

The projected annual costs to managing the Stillwater NWR Complex under Alternative B would be an estimated \$3.1 to 3.4 million per year upon completion of the water rights acquisition program. Projected annual expenditures include salaries; refuge operation and maintenance costs; water delivery and operation and maintenance charges; refuge revenue sharing payments; and water rights leasing costs. Annual expenditures related to the water rights acquisition program were discussed in Section 3.3.1.1., Features and Assumptions Common to all alternatives. Refuge salaries and operations and maintenance costs would be an estimated \$1.55 million per year under this alternative.

Refuge staff under Alternative B would be similar to Alternative A except one additional position would be added: a park ranger (GS-9 law enforcement), bringing the total number of permanent full-time positions to fourteen.

3.4.C ALTERNATIVE C

This Alternative would emphasize restoring the diversity of native wildlife and habitat associated with a naturally functioning Great Basin wetland ecosystem. The ecological processes that naturally shaped and maintained this ecosystem would be mimicked, and this overall approach would be adjusted to ensure benefits to native wildlife. Breeding habitat for wetland birds would be emphasized, but considerable wetland habitat would be made available for fall and winter waterfowl habitat and for waterfowl hunting. Declining water levels during the late summer and fall would greatly benefit fall migrating shorebirds. Monitoring species of special interest, especially those identified as priority species in international bird conservation plans, would provide a check on management to ensure that the needs of these and other species are being adequately met.

The Alternative C boundary revision would most significantly add an 18 mile stretch of riparian habitat along the lower Carson River and a 21 mile long dune complex to the Refuge System. The contiguous portion of Fallon NWR, encompassing much of the Carson River delta, would be incorporated into Stillwater NWR, as would a vast area of salt desert shrub that is now in the Stillwater WMA.

Under this alternative, opportunities for wildlife-dependent recreation would be enhanced considerably over existing conditions. Waterfowl hunting would remain an integral part of the program, with uncrowded hunting conditions and a variety of opportunities being promoted. The environmental education program would be enhanced and several areas for wildlife observation and environmental interpretation would be developed. Under this alternative, the Service would strive to balance opportunities for wildlife-dependent recreation. Cultural resource management would become a proactive program under this alternative.

Anaho Island NWR would be managed much as it has in the past, with an emphasis on protecting and monitoring the nesting colony of American white pelicans and other colonial nesting birds that use the island.

3.4.C.1 BROAD MANAGEMENT DIRECTION

3.4.C.1.1 Refuge Purposes

The purposes of Stillwater NWR and Anaho Island NWR would be the same as under Alternative B. Fallon NWR would not exist under Alternative C, but the purpose of Fallon NWR would be added to the purposes of Stillwater NWR for the management of a “Fallon Unit.” Also, other provisions of Executive Order 5606 would comprise management standards for the Fallon Unit.

3.4.C.1.2 Refuge and Program Goals

Refuge goals step down directly from refuge purposes, as influenced by applicable laws, executive orders, and Service policy. For each refuge, they are listed in priority order.

Stillwater NWR Goals

- A. Conserve and manage fish, wildlife, and their habitat to restore and maintain natural biological diversity.
- B. Contribute toward fulfilling obligations of international treaties and other international agreements with respect to fish and wildlife.
- C. Provide opportunities for scientific research, environmental education, and wildlife-dependent recreation that are compatible with refuge purposes.

Basis of Goals: These goals stem directly from the purposes set forth in P.L. 101-618 §206(b)(2). Restoration of natural biodiversity is one of several viable ways to conserve and manage the fish and wildlife of Stillwater NWR. The focus on natural biodiversity is therefore consistent with the first and second purposes of the refuge, as well as the third purpose (reflected in Goal B), given the common theme in international treaties to restore natural habitat and ecosystems. This focus is also consistent with the Refuge System Improvement Act's directives to maintain biotic integrity and diversity, and environmental health on refuges. Goal C mirrors the third refuge purpose with the addition of a compatibility phrase to ensure consistency with the Refuge System Administration Act.

Anaho Island NWR Goals

- A. Protect and perpetuate colonial nesting birds and other migratory birds.
- B. Restore and maintain natural biological diversity.

Basis of Goals: These goals were derived from the purposes set forth in P.L. 101-618 210(b)(2) and Executive Order 1819 that originally established the refuge. The secondary goal, to restore and maintain natural biodiversity, supports the overall mission of the Refuge System and the Refuge System Administration Act's directive to maintain biological integrity and diversity, and environmental health on refuges.

In addition to refuge goals, which identify what was hoped to be accomplished by establishing the refuges, many refuges have other programs that are peripheral to the core programs (i.e., wildlife and wildlife-dependent recreation). Many of these are integrally related to more parts of the core programs. Goals were developed for two of these programs. Although they do not directly relate to the purposes for which the refuges were established, they are important programs that can contribute indirectly toward the achievement of refuge goals in a number of ways.

Outreach Program Goal

Enhance public awareness of the Service and the Service's mission and role in wildlife conservation.

Basis of Goal: This goal supports the Service's nationwide communication strategy called the *100 on 100 Outreach Campaign*, which targets 100 percent of Americans being aware of the Refuge System by its 100th anniversary. This goal reaches beyond the environmental education and interpretation program addressed in Stillwater NWR goals toward educating the public about the Refuge System and the Service as a whole, although it is integrally related to this refuge specific program.

Cultural Resource Management Program Goal

Manage cultural resources for the educational, scientific, and cultural benefit of present and future generations of Americans.

Basis of Goal: The culture of the original human inhabitants of Stillwater Marsh and the cultural resources left behind by these people are an important part of the marsh's history. The archaeology of Stillwater Marsh, which has rewritten the standard interpretation of Great Basin prehistory, has attracted considerable interest. Cultural resources of Stillwater Marsh are some of the most important in Nevada.

Other Program Areas

Several other programs would be maintained or enhanced under Alternative C. As yet, goals have not been established for these programs. The programs identified below are described in more detail later:

- Partnerships and Other Cooperative Efforts
- Water rights Acquisition and Land Disposal Program
- Fire Management
- Other Public Uses
- Monitoring and Research Program
- Facilities Maintenance and Safety
- Law Enforcement
- Administration

3.4.C.2 STILLWATER NWR

3.4.C.2.1 Boundary

Under Alternative C, the boundary of Stillwater NWR would be revised to encompass much of Stillwater WMA and Fallon NWR, the management and operation of the remaining portions of

each would be conveyed to the jurisdiction of the Bureau of Reclamation¹ or public land status (Map 3.5). The revised boundary would also include six sections south of Stillwater WMA along the Carson River and 26 sections north of Stillwater NWR following the chain of sand dunes. This would be done to restore and maintain the natural biological diversity associated with the lower Carson River and its delta, the sand dune complex along the southern “shore” of the Carson Sink, and salt desert shrub uplands representative of the Carson Desert. Map 3.5 depicts the ecological zones that would be included within Alternative C’s boundary of Stillwater NWR, as compared to the ecological zones that now exist within Stillwater NWR, Stillwater WMA, and Fallon NWR. All ecological zones would continue to be represented under this alternative.

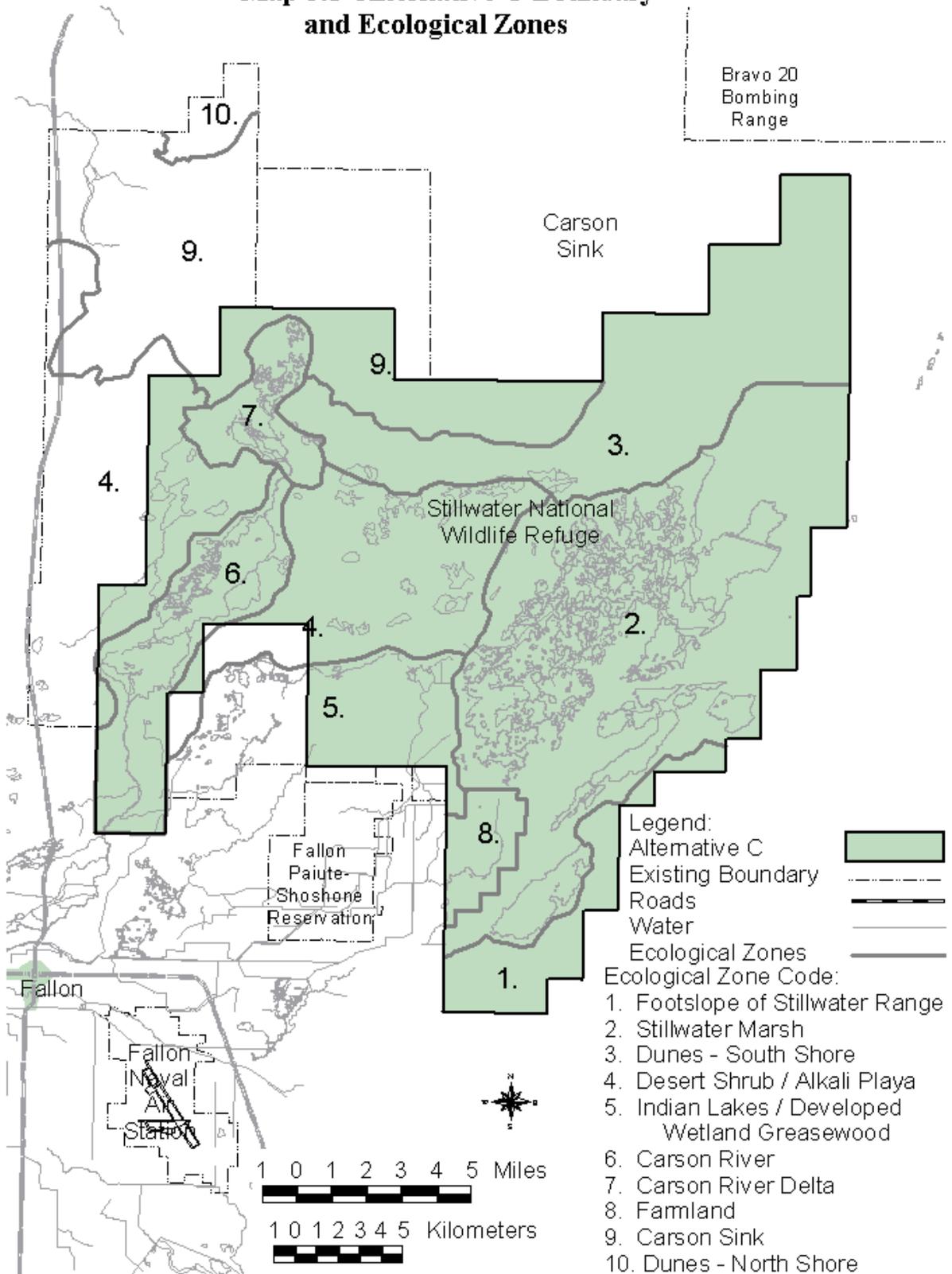
Consistent with Public Law 101-618, the Service intends to recommend that Congress, through special legislation, revoke (1) the wildlife reservation on BOR withdrawn lands on those portions of Fallon NWR identified in this boundary alternative, (2) the name Fallon NWR, and (3) establish the Service with primary jurisdiction on those portions of Stillwater WMA and the former Fallon NWR which the Service proposes to include in the revised Stillwater NWR boundary. The Bureau of Reclamation’s primary withdrawal on these lands would end. The remaining portion of Fallon NWR (those sections not added to Stillwater NWR, totaling about 7,030 acres located in T22N, R30E, alternating sections 2, 4, 6, 8, 10, 14, 16, 18, 20, and 26) would, under this alternative, continue to be withdrawn by the Bureau of Reclamation for Newlands Project irrigation purposes.

The portion of Fallon NWR proposed for disposal from the National Wildlife Refuge System contributes minimally toward its original purposes. These alternating sections of land are located in the Carson Sink and are representative of habitat already well represented within the proposed boundary. The lands comprise less than 5 percent of the Carson Sink. Most of the remaining portion of the Carson Sink consists of public lands withdrawn by the Bureau of Reclamation for Newlands Project irrigation drainage purposes. Disposal of Fallon NWR lands from the Refuge System would require Congressional approval.

Upon the expiration of the 1948 Tripartite Agreement extension, management and operation of the Federal lands within Stillwater WMA not added to Stillwater NWR, will be returned to the jurisdiction of the Bureau of Reclamation or public land status. Possible exceptions include the Indian Lakes area and certain lands north of the Fallon Paiute-Shoshone Indian Reservation. It is possible that the Indian Lakes area will be transferred to Churchill County and subsequently to the City of Fallon, as authorized under subsection 206(g) of P.L. 101-618. The portion of the WMA just north of the Fallon Paiute-Shoshone Indian Reservation that is not proposed for addition to the Stillwater NWR is of interest to the Tribe as they explore options for expanding the boundary of the reservation.

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

Map 3.5 Alternative C Boundary and Ecological Zones



The existing 1987 MOU with the U.S. Navy would be revised to reflect that this northward extension of the boundary toward the Bravo 20 Bombing Range would not affect the 3,000 foot ceiling. It would remain at the northern limit of the existing, P.L. 101-618 boundary of Stillwater NWR. The designations of Stillwater WMA and Fallon NWR would no longer exist under this alternative. The boundary of Anaho Island NWR would remain unchanged.

3.4.C.2.2 Management Program

Goals, subgoals, and objectives of Stillwater NWR are long-term; some could be achieved and maintained within a few years, whereas others may require several decades to accomplish. One driving force behind many of the wetland related subgoals and objectives is the completion of the water rights acquisition program, which, although it could possibly be completed within 15 years, could take 20 years or more to complete. Furthermore, restoration of the composition, structure, and functioning of riparian communities would take longer than 15 years. Goals and objectives are presented in the long-term because of the difficulty in estimating what can be accomplished within the 15 year planning horizon, and, more important, because long-term, goals and objectives are needed to adequately show the direction of management. Fifteen year objectives must be developed within the context of long-term goals and objectives. Chapter 4 identifies the estimated progress that would take place toward meeting long-term goals and objectives. The CCP, when completed, would identify 15 year objectives, as well as long-term goals and objectives.

This section is divided into two main parts: (1) Native Fish, Wildlife, and Vegetation Conservation; and (2) Public Use Management. For each of these parts, guiding principles, the refuge goals (identified earlier), subgoals, objectives, and strategies are outlined.

3.4.C.2.2.1 Native Fish, Wildlife, and Vegetation Conservation

Guiding Principles

Wildlife, and vegetation management on Stillwater NWR, under this alternative, would be guided by the following principles.

Habitat Conditions. This alternative would focus on approximating natural habitat conditions as the primary means to conserve and manage the Refuge's wildlife, restore its natural biological diversity, and fulfill international treaty obligations with respect to fish and wildlife. The needs of particular species, including species highlighted in regional conservation plans, may be used to adjust management practices where this is deemed necessary and within the general framework established by this alternative. Parallel with the natural swell in springtime wetland habitat, providing breeding habitat for wetland birds and other wetland wildlife would be emphasized under this alternative. This would complement management of other wetland areas in the Lahontan Valley (e.g., Carson Lake), which emphasize fall and winter habitat for these birds. Another principle inherent to this alternative is that natural vegetative structure is an important

component of the natural biodiversity in meadow, marsh, riparian, and upland habitat, and it is in short supply in many of these habitat in the Lahontan Valley. In contrast, the availability of temporarily shallowly flooded pasture and other areas of short vegetation is abundant in the Lahontan Valley during the spring.

General Approach to Producing these Habitat Conditions. An underlying principle of refuge management under this alternative is that mimicking natural processes is a fundamental and necessary part of restoring the biological integrity and health of the ecosystem, and its natural biodiversity (USFWS 1999). However, it would be recognized under this alternative that mimicking natural hydrologic patterns with a limited water supply (among other factors, such as occurrence of nonnative plants and contaminants) would not result in the exact habitat conditions that would occur under natural conditions. Although peak wetland habitat acreage would occur during early spring, the natural hydrologic patterns would be adjusted to minimize nest flooding, enhance winter waterfowl habitat, and to provide additional acres for waterfowl hunting (as compared to mimicking the natural seasonal flow pattern; i.e., Alternative D). The adjustments take into account the significant reduction in wetland habitat acreage in the Interior Basins Ecoregion and its effects on wetland dependent migratory birds. Figure 3.1 illustrates one of the ways in which the objectives of this alternative differ from the objectives developed for other alternatives. Under this alternative, it is assumed that natural ecological conditions and processes, including the hydrologic regime, produced a particular range of conditions in the Carson Desert, and that these are the conditions under which particular communities of plants, animals, and microorganisms were formed and sustained. This alternative recognizes that the assemblages under natural conditions were in a dynamic flux over time in response to ever changing ecological conditions.

Therefore, fluctuations in plant and animal populations would be expected and allowed. This alternative places habitat management in the context of process management and it recognizes our limited understanding of the diversity of plants, animals, and microorganisms, and the diversity of biotic processes that would occur under natural conditions. By focusing efforts exclusively on providing habitat for taxa for which we have adequate information (e.g., waterfowl, certain shorebirds and other waterbirds), we may be managing against species for which information is limited or nonexistent, or simply against species that were not selected as key species. Thus, by targeting a natural functioning of ecological processes (of which our understanding is relatively high) and natural composition of habitat, the needs of these species could be accommodated without specific knowledge this is occurring (Wallin et al. 1996).

To the extent practical and feasible, construction, maintenance activities, and habitat management practices would be designed and undertaken so that the appearance of naturalness is restored and maintained. This includes mitigating past actions, such as eliminating or substantially lowering the piles of soil dredged from canals.

Special Area Designation: If the Alternative C boundary is formally adopted and approved, the area within this boundary would be further evaluated for its value as a Research Natural Area and

its wilderness potential, with an emphasis on Research Natural Area. Given this alternative's management direction in the contiguous sand dunes and adjoining salt desert shrub communities, either of these designations would contribute to the goal of restoring and maintaining natural biological diversity.

Compatibility: This alternative recognizes a distinction between a visitor services program and human disturbance management (Morton 1995). The former focuses on positive aspects of refuge visitation (promoting public use to satisfy public needs and to achieve public use goals), whereas the latter focuses on ensuring that human disturbance resulting from refuge visitation does not impair the achievement of wildlife goals, by its very nature a "negative" subject. Human disturbance management, the primary subject of compatibility determinations, would be addressed within the biological monitoring program. This approach would allow the visitor services program to continue to promote Stillwater NWR as a destination for birdwatching, hunting, and environmental education, yet allow the biological program to maintain an effective check on how this use is managed to ensure that the refuge continues to provide high quality habitat for wildlife. Under this alternative, attempts would be made to manage human disturbance in a way that avoids future compatibility problems, minimizing the extent to which changes have to be made to public use in response to problems.

Monitoring: Recognizing the importance of a sound monitoring program in a successful management program, increased emphasis would be placed on monitoring the status and trends of fish, wildlife, and plant populations and their habitat on each refuge (Refuge System Administration Act, Sec. 5(3)(N)). Priority in the monitoring program would be given to tracking long-term wetland habitat acreage, long-term waterfowl and shorebird data sets, and habitat, while ensuring that representatives of each guild and habitat type occurring on the refuge complex are monitored, at least at some level.

Goals, Objectives and Strategies

Goal A: Conserve and manage fish, wildlife, and their habitat to restore and maintain natural biological diversity.

Subgoal A.a: Approximate natural diversity within and among animal communities on Stillwater NWR.

This subgoal and the accompanying objectives below would be achieved primarily through strategies outlined under Subgoals A.b and A.c. In other words, wildlife would be managed in large part through managing their habitat. The boundary revision proposed under this alternative would also contribute to accomplishing of this subgoal and objectives. Migratory waterbirds and Neotropical migratory birds are important components of the area's natural biological diversity. Several population and use level objectives have been identified for some birds and groups of birds at the flyway, regional, state, and local levels in international bird conservation plans, including the Intermountain West Joint Venture Implementation Plan (Intermountain West Joint

Venture 1995) and Nevada Partners in Flight Bird Conservation Plan (Neel1999). Although population or use level objectives would not be established for Stillwater NWR under Alternative C, objectives and strategies under Goal A would generally support the population targets identified in the bird conservation plans. Objectives and strategies of these plans are further addressed in Goal B.

Objective A.a.1: Restore and perpetuate the presence of all native species and native guilds of birds, mammals, reptiles, amphibians, fish, and invertebrates, according to season (Appendix B).

Objective A.a.2: Approximate the relative (e.g., rare, uncommon, common, abundant) population levels (or, use level of the refuge) of native wildlife species that would exist under natural conditions, according to season and recognizing natural fluctuations in populations, through the use of representative species (for monitoring purposes).

Basis of Objectives: Richness and relative abundance of native species is a major component of natural biological diversity.

Strategies to Achieve Objectives: These objectives would be accomplished primarily by continuing to protect habitat on refuge lands within the approved refuge boundary and by sustaining refuge habitat in conditions outlined in forthcoming habitat objectives. Under this alternative, the Service would allow for fluctuating wildlife populations, which is a characteristic of Great Basin marsh ecosystems.

Because some species of native wildlife, when their populations become unnaturally high, can have unusually high impacts on other native wildlife species, measures may be taken to alleviate these problems by directly controlling populations of target species. As a general rule, however, management would allow populations of native wildlife species to fluctuate unabated. Exceptions to this are presented in more specific objectives that follow.

The wildlife population management strategies described under forthcoming objectives would be undertaken in a way that recognizes the role of all native species in the refuge's ecosystem and the relative composition of these species in native wildlife communities. Any control programs would make use of the most humane method possible.

One group of wildlife that is considered a nuisance by some, but also contributes to native species diversity is mosquitos. Recognizing that mosquitos are native wildlife and are natural and important components of the wetland ecosystem, no active control of mosquitos would be undertaken on Stillwater NWR. However, their populations would continue to be controlled by native and nonnative insectivores, including mosquito fish (a nonnative species) which could become abundant on Stillwater NWR. A contingency plan would be developed in conjunction with the Churchill County Mosquito Abatement District to identify actions to take in the event of an encephalitis outbreak (To date, there have been few cases of human and horse mosquito borne encephalitis in Nevada).

Monitoring Elements: All major taxonomic groups would be addressed in a monitoring program which would allow trends in abundance or use levels of species within these groups to be tracked over time. Emphasis would continue to be placed on marsh wildlife, but increased emphasis would be placed on riparian and upland species.

Objective A.a.3: Minimize distribution and abundance of nonnative animal species and their prominence in fish and wildlife communities, in the near term focusing on:

- (a) Reducing, to the greatest extent possible, populations of European carp and other nonnative fish populations in Stillwater Marsh wetland units, while maintaining high populations of tui chub,
- (b) Exploring and identifying practical and cost effective ways to significantly reduce bullfrog numbers in designated areas.
- (c) Determine whether other nonnative species should be controlled, and implement needed control measures.

Basis of Objectives: In general, the extent to which nonnative fish and wildlife species are eliminated or reduced in number, the diversity of native species will increase. This is because presence of nonnative species proportionally reduces the composition of native species, and because nonnative species compete with, prey on, and impair habitat of native species, further reducing natural biodiversity. This objective addresses one of the core problems of Stillwater NWR and is of high priority.

Strategies to Achieve Objectives: Carp and other nonnative fish species would be controlled through water management (e.g., drying of wetland units) and possibly through the limited use of pesticides. No species of nonnative fish would be stocked or otherwise intentionally introduced into Stillwater NWR. Precautions would be undertaken to avoid fish kills that could contribute to a botulism outbreak.

A step down plan would be prepared within 2 years that further analyzes the problems associated with particular nonnative wildlife species, provides an assessment of whether control measures should be implemented for each species and an assessment of the cost effectiveness of control, and identifies the control measures to be implemented. Strategies evaluated would focus on specific units where nonnative plant species have become a hindrance to meeting habitat management objectives.

In carrying out nonnative fish control measures, it would be recognized that white pelicans and other species make heavy use of carp and other nonnative fish as a food source. Control efforts would not be initiated marsh wide in any given year.

Monitoring Elements: Distribution and relative indication of density or abundance of carp, other nonnative fish, and bullfrogs.

Subgoal A.b: Approximate, within a natural range of variability, a natural diversity within and between plant communities and habitat types (the latter including nonvegetated habitat types and physical attributes of habitat such as water depth and water chemistry).

Objective A.b.1: Restore and perpetuate the presence of all native plant species (Appendix B) and native plant communities in Stillwater Marsh, Carson River corridor and its delta, Stillwater Slough corridor, dune complex, and salt desert shrub uplands.

Basis of Objectives: Richness of native plant species and communities is a major component of natural biological diversity.

Strategies to Achieve Objectives: The presence of all native plant species and communities will be maintained to the extent that strategies under Objectives A.b.2(a-e), A.b.3(a-c), A.b.5, A.c.1, and A.c.2 are carried out. However, in some cases reintroduction may be necessary. The reintroduction of extirpated plant species would be evaluated.

A more thorough assessment would be made of the native plant species of the Stillwater area, including a review of existing archaeological reports, field notes, museum collections, and possibly through additional examination of archaeological deposits.

Monitoring Elements: Number and type of plant communities and habitat types occurring on Stillwater NWR.

Objective A.b.2: Approximate and perpetuate the mix of plant communities and habitat types that would occur on Stillwater NWR under natural conditions, within a natural range of variability, including representation by all native plant communities and habitat types, amount of area occupied by each plant community and habitat type, and the distribution and pattern (shape) of each.

Basis of Objective: The pattern, distribution, and amount of area occupied by each native plant community type are major components of natural biological diversity and have major and direct effects on the diversity of wildlife that can be supported.

Strategies to Achieve Objectives: The strategies to achieve this objective would vary depending on the ecological setting (Stillwater Marsh, Carson River and Stillwater Slough, the Carson River delta, and uplands), and these are presented below.

Monitoring Elements: These are presented below for each ecological zone.

Objective A.b.2(a): Attain and sustain a long-term average of 14,000 acres of wetland habitat on Stillwater NWR, including marsh (palustrine), shallow lake (lacustrine), and riverine wetland habitat as described in more detail below.

Basis of Objectives: P.L. 101-618 (Subsection 206(a)) requires that 25,000 acres of primary wetland habitat be maintained in the Lahontan Valley. Of this target, 14,000 acres will be maintained on Stillwater NWR (USFWS 1996a, b). Furthermore, this objective addresses one of the core problems of Stillwater NWR.

Strategies to Achieve Objectives: Water rights and water would continue to be secured as outlined in the 1996 WRAP EIS/ROD until it is determined that a long-term average of 14,000 acres of wetland habitat is being maintained on Stillwater NWR (USFWS 1996a, b). Acquiring water rights for Stillwater NWR wetlands also supports directives in the Refuge System Administration Act, as amended, to acquire water rights needed for refuge purposes, and strategies identified in the Nevada Partners in Flight Plan and the U.S. Shorebird Conservation Plan, Intermountain West Region.

Monitoring Elements: At present, the record of decision for the WRAP EIS specifies that wetland habitat acreage will be monitored annually in August. Alternatives to this are being evaluated in this Final EIS (Section 4.3.3.1). During the surveys, wetland habitat acreage would be determined by the total acreage of the wetted area within wetlands.

Objective A.b.2(b) Stillwater Marsh:

Objective A.b.2(b)(i): Attain and sustain a long-term average of 13,500 acres of wetland habitat in Stillwater Marsh in a way that attains the following seasonal targets (see table below for actual acreages for representative inflow volumes):

- 75-100 % of annual peak acreage during April-June, with the peak occurring in late March or early April prior to major nest initiation;
- 40-70 % of annual peak acreage during July-September (>50 percent in July);
- 55-70 % of annual peak acreage during October-February.

Basis of Objective: This objective and the following strategies support Objectives A.b.1-A.b.2(a). It addresses one of the core problems facing the refuge and would be emphasized. Maintaining a long-term average of 13,500 acres of wetland habitat would contribute toward the target of 14,000 acres for the refuge.

Mimicking the seasonal pattern of wetland acreage is key to approximating the natural diversity of plants and animals occupying the marsh. Peak acreage under natural conditions typically occurred between April and June, and the low point was generally in August/September. The natural seasonal pattern was adjusted somewhat to minimize nest flooding during April-June, and to ensure that an acceptable amount of wetland habitat is provided in the fall and winter. Fall and winter wetland habitat was extensive in the Lahontan Valley under natural conditions, and Stillwater Marsh is important to migrating and wintering waterbirds in the Great Basin.

By tailoring management to achieve the above stated objective, important hydrologic functions would be simulated, such as declining water levels during July-October, rising water levels during the early spring, and to some extent higher springtime flow rates into and through wetland units.

At a regional and flyway level of restoring natural biological diversity, the objective also contributes toward wetland habitat goals and objectives of the Intermountain West Joint Venture, Nevada Partners in Flight, and U.S. Shorebird Conservation Plan Intermountain West Region.

Strategies to Achieve Objectives: A natural seasonal flow volume pattern and natural seasonal fluctuations in water levels would be approximated, modified slightly to minimize impacts to nesting waterbirds and accommodate fall migration and wintering habitat for waterfowl and for waterfowl hunting, through the following strategies. Deliverable water, including acquired and leased water rights, would be delivered to Stillwater NWR in the following proportions of the annual volume (this does not include spill water, drainwater, or groundwater pumping):

	<u>Dec-Feb</u>	<u>Mar-Jun</u>	<u>Jul-Sep</u>	<u>Oct-Nov</u>
Low water-year	0-10%	50-80%	0-30%	0-15%
Full water-year	5-10%	50-70%	20-30%	10-15%
Spill year	0-10%	30-60%	20-40%	10-30%

Water levels would be raised above operational levels temporarily in March, prior to the onset of nesting, to recharge wet meadow shoreline habitat, thus, simulating a naturally occurring pulse. This would require up to about 30 percent of the annual allocation to be delivered in March. (In spill years, this pulse could occur anytime between November and June.) Starting in April, attempts would be made to maintain a constant level through May or June. To achieve habitat objectives, about one third of the annual supply of deliverable water would have to be delivered to Stillwater NWR before April 1. If water delivery cannot start before March 15, this volume of water would have to be delivered in a two week period.

Water levels throughout most of the marsh would be allowed to decline starting in late June or July, but care would be taken to ensure that sufficient water levels would be maintained for brooding habitat at least through mid July. Declining water levels would be permitted to proceed through December, January, or February in some of these wetland units (roughly 1/3 of the units or acreage).

The strategy of allowing water levels to decline during the late summer and fall would benefit fall migrating shorebirds by concentrating and exposing invertebrates as water levels decline. In the other wetland units, declining water levels would be curtailed in September or October.

Water levels in roughly half of these units (about 1/3 of the refuge units) would remain stable from September through December. In the remaining units (roughly 1/3 of refuge units), approximation of natural hydrologic functioning would cease until about January, and management for specific needs of waterfowl would be undertaken (see strategies for Objective B.e.2).

The preceding discussion addressed the delivery and management of water during non spill years. In spill years when sufficient water is available, deliveries could be delayed until after conveyance of spill water onto the refuge ceases. This would provide additional wetland habitat during the late summer, fall, and winter, which would also result in carryover water to the next year.

Monitoring Elements: Water receipts, wetland habitat acreage by season.

Objective A.b.2(b)(ii): Approximate a natural diversity of Stillwater Marsh habitat by targeting the following mix of habitat, with intervening months being managed as transition periods.

Low Water Conditions (seasonal range = 2,500 - 7,000 acres of wetland habitat^A)

Habitat Type (and annual peak depth)	Annual	Apr-Jun	Aug-Sep	Oct-Dec
Deep, unvegetated zone (3-6 ft)	1-2%	1-2%	1-2%	1-2%
Submergent marsh (1-3 ft)	20-45%	20-35%	30-45%	25-40%
Deep emergent marsh (1-3 ft)	20-45%	20-35%	30-45%	20-35%
Shallow emergent marsh (0.1-2 ft)	0-35%	10-30%	0-30%	10-35%
Wet meadow (0.1-1 ft)	0-15%	5-15%	0%	0%
Moist soil ^D (0.1-1 ft)	0-15%	5-15%	0-5%	5-15%
Unvegetated mudflat (0.1-0.5 ft)	5-10%	5-10%	5-10%	5-10%

^A Assumes a full water year with about 17,000 acre-feet of water available for wetland delivery (20,000 acre feet of water rights acquired), or a shortage year at a later stage of the acquisition program, equivalent of this annual volume of water.

Moderate Water Conditions (seasonal range = 6,000 - 15,000 acres of wetland habitat)

Habitat Type (and annual peak depth)	Annual	Apr-Jun	Aug-Sep	Oct-Dec
Deep, unvegetated zone (3-6 ft)	2-4%	1-3%	2-4%	2-4%
Submergent marsh (1-3 ft)	20-40%	20-30%	30-40%	25-40%
Deep emergent marsh (1-3 ft)	20-40%	20-30%	30-40%	20-40%
Shallow emergent marsh (0.1-2 ft)	5-30%	15-30%	5-25%	10-25%
Wet meadow (0.1-1 ft)	0-20%	10-20%	0%	0%
Moist soil ^D (0.1-1 ft)	0-15%	10-15%	0-5%	10-15%
Unvegetated mudflat (0.1-0.5 ft)	5-15%	5-10%	5-15%	5-10%

^B Assumes a full water year with about 30,000 acre-feet of water available for wetland delivery (35,000 acre feet of water rights acquired), or a shortage year at a later stage of the acquisition program, equivalent of this annual volume of water.

High Water Conditions (seasonal range = 7,000 - 18,000 acres of wetland habitat)

Habitat Type (and annual peak depth)	Annual	Apr-Jun	Aug-Sep	Oct-Dec
Deep, unvegetated zone (3-6 ft)	1-4%	2-4%	1-2%	1-3%
Submergent marsh (1-3 ft)	20-35%	20-30%	25-35%	20-35%
Deep emergent marsh (1-3 ft)	15-40%	15-35%	25-40%	20-35%
Shallow emergent marsh (0.1-2 ft)	10-30%	10-25%	10-20%	10-25%
Wet Meadow (0.1-1 ft)	0-25%	10-25%	0%	0%
Moist soil ^D (0.1-1 ft)	0-15%	10-15%	5-10%	10-15%
Unvegetated mudflat (0.1-0.5 ft)	5-15%	0-10%	5-15%	5-10%

^C Assumes a full water year with about 47,000 acre-feet of water available for wetland delivery (completion of acquisition program).

^D Moist soil habitat, for the purposes of this objective, includes saltgrass and other shoreline or meadow vegetation that is flooded during the fall to provided food for dabbling ducks.

Basis of Objectives: Second to increasing the acreage of wetland habitat, restoring a natural mix and within community composition of wetland habitat types may have the greatest, positive effect on the Service’s ability to approximate a natural diversity of wildlife in Stillwater Marsh. The percentages shown above were based on estimates of the natural composition of the marsh, adjusted in places to account for things such as (1) the fact that it would not be possible to restore the deep water channels to cover the extensive area they historically covered without significant changes to infrastructure, and (2) emergent vegetation was at times higher than shown, but this would adversely affect some species of interest and thus approximation of the high end would not be sought. Within community composition is addressed under Objective A.b.3.

Strategies to Achieve Objective: The water management strategies described under Objective A.b.2(b)(i), including seasonal pattern of inflow and rate of flow, would be the primary means to achieve this objective, but the following strategies would also be undertaken.

The criteria would include water management efficiency and other issues (efficient use of limited water, impediments to water movement, necessity to achieve habitat objectives and to carry out other strategies) and biological issues (habitat quality and diversity, predation and nest depredation rates, human disturbance). Creating deeper channels may be needed to produce deep water habitat that were once prevalent in the marsh, especially along the main flow routes in the center of the marsh.

In establishing annual water management plans, wetland managers would recognize the influence that topography, geomorphology, and soils have on wetland plant communities and habitat, especially as this pertains to mimicking natural habitat conditions. Although these physical elements cannot be managed to any large degree, wetland managers would take these factors into consideration when deciding which wetland units would receive water. The natural geomorphology and topography of the historic marsh and surrounding area would be emphasized, which may require action such as: (1) recontouring certain wetland units to create deeper channels; (2) removing spoil banks along canals; and (3) removing certain dikes, after a detailed analysis of whether they are needed and whether their adverse impacts outweigh the benefits of maintaining them.

Other tools for mimicking a natural mix of plant communities and habitat types may include prescribed burning, disking, cattle grazing and trampling, as well as allowing muskrats to graze unabated.

Monitoring Elements: Seasonal acreage of each wetland habitat type.

Objective A.b.2(b)(iii): Within five years, examine the feasibility and, if appropriate, develop a plan to restore native wet meadow habitat on the properties formerly owned by the Kents and Weishaupt.

Basis of Objective: Wet meadow habitat in its natural condition, once covering thousands of acres, is nearly nonexistent in the Lahontan Valley. This area is within the historic floodplain of the Stillwater Slough.

Strategies to Achieve Objective: Objectives and strategies for restoring wet meadow communities and other wetlands on previously farmed areas of the properties formerly owned by the Kents and Weishaupt would be detailed in an operational plan. The plan would include appropriate contouring to simulate the natural topography and to facilitate mimicking the natural hydrology. The plan would contain the provision that local sources of native species (e.g., seeds and cuttings collected locally) would be emphasized and species not native to the Lahontan Valley would be avoided in all revegetation efforts and other plantings. Native vegetation would be reestablished through practices such as seeding, planting seedlings and cuttings, in addition to fostering and allowing natural colonization and recruitment.

Monitoring Elements: Acres of wet meadow habitat restored in the specified area.

Carson River and Stillwater Slough (A.b.2(c)):

Objective A.b.2(c)(i): Attain and sustain a long-term average of at least 100 acres of riverine wetland habitat on Stillwater NWR.

Objective A.b.2(c)(ii): Restore cottonwood, mesic shrub (e.g., willow, rose, buffaloberry), wet meadow, riverine aquatic communities to their natural distribution and extent along the lower Carson River and Stillwater Slough (*see objectives under Subgoal A.d., Monitoring and Management Studies*).

Basis of Objectives: The low elevation, riparian cottonwood community is one of Nevada's most threatened biological communities. This is also one of the three major components of the Lahontan Valley wetland system. Given sufficient water and protection, the lower Carson River holds great restoration potential.

Strategies to Achieve Objectives: A major strategy would be to restore or approximate the natural geomorphology and hydrologic functioning of the Carson River and side channels, and of the Stillwater Slough, recognizing that water flows and channel dimensions would be scaled to the peak water volumes available under anticipated future conditions. To this end, a baseline survey of the river and slough would be conducted to determine the existing width/depth ratios, sinuosity, depth of incising, and other geomorphologic characteristics.

A more detailed assessment would be made of the natural conditions of these features, including further examination of archaeological field notes and ethnographies. A more thorough assessment would be made of the native plant species occurring in the Stillwater area, including a review of existing archaeological reports, field notes, and museum collections, and possibly through additional examination of archaeological deposits. Objective levels of each attribute would be based on estimated natural conditions and the anticipated maximum, minimum, and frequency of surface water flows.

Based on the outcome of the baseline survey and objective setting, an operational plan would be prepared that identifies management actions needed to achieve objectives; with an emphasis on non engineering solutions. As part of the strategy, the Service would acquire, on a willing seller basis as part of the water rights acquisition program, land and associated water rights along the lower Carson River corridor for use in restoring this riparian area.

The Service would also continue to work with the Bureau of Reclamation and its contractor, TCID, to ensure that Carson River water released or spilled from Lahontan Reservoir during precautionary releases is conveyed to the lower Carson River as provided for under the Emergency Release Criteria for Lahontan Reservoir (USBOR 1997b).

Native vegetation would be reestablished through practices such as seeding, planting seedlings and cuttings, in addition to fostering and allowing natural colonization and recruitment. Revegetation objectives and strategies for riparian restoration would be detailed in an operational plan. The plan would include the provision that local sources of native species (e.g., seeds and cuttings collected locally) would be emphasized and species not native to the Lahontan Valley would be avoided in all revegetation efforts and other plantings. During the interim, while the operational plan is being developed, the following actions would be continued or initiated: (1) cuttings and/or seedlings of cottonwoods, willows, wild rose, and buffaloberry would be planted along the Carson River and Stillwater Slough in coordination with efforts to restore the geomorphology of the water channels (e.g., banks would not be re vegetated if there is a possibility they would be recontoured); and (2) seedlings and cuttings would be protected from mule deer, beaver, and other herbivores.

Monitoring Elements: Seasonal acreage of wetland habitat, distribution and acreage of each riparian vegetation type, and riverine geomorphological features.

Carson River Delta (A.b.2(d)):

Objective A.b.2(d)(i): Attain and sustain a long-term minimum average of 400 acres of wetland habitat in the Carson River delta.

Objective A.b.2(d)(ii): During years when water reaches the Carson River delta via the Carson River (spill years), approximate natural habitat conditions (*see objectives under Subgoal A.d., Monitoring and Management Studies*).

Basis of Objectives: Maintaining the Carson River delta within a primary wetland area, would contribute to attaining the valley wide target of 25,000 acres of primary wetland habitat. Approximating natural habitat conditions would contribute to the approximation of natural wildlife diversity.

Strategies to Achieve Objectives: The Service would continue to work with the Bureau of Reclamation and its contractor, TCID, to provide the highest possible flow volumes down the Carson River to its delta during precautionary releases and spills from Lahontan Reservoir, as outlined in the Emergency Release Criteria for Lahontan Reservoir (USBOR 1997b). In the near term, this would be the only water reaching the delta.

Through examination of historical and archaeological information, estimates of Carson River and Humboldt River hydrologic regimes, topography of the Battleground area, known relationships between hydrologic conditions and vegetation response, and other information, a better estimate of natural habitat conditions in the Carson River delta would be obtained (see Subgoal A.d). Long range objectives would be developed based on this information.

During the interim, prior to development of specific long range objectives for the Carson River delta area, the following strategies would be implemented. The natural timing and flow rate through the delta wetlands would be approximated by:

1. Maximizing the amount of water flowing through the wetlands during Lahontan Reservoir precautionary releases and spills.
2. Providing input into the U.S. Army Corps of Engineer's study of the Fallon flood abatement study and participating in the development of any subsequent plans based on the study.

3. Allowing the Carson River to flow into the Carson River delta unabated during years of Lahontan Reservoir precautionary releases and spills.
4. Allowing water levels to decline through evapotranspiration following cessation of water inflow.

Monitoring Elements: Seasonal wetland habitat acreage, acres of habitat types.

Upland Areas (A.b.2(e)):

Objective A.b.2(e)(i): Restore, approximate, and maintain the natural distribution and abundance of upland plant communities and habitat types that would exist naturally, according to location, throughout upland portions of the refuge.

Basis of Objectives: Although not as diverse as marsh and riparian biotic communities, upland communities are a major component of the Lahontan Valley’s biological diversity. Approximating natural vegetation characteristics is key in restoring these communities. The plant communities have been impacted by the introduction of nonnative plant species and livestock grazing, which in turn has impacted native fauna associated with these habitat.

Strategies to Achieve Objectives: Removing livestock grazing from upland areas on the refuge would be the main strategy for restoring these habitat. In general, upland areas would be permitted to recover on their own, but options would be explored to facilitate recovery.

While wide scale efforts to eliminate nonnative invasive species in upland habitat is not practical, reduction in targeted areas or elimination of unnatural processes leading to these suspected changes can be accomplished. Tracking invasive species’ distributions, expansions, and reductions is paramount to restoring upland plant community integrity, by identifying areas where nonnative species (including Russian thistle, saltcedar, and cheat grass) have become well established and provide a source of seeds to spread into new areas. Once identified, control efforts including herbicide application, prescribed burning, and limited mechanical treatments could be applied to eliminate high density seed sources.

Monitoring Elements: Distribution and acreage of upland habitat types and plant communities.

Objective A.b.3: Approximate, within each habitat type and plant community, a natural species composition; emphasizing the domination of these communities by one or more native species representative of the community (Table 2.2) and reduce, or eliminate, if possible, the number of nonnative species.

Objective A.b.3(a): For each habitat type and plant community, determine the approximate proportion that each of the major plant species should comprise within the community, and develop targets based on this assessment.

Basis of Objectives: Within community plant species composition is a major component of the area’s biological diversity, and it can have a marked effect on wildlife diversity and use by particular wildlife species.

Strategies to Achieve Objectives: Strategies and management actions to achieve targeted compositions would be developed upon further examination. Historic accounts, ethnographies, and plant environment relationship information could be used to determine the relative composition of dominant plant species for selected major plant communities being restored on Stillwater NWR.

Objectives and strategies would be developed based on this information where appropriate. Strategies for achieving these objectives would be similar to those under other objectives (Objectives A.b.2(b)(iii), A.b.2(c)(ii), A.b.3(b-c)).

Monitoring Elements: Set of objectives addressing the relative canopy cover or density of major plant species in plant communities.

Objective A.b.3(b): Prevent the nonnative species not already present within the boundaries of Stillwater NWR, especially species listed as a noxious weed (e.g., purple loosestrife, Eurasian water milfoil).

Basis of Objectives: Nonnative species detract from natural plant diversity and, once established, some nonnative species can dominate whole communities to the exclusion or near exclusion of native species. Preventing additional nonnative species from becoming established would reduce significant resources being expended later to control them.

Strategies to Achieve Objectives: Place restrictions, as appropriate, on public uses to minimize the chance of new species being introduced to the refuge. Continue to coordinate with local agencies, private groups, and individuals to prevent upriver populations spreading to the refuge and to prevent new species from being established in the river basins.

Monitoring Elements: Up to date list of nonnative species occurring on Stillwater NWR, list of potential nonnative species occurring outside the refuge.

Objective A.b.3(c): Curtail the spread of noxious weeds and other nonnative invasive vegetation within Stillwater NWR, and reduce the amount of area dominated by saltcedar and perennial pepperweed, including reducing the composition in plant communities.

Basis of Objectives: Nonnative plant species detract from a natural diversity of plants and animals in several ways, and for several nonnative species, their active control outweighs the benefits of taking a hands off approach to conserving natural parts of the ecosystem. Higher composition (e.g., density, canopy cover) of nonnative species reduces the composition of native species in plant communities and, once established, some nonnative species can dominate whole communities to the exclusion or near exclusion of native species. This is a critical issue at Stillwater NWR, second only to water issues.

Strategies to Achieve Objectives: The occurrence of nonnative plant species in plant communities would be minimized, with an emphasis on controlling those species having the most detrimental impacts to native plant community composition and structure. Active control would be undertaken where necessary. An operational plan would be developed that would include:

1. Continued control of saltcedar and perennial pepperweed (tall white top), prioritized according to the map of noxious weed control zones, using mechanical and herbicide treatments;
2. Continued promotion of Stillwater NWR as a test site of the Chinese leaf beetle for controlling saltcedar;

3. Development of an integrated pest management (IPM) plan, in which the reliance on herbicides for controlling nonnative vegetation would be reduced.

Under Service policy, the ultimate goal of IPM is to reduce pesticide use on Service lands and facilities to the minimum practical extent, and to encourage pest management programs that benefit trust resources and provide long term, environmentally sound solutions to pest management problems on sites off Service lands (30 AM 12.3). Integrated pest management is a method for pest management decision making. Integrated pest management is defined as “the control of pests utilizing a practical, economical, and scientifically based combination of biological, physical, cultural, and chemical control methods” (30 AM 12.5). It is a balanced approach which considers hazard to the environment, efficacy, costs, and vulnerability of the pest. “The ultimate goal is to eliminate pesticide use on Service lands and, where possible, to encourage pest management programs that benefit trust resources and provide long-term, environmentally sound solutions to pest management problems on sites off Service lands.”

Control tactics in the plan may include: flooding or dessication; mechanical treatments (e.g., chainsawing, rooting, disking); prescribed burning (to be addressed in the Fire Management Plan); introduction of host specific insects (e.g., Chinese leaf beetle); grazing or browsing by goats or sheep for noxious weeds; grazing by cattle on agricultural fields and ditches in the farmland area to reduce weeds; and herbicides (minimized to the extent possible). For the foreseeable future, herbicides (e.g., Rodeo) would be needed as part of an IPM plan to control saltcedar. Efforts would be made to form partnerships with adjacent landowners, other Federal and non Federal agencies, and organizations to control undesirable vegetation at a landscape level. Noxious weed control priorities would be according to zones.

Chemical control methods would be necessary during initial phases of control efforts and with broadly distributed species, but chemicals would be used only when it is determined that they are the most appropriate management tool available. For example, tall whitetop is sporadically distributed at low densities. The control technique currently used is hand pulling individual plants as they are located. However, chemical control has been more effective as wider distribution of tall whitetop has occurred. No control methods are currently practiced for Russian olive or purple loosestrife. All of these species and other potential invasive species will be covered in the stations integrated pest management plan which will be completed concurrent with the CCP.

As a measure to prevent the spread of undesirable invasive species in upland areas, livestock grazing would not be permitted in native upland habitat and horseback riding would be restricted to open roads.

Monitoring Elements: Distribution, within community species composition, and rate of spread.

Objective A.b.4: Approximate, within each habitat type and plant community, the vegetative structure of plant communities that would occur under natural operation of ecological processes, such as spring flooding, drought, succession and competition, accumulation of residual plant material, herbivory, seed caching, long intervals between fires, including:

Stillwater Marsh and Carson River delta (A.b.4(a)):

- (i) A natural pattern of emergent vegetation and open water areas in the marsh that is maintained by deeper channels and by disturbances such as spring flooding and muskrat grazing, or secondarily, a mosaic that simulates natural disturbances; and
- (ii) Portions of the marsh having residual vegetation that has accumulated for many years (e.g., five years or more).

Basis of Objectives: Horizontal structure (e.g., pattern, shape of plant communities and habitat types) and vertical structure are major components of an area's biological diversity and they have a considerable influence on wildlife diversity, further affecting biodiversity.

Strategies to Achieve Objectives: Beyond the strategies for achieving Objective A.b.2(b)(ii), which focused on approximating geomorphology of the marsh and other physical attributes, the following actions would be undertaken to achieve this objective.

Muskrats would be allowed to graze on emergent vegetation, unabated. However, the following factors would be considered:

1. Muskrat control measures may be necessary while emergent vegetation is recovering in some units, or possibly to avoid over grazing by the muskrats if this is deemed undesirable.
2. Muskrat control may be needed along dikes. In these cases, muskrats would not be trapped further than about 100 feet from dikes.
3. A study would be initiated to examine the relationships between muskrats and marsh ecology, to ascertain whether environmental conditions would allow muskrat populations to reach deleterious levels (part of the study may involve allowing the population to climb without any control to see what happens to the habitat and population). The study would include a review of existing literature on muskrat management. Any muskrat control program would recognize their natural role in the wetland ecosystem.

Grazing and browsing would be managed to simulate natural rates of herbivory by carrying out the following strategies. Livestock grazing would be excluded from Stillwater Marsh and the Carson River delta, except as prescribed under the strategies described under Objectives A.b.3(c) and B.e.1, which would require boundary fencing along the external boundary and certain inholdings. Livestock grazing on the entirety of Stillwater NWR in any given year would not exceed 500 AUMs under this alternative.

The frequency and extent of fires on the refuge would be minimized, except as needed to achieve other wildlife habitat objectives, and a fire suppression program (especially for upland areas invaded by cheatgrass) would be developed and implemented as part of the Stillwater NWRC Fire Management Plan (Appendix K). However, fire could be used to manage farmland vegetation and to manage emergent vegetation when it has become dense and decadent in significant parts of the shallow emergent, deep emergent, and submergent aquatic zones. Prescribed burning efforts would recognize that dense stands of marsh vegetation, lasting season after season is a significant component of the natural marsh environment. Habitat management zones would be established for prescribed burning and other practices. As noted above, prescribed fire would be an important component of the integrated pest management plan.

Monitoring Elements: Acreage and distribution of marsh plant communities and habitat types, acreage and distribution of areas having residual vegetation, vegetation height, density, and age of decadent plant material.

Lower Carson River and Stillwater Slough (A.b.4(b)):

- (i) An overstory of cottonwoods and/or willows along most stretches;
- (ii) An understory of native grasses and grass like plants, forbs, and young cottonwoods and mesic shrubs (e.g., willows, rose, buffaloberry); and
- (iii) Some areas dominated by grasses and grass like plants (i.e., no woody overstory);
- (iv) Carry over of native herbaceous plant material (residual vegetation) from season to season and year to year during most periods, recognizing that spring flooding would naturally have matted some vegetation and induced decomposition, and that fires (late summer or fall) would have been infrequent.

Basis of Objectives: A natural vegetative structure in riparian areas is critical to approximating a natural diversity of wildlife in these areas.

Strategies to Achieve Objectives: In addition to strategies identified under Objectives A.b.2(c)(i-ii), the following strategies would be employed. Livestock grazing would not be permitted on Federal lands along the lower Carson River corridor, except possibly sheep or goats used in an integrated pest management plan to control undesirable invasive vegetation. Prescribed burning would be minimized in this habitat, except as part of an integrated pest management plan to control undesirable invasive vegetation.

Monitoring Elements: Relative composition of different classes of vegetation (e.g., trees, shrubs, grasses) by habitat types and differentiated by native and nonnative, and composition of residual vegetation.

Uplands (A.b.4(c)):

- (i) An overstory of native shrubs in many communities, with some communities having an extensive understory of Indian ricegrass and other native bunchgrasses;
- (ii) Extensive amounts of bare soil between shrubs in many communities;
- (iii) A build up of residual plant material from native bunchgrasses and forbs, allowed to accumulate naturally over the years (i.e., not grazed or trampled by livestock, crushed by off road vehicles, etc.).

Basis of Objectives: The shrub component of native salt desert shrub communities is critical given the estimated low frequency of fire return intervals in this habitat type; the spread of cheatgrass threatens this element in some areas of the refuge. Extensive bare soil is also characteristic of these habitat, and cheatgrass and other introduced annuals appear to be detracting from this in many areas. Indian ricegrass is a keystone species, having the potential to greatly influence wildlife diversity.

Strategies to Achieve Objectives: Natural processes in upland areas would be allowed to operate unabated, except possibly efforts to control nonnative vegetation (e.g., cheatgrass), suppress fires (fire was a rare event under natural conditions, but cheatgrass has the potential to alter this significantly), and possibly efforts to facilitate recolonization of areas by Indian ricegrass and other native bunchgrasses. The Agricultural Research Service, Reno, University of Nevada Reno, and other institutions would be consulted.

Livestock grazing would not be permitted in salt desert shrub habitat, dunes, or other upland areas, and traveling off road by off road vehicles, bicycles, and horses would be prohibited in these areas to reduce trampling and compaction of vegetation and to reduce the risk of dispersing of nonnative vegetation seeds.

The dune system would be considered as a potential Research Natural Area (RNA), and, depending on the results of the assessment, it could be recommended for designation as an RNA (Maps 3.6 and 3.7). Wildlife, habitat, and archaeological values would be assessed.

Monitoring Elements: Distribution and acreage of upland habitat types including sand dunes. Relative composition by plant class (e.g., shrub, bunchgrasses, annual grass) within plant communities and habitat.

Objective A.b.5: Approximate water chemistry conditions that occurred naturally in Stillwater Marsh and the lower Carson River and its delta, according to location of wetland habitat (i.e., freshwater in riverine and the upper end of the marsh, and brackish at the lower end of marsh), in a way that contributes toward the approximation and maintenance of the natural extent, distribution, composition, and structure of plant and animal communities.

Objective A.b.5(a): Maintain the lowest possible TDS levels in all upper Stillwater Marsh wetland units (generally <600 mg/L during February June and <1,000 mg/L during the remainder of the year) and portions of the mid and lower Stillwater marsh that are within the flow route of water through the wetland units (<5,000 mg/L); and simulate other key hydrologic factors of the natural marsh such as large volumes of water flowing through the marsh. Wetlands lower down in the system and off channel areas would at times have much higher levels of total dissolved solids, possibly approaching 100,000 mg/L in some locations.

Basis of Objectives: Simulating natural water conditions is one of the most important elements of approximating a natural diversity of fish, wildlife, and plants, given the relatively high level of information available on this component of the ecosystem and the comparatively low amount of information on habitat conditions and wildlife diversity. This objective is also based on the assumption that hydrologic functioning is one of the most critical factors that influences habitat and wildlife diversity in wetland systems. Water chemistry objectives are focused on the upper wetland units in Stillwater Marsh because this is where water generally enters the marsh, fresh water habitat would be produced in these units, and progressively more saline and alkaline habitat would be produced down gradient of these units. Achieving of these objectives depends on completing of the water rights acquisition program (e.g., acquisition of 42,000 acre-feet of water rights for Stillwater NWR in addition to leasing of water rights during low water years).

Strategies to Achieve Objectives: The following strategies would be carried out to contribute toward achieving these objectives. The main strategy would be the completing of the ongoing water rights acquisition program, which would contribute most significantly toward achieving objectives. Drainwater and water from groundwater pumping would be mixed with irrigation quality water. Flushing flows through the marsh would be maximized during precautionary releases and spills from Lahontan Reservoir by implementing strategies described previously to flush salts and other dissolved solids. Large volumes of water would be delivered during relatively short periods of time to the extent possible, as prescribed under strategies described above.

Stillwater Point Reservoir would be used to store water to be delivered to other parts of the marsh at strategic times to more closely approximate natural inflow patterns and for other objectives; the Service would work with the Bureau of Reclamation and TCID to use Harmon Reservoir, S Line Reservoir, and possibly Sheckler Reservoir (with modification) to store water for delivery to the refuge, when necessary, during December to early March.

To accommodate the delivery of larger volumes of water and to allow larger volumes of water to flow through the marsh during precautionary releases and spills from Lahontan Reservoir, the following strategies would be undertaken. Water control structures, internal canals, and other facilities would be modified to accommodate 750-850 cubic feet per second (cfs) or more from the upper end of the refuge (Stillwater Point Reservoir, West Canal, etc.) through Pintail Bay and/or Big Water into the Carson Sink. The West Canal would be enlarged (to accommodate up to 250 or 300 cfs) and extended to West Marsh.

East and Center Canals would be enlarged to accommodate 250 cfs each, and water control structures and conveyance between wetland units would be enlarged to accommodate significantly higher flows. During peak flows in any given year, water flow would be concentrated in one pathway to the extent possible, although this could change among years. Modifications to infrastructure would account for continued inflow of up to 120 cfs from the D Line Canal at the northwest end of Stillwater Marsh. Other alterations to the system to allow for more independent management of wetland units included extending the Goose Lake Bypass Canal.

The need for small units, such as Swan Check, given refuge goals and purposes, would be evaluated and eliminated where deemed nonessential (the more units there are, the more potential constrictions). Options for outlets of Pintail Bay and/or Big Water to the Carson Sink would be analyzed and designed in a way that these units would not restrict the amount of water that can be conveyed into and through the historic marsh.

The Service would work with Department of the Interior, Bureau of Reclamation, and TCID to analyze options for increasing the capacity of delivery canals leading to Stillwater Point Reservoir and West Canal to accommodate flows of at least 750 cfs from the southern end of Stillwater NWR.

Water management strategies would be undertaken in a way that maximizes the volume of flow per surface acre of wetland habitat to more closely approximate natural flow rates through the marsh, which can be accomplished in part by:

1. Limiting peak wetland acreage to about 18,000 acres, to the extent possible even in spill years, unless the volume of excess water exceeds 150,000 acre-feet (AF) (i.e., flood no more wetlands than necessary to prevent damage to the infrastructure).
2. Modifying the infrastructure to allow a flow rate of at least 500 cfs through the marsh without the use of bypass canals, which likely would require the construction of spillways between units in addition to enlarged water control structures.
3. Conveying water from unit to unit in the historic marsh during precautionary releases and spills, only using bypass canals when this is needed to avert damage to the infrastructure.
4. Concentrating the majority of the flow through one chain of units in the historic marsh, which may require spillways in addition to enlarged water control structures.

Monitoring Elements: Specific conductance, pH, turbidity, and dissolved oxygen would be monitored monthly in major wetland units, water delivery canals (both on and off the refuge), and major drains entering the refuge.

Objective A.b.5(b): Manage wetlands water on Stillwater NWR to maintain concentrations of potentially toxic trace elements below effect levels, identified below, while recognizing that maintaining concentrations below these levels in the refuge's wetlands may not be attainable in all wetland units (e.g., wetlands lower on the hydrologic gradient) at all times of year (e.g., later in the summer when wetland habitat acreage shrinks), or during all time periods (e.g., regional drought conditions).

Basis of Objectives: A variety of environmental contaminants have been identified in water, sediment, and biological tissues on Stillwater NWR, as identified above. Elevated contaminant concentrations have the potential to compromise attainment of other refuge objectives, including restoration of natural biological diversity, maintenance of high quality habitat, and production of waterbirds. Effect concentrations were so noted in published literature or were associated with significant toxic effects to fish and wildlife, such as substantial mortality, reduced production, or teratogenesis. Concern concentrations were so noted in published literature or were associated with less severe observable effects, such as low level mortality or decreased growth for limited time periods. The attainment of objectives for water chemistry, sediment, and biological tissues, as provided in the above table, would minimize the potential for contaminants to compromise other refuge objectives.

Strategies to Achieve Objectives: As discussed under Objective A.b.5(a), the acquisition of water, the management of drainwater, and regular flushing of marshes are expected to reduce concerns with dissolved solids. As such, it is anticipated that concerns with trace elements closely associated with dissolved solids, such as arsenic and boron, would also be reduced. Previous sampling has demonstrated that the chemical quality of water varies with water delivery routes.

The Service would continue to monitor water quality parameters in delivered water and review water quality data collected by other entities to identify those routes through which the water with the lowest concentrations of TDS and trace elements can be delivered. Use by routes that provide the lowest concentrations of these elements would be emphasized, while using routes that provide water with higher concentrations of these elements would be de-emphasized.

Pesticides have been identified as a concern on Stillwater NWR. The Service (Nevada Fish and Wildlife Office) would conduct a review of pesticide use in Lahontan Valley and continue to review water quality data to determine the extent and severity of concerns with pesticides. If deemed necessary, pesticide residues in major water delivery routes and drains would be monitored. If it is determined that pesticides have the potential to impair the achievement of refuge purposes, the Service would work with TCID and other entities to reduce pesticide transport to the refuge.

The Service would collect additional data to evaluate concerns with nutrients (including ammonia) and bacteria. If nutrients continue to be of concern, the Service would pursue source identification and work with appropriate entities (i.e., Natural Resource Conservation Service, University of Nevada Cooperative Extension, and Nevada Division of Environmental Protection) to identify measures to reduce concerns with nutrient and bacteria transport to the refuge.

In some cases, exposure to contaminants in sediment and food chains represents the greatest hazard to fish and wildlife on Stillwater NWR. The acquisition of water is expected to reduce the risk with at least some of these contaminants. However, the degree to which concerns may be reduced is uncertain. The Service would continue to monitor contaminant concentrations in sediment and biological tissues to evaluate contaminant risk in wetlands and associated wildlife. Additional measures to reduce risk may be developed if warranted.

Monitoring Elements: Monthly concentrations of TDS through measurements of specific conductance, pH, turbidity, and dissolved oxygen. Water samples would be collected quarterly from major water delivery routes for analysis of total dissolved solids, major ions, nutrients, trace elements, and bacteria. To the extent possible, water quality data collected by other agencies would be used. If warranted, samples would be collected for pesticide analyses during periods of peak pesticide use. Monitor trace element concentrations in water, sediment, and biological tissues from selected Stillwater NWR wetlands every three years.

Fish and wildlife concern and effect concentrations for contaminants of concern on Stillwater National Wildlife Refuge, Churchill County, Nevada.

constituent	effect concentration ^a	concern concentration ^a	reference ^b
ammonia (mg/L)	0.4	0.04	1
arsenic (: g/L)	40	-	2
boron (: g/L)	1,016	200	3, 4
copper (: g/L)	10	5	6
lead (: g/L)	3.5	1.0	7, 8
mercury (: g/L)	0.1	0.0006	9
molybdenum (: g/L)	790	28	5
selenium (: g/L)	3.0	1.0	10
zinc (: g/L)	32	-	11

^a Effects were identified as such in literature or were associated with a major adverse effect (i.e., mortality), concern concentrations were identified as such in literature or were associated with non lethal effects (i.e., reduce growth).

^b 1, Russo (1985); 2, U.S. EPA (1985a); 3, Birge and Black (1977); 4, Birge et al. (1979b); 5, Eisler (1997); 7, U.S. EPA (1985b); 8, Wong et al. (1981); 9, Schwarzbach (1998); 10, Skorupa (1998); 11, U.S. EPA (1987)

Objective A.b.5(c): Minimize the amount of mercury entering Stillwater NWR wetlands and reduce mercury levels in wetland sediments and biological tissues to non hazardous levels.

Basis of Objective: Mercury has the potential to impair the Service’s ability to achieve refuge goals and purposes.

Strategies to Achieve Objectives: The amount of mercury entering Stillwater NWR wetlands would be minimized and mercury in wetland sediments and biological tissues would be reduced to non hazardous levels. Through cooperation with the EPA and the Ecological Services office of the Fish and Wildlife Service in Reno, the most appropriate means to reduce mercury concentrations and avoid any increased distribution of mercury contamination would be determined, and an operational plan would be developed and implemented. To assist in these efforts, the Service and EPA anticipate the development of a model to increase the understanding of mercury dynamics in Lahontan Valley wetlands. Some potential remedial considerations include:

1. Avoid certain water delivery routes to the refuge;
2. Evaluate the benefits and possible detriments of using precautionary releases and spills from Lahontan Reservoir;
3. Use cattail stands to filter water entering the refuge;
4. De-emphasize management of contaminated wetlands;
5. Work with Bureau of Reclamation, TCID, and EPA to identify and explore options of conducting releases from Lahontan Reservoir for deliveries and for precautionary releases that would minimize transport of mercury from Lahontan Reservoir;
6. Implementation of measures to reduce the biological availability of mercury.

Monitoring Elements: Mercury loading in various locations throughout the marsh and riparian areas.

Subgoal A.c: Allow and provide for natural types, levels, rates, and distributions of biotic processes, such as herbivory, granivory, predation, population fluctuations of resident wildlife, and production; minimize or exclude processes not natural to the area or that are above or outside the levels, rates, locations, or communities that would occur naturally. Exceptions to this include:

1. Diseases such as botulism and cholera, which would be minimized.
2. Browsing by deer and other wildlife may be controlled, to allow native vegetation to reestablish.

Objective A.c.1: Prevent grazing and browsing by nonnative herbivores above natural levels (use and distribution) for any given plant species and community, and season for these species and communities, and prevent fires in upland areas except as prescribed.

Basis of Objectives: One of the major elements of natural biological diversity is the natural operation of biotic processes. Cattle herbivory has resulted in unnaturally high rates of grazing and browsing in many habitat on the refuge. Furthermore, excessive grazing and browsing by cattle would continue to impair restoration of many of the refuge’s plant communities and associated wildlife (Appendix M).

Strategies to Achieve Objectives: As part of an effort to approximate natural levels, distributions, and rates of natural biotic processes, livestock grazing would be excluded from all areas of the refuge except where needed to achieve specific habitat objectives for particular wildlife species.

Natural succession rates would be fostered by allowing vegetation to progress to late seral stages of succession undisturbed by livestock grazing or burning in designated areas of the refuge. This would require fencing along the external boundary and a number of inholdings. Natural processes in upland areas would be allowed to operate unabated, except efforts to control nonnative vegetation (e.g., cheatgrass) and suppress fires (fire was a rare event in upland habitat under natural conditions, but cheatgrass has the potential to alter this).

Monitoring Elements: Acreage protected through fencing, upland plant community composition; distribution, acreage, and the frequency and timing of fires.

Objective A.c.2: Allow native herbivores to graze and browse at natural levels (use and distribution).

Basis of Objectives: Same as above. Also, muskrats are a natural part of the marsh ecosystem and have influenced marsh vegetation dynamics for many thousands of years.

Strategies to Achieve Objectives: Muskrats would be allowed to graze unabated on emergent vegetation. However, the following factors would be considered: (1) muskrat control measures may be necessary while emergent vegetation is recovering in some units, or possibly to avoid over grazing by the muskrats if this is deemed undesirable; (2) muskrat control may be needed along dikes; in these cases, muskrats would not be trapped further than 100 feet from dikes; and (3) a study would be initiated to examine the relationships between muskrats and marsh ecology, to ascertain whether environmental conditions would allow muskrat populations to reach deleterious levels (part of the study may involve allowing the population to climb without any control to see what happens to the habitat and population). The study would include a review of existing literature on muskrat management. Any muskrat control program would recognize their natural role in the wetland ecosystem.

Monitoring Elements: Acreage of deep emergent vegetation, muskrat lodge index, outside research to elucidate muskrat/marsh interactions specific to Stillwater Marsh.

Objective A.c.3: Prevent depredation of nests above natural levels when caused by unnaturally high populations of predators. (This objective does not include taking action when other factors are causing unnaturally high depredation rates, such as lowered habitat quality.)

Basis of Objectives: It has been surmised that the common raven population is well in excess of natural levels and that this is causing excessive nest depredation on many waterbird species.

Strategies to Achieve Objectives: Natural predation rates would be studied to gain a better understanding of: (1) the role of common ravens, coyotes, and other predatory species in a naturally functioning system, (2) changes in predator populations (especially ravens) from pre Euro-American settlement to present, (3) changes in the production of migratory waterbirds from pre Euro-American settlement to present, and (4) relationships between changes in predator populations and changes in waterbird production, including assessments of changes in habitat conditions, human disturbance, and other factors that could potentially affect production. In addition to addressing the above factors, the information would be used to identify triggering mechanisms.

Under this alternative, a predator control program would recognize the natural role that predators play in the refuge ecosystem. Furthermore, non lethal techniques would be of highest priority, including the elimination of poles, spoil piles, and other perches near waterbird nesting locations, and egg aversion methods. However, if production of a species of special concern was considerably impaired by predation or nest depredation, a targeted program to resolve the immediate threat would be designed and implemented with the appropriate level of NEPA documentation. The least invasive technique available would be used in all such control efforts.

Monitoring Elements: These would include production levels and nest depredation rates for selected species, and spring populations of common ravens and coyotes, but factors to consider would be further refined through research.

Objective A.c.4: Prevent human disturbances that would materially affect the use of the refuge by native wildlife, nest success of waterbirds and riparian birds, overall production, daily activity patterns of birds, use of important feeding habitat by waterbirds during migration and winter and the nutritional status of these birds, and other biotic processes.

Objective A.c.4(a): Maintain a minimum of 60 percent of the refuge’s wetland habitat in areas providing relatively secure habitat (e.g., free from boat traffic, sanctuary), combined, such that

- (I) The full range of life history requirements of all major waterbird guilds are contained in the selected areas.
- (ii) A minimum of 4,000 acres are in sanctuary (no public access).
- (iii) The “other secure areas” provide relatively secure feeding, resting, and breeding habitat for waterbirds.

Objective A.c.4(b): Minimize public use impacts to wildlife in areas outside the sanctuary while still providing opportunities for compatible wildlife-dependent recreation.

Basis of Objectives: The presence of people and human activity can, depending on a variety of factors influence the distribution, behavior, health, production, and survival of wildlife. This has the potential to impair the Service’s ability to achieve refuge goals. However, given the desire by the Service to encourage more people to learn about the marsh, its wildlife, and wildlife conservation issues (another refuge goal), it is imperative that this is done in a way that minimizes adverse impacts to wildlife.

Providing areas for wildlife where the density of refuge visitors is low or nonexistent would ensure that birds have a place to rest, feed, and find shelter from the weather in an area where they would not be flushed or otherwise disturbed by people. Providing a “core reserve” (or sanctuary) is a fundamental principle of conserving natural biological diversity. These objectives link the wildlife related goals and the public use goal of the refuge.

Strategies to Achieve the Objective: Several requirements would be implemented under Alternative C to minimize adverse impacts associated with human activity in wildlife habitat. A minimum of 4,000 acres of the refuge’s wetland habitat would be maintained in sanctuary status year round^A. During the nonhunting season, access in the vicinity of wetlands would be limited to open roads and trails except in designated areas.

New observation areas, trails, and other developed sites would be located and managed to minimize adverse impacts to wildlife. Two options would be considered to minimize adverse impacts associated with human activities during the waterfowl hunting season. Although the acreage of wetland habitat would vary through the hunting season and from season to season, the actual boundaries of the sanctuary, hunt area, and walk in only hunt area (Option 2) would not change (Maps 3.6 and 3.7; located in the public use management section).

Option 1. During the hunting season, water would be apportioned in the following way:

- the first 4,000 acres^A of wetland habitat would be maintained in the sanctuary;
- the next 3,000 acres of wetland habitat would be maintained in the hunt area; and
- each additional 2,000 acres would be distributed as follows, in this order:

- N general public use area (500 acres),
- N sanctuary (500 acres), and
- N hunt area (1,000 acres).

The following units would be maintained as year round sanctuary: West Marsh, Lead Lake, Stillwater Point Reservoir (except immediately adjacent to the wildlife viewing site and interpretive trail), Upper Foxtail Lake, the southern two thirds of Lower Foxtail Lake, and Dry Lake (Map 3.6). No public access would be permitted in these units year round. The amount of wetland habitat available for flooding in the sanctuary would be about 7,300 acres under this alternative. Areas open for wildlife viewing would provide additional areas that would provide at least some level of security for hunted species of birds.

Option 2. During the hunting season, water would be apportioned in the following way:

- the first 4,000 acres^A of wetland habitat would be maintained in the sanctuary;
- each additional 5,500 acres would be distributed as follows, in this order:

- N general hunt area (2,500 acres),
- N walk in only area (2,500 acres), and
- N sanctuary (500 acres).

The following units would be maintained as year round sanctuary: Stillwater Point Reservoir (except immediately adjacent to the wildlife viewing site and interpretive trail), Lower Foxtail Lake, Doghead Lake, Dry Lake, Cattail Lake, Division Pond, and East Alkali Lake (Map 3.7). No public access would be permitted in these units throughout the year. The amount of wetlands available for flooding in the sanctuary would be about 4,500 acres under this alternative. Additionally, West Marsh and Swan Lake would be maintained as walk in only areas during the hunting season. Once the sanctuary and walk in only area is filled, all additional acreage would go to the general hunt area.

During the hunting season, walk in only access into West Marsh and Swan Lake would entail closing North Road and Willow Dike Road, and exclude all watercraft and mechanized forms of travel and gear portage.

Additional restrictions may be added (e.g., a permit system) if monitoring reveals that the walk in only hunt area is not accomplishing the objectives for which it was designed.

Under both options, recreation in the Carson River corridor south of Wolf Dam (Federal lands only) and the Carson River from the southern limit of Section 30 (Timber Lake area) north to, and including, the delta wetlands in the "Fallon Unit"¹ would be managed to minimize adverse impacts to wildlife. The Carson River delta is anticipated to provide less than 100 acres of wetland habitat during the fall and winter except on rare occasions.

In years when less than 4,000 acres of wetland habitat would be provided during the hunting season, hunting would not be permitted^A and the 4,000 acres could be provided anywhere on the refuge (so as not to limit wetland habitat to the areas designated as sanctuary). A monitoring program would be designed to assess the effectiveness of maintaining disturbance below acceptable levels. The monitoring program would include success criteria and triggering mechanisms.

The three major sources of impacts from boating, with respect to disturbing wildlife, are: noise, speed, and access. The latter two can also result in adverse impacts to cultural resources. Boating regulations to minimize these elements of disturbance to wildlife and cultural resources would be developed and implemented. These regulations would include: (1) prohibiting all watercraft (including floattubes) on the refuge from March 1 through August 1; (2) limiting boating during the two periods, August 1 through the onset of waterfowl hunting season and the end of waterfowl hunting season through February 28, to nonmotorized boats and boats powered by electric motors; and (3) limiting boating during the waterfowl hunting season to boats with motors of less than 15 horsepower (higher than what is now identified in the refuge brochure), and less than 5 miles per hour. The intent of this horsepower and speed restriction is to minimize noise and speed of boats to the greatest extent possible (as these have the highest potential for impacting birds) while still providing reasonable access to the marsh.

An exception under Option 1 would be Goose Lake, in which one or two canoe trails would be developed and maintained for wildlife observation and environmental education during the nonhunting season. Goose Lake would be closed to motorized boats during the hunting season. An exception under Option 2 would be a year round closure to motorized boats in Lead Lake.

Further protection from human disturbance would be provided by: (1) limiting land based vehicles to roads, parking areas, and vehicle pullouts; and (2) maintaining road closures to some portions of wetland units in public use areas (i.e., no land based vehicle access), including seasonal closures. Service activities would be conducted in such a way that they minimize adverse impacts to wildlife, while still allowing sufficient access to accomplish the goals and objectives of the refuge. To minimize disturbance to upland wildlife species, off road vehicles, bicycles, and horseback riding would be restricted to open roads only.

The West Pasture unit could also be managed to produce moist soil habitat to enhance habitat quality within the sanctuary, which would provide additional food for dabbling ducks. Foods that currently do not grow in the existing sanctuary could be produced.

A monitoring program would be designed to assess effectiveness of maintaining disturbances and their effects below acceptable levels. The monitoring program would include success criteria and triggering mechanisms.

^ATo mitigate possible adverse impacts to waterfowl hunting opportunities in the near term (due to the restrictions identified above), the minimum sanctuary size would be phased in over a period of six years. For the first three years, the minimum sanctuary size would be 2,500 acres of wetland habitat, followed by another three years in which the minimum sanctuary size would be 3,500 acres. After six years, the minimum sanctuary size would be increased to 4,000 acres.

Monitoring Elements: Wetland habitat acreage inside sanctuary, walk in only area, and other public use area, by season; distribution and use of habitat by waterbirds; other measures to assess disturbance; and distribution and density of refuge visitors, by activity and season (from public use monitoring program).

Subgoal A.d: Fill information gaps with knowledge gained through monitoring, management studies, and research (including archaeological and paleoenvironmental investigations, and assessment of historical records), and assess the effectiveness of management actions and identify needed modifications to the management program. Key information items are as follows.

Objective A.d.1: Within five years, estimate the natural, relative level of abundance of all native species of fish and wildlife within Stillwater NWR (e.g., rare, accidental, uncommon, common, abundant), including natural variability over time.

Objective A.d.2: Design management studies and modify the monitoring program, as needed, to ensure that major components of biodiversity, including key taxa of wildlife and vegetation diversity, are being adequately monitored and to evaluate the effectiveness of management actions undertaken by the Service.

Objective A.d.3: Design and implement baseline inventories of birds, amphibians, aquatic and terrestrial invertebrates (e.g., butterflies), and plants within three years along the lower Carson River and its delta, Stillwater Slough, dunes, and nearby salt desert shrub areas to provide baseline information to assess the effects of habitat restoration efforts, including excluding of cattle from riparian and upland areas.

Objective A.d.4: Estimate the natural geomorphology, hydrology, and habitat composition of the lower Carson River and its delta in the Battleground area, in a way that recognizes natural year to year variations.

Objective A.d.5: Estimate the natural composition, structure, and distribution of upland plant communities, and design and implement an inventory to determine the existing conditions of these parameters.

Objective A.d.6: Assess whether the adopted sanctuary and other areas managed to provide security for waterbirds are of sufficient size, encompass adequate breeding habitat for waterbirds and feeding and loafing habitat for migrating and wintering waterfowl; and whether an adequate amount of secure habitat is provided in the walk in only hunt area of Option C2.

Objective A.d.7: Research ways to provide wetland unit draw downs during July September in ways that mimic natural water level declines and that accomplish habitat objectives, but do not contribute to significant avian botulism outbreaks (adapted from Nevada Partners in Flight Plan).

Objective A.d.8: Investigate the habitat needs, especially nesting habitat, of snowy plovers.

Objective A.d.9: Participate in the comprehensive state wide survey of potential nesting sites of black terns using professional and volunteer personnel, as well as conduct an assessment of the role that Stillwater Marsh played in black tern ecology in the Great Basin (from Nevada Partners in Flight Plan).

Objective A.d.10: Conduct an inventory of the fish occurring on the refuge, with an emphasis on determining the status of Lahontan red shiner and speckled dace.

Objective A.d.11: Ascertain whether Nevada viceroy and Carson wandering skippers (butterflies) inhabit Stillwater NWR, and determine more precisely their habitat requirements.

Basis of Objectives: Additional information is needed to achieve refuge goals, subgoals, and objectives, and to assess the effects of Alternative C on particular species. Some of the objectives were adopted from the Nevada Partners in Flight Plan (e.g., A.d.7 9), and would also contribute to approximating a natural diversity of wildlife.

Strategies to Achieve Objectives: Specific strategies would be outlined in a biological monitoring program (Appendix D).

Monitoring Elements: Completion of investigations and tracking of monitoring efforts.

Goal B: Contribute toward fulfilling obligations of international treaties and other international agreements with respect to fish and wildlife.

Subgoals fully addressed under Goal A: *The following subgoals pertaining to international treaty obligations would be achieved to the extent that the subgoals and objectives of Goal A are accomplished.*

Subgoal B.a: Prevent and abate pollution and detrimental alterations of habitat of native plants and animals, including:

1. Preventing the introduction of nonnative plants and animals.
2. Preventing the spread of introduced species that have become established.
3. Eradicate, to the extent possible, existing populations of nuisance species.

Basis of Subgoal: Preventing and abating pollution and the detrimental alteration of habitat and ecosystems as identified in this objective are identified as obligations of the United States and other contracting parties in several international treaties (migratory bird treaty with the [former] Soviet Union, The Convention on Biological Diversity). The Convention on Biological Diversity further obligates contracting parties to prevent the introduction of, and control species that threaten ecosystems, habitat, or species.

Strategies to Subgoal: See strategies under Objectives A.a.3, A.b.3(b)(c), and A.b.4(b).

Monitoring Elements: See monitoring elements under these objectives.

Subgoal B.b: Restore, preserve, and conserve natural ecosystems and habitat for migratory birds, other animals, plants, other components of biodiversity, and for the protection and conservation of natural areas.

Basis of Subgoal: The target of this objective is a common theme of several international treaties (Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, Convention on Protection of World Culture and Natural Heritage, the migratory bird treaty with the [former] Soviet Union, Convention on Biological Diversity).

Strategies to Subgoal: See objectives and strategies under Goal A.

Monitoring Elements: See monitoring elements under Goal A.

Subgoal B.c: Ensure that public use does not detract from the Service's ability to achieve wildlife related refuge purposes and that it is consistent with conservation and sustainable use principles; and ensure that sufficient sanctuary is provided for waterfowl using the Lahontan Valley, which may require additional study.

Basis of Subgoal: Several international treaties contain provisions to ensure that contracting parties (e.g., the United States) manage public uses within protected areas (e.g., refuges and reserves) in a way that is compatible with the purposes for which they were established (Convention on Biological Diversity, Convention on the Wetlands of International Importance, Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere). The migratory bird treaties with Mexico and Japan obligate the United States to establish no hunt zones and sanctuaries for migratory birds. Additional rationale for this objective is provided under Objective A.c.4.

Strategies to Subgoal: See strategies under Objectives A.c.4.

Monitoring Elements: See monitoring elements under Objectives A.c.4.

Subgoals not fully addressed under Goal A: The following subgoals and objectives are additions that may be necessary to address international agreements addressing fish and wildlife conservation (e.g., Western Hemispheric Shorebird Reserve Network and international bird conservation plans). They supplement the objectives listed under Goal A, but would result in no more than minor deviations from the objectives and strategies outlined under Goal A. The following subgoals, objectives, and strategies were developed in consideration of the goals, objectives, strategies, and actions outlined in the Intermountain West Joint Venture Plan (Intermountain West Joint Venture 1995), Nevada Partners in Flight Plan (Neel 1999), and the U.S. Shorebird Conservation Plan, Intermountain West Region Report (Oring and Neel 1999), hereafter referenced as the Intermountain West Shorebird Conservation Plan.

Subgoal B.d: Provide for the needs of migrating and breeding shorebirds as part of the Western Hemispheric Shorebird Reserve Network in ways that are consistent with the overall approach prescribed under Goal A.

Objective B.d.1: Provide high quality nesting and brood rearing habitat for shorebirds, in consideration of habitat availability in other parts of the Lahontan Valley and throughout the Interior Basins ecoregion.

Basis of Objectives: Stillwater Marsh and other wetlands in the Lahontan Valley are components of the Western Hemispheric Shorebird Reserve Network, meaning that the Service should make a diligent effort to contribute to this international effort to conserve shorebird populations.

In some years the Lahontan Valley wetlands provide stopover habitat for about half of North American's population of long billed dowitchers, and Stillwater NWR is a key area for snowy plovers, a species of special concern. Providing high quality habitat for shorebirds would also contribute toward accomplishing of goals and objectives of the U.S. Shorebird Management Plan and Nevada Partners in Flight Plan, two international planning efforts. The Convention on Wetlands of International Importance calls for contracting parties to increase waterbird populations on appropriate wetlands.

Strategies to Achieve Objectives: It is anticipated that this objective would be accomplished through the achieving the objectives under Goal A, especially the objective to sustain a long term average of 13,500 acres of wetland habitat in Stillwater Marsh. Carrying out the strategies outlined under Goal A would also contribute to the habitat goal for marshes and lakes in the Intermountain West Shorebird Conservation Plan and the objectives and strategies in the Nevada Partners in Flight Plan for snowy plover and American avocet.

Particular attention would be paid to flooding at least one major alkaline playa for snowy plover nesting each year (an action in the Nevada Partners in Flight Plan), see also Objective B.g.2. It is expected that a sufficient amount of flooded saltgrass meadow, submergent vegetation, and other suitable habitat would be provided on Stillwater NWR during the breeding season to adequately contribute toward the Nevada Partners in Flight Plan population objective for American Avocet in the Lahontan Valley, even though a breeding population objective would not be adopted for Stillwater NWR.

To the extent that suitable habitat is not being provided for these species, the Service would consider adjusting wetland management to better provide for their needs. This could possibly include actions identified in the Nevada Partners in Flight Plan that deviate from the approach outlined under Goal A to include maintaining one saltgrass pasture flooded at a constant depth between 2 and 6 inches from April 15 through August 1 (wet meadow communities typically did not remain flooded after mid June). This practice would be further evaluated to determine if it is needed given the expanse of other suitable wetland habitat that will be available on Stillwater NWR and Carson Lake. Specifically, Carson Lake may provide enough of this habitat for Lahontan Valley.

Predator control would generally not be practiced under this alternative, except as described under Objective A. If production rates are significantly lower than estimated natural production rates for a particular species of shorebird and predation is determined to be the ultimate factor causing reduced production, predator control may be used to enhance shorebird production. A possible exception to this is the snowy plover, due to its low and possibly declining population in Nevada.

Monitoring Elements: Acreage of breeding habitat types, nest production. A shorebird breeding population survey would be coordinated with other agencies (Nevada Partners in Flight Plan).

Objective B.d.2: Provide high quality shorebird habitat during spring and fall migration, including rising water levels during spring and declining levels during the late summer and fall.

Basis of Objectives: same as above

Strategies to Achieve Objectives: This objective should be fully met through objectives and strategies under Goal A, given extensive amounts of declining water levels during the late summer and fall and rising water levels during the spring. Nonetheless, monitoring would be undertaken to determine whether adequate habitat is provided to migrating shorebirds at appropriate times. Planning, monitoring, and other aspects of wetland management would be coordinated with the Intermountain West Shorebird Conservation Plan.

To the extent that suitable habitat is not being provided for these species, the Service would consider adjusting wetland management to better provide for their needs. This could possibly include actions identified in the Nevada Partners in Flight

Plan that deviate from the approach outlined under Goal A to include managing one wetland unit to be in a mature stage of invertebrate growth and gradual drawdown from April 1 through May 10. This practice would be further evaluated to determine if it is needed given the expanse of other suitable wetland habitat that will be available on Stillwater NWR and Carson Lake at the completion of the water rights acquisition program. Consideration would be given to the declining springtime water levels at Carson Lake (i.e., rising water levels in Stillwater Marsh could compliment the different water management approach at Carson Lake).

Monitoring Elements: Seasonal acreage of alkali mudflat, moist soil, and wet meadow wetland habitat types.

Subgoal B.e: Provide high quality habitat for migrating, breeding, and wintering waterfowl and other birds associated with marshes in ways that are consistent with the overall approach prescribed under Goal A.

Objective B.e.1: Provide high quality nesting and brood rearing habitat for waterfowl and other waterbirds.

Basis of Objective: This objective generally falls under the umbrella of contributing to the goals and objectives of the Intermountain West Joint Venture (North American Waterfowl Management Plan). The Lahontan Valley wetlands, including Stillwater NWR, have been identified as one of the focus areas of the Intermountain West Joint Venture, which called for habitat to accommodate a breeding population of at least 2.5 million ducks throughout the Intermountain West.

Strategies to Achieve Objectives: This objective would in large part be accomplished through the achievement of objectives under Goal A, especially the objective to sustain a long-term average of 13,500 acres of wetland habitat in Stillwater Marsh and a large volume of water to be delivered in early spring. Shoreline and meadows would provide enhanced nesting habitat for upland nesting species as a result of spring pulses of water flooding saltgrass and mixed meadow grass communities and in some areas through the elimination of cattle grazing in these habitat.

Monitoring would be undertaken to determine whether adequate habitat is provided for nesting waterfowl. This information would then be weighed against other objectives and priorities to determine the appropriate action. In some cases, it may be decided that reducing of extensive stands of rank emergent vegetation should be undertaken to enhance habitat for breeding waterfowl that require openings in vegetation. Methods may include prescribed burning, cattle grazing and trampling, and disking.

Predator control would not be used to enhance waterfowl production, unless production rates are found to be significantly lower than estimated natural production rates for the species and predation is determined to be the ultimate factor causing reduced production. The assumption at present is that habitat conditions are the ultimate factor influencing production rates.

Monitoring Elements: Acreage of meadow and deep emergent nesting habitat available, structure and height of meadow habitat, pattern of emergent vegetation/open water, numbers of waterfowl breeding pairs.

Objective B.e.2: Provide high quality habitat for waterfowl during fall and winter, until wetland units ice over (generally late December or January).

Basis of Objectives: The Intermountain West Joint Venture Plan set objectives for providing migrational and staging habitat to support a fall migration of at least 20 million ducks, 60,000 tundra swans, 700 trumpeter swans, and 90,000 geese; and habitat to support a midwinter population of at least 2.5 million ducks and 90,000 geese. Lahontan Valley, including Stillwater NWR, is an emphasis area within the Intermountain West. In many years, up to about 70 percent of the waterfowl migrating and wintering in Nevada, pass through and use Stillwater NWR and other Lahontan Valley wetland areas.

Strategies to Achieve Objectives: This objective would be met through objectives and strategies outlined under Goal A, especially the objective to sustain a long-term average of 13,500 acres of wetland habitat in Stillwater Marsh. However, few details were provided on one aspect of the fall and winter habitat for waterfowl, that is the flooding of moist soil vegetation during this time period. In certain wetland units (which may differ from year to year), the process of allowing water levels to decline during the summer would be curtailed in September or October. At this time, water levels in designated units (roughly 1/3 of the refuge units, or an average of about 1/3 of the acreage during October-December) would be slowly raised to flood areas containing seed producing annual plants, which would provide carbohydrates and fat for the higher maintenance requirements of dabbling duck species during winter and migration.

This process, which would continuously provide new habitat at optimum depths (eight inches or less), would be continued through late fall or early winter. Previously exploited habitat (depleted of seeds) would become deeper while unexploited habitat would become available. An important component of this strategy would be to take advantage of the natural lowering of water levels from June through September (accomplished through previously discussed strategy), which would saturate wetland soils, and would promote germination of annual plants.

West Marsh (Option 1) or West Marsh or Swan Lake (Option 2) would be included in the wetland units to annually receive this treatment. To supplement these units, West and East Pastures would also be flooded during the fall and winter to provide access to moist soil vegetation inside the existing sanctuary.

High water levels would be maintained in a few wetland units into late summer or fall, at which time they would be permitted to decline through late winter or early spring. Wetland units targeted for this approach would be those in the upper marsh containing marked potential for producing aquatic vegetation (e.g., Lower Foxtail). This likely occurred in the upper marsh under natural conditions and would be, in part, undertaken to facilitate feeding by diving ducks and swans.

Upon completion of the water rights acquisition program (i.e., long-term average of 70,000 acre-feet of water per year), annual water plans would be written to provide a minimum of 10,000 acres of wetland habitat during October-December to benefit waterfowl and to provide waterfowl hunting opportunities.

The Service would work to provide up to 300 acres of alfalfa, wheat, oats, or other crop for wintering Canada geese. However, water and water rights acquired under subsection 206(a) of P.L. 101-618 would not be used to irrigate crops in the farmland area, except possibly after water rights have been acquired but before they have been transferred to the wetlands. Because the Service would not acquire additional water rights for use on farmlands or for other agricultural purposes, other sources of water would be needed for these crops, such as temporary transfers by farmers in a cooperative farming program.

Haying, prescribed burning, and livestock grazing would be used to provide the crop vegetation at a low height. Although cattle grazing may be used to enhance goose browse in the farmland area of the refuge, it would not be used for this purpose outside the farmland area. Livestock grazing in any given year would be limited to 500 AUMs for the entire refuge.

Monitoring Elements: Acres and within unit density of submergent aquatic vegetation available to waterfowl, acres of moist soil habitat and its quality, acres of farmland cultivated for the purpose of providing goose forage, and the waterfowl response to this acreage would be a measure of habitat effectiveness.

Objective B.e.3: Minimize the occurrence, spread, and severity of botulism and cholera outbreaks.

Basis of Objectives: Waterbird diseases such as type C botulism and fowl cholera have the potential to impact populations of waterbirds using the Stillwater NWR Complex. These diseases occur seasonally. Cholera typically occurs during winter and botulism during hot summer months. Past die offs have been as high as 55,000 birds, which resulted from a suspected combination of botulism and cholera, diminish the contribution of Stillwater NWR wetlands to achieving Intermountain West Joint Venture goals and objectives. In addition to direct mortality, waterbird use of refuge wetlands can be severely impacted at this level of effect because control efforts (e.g., use of airboats) tend to push remaining birds into isolated and often less desirable habitat. Botulism and fowl cholera can diminish the contribution of Stillwater NWR wetlands to achieving Intermountain West Joint Venture goals and objectives.

Strategies to Achieve Objectives: Botulism and cholera monitoring and cleanup would be continued as it has in the past, with botulism patrols initiated by mid June and continuing into early fall. Wetland units with a history of botulism problems would be identified and targeted for regular airboat patrols, with more frequent patrol efforts initiated as outbreaks are discovered. Fall, winter, and early spring patrols would be conducted in more remote areas such as the Carson Sink and where large concentrations are identified through aerial surveys. Carcasses would be immediately removed from wetland units and sick birds would be transported to the refuge “duck hospital” where rehabilitation would be conducted using fresh uncontaminated water in the holding pen.

To meet other objectives under this alternative, water levels would decline in many wetland units during late summer months through evapotranspiration, which could potentially increase the potential for botulism outbreaks. To address this potential problem, options would be explored to minimize the potential for botulism outbreaks while meeting other objectives requiring drawdowns during July September (e.g., Objective A.d.7 and Nevada Partners in Flight Plan). Where outbreaks occur, wetland unit flushing or draining could be used to either dilute contaminated units (through flushing) or to reduce the desirability of the unit to susceptible waterbirds (e.g., through draining the unit). Portable Cristafulli pumps would be used to facilitate wetland unit draining.

Monitoring Elements: Botulism and cholera occurrence by wetland unit, annual number of waterbirds, by species, that die annually due to botulism and cholera.

Objective B.e.4: Ensure that suitable wetland habitat is provided for other marsh dependent species, using white faced ibis, black terns, white pelicans, Clark’s grebes, and short eared owls as indicator species.

Basis of Objective: This objective generally falls under the umbrella of contributing to the goals and objectives of the Nevada Partners in Flight Plan, in which white faced ibis, black terns, American white pelicans, Clark’s grebes, and short eared owls were identified as key species. White faced ibis and black terns are species of special concern. Black terns were once abundant in the Lahontan Valley, but now are uncommon.

Strategies to Achieve Objectives: This objective should be fully met through objectives and strategies under Goal A and Objective B.e.2, especially the objective to sustain a long-term average of 13,500 acres of wetland habitat in Stillwater Marsh. For example, the conditions produced resulting from the following strategies and actions of the Nevada Partners in Flight Plan would be provided through the implementation of objectives and strategies under Goal A:

(a) maintaining constant water levels (12-24 inches) in certain hardstem bulrush units from April 15 through August 15 for white faced ibis nesting; (b) providing foraging habitat at Stillwater NWR for white pelicans; and (c) maintaining semi permanent marsh with well developed emergent and submergent plant communities, abundant populations of small fish, and relatively stable water levels from May 1 through November 15 for Clark's grebes. Monitoring would be undertaken to determine whether adequate habitat is provided for these species.

Although objectives would not be established for breeding populations of white faced ibis as identified in the Nevada Partners in Flight Plan, a minimum threshold may be established. To the extent that suitable habitat is not being provided for these species, the Service would consider adjusting wetland management to better provide for their needs. This could possibly include actions identified in the Nevada Partners in Flight Plan that are outside the framework of this alternative's management program, such as actively managing nongame fish in Stillwater Marsh for white pelicans (as opposed to relying on fish to respond to enhanced habitat), and maintaining residual stands of emergent marsh vegetation by drying an emergent marsh unit for an extended period to build the vole population such that it is high during the period March 1 through July 1, for short eared owls. This will happen in many years by default, but it likely cannot be done on an annual basis in this specific habitat type. The need for providing this type of feeding habitat for short eared owls would be assessed and compared to feeding opportunities in other habitat where voles abound, such as meadows.

Monitoring Elements: Acreage and quality of habitat available to each species for nesting and brood rearing, and waterbird response to the habitat provided (e.g., number of nesting pairs, annual production).

Subgoal B.f: Provide high quality habitat for migrating and breeding birds in riparian areas and salt desert shrub communities in ways that are consistent with the overall approach prescribed under Goal A.

Objective B.f.1: Provide high quality habitat for neotropical migratory birds associated with riparian areas in ways that are consistent with the overall approach prescribed under Goal A, using yellow billed cuckoos, ash throated flycatchers, blue grosbeaks, yellow-breasted chats, and western bluebirds as indicator species.

Basis of Objectives: This objective generally falls under the umbrella of contributing to the goals and objectives of the Nevada Partners in Flight Plan, in which yellow-billed cuckoos, ash-throated flycatchers, blue grosbeaks, yellow-breasted chats, and western bluebirds were identified as key species pertinent to Stillwater NWR. Yellow-billed cuckoos are a species of special concern.

Strategies to Achieve Objectives: This objective should be fully met by carrying out the strategies outlined under Objectives A.b.2(c, d), A.b.3, A.b.4(b), and B.g.1.3. Most if not all of the specific objectives, strategies, and actions identified in the Nevada Partners in Flight Plan for key riparian bird species are consistent with the strategies to be undertaken under these objectives. For example, major strategies in the Nevada Partners in Flight Plan are to (1) maintain and increase large contiguous blocks of multi storied cottonwood-willow forests; (2) maintain and enhance mature stands of cottonwood/willow and buffaloberry, and (3) maintain thriving buffaloberry stands mixed with cottonwood and/or willow stands on lowland river floodplains.

Three related action items listed under these strategies were to control saltcedar and reestablish native plant communities, discourage propagation of Russian olive on lowland floodplains, and avoid removing of buffaloberry. These restoration actions, and more, are emphasized in the strategies of this alternative.

Although the lower Carson River within Stillwater NWR was not identified as a potential site in which to restore cottonwood forests for yellow-billed cuckoo, potential exists to restore suitable cottonwood forests along this portion of the river, which would also provide habitat for yellow-breasted chats. To the extent that suitable habitat is not being provided for these species, the Service would consider adjusting riparian restoration efforts to better provide for their needs.

Additional indicator species would be identified.

Monitoring Elements: Amount (acres, miles) and quality (composition, structure) of restored riparian habitat, and bird response to available habitat (e.g., species richness, relative abundance of representative species).

Objective B.f.2: Provide high quality habitat for birds associated with salt desert shrub areas in ways that are consistent with the overall approach prescribed under Goal A, using loggerhead shrikes and burrowing owls as indicator species.

Basis of Objectives: This objective generally falls under the umbrella of contributing to the goals and objectives of the Nevada Partners in Flight Plan, in which loggerhead shrikes and burrowing owls were identified as key species pertinent to Stillwater NWR. Loggerhead shrikes are a species of special concern.

Strategies to Achieve Objectives: This objective should be fully met by carrying out the strategies outlined under Objectives A.b.2(e), A.b.3, and A.b.4(c). All of the specific objectives, strategies, and actions identified in the Nevada Partners in Flight Plan for key salt desert shrub bird species are consistent with the strategies to be undertaken under these objectives.

For example, major strategies and actions in the Nevada Partners in Flight Plan, pertinent to Stillwater NWR, are to (a) sustain sufficient acreages of salt desert shrub habitat, with large bush diameters for loggerhead shrikes; (b) encourage the maintenance of healthy, diverse salt desert shrub habitat complete with a healthy Indian ricegrass component supporting a thriving rodent community to benefit burrowing owls; and (c) protect and maintain suitable burrowing habitat and primary burrow providers (e.g., ground squirrels, kit foxes, badgers) because burrowing owls use vacated burrows.

Stillwater NWR, under the Alternative C boundary revision and protective measures for upland habitat, would be an important contribution to these strategies in the Lahontan Valley, identified in the plan as a major population center for loggerhead shrike (defined as productive population that contributes to surrounding populations). To the extent that suitable habitat is not being provided for these or other upland species, the Service would consider adjusting upland habitat restoration efforts to better provide for their needs.

Additional indicator species would be identified, possibly including species of butterflies and dune beetles.

Monitoring Elements: Numbers of acres and assessment of quality (composition, structure) of salt desert shrub habitat, and bird response (species richness, relative abundance of representative species).

Subgoal B.g: Restore, enhance, and protect habitat for threatened and endangered species, species of special concern, and other sensitive, rare, or endemic species inhabiting the refuge.

Basis of Subgoal: The migratory bird treaties with Japan and the [former] Soviet Union, Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, Convention on the Protection of World Culture and Natural Heritage, and Convention on Biological Diversity obligate the United States and other contracting parties to take appropriate measures to provide for the protection and recovery of species endangered with extinction or threatened with becoming endangered. Bald eagles are a federally listed threatened species and Stillwater NWR would, under Alternative C, contain one of the most important roost sites in western Nevada.

Objective B.g.1: Within the next five years, reestablish, in a way favorable for future roosting by bald eagles (including a suitable distance from areas accessible by the public), cottonwood trees in the Timber Lake area, and reestablish similar stands along other parts of the Carson River as additional lands are acquired.

Basis of Objective: See basis of subgoal. Bald eagles are a federally listed threatened species and Stillwater NWR would, under Alternative C, contain one of the most important roost sites in Nevada.

Strategies to Achieve Objectives: As part of the effort to reestablish cottonwood communities in riparian areas (Objective A.b.4(b)), emphasis would be placed on first reestablishing cottonwoods in the Timber Lake and other areas that would provide suitable roosting habitat for bald eagles. Assurance would be made that the selected locations are areas that would naturally support cottonwoods.

Monitoring Elements: Number of cottonwood stands of suitable characteristics, number of trees established per stand, and ultimately, the number of bald eagles using the trees.

Objective B.g.2: During the interim until their habitat needs are better delineated, provide shallowly flooded, unvegetated playa habitat for snowy plover nesting in areas they have used in the past.

Basis of Objectives: The snowy plover is a species of special concern and a species of priority focus in the Nevada Partners in Flight Plan, in which Stillwater NWR (including areas added to Stillwater NWR under Alternative C) have been identified as an area of special emphasis. Nevada is an important breeding area for the western population of snowy plovers.

Strategies to Achieve Objectives: At least one major alkaline playa (or similar habitat) would be flooded each year to support snowy plover nesting, and emphasis would be placed on enforcing the no off road vehicle use policy in areas used by snowy plovers for nesting (Nevada Partners in Flight Plan). The nesting habitat needs of snowy plovers would be studied (Objective A.d.8), and periodic censuses would be coordinated with other agencies and groups involved in snowy plover recovery efforts.

Monitoring Elements: Acres and distribution of suitable habitat, response of snowy plovers to habitat provided (e.g., breeding pairs, production).

Objective B.g.3: Within the next five years, reestablish native willow and mesic shrub communities along the Carson River in the Timber Lake area for the benefit of Nevada viceroy and other riparian shrub species of special concern, and reestablish such communities along other parts of the Carson River as additional lands are acquired and along the Stillwater Slough.

Basis of Objectives: The Nevada viceroy, which is a willow dependent butterfly, is a species of special concern that has been reported in the Fallon area. Yellow-billed cuckoo, another species of special concern, is dependent on large gallery stands of cottonwoods. Sightings of individual yellow-billed cuckoos have been recently recorded in the Lahontan Valley. Habitat quality along the lower Carson River is low at present for both of these species.

Strategies to Achieve Objectives: Willow and other native shrub communities would be reestablished in riparian areas that would naturally support these communities, as outlined in strategies under Objective A.b.4(b).

Monitoring Elements: Presence or absence of species of special concern and the relative abundance of each.

3.4.C.2.2.2 Public Use Management

Guiding Principles

Public use management would be guided by the following principles. Public use management on Stillwater Refuge would recognize the importance of national wildlife refuges in providing opportunities for compatible wildlife-dependent recreational activities. Wildlife-dependent public uses would be managed to provide a balance between hunting, environmental education and interpretation, wildlife observation, wildlife photography, and scientific research; the priority public uses of Stillwater NWR under this alternative. Based on the specific reference to environmental education and research in refuge purposes, and given the lack of facilities on the refuge for these uses, emphasis would be given to locating sites and developing adequate facilities for viable programs.

Public use would be managed in a way that recognizes that wildlife will not prosper without high quality habitat, and without wildlife, wildlife-dependent uses cannot be sustained on refuges. Wildlife-dependent recreation helps foster stewardship and a connection with the resources, and direction for encouraging wildlife-dependent public uses is clearly spelled out in the Service's vision document "Fulfilling the Promise" (USFWS 1999) and in the Refuge System Administration Act. Education is key, and will be a focal point of all facets of the public use program within this alternative. It is through education, both on and off site, that the public will gain an understanding of the role of humans within their environment. Through on site programs demonstrating wildlife needs and requirements, people will learn how to practice proper wildlife viewing etiquette and the importance of management strategies and techniques. It is through education and interpretation that negative human wildlife interactions can be minimized, by teaching the reasons behind facility design and why certain methods of observation are adopted.

Outreach will be another key component of the public use program. Little marketing of Stillwater NWR has been done in the past, which has resulted in low visitation numbers. With an increase of awareness through media attention, visitation should increase dramatically.

Goals, Objectives and Strategies

Goal C: Provide opportunities for environmental education and wildlife-dependent recreation that are compatible with refuge purposes and the Refuge System mission.

Subgoal C.a: Provide opportunities for high quality hunting experiences.

Basis of Subgoal: Hunting is a wildlife oriented recreational activity, and one of the purposes of Stillwater NWR is to provide opportunities for wildlife oriented recreation. As one of the priority general public uses of the Refuge System, hunting must receive higher consideration during the planning process. The Service is encouraged under the Refuge System Administration Act, to find ways to allow wildlife-dependent recreation on refuges, primarily because providing these types of opportunities teaches refuge visitors about wildlife ecology, and this ultimately facilitates the conservation mission of the Refuge System.

Objective C.a.1: Provide opportunities in which hunters would have a reasonable chance of success in uncrowded conditions and would meet the needs of a broad spectrum of users.

<p>Basis of Objective: Given Stillwater NWR’s location, the landscape and size of wetland units, and the types of opportunities that Stillwater NWR has provided in the past, Stillwater NWR would be well suited to provide uncrowded hunting opportunities where there is a reasonable chance of success. This would be the type of high quality hunting experience that could be provided at Stillwater NWR.</p>	
<p>Strategies to Achieve Objective: Alternative C would continue to maintain hunting as an integral part of the recreation program. Two options would be considered by the Service:</p>	
<p><u>Option 1.</u> The following Stillwater Marsh units would be open to waterfowl hunting during the hunting season: Goose Lake, Nutgrass Lake, Swan Lake, Pintail Bay, Swan Check, and Tule Lake (Map 3.6).</p> <p>At the completion of the water rights acquisition program, it is anticipated that at least 4,500 acres (43 percent or more) of the fall and winter wetland habitat in Stillwater Marsh would be consistently open to waterfowl hunting during nonspill years under this alternative (as high as 5,000 acres). In spill years (one of four years) and years following a spill year, it would be as high as 7,000 acres or more.</p>	<p><u>Option 2.</u> The following Stillwater Marsh units would be open to waterfowl hunting during the hunting season: Goose Lake, Nutgrass Lake, Swan Lake, Pintail Bay, Swan Check, Tule Lake, West Marsh, and Lead Lake (Map 3.7). West Marsh and Swan Lake would be restricted to foot traffic only, which would provide high quality, low density hunting opportunities.</p> <p>At the completion of the water rights acquisition program, it is anticipated that at least 6,000 acres (57 percent or more) of the fall and winter wetland habitat in Stillwater Marsh would be open to waterfowl hunting during nonspill years under this alternative (as high as 7,500 acres). In spill years (one of four years) and years following a spill year, it would be as high as 10,500 acres or more.</p>
<p>Under both options, opportunities for waterfowl hunting would also be available along the D Line Canal between the Indian Lakes area and the existing western boundary of Stillwater NWR. Hunter densities would be monitored in part to maintain relatively low density hunting opportunities now available on Stillwater NWR. “Uncrowded conditions” would be further defined.</p> <p>Nonmotorized and motorized water craft with motors of 15 horsepower or smaller (as compared to the 10 horsepower limit currently identified for the refuge) and operated less than 5 miles per hour would be allowed in all open hunting areas, except Goose Lake which would be designated as nonmotorized only. Overnight stays would be allowed in designated areas only. These areas would be maintained away from the interior marsh and will contain no amenities such as water or electricity, but restrooms would be provided. A cooperative effort would be sought to provide camping opportunities near the wetlands as described in the Hunting section of Alternative B.</p> <p>Under this alternative, hunting California quail in addition to waterfowl, would be allowed during the appropriate season in the hunt area of Stillwater Marsh and along the D Line canal east of the Indian Lakes area. Lead shot would not be permitted.</p> <p>To the extent that lands are acquired along the Carson River corridor between Wolf Dam and the Timber Lake area (south and west of Township 21 North, Range 30 East), additional opportunities to allow hunting would be explored. At present, very little of this land is owned by the Federal government. If enough land is acquired along this stretch, it would be opened to hunting, pending the completion of a compatibility determination.</p>	
<p>Monitoring Elements: Number of hunters, demographics, feedback on the quality of hunting experience.</p>	

Objective C.a.2: Ensure that hunting experiences are safe.

Basis of Objective: Beyond being a vital consideration in the management of any public use, the Refuge System Administration Act requires that wildlife-dependent recreation be allowed only to the extent that they are consistent with public safety.

Strategies to Achieve Objectives: A limit of 1 hunter per 30 acres would be established for safety purposes. A combined effort between State and Federal agencies would be maintained to provide hunters with sufficient opportunity to attend hunter education courses and ad hoc hunter safety programs. Monitoring hunter density would provide the Refuge Manager with information to determine unsafe conditions.

Monitoring Elements: Number and types of reported and observed injuries per hunting season, observations by staff of unsafe practices and law enforcement infractions.

Subgoal C.b: Provide opportunities for environmental education and interpretation that meet requirements of a broad spectrum of users.

Basis of Subgoal: Providing opportunities for environmental education was specifically identified as one of the purposes of Stillwater NWR. Furthermore, the Refuge System Administration Act encourages the Service to provide opportunities for the priority public uses of the Refuge System. Environmental education and environmental interpretation are two of these six priority public uses. These opportunities are provided in the Refuge System to advance public awareness, understanding, and appreciation of the functioning of ecosystems and the benefits of their conservation to fish, wildlife, and people. This ultimately contributes to the mission of the Refuge System.

Objective C.b.1: Provide adequate facilities, equipment, and staffing for environmental study and interpretation, including facilities within the nonhunted public use area of the refuge.

Basis of Objective: Providing adequate facilities and staffing is imperative to providing environmental education and environmental interpretation opportunities to a wide spectrum of users. Service policy requires that environmental education be conducted outside the hunting areas.

Strategies to Achieve Objective: A visitor facility and outdoor classroom would be located on or near the property formerly owned by the Kent family or the Weishaupt family. Restoration of the Stillwater Slough and a demonstration wetland unit would attract waterbirds to the area and support environmental education and interpretation activities. The facility would include a classroom, audio/visual, and interpretive displays. Volunteer docents, with the aid of Service personnel, would supply the bulk of the manpower. The volunteers would be well versed in all aspects of refuge management to provide a wide range of information.

The environmental education program would have a mobile component (as in Alternative B) and an environmental education location on site would be developed. In Option C-1, the educational site would be located at the eastern end of Cattail Lake just off of Division Road. In Option C-2, development would occur in the southeastern portion of the Upper Foxtail unit. This site would include an area for study, (e.g., a shaded table area) and a permanent, restroom facility. Interpretive signs at this facility would provide information on wildlife and habitat occurring at the site, current refuge management practices, facilities, and opportunities, and cultural resources to broaden the awareness of a wide range of visitors.

Interpretive kiosks would be designed and placed at the visitor facility and Stillwater Point. These kiosks would provide guidance and information on important natural and cultural features of the surrounding area. Housing for volunteers, temporary staff, and research personnel, as well as a storage facility would be provided to the extent possible. Trailer pads would be made available to accommodate a growing workforce of volunteers.

The property formerly owned by the Alves family would be developed to provide additional opportunities for scientific research and on site learning. Existing structures would be evaluated for utility and unnecessary structures removed. A kiosk would be designed and constructed to serve as a trailhead to the riparian area along the Carson River. An accessible trail would be designed to facilitate wildlife viewing and photography of riparian species. An accompanying leaflet depicting trail route and location as well as resident and migrant bird species would be developed.

Monitoring Elements: Number, type, and location of facilities, and response by refuge visitors (e.g., number and type of visitor/group using each facility or location).

Objective C.b.2: Provide for the needs of students and teachers and make refuge and Service programs available to them.

Basis of Objectives: Refuges are “learning laboratories” and Service programs are designed to show students and teachers the value of fish and wildlife resources.

Strategies to Achieve Objectives: The environmental education program would be centered around the need to “teach the teachers.” A number of comprehensive workshops for local teachers would be developed to demonstrate how to use refuge resources to teach students about conservation issues, specific species and needs, cultural resources, and refuge management. The knowledge gained from Stillwater NWR practices and concerns will aid both teachers and students in understanding the important connections between humans and wildlife.

Monitoring Elements: Number of student and teacher groups per year, assessment of how well their needs and expectations were met.

Objective C.b.3: Provide adequate interpretation of natural and cultural aspects of the area to satisfy the curiosity, and broaden the awareness, of a wide spectrum of visitors.

Basis of Objective: See basis for the subgoal.

Strategies to Achieve Objective: The visitor facility would be staffed to accommodate the majority of visitors during peak use. Volunteers would be trained to answer a wide range of questions about Stillwater NWR, and to provide sufficient background and local information to satisfy the curiosity, and broaden the awareness, of a wide spectrum of visitors. Volunteers would need to be familiar with the refuge infrastructure, as well as the resident and migratory wildlife in the area. Staff would also be well trained in local cultural resources.

Several detailed refuge brochures and leaflets would be developed in compliance with Service graphic standards and distributed through a variety of media resources. The publication would list recreational opportunities and restrictions, as well as provide visitors with information about the refuge and tour route.

The auto tour loop would provide additional interpretation opportunities. High quality interpretation of fish, wildlife, and their habitat, cultural resources, and resource management practices, including placing of information in strategic locations, would increase public awareness, understanding, and appreciation.

Monitoring Elements: Response by refuge visitors; (e.g., number of visitors using visitor facilities, number of brochures provided.)

Subgoal C.c.: Provide high quality opportunities for wildlife viewing and photography.

Basis of Subgoal: Providing opportunities for wildlife-dependent recreation is one of the purposes of Stillwater NWR. The Refuge System Administration Act identified wildlife viewing and photography as two of the six wildlife-dependent recreational uses to be facilitated in the Refuge System, and the act encourages the Service to provide opportunities for these uses. When the public is provided opportunities to view and photograph wildlife, plants, and wildlands, awareness, understanding, and appreciation of the ecosystem functioning and the benefits of ecosystem conservation to fish, wildlife, and people will increase. This ultimately contributes to the mission of the Refuge System.

Objective C.c.1: Provide high quality viewing opportunities throughout the distinctive habitat of the refuge.

Basis of Objective: Providing facilities for viewing wildlife (e.g., roads, pullouts, observation sites) is important for providing high quality viewing opportunities. Achieving of this objective would provide the public with the opportunity to view wildlife and the relationships between resource management, wildlife and habitat, and people.

Strategies to Achieve Objective: The road between the town of Stillwater and Stillwater Point Reservoir would be paved, and an accessible interpretive trail and wildlife observation structure would be constructed to facilitate viewing the wetland unit. A self guided interpretive trail would be developed along the eastern side of the reservoir. Stillwater Point Reservoir is a regulating reservoir for Stillwater NWR wetland units and, as such, water levels can fluctuate widely at times in the reservoir. This results in lower quality wetland habitat for wetland wildlife. However, due to the ease of access, this is an area that would be useful for developing facilities to support viewing the marsh and wildlife.

Two options will be considered for a tour loop under this alternative:

Option 1. An all weather tour route would be developed, starting from the visitor facility, proceeding north along Hunter Road, then northeasterly, along a road to be constructed, to and between Lower Foxtail and Dry Lake and proceeding between Cattail Lake and Division Pond to Division Road. At this point the route would return to Hunter Road (Map 3.6). To facilitate viewing along Hunter Road, wetland habitat would be created and maintained along the east side of the road.

A longer tour route, which would be open seasonally, would continue from Division Road north to a road that would be constructed on the spoil bank north of the Lead Lake bypass canal for about 1 mile, then continuing west along Center Road and south along West County Road to the visitor facility. The section around Lead Lake would be closed during the hunting season to provide adequate protection for waterfowl.

One or two canoe trails for wildlife observation would be established in Goose Lake, which would be open all year.

Option 2: Under this option, a one way all weather tour route would be developed from the visitor facility, transecting Hunter Road and proceeding east along the water delivery canal and veering southeast through a point between Upper and Lower Foxtail Lakes, then southwest along the east side of Upper Foxtail to Stillwater Point Reservoir. From this point, visitors could exit the refuge via Stillwater Road or could travel north along Hunter Road and return to the visitor facility (Map 3.7).

This tour loop, which would make use of existing roads, would be closed to the public during the hunting season. At this time, all or a portion of the tour loop could be opened for guided tours or environmental education classes. The tour loop could also be opened at the Project Leader's discretion during periods of low hunting pressure.

Nonmotorized boating would be allowed year round in Lead Lake.

Interpretation of refuge resources along the tour route under both options would be accomplished by placing markers at vantage points for viewing wildlife and important habitat, geologic, and cultural features. Cassette tapes and brochures would describe these resources of interest, as well as wildlife that might be seen at the site. Under Option 2, additional kiosks would be strategically located to provide information on local wildlife, vegetation, and cultural resources as well as management practices.

A trail at the Timber Lakes area would be developed to facilitate wildlife viewing and photography. The trail would be designed to minimize disturbance to nesting species during the spring and bald eagle roosting during the winter. This could be done by altering the trail route each season and by providing an interpretive sign that designates the current route and explains why changes and closures are needed.

An accessible trail would be designed along the Carson River near the new refuge entrance to facilitate wildlife viewing and photography of riparian species. An accompanying leaflet depicting trail route and location as well as resident and migrant bird species would be developed.

A wildlife observation site would be developed at the eastern end of Cattail Lake just off of Division Road in Option 1 (Map 3.6), and in Option 2 (Map 3.7), off the north side of the tour loop overlooking Lower Foxtail.

Monitoring Elements: Number, type, and location of facilities constructed, and response by refuge visitors, e.g., number of visitors using each of the facilities (e.g., tour loop, Dry Lake wildlife viewing trail, boardwalk) by season.

Objective C.c.2: Provide opportunities for high quality experiences in wildlife photography.

Basis of Objectives: Providing facilities for viewing wildlife (e.g., roads, pullouts, observation sites) is important for providing high quality viewing opportunities. Achievement of this objective would provide the public with the opportunity to view wildlife and the relationships between resource management, wildlife, and habitat, and people.

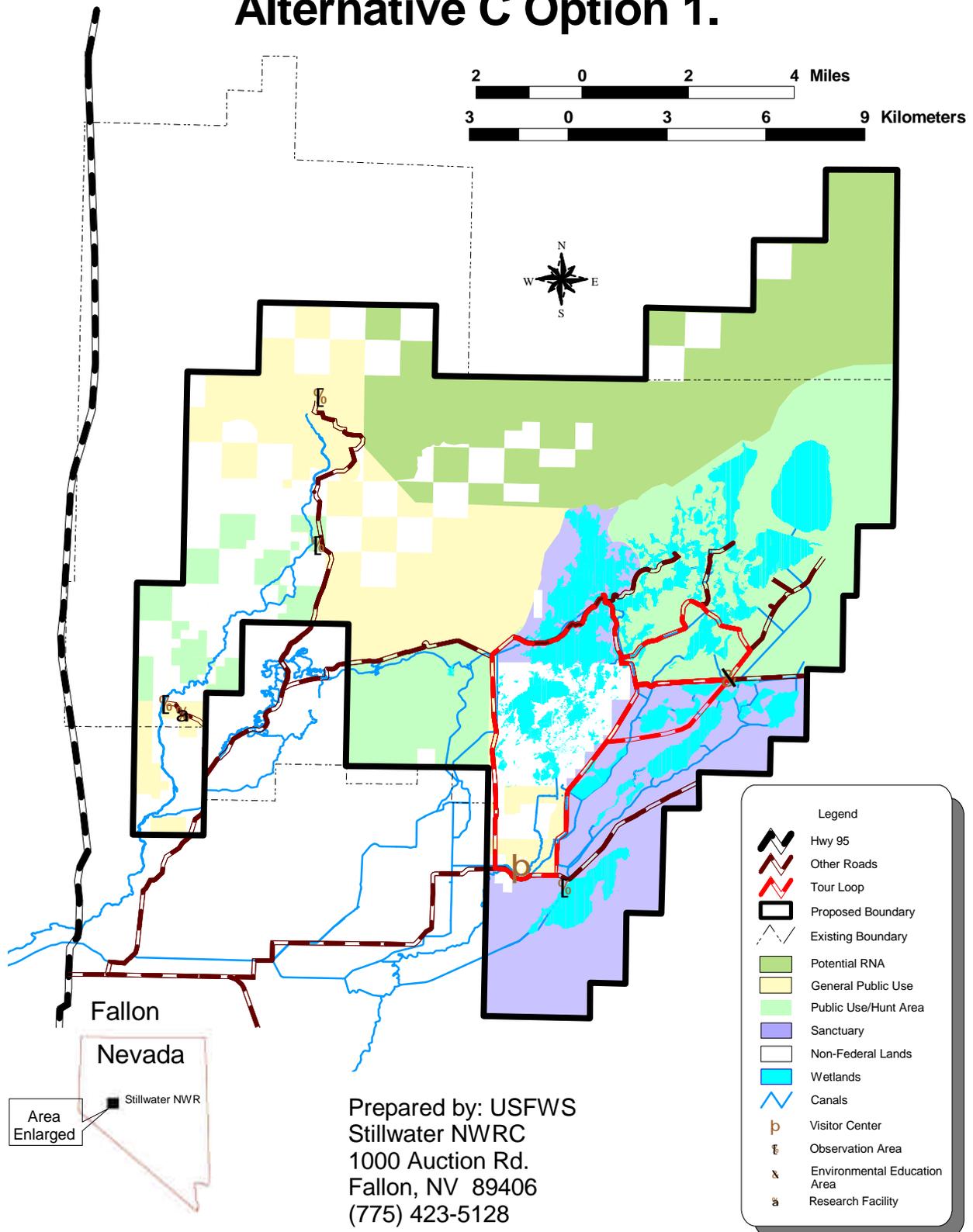
Strategies to Achieve Objectives: In addition to strategies under Objective C.c.2, the following would be undertaken specifically for photography. Temporary or permanent photography blinds would be strategically located. Their placement and construction would be done so that the blinds are unobtrusive to provide maximum opportunities. Use of blinds would require a special use permit.

Monitoring Elements: Number, type, and location of facilities constructed, and response by refuge visitors, e.g., number of visitors using each of the facilities (including those under Objective C.c.1) by season.

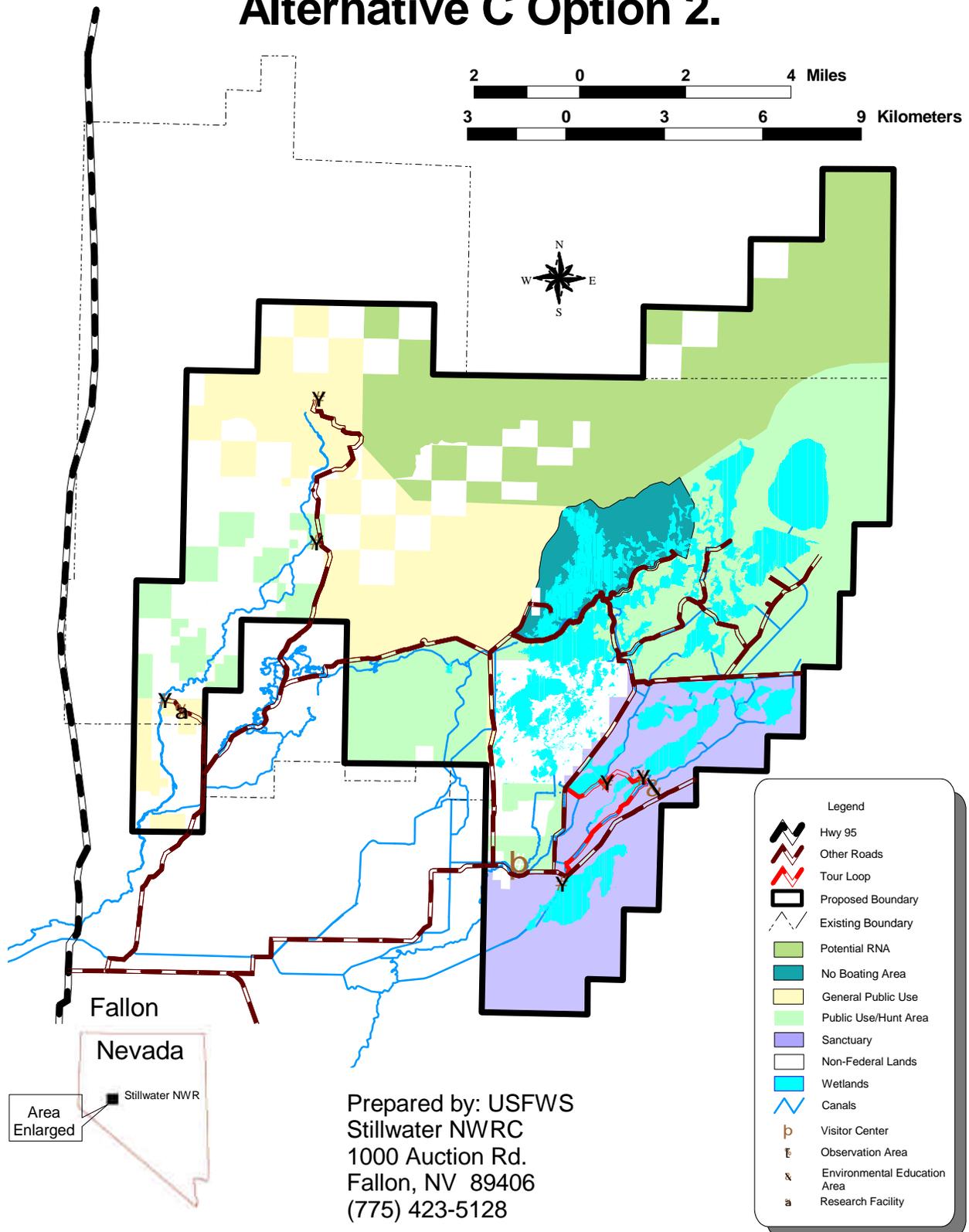
Subgoal C.d: Encourage and provide opportunities for research by other agencies (e.g., USGS, Agricultural Research Service), universities, and other institutions, especially as they relate to the management goals and objectives of Stillwater NWR.

Basis of Subgoal: As one of the purposes of Stillwater NWR, it is clear that importance is placed on the need for providing opportunities for scientific research. Furthermore, it is the policy of the Service to encourage and support research and management studies that provide additional scientific data upon which to base decisions regarding management of units of the refuge system (4 RM 6). Research is key to sound resource management.

Map 3.6 - Stillwater NWR Public Use Zones Alternative C Option 1.



Map 3.7 - Stillwater NWR Public Use Zones Alternative C Option 2.



By providing research opportunities to universities, colleges, and other institutions, the education of students pursuing wildlife, archaeological, or other degrees is enhanced (Subgoal C.b), and the information they provide the refuge on wildlife habitat relationships, the Cattail-eater culture, and other topics further facilitates environmental education and interpretation (Subgoal C.b) and wildlife conservation (Goals A and B). One of the objectives of supporting research in the Refuge System is to provide students and others with the opportunity to learn the principles of field research (4 RM 6).

Objective C.d.1: Foster relationships with government agencies, conservation groups, and institutions of higher education and communicate the most critical research needs of the refuge.

Basis of Objectives: Subgoal C.d addresses research by non Service entities, such as other agencies, universities, colleges, and private institutions and organizations. Therefore, communicating this subgoal to these institutions, followed by ongoing coordination, would be important to its achievement.

Strategies to Achieve Objectives: Partnership opportunities would be actively sought, and unsolicited proposals for research in a variety of disciplines would be considered, including wildlife, public use, and cultural resources. All reports, surveys, and scientific papers generated from such endeavors would be made available to refuge staff and cataloged for future needs. The Service would communicate to these institutions the priority information gaps that the Service is seeking to fill, such as the effects of human activities on wildlife and habitat on Stillwater NWR and other aspects of human and wildlife interactions; the natural composition, structure, and function of the lower Carson River and delta ecosystem; and habitat needs of species of special concern.

Although not necessarily a priority for the refuge, Stillwater NWR would, under this alternative, provide opportunities for studying other wildlife related topics of broader application, such as the effects of removing livestock on salt desert shrub communities (Nevada Chapter The Wildlife Society 1995).

In addition to wildlife oriented research, the Service may also permit the use of the refuge for other investigatory scientific purposes when such use is compatible with the purposes, goals, and objectives of the refuge. Priority would be given to studies that contribute to enhance, protecting, using, preserving, and managing native wildlife populations and their habitat in their natural diversity (4 RM 6).

Monitoring Elements: Number of research projects conducted and participants for each.

Objective C.d.2: Facilities, equipment, and refuge lands would be maintained for potential use by researchers.

Basis of Objective: Providing facilities and equipment would facilitate research by non Service institutions, in support of Subgoal C.d.

Strategies to Achieve Objective: Housing, equipment storage, and use of Service equipment would be provided at the discretion of the Refuge Manager, with priority given to research that furthers the goals and purposes of the refuge.

A research facility would be maintained at the location formerly owned by the Alves family, in the southeastern portion of the refuge along the Carson River. This facility could house researchers and equipment, and could serve as a base of operations.

There are many valuable habitat and wildlife community assets on the refuge. The sand dune ecosystem at the northern end of the refuge holds particular promise, in that it would be designated as a research natural area under this alternative (Maps 3.6 and 3.7).

Monitoring Elements: Inventory of facilities available for researchers, occupancy of research quarters, listing of habitat used during research endeavors.

3.4.C.3 ANAHO ISLAND NWR

3.4.C.3.1 Management Program

Guiding Principles

Guiding principles for Anaho Island NWR would be the same as under Alternatives A and B, except that management efforts would be expanded to maintain and restore the island's natural biological diversity, to the extent that conflicts with refuge purposes are not created.

Goals, Objectives, and Strategies

Objectives for Anaho Island NWR would be the same as under Alternatives A and B, except the following goal and objectives would be added. This goal would be of secondary importance to the primary goal of the refuge (i.e., actions taken to accomplish Goal B would only be done to the extent that they do not conflict with Goal A).

Goal B: Restore and maintain natural biological diversity.

Objective B.1: Restore and maintain a natural composition and structure of vegetation.

Objective B.2: Provide research opportunities to gather information on the other species of birds, mammals, reptiles, invertebrates, and plants present on Anaho Island, and to provide better understanding of the effects of red brome, cheatgrass, and other invasive nonnative plants on native plant communities and possible ways to control these species.

Basis of Objectives: Little information is available on the other species that occupy Anaho Island. An invasion of nonnative plant species has been documented, but its potential effects on the island's native species is not well understood. Cheatgrass and red brome have the potential to significantly alter the vegetative structure on Anaho Island and they may increase the hazard of fire spreading into the colonial nesting areas, which could deleteriously impact colonial nesting species if shrubs are eliminated. Additional information would help guide management of the island.

Strategies to Achieve Objectives: Research needs would be identified and pursued. Options would be explored for controlling cheatgrass and red brome.

Monitoring Elements: Final research reports submitted to the Service; acreage and distribution of plant communities and land cover, distribution and within community composition of cheatgrass and red brome.

3.4.C.4 OTHER PROGRAM AREAS

The management of other programs would be managed out as described under Alternative A, as modified in Alternative C, and as further noted below.

3.4.C.4.1 Partnerships and Other Cooperative Efforts

The guiding principles and strategies would be similar to those described under Alternative A, except that the following would be added. Members of the Fallon Paiute-Shoshone Tribe would be allowed periodic access to designated areas, for the purpose of conducting religious ceremonies or to teach their traditional ways. These areas would be delineated in an MOU, to be signed by the Tribe and the Service, and would be covered by a special use permit.

Under Alternative C, the Service would enter into an agreement with the U.S. Navy (Naval Air Station Fallon) to the effect that the 3,000 foot ceiling over Stillwater NWR would remain along the existing northern boundary of the refuge and would not include the additional 26 sections that would be added between the existing boundary and the Bravo 20 Bombing Range under this alternative.

3.4.C.4.2 Fire Management

The guiding principles, goals, objectives, and strategies of the fire management program would be the same as outlined under Alternative A, except that “and farm” would be added to Objective 4, and an objective would be added to use prescribed fire as a management tool to simulate natural ecological processes.

3.4.B.4.3 Other Public Uses

Guiding Principles

Nonwildlife-dependent public uses would not be promoted nor encouraged on Stillwater NWR, but may be permitted if they are found to be appropriate and compatible with refuge purposes and the Refuge System mission.

Strategies

Horseback riding would be permitted on open roads only and as outlined in a compatibility determination. A draft compatibility determinations is included in Appendix O. Other nonwildlife-dependent uses would not be permitted on the refuge until they are determined to be appropriate and compatible. A cooperative effort would be sought to provide camping opportunities during the nonhunting season through the Fallon Paiute-Shoshone Tribe, Bureau of Land Management, the City of Fallon, Churchill County, or private organizations with land near or adjacent to Stillwater NWR.

3.4.C.4.4 Cultural Resources Management

Guiding Principles

Under Alternative C, the goal of the cultural resource management program would be to manage cultural resources for the benefit of present and future generations. Almost all management activities that disturb the ground at Stillwater NWR and Fallon NWR invoke the National Historic Preservation Act (NHPA). However, cultural resource management would be more than simple compliance to the law. Several other laws, refuge needs, and Service policy compel a proactive approach to cultural resource management at Stillwater NWR and Fallon NWR. The Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and Section 110 of the NHPA call for an active cultural resource program. Ways to increase our understanding of the Cattail-eaters culture would be explored with the Fallon Paiute-Shoshone Tribe and the Region's Cultural Resources Team. This would include funding sources. Stillwater NWR and the surrounding Lahontan Valley have a strong tradition of archaeological and ethnographic research, and this would be continued. The local Fallon Paiute-Shoshone Tribe has maintained a vital interest in its traditional culture and archaeology.

In addition to providing information about the local Tribe, environmental data contained in archaeological sites have contributed to our understanding of the natural ecological processes and biological diversity of the Stillwater area. This information was used in ascertaining natural ecological conditions prescribed in draft Goal 1 of Stillwater NWR.

Given the fragile and nonrenewable nature of archaeological resources, a cultural resource management program would include development and implementation of programs and activities for cultural resource education and interpretation on Stillwater NWR. Increased emphasis would be placed on interpreting cultural resource information to refuge visitors, including educating the public of the need to preserve cultural resources. Interpretation of cultural resources can be integrated with Goal 3 of Stillwater NWR, to provide opportunities for scientific research, environmental education, and wildlife oriented recreation. By sharing knowledge of the Northern Paiute legacy at Stillwater Marsh, the Service would contribute to the development of partnerships in historic and wildlife conservation.

Reconnaissance surveys at Anaho Island NWR have failed to identify any significant prehistoric cultural resources (archaeological sites). However, Anaho Island figures prominently in the spiritual beliefs of the Pyramid Lake Paiute Tribe. Given the limited access to the island by visitors (it is closed to public access) and the largely passive management of the land and its wildlife, cultural resource management is not a significant issue at Anaho Island NWR.

Goals, Objectives and Strategies

The objectives for achieving the cultural resource management goal, which is to manage cultural resources for the educational, scientific, and cultural benefit of present and future Americans, are as follows.

Objective 1: Preserve archaeological resources for present and future cultural and scientific research.

Objective 2: Preserve cultural resources to contribute to the Service's trust responsibilities to the Fallon Paiute-Shoshone Tribe.

Objective 3: Conduct archaeological research to further refuge management goals.

Objective 4: Implement programs and activities for cultural resource education and interpretation.

Objective 5: Provide opportunities for the Fallon Paiute-Shoshone Tribe to learn about and enhance their traditional cultural heritage in the Stillwater Marsh.

Strategies to achieve these objectives would include the following. The Service would take all necessary steps to comply with applicable laws and policies pertaining to the protection of cultural resources. Beyond compliance, the following strategies would be carried out to the extent that available funding and staffing would allow. It would require the addition of an archaeologist to the refuge staff, as proposed under this alternative. Refuge staff would assist Region One's Cultural Resources Team to locate and secure funding to implement the strategies that would require funding above base funds.

Several strategies would be carried out to achieve Objectives 1 and 2: to "Preserve archaeological resources for present and future cultural and scientific research," and to "Preserve cultural resources to contribute to the Service's trust responsibilities to the Fallon Paiute-Shoshone Tribe." A program would be established to monitor archaeological sites to record deterioration from erosion and vandalism, and to identify sites in need of special protection from erosion. Targeted archaeological sites susceptible to erosion could be stabilized with plantings or erosion cloth, as appropriate, and to the extent it is compatible with refuge goals. A plan would be prepared to protect and salvage data from archaeological sites in the event of serious flooding of cultural resources.

Cultural resource data would be incorporated into road planning and maintenance. For instance, existing roads that conflict with cultural resource preservation would be identified. Locations where barriers, guard rails or other devices could be installed to prevent off road vehicle traffic and to otherwise protect cultural resource sites would also be identified. This information would be used in deciding whether to close certain roads. Roads to be closed permanently would be targeted, as would roads to be closed or monitored in the event of flooding that expose considerable cultural resources. Sensitive archaeological areas and procedures for avoiding these areas during refuge projects, hunting programs, and other public use activities would be identified. Cultural resource site locations and elevations would be incorporated into the refuge Geographic Information System (GIS) database so that managers would have easy access to such

data to determine the effects of refuge management activities on cultural resource protection, including water management.

A component of the program would be to identify, in various wetland units, water elevations above which archaeological sites could suffer erosion. This information could then be forwarded to water managers, so that they would have access to this information when making water management decisions. The information could also be used in deciding whether particular sites especially susceptible to erosion should be stabilized with plantings, erosion cloth, or other means. Before plantings or other erosion control measures are undertaken, compatibility with habitat objectives would be assessed.

An-Adopt-A-Site program, to monitor selected archaeological sites, would be promoted and implemented given sufficient interest. Refuge law enforcement officers would be trained in the implementation of the Archaeological Resources Protection Act and cultural resource protection, and the Service would coordinate with law enforcement personnel in other agencies and Tribes to provide a law enforcement presence for cultural resource protection. Service law enforcement personnel would attend specific training in cultural resource protection, identification, the Archaeological Resources Protection Act, and Tribal consultations.

Several actions could be taken that would contribute to a better understanding of the northern Paiute culture and the natural ecological conditions of the area. As such, several objectives related to estimating natural hydrologic functioning and the natural composition of plant and animal communities could be achieved, in part, by implementing the following strategies. For instance, environmental data contained in archaeological and geological sites could be recovered and interpreted to provide information on natural biological diversity and ecological processes of the Stillwater wetlands:

1. Research results contained in existing reports, field notes and museum collections could be compiled and synthesized.
2. Research questions could be identified that could potentially be answered by examining archaeological and other environmental deposits on the refuge, and these would be related to other goals and objectives of the CCP.
3. Data could be recovered from archaeological and environmental deposits that contain environmental data identified in other investigations. Surveys for archaeological sites conducted on the refuge should be done in the context of the predictive model (Zeanah 1995).

Opportunities to accomplish cultural resource research with third parties such as universities, volunteers, and museums would be developed. Results of archaeological research would be published in ways that are usable and accessible by scholars and the public. Research of other

cultural resource questions identified in the “Wetland Element” of the *Nevada Historic Preservation Plan* would be encouraged.

Cultural resource education and interpretation would be coordinated with environmental education and interpretation on and off the refuge. For instance, other educational and interpretation programs on Stillwater NWR would be reviewed to assess whether cultural resources could be incorporated into them (e.g., boardwalks, interpretive signs, auto tour route). Classroom presentations on archaeology, prehistory, and conservation would be conducted in the Fallon school district and at Naval Air Station Fallon. A program of guided refuge tours habitat and traditional *Toedokado* use of the wetlands would be developed in concert with other guided tours. Opportunities to provide internships, volunteer opportunities, and modest stipends for researchers, volunteers, and special lab analyses for graduate students would be pursued. Assistance would be sought from local museums and other agencies and institutions in developing displays, exhibits, brochures, and interpretive activities. The refuge would actively participate in Nevada Archaeological Awareness Week.

All cultural resource research, interpretation, education, and preservation would be conducted in consultation with the Fallon Paiute-Shoshone Tribe (and Nevada State Historic Preservation Office as appropriate). The refuge would facilitate opportunities for the Fallon Tribe to learn about and enhance their traditional cultural heritage. These opportunities would be pursued so they remain compatible with refuge purposes. Strategies would include encouraging the Fallon Tribe to identify traditional and sacred places on the refuge pursuant to the sacred Sites Executive Order #13009. The Service would facilitate, under special use permits, visitation and ceremonial activities by the Fallon Tribe at these places, and would protect the sites from adverse effects. The Service would work with the Fallon Tribe to identify cultural items that need treatment according to the Native American Graves Protection and Repatriation Act.

The Service would also work with the Fallon Tribe to facilitate the harvest and use of traditional plant and animal resources. Such harvest and use would be for educational, ceremonial, artistic, and allied purposes necessary to learn about, or enhance, traditional culture. Harvest and use for subsistence and commercial purposes would not be allowed. For example, the Fallon Tribe in consultation with the Service would identify traditional plants and their gathering locations and establish a protocol for their protection, harvest, and use. The Service could also work with the Fallon Tribe to permit them to harvest other traditional resources, such as, rabbits and coots, for educational and ceremonial purposes.

3.4.C.4.5 Monitoring and Research Program

Guiding Principles

Guiding principles would be similar to those described under Alternatives A and B, except more emphasis would be given to monitoring a wider range of species and plant communities.

Strategies

The monitoring program of Alternative A would be revised to more accurately reflect the objectives that would be adopted under this alternative. Adjustments would be needed due to the shift in management direction. Long-term data sets of the existing monitoring program would be evaluated to determine if they should be continued. It is anticipated that most, if not all, long-term data sets would be continued. Under this alternative, monitoring wetland habitat acreage would be conducted quarterly (January, April, July, and October).

Given the focus on biological diversity, additional components would be added to the monitoring program (summarized in Appendix D). The monitoring program would encompass at least two main parts: monitoring representative components of biological diversity and habitat parameters addressed in refuge objectives. Because of the many aspects of biological diversity, a hierarchical system would be adopted. Of most importance would be the monitoring of species richness in each major phylum, although this would not have to be done each year. Species observed would be compared to native species richness. Monitoring the relative abundance of representative species within each phylum would also be undertaken.

With respect to habitat management, quarterly monitoring of wetland habitat acreage would be the most critical factor. Next in importance would be monitoring the relative mix (in acres) of habitat types within marsh, riparian, upland, and farmland areas. As part of this effort, the distribution of nonnative dominated communities and riparian communities would be tracked. Within community composition and structure would also be monitored, emphasizing marsh, riparian areas, and revegetated areas.

In addition to the core biological monitoring program, additional emphasis would be placed on monitoring the effects of all recreational activities and management techniques that involve commercial uses (for example, livestock grazing and muskrat trapping). In particular, a monitoring program would be designed to assess whether a sufficient amount of high quality habitat is being provided in secure areas (free of human disturbance or of limited disturbances) for waterbird breeding, feeding, and resting.

Public use monitoring would include the components listed in Alternatives A and B, except that there would be an improved method for determining what percent of road use results from refuge vehicle travel. Volunteers or staff members would monitor all vehicles entering and exiting the refuge on a monthly basis to assess a more accurate accounting of how many persons per vehicle should be assumed. This method would coincide with a national standard for assessing visitation. These numbers would be correlated with wildlife monitoring numbers to assess level of human disturbance. Appendix D describes the public use monitoring program of this alternative.

3.4.C.4.6 Budget and Administration

Several projects have been identified for implementation under Alternative C. The largest would be a refuge administrative complex which would include a visitor facility and maintenance shop, an estimated \$4,687,200 under this alternative. Other projects include development of additional public use facilities such as auto tour routes, nature trails, observation areas and interpretive signs, an estimated \$8,111,100 under Option 1 of this alternative and an estimated \$3,602,700 under Option 2. Total capital costs of the water rights acquisition program are presented in the WRAP EIS (USFWS 1996a). Funding for these projects varies greatly depending on Congressional appropriations and the refuge's ability to obtain special project funds from sources such as grants, and Transportation Equity Act funds and, therefore, predicting the actual "nonsalary" funding is difficult.

The projected annual costs of managing the Stillwater NWR Complex under Alternative C would be an estimated \$3.4 to \$3.6 million per year (Option 1) or \$3.3 to \$3.4 million per year (Option 2) upon completion of the water rights acquisition program. Projected annual expenditures include salaries; refuge operation and maintenance costs; water delivery and operation and maintenance charges; refuge revenue sharing payments; and water rights leasing costs. Annual expenditures related to the water rights acquisition program were discussed in Section 3.3.1.1, Features and Assumptions Common to all Alternatives. Refuge salaries and operations and maintenance costs would be an estimated \$1.7 million per year under this alternative.

Refuge staff under Alternative C would be similar to Alternative A, except two additional positions would be added: a park ranger (GS-9 law enforcement) and an Archaeologist (GS-9/11), bringing the total number of permanent full-time positions to fifteen. An additional term position would also be added: a wildlife biologist (GS-7/9).

3.4.D ALTERNATIVE D

This alternative would stress restoring natural ecological processes to restore a natural diversity of wildlife and habitats. In particular, the natural hydrologic pattern would be replicated using water acquired through the Service's water rights acquisition program. Other ecological processes would be permitted to operate unabated, and efforts would be made to allow natural restoration to occur. Large acreages of wetland habitat would be provided during the spring and early summer. Declining water levels during the late summer and fall would greatly benefit fall migrating shorebirds. Monitoring species of special interest, especially those identified as priority species in international bird conservation plans, would provide a check on management to determine whether the needs of these and other species are being adequately met.

The Alternative D boundary revision would most significantly add an 18 mile stretch of river riparian habitat along the lower Carson River, a 21 mile long dune complex, and the lower portion of the Humboldt Slough where it enters the Carson Sink, thereby encompassing the junction of the Carson River and Humboldt River systems within the boundaries of the refuge. The contiguous portion of Fallon NWR, encompassing much of the Carson River delta, would be incorporated into Stillwater NWR, as would a vast area of salt desert shrub that is now in the Stillwater WMA.

Under this alternative, opportunities for nonconsumptive wildlife-dependent recreation would be enhanced considerably over existing conditions. The environmental education program would be enhanced and several areas for wildlife observation and environmental interpretation would be developed. Under this alternative, the Service would strive to balance opportunities for wildlife-dependent recreation. Waterfowl hunting would remain part of the program, but it would not receive as much emphasis as it did in the past. Cultural resource management would become a proactive program under this alternative.

Anaho Island NWR would continue to be managed much as it has in the past, with an emphasis on protecting the nesting colony of American white pelicans and other colony nesting birds that use the island. Monitoring would continue.

3.4.D.1 BROAD MANAGEMENT DIRECTION

3.4.D.1.1 Refuge Purposes

The purposes of Stillwater NWR and Anaho Island NWR would be the same as they would be under Alternatives B and C (noting that Fallon NWR would not exist under Alternative D). As with Alternative C, the original intent of establishing Fallon NWR would be carried on by adding the original purpose to the other purposes of Stillwater NWR for a Fallon Unit: i.e., to provide a sanctuary and breeding ground for migratory birds and other wildlife. Other provisions of Executive Order 5606 would also comprise management standards for the Fallon Unit.

3.4.D.1.2 Refuge and Program Goals

The goals of Stillwater NWR and Anaho Island NWR, and program goals would be the same as they would be under Alternative C. These goals are also repeated in appropriate sections that follow.

Other Program Areas

Several other programs would be maintained or enhanced under Alternative D. As yet, goals have not been established for these programs. The programs identified below are described in more detail later:

- Partnerships and Other Cooperative Efforts
- Water Rights Acquisition and Land Disposal Program
- Fire Management
- Monitoring and Research Program
- Facilities Maintenance and Safety
- Law Enforcement
- Administration

3.4.D.2 STILLWATER NWR

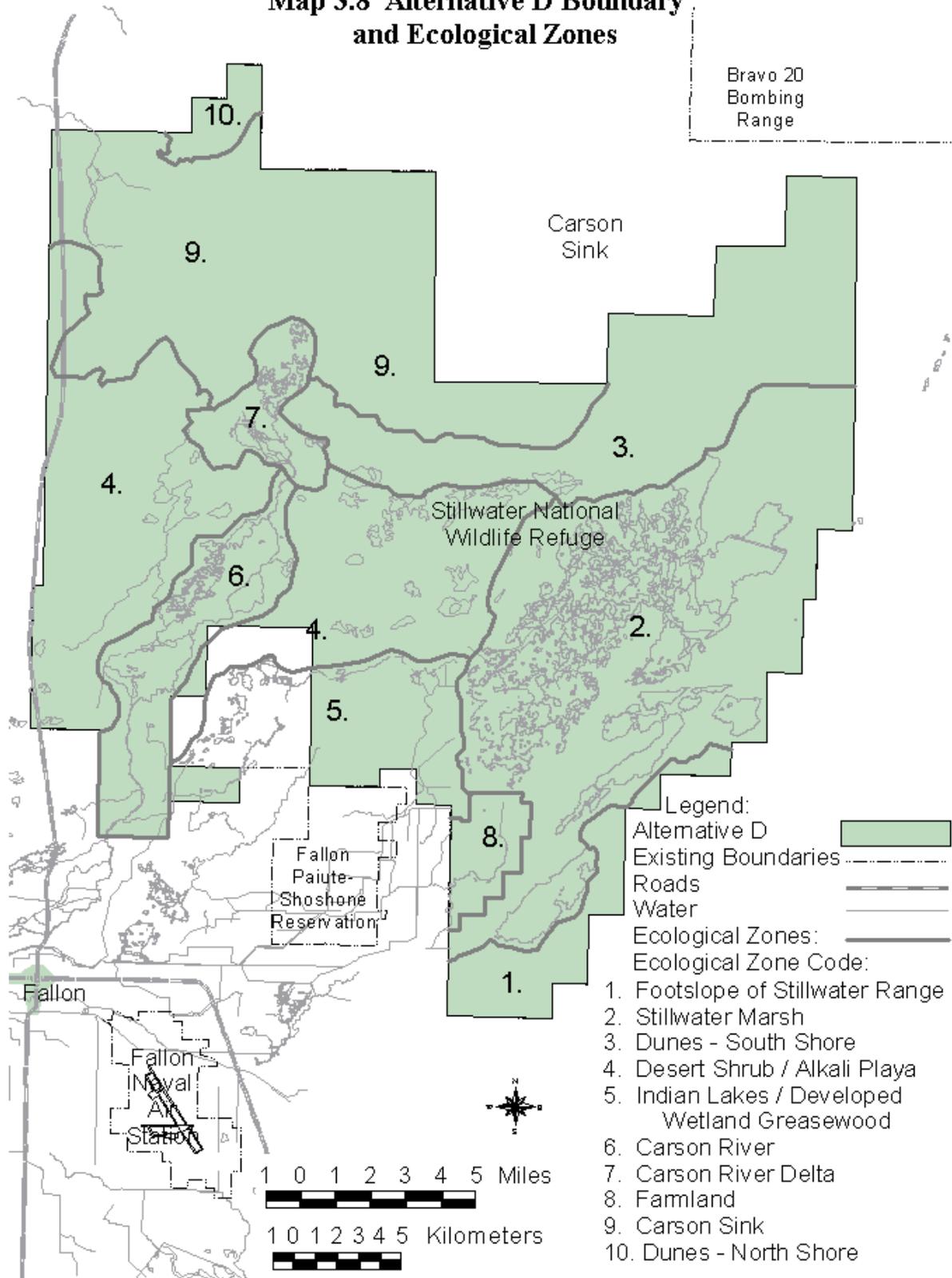
3.4.D.2.1 Boundary

Under this alternative, the boundary of Stillwater NWR would be revised to encompass all of Stillwater WMA (except the Indian Lakes area), Fallon NWR, and the six sections south of Stillwater WMA along the Carson River and the 26 sections north of Stillwater NWR that were identified in Alternative C (Map 3.8). This would provide opportunities for restoring and maintaining the natural biological diversity associated with the lower Carson River and its delta, the sand dune complex along the southern edge of the Carson Sink, and salt desert shrub uplands representative of the Carson Desert. This boundary configuration would also provide protection to the place where the Humboldt and Carson Rivers meet in the Carson Sink, considered a critical biogeographical contact point from the standpoint of biodiversity conservation (Charlet et al. 1998). All ecological zones that are now within Stillwater NWR, Stillwater WMA, and Fallon NWR would continue to be represented under this alternative (Map 3.8).

Upon completion of all required environmental analyses, the Service would seek legislation to expand Stillwater NWR to include Stillwater WMA and Fallon NWR to conserve additional riparian and dune habitat. Congressional approval would be required to dispose of any lands now within the Fallon NWR from the Refuge System.

As part of this alternative boundary revision, it would be proposed that the name and designation of Fallon NWR be rescinded, and that all of Fallon NWR be added to Stillwater NWR. The

Map 3.8 Alternative D Boundary and Ecological Zones



Bureau of Reclamation's primary withdrawal on these lands, as well as those in the Stillwater WMA, would have to be rescinded and replaced with a primary withdrawal by the Service.

It is possible that the Indian Lakes area will be transferred to Churchill County and subsequently to the City of Fallon, as authorized under subsection 206(g) of P.L. 101-618. The eight southernmost sections within this alternative's boundary revision, just north of the Fallon Paiute-Shoshone Indian Reservation is proposed for addition to the Stillwater NWR to the extent that it is not added to the reservation (Map 3.8). The Fallon Paiute-Shoshone Tribe has been exploring options for expanding the boundary of the reservation into this general area.

The existing 1987 memorandum of understanding with the U.S. Navy would be revised to reflect that the northward extension of the boundary toward the Bravo 20 Bombing Range would not result in the 3,000 foot ceiling being moved. The northern boundary of the 3,000 foot ceiling would remain at the northern limit of the existing, P.L. 101-618 boundary of Stillwater NWR. The designations of Stillwater WMA and Fallon NWR would no longer exist under this alternative.

3.4.D.2.2 Management Program

Goals, subgoals, and objectives of Stillwater NWR are long-term in nature; some could be achieved and maintained within a few years, whereas others may require several decades to accomplish. One driving force behind many of the wetland related subgoals and objectives is the completion of the water rights acquisition program, which, although it could possibly be completed within 15 years, could take 20 years or more to complete. Furthermore, restoration of the composition, structure, and functioning of riparian communities would take longer than 15 years. Goals and objectives are presented in the long-term because of the difficulty in estimating what can be accomplished within the 15 year planning horizon, and, more important, because long-term, eventual goals and objectives are needed to adequately show the direction of management. Fifteen year objectives must be developed within the context of long-term goals and objectives. Chapter 4 identifies the estimated progress that would take place toward meeting long-term goals and objectives. The CCP, when completed, will identify 15 year objectives, as well as long-term goals and objectives.

This section is divided into two main parts: (1) Native Fish, Wildlife, and Vegetation Conservation; and (2) Public Use Management. For each of these parts, guiding principles, the refuge goals (identified earlier), subgoals, objectives, and strategies are outlined.

3.4.D.2.2.1 Native Fish, Wildlife, and Vegetation Conservation

Guiding Principles

The guiding principles under this alternative are similar to those of Alternative C, except for the differences noted below. A strict interpretation of biodiversity conservation principles would be

undertaken as part of this alternative. Figure 3.1 illustrates one of the ways in which the objectives of this alternative differ from the objectives developed for other alternatives.

This alternative would assume that, by mimicking natural hydrologic patterns and other natural processes, the best possible approximation of natural biological diversity would result. With respect to hydrology, this alternative would focus on approximating natural *patterns* of water flow into and through the marshes as opposed to the *conditions* these flow patterns produced under natural conditions. One exception to this is that Alternative D would give greater emphasis to natural geomorphology and topography than would Alternative C. No adjustments would be made to the natural hydrologic patterns to reduce nest flooding (resulting from mimicking hydrologic patterns with a significantly reduced water supply) or to provide additional habitat during the fall and winter for waterfowl and waterfowl hunting. These are the major differences as compared to Alternative C.

Goals, Objectives and Strategies

The goals, subgoals, objectives, and their rationale under Alternative D would be the same as they would be under Alternative C, except the following additions and replacements. The numbering system was kept the same to help in comparisons with Alternative C. The following goals and subgoals are the same as Alternative C, and many of the objectives are the same. Several objectives were modified or deleted. Strategies that would be undertaken under Alternative D are described, except where they would be the same as under Alternative C.

Goal A: Conserve and manage fish, wildlife, and their habitat to restore and maintain natural biological diversity.

Subgoal A.a. Approximate natural diversity within and among animal communities on Stillwater NWR.

As under Alternative C, this subgoal and accompanying objectives would be achieved primarily through strategies outlined under Subgoals A.b and A.c. In other words, wildlife would be managed in large part through managing their habitat. The boundary revision proposed under this alternative would also contribute to the accomplishment of this subgoal and objectives. Migratory waterbirds and neotropical migratory birds are important components of the area's natural biological diversity. Several population and use level objectives have been identified for some birds and groups of birds at the flyway, regional, state, and local levels in international bird conservation plans, including the Intermountain West Joint Venture Implementation Plan (Intermountain West Joint Venture 1995) and Nevada Partners in Flight Bird Conservation Plan (Neel 1999). Although population or use level objectives would not be established for Stillwater NWR under Alternative D, objectives and strategies under Goal A would generally support the population targets identified in the bird conservation plans.

Except for a revised Objective A.a.2, the objectives would be the same as the corresponding objectives outlined under Alternative C. The strategies differ to some degree.

Objective A.a.1: Restore and perpetuate the presence of all native species and native guilds of birds, mammals, reptiles, amphibians, fish, and invertebrates, according to season (Appendix B).

Objective A.a.2: Restore and perpetuate population levels (or, use level of the refuge) by each species to relative abundances (e.g., rare, uncommon, common, abundant) that would exist under natural conditions, recognizing natural fluctuations in populations.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Strategies would be the same as under Alternative C, except that predator control would not be undertaken except when a species is shown to be at risk and (1) the species impacting the population of another species is significantly more abundant on the refuge than would occur naturally; (2) predation or nest depredation is shown to be a major cause of the species' limited population; and (3) other measures are not timely or feasible. Pesticides would not be used to control carp.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.a.3: Minimize distribution and abundance of nonnative animal species and their prominence in fish and wildlife communities.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Carp and other nonnative fish species would be controlled primarily through water management (e.g., drying of wetland units), but other passive methods would be explored. In carrying out nonnative fish control measures, it would be recognized that white pelicans and other species make heavy use of carp and other nonnative fish as a food source. Therefore, control efforts would not be initiated marsh wide in any given year.
<i>Monitoring Elements:</i> Distribution and relative indication of density or abundance of carp, other nonnative fish, and bullfrogs.

Subgoal A.b: Approximate, within a natural range of variability, a natural diversity within and among plant communities, habitats, and ecological functioning.

Objective A.b.1: Restore and perpetuate the presence of all native plant species (Appendix B) and native plant communities in Stillwater Marsh, Carson River corridor and its delta, Stillwater Slough corridor, dune complex, and salt desert shrub uplands.

Objective A.b.2: Approximate and perpetuate the mix of plant communities and habitat types that would occur on Stillwater NWR under natural conditions — within a natural range of variability — including representation by all native plant communities and habitat types, amount of area occupied by each plant community and habitat type, and the distribution and pattern (shape) of each.

Objective A.b.2(a): Attain and sustain a long-term average of 14,000 acres of wetland habitat on Stillwater NWR, including marsh (palustrine), shallow lake (lacustrine), and riverine wetland habitat as described in more detail below.

<i>Basis of Objective:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Stillwater Marsh (A.b.2(b)):

Objective A.b.2(b)(i): Attain and sustain a long-term average of 13,500 acres of wetland habitat in Stillwater Marsh. (Reference to seasonal acreages in Alternative C was removed for this alternative because the emphasis would be on mimicking the natural seasonal pattern of inflow (Objective A.b.2(b)(iv)) and wetland habitat acreage would be viewed as a result of the natural seasonal flow pattern, rather than an objective for it.) Objective A.b.2(a) identifies the targeted 14,000 acres for the entire refuge.

<i>Basis of Objectives:</i> P.L. 101-618 (Subsection 206(a)) requires that 25,000 acres of primary wetland habitat be maintained in the Lahontan Valley. Of this target, 14,000 acres will be maintained on Stillwater NWR (USFWS 1996a,b), and of this, a long-term average of 13,500 acres would be maintained in Stillwater Marsh.
<i>Strategies to Achieve Objectives:</i> Water rights and water would continue to be secured as outlined in the 1996 WRAP EIS/ROD until it is determined that a long-term average of 13,500 acres of wetland habitat is being maintained in Stillwater Marsh on Stillwater NWR. Acquiring water rights for Stillwater NWR wetlands also supports directives in the Refuge System Administration Act, as amended, to acquire water rights needed for refuge purposes, and strategies identified in the Nevada Partners in Flight Plan and the U.S. Shorebird Conservation Plan, Intermountain West Region. An alternative to the objective of attaining and sustaining a long-term average of 13,500 acres of wetland habitat would be to more closely approximate the natural composition, structure, and functioning of Stillwater Marsh using the volume of water identified in the 1996 WRAP EIS/ROD (USFWS 1996b). Under this approach, the Service could more closely approximate natural biological diversity, but it would be done on a smaller scale (less than a long-term average of 4,000 acres of wetland habitat). Major modifications to water delivery and control facilities would be required, and, more important, this approach would be inconsistent with subsection 206(a) of P.L. 101-618.
<i>Monitoring Elements:</i> At present, the record of decision for the WRAP EIS specifies that wetland habitat acreage will be monitored annually in August. Alternatives to this are being evaluated in this Draft EIS (Section 4.3.3.1). During the surveys, wetland habitat acreage will be determined by the total acreage of the wetted area within wetlands.

Objective A.b.2(b)(ii): This objective of Alternative C would not be included in Alternative D.

Objective A.b.2(b)(iii): Within five years, examine the feasibility and, if appropriate, develop a plan to restore native wet meadow habitat on the properties formerly owned by the Kents and Weishaupt.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Objective A.b.2(b)(iv): Approximate a natural seasonal flow volume pattern, including natural variability among years, by delivering water to Stillwater NWR in the following seasonal proportions of the annual volume of deliverable water (in addition to drainwater flowing into the refuge), ensuring that peak inflow occurs during May.

	<u>Jan-Mar</u>	<u>Apr-Jun</u>	<u>Jul-Sep</u>	<u>Oct-Dec</u>
Low water year	0-15%	70-100%	0-10%	0-10%
Full water year	5-15%	70-90%	5-10%	0-10%
Spill year	10-30%	60-90%	5-10%	0-5%

Objective A.b.2(b)(v): Restore, approximate, design, and maintain physical features of the marsh (e.g., geomorphology, topography, water control facilities) in a way that facilitates natural hydrologic patterns, including one, or more, deeper channels running the length of the marsh (e.g., simulating Stillwater Slough of the Government Land Office maps of the late 1800s and other historic maps).

Objective A.b.2(b)(vi): During peak inflows, attain flow rates of 500-1,000 cfs from one end of the marsh to the other through one primary route (e.g., simulated Stillwater Slough).

Basis of Objectives: These objective and strategies support Objectives A.b.1-A.b.2(a). Mimicking the seasonal pattern of wetland acreage is key to approximating the natural diversity of plants and animals occupying the marsh. Peak acreage under natural conditions typically occurred between April and June, and the low point was generally in August/September.

Objective A.b.2(b)(iv) assumes that mimicking the natural seasonal flow pattern will in large part produce natural habitat conditions and associated wildlife diversity. By tailoring management to achieve the above stated objective, important hydrologic functions would be simulated, such as declining water levels from July through October, rising water levels during the early spring, and to some extent higher springtime flow rates into and through wetland units.

At a regional and flyway level of restoring natural biological diversity, the objective also contributes toward wetland habitat goals and objectives of the Intermountain West Joint Venture, Nevada Partners in Flight, and U.S. Shorebird Conservation Plan Intermountain West Region, especially those dealing with breeding and migration habitat.

Strategies to Achieve Objectives: Strategies would be the same as Alternative C, except for the following: (1) more emphasis would be given to natural geomorphology and topography; (2) efforts would not be taken to ensure that brood habitat remains beyond any point in time (reliance would be on brood survival under natural lowering of wetland units through evapotranspiration); (3) a pool of water would not be held back to control botulism or to sustain wetland habitat into the fall and winter beyond that provided under more natural conditions; and (4) water control structures and other modifications would be made to accommodate up to 1,000 cfs from the upper end of the marsh to the lower end, and the Service would work with the appropriate parties to increase the capacity of canals leading to the refuge to accommodate deliveries of up to 1,000 cfs (as compared to 800 cfs under Alternative C).

Under Alternative D, more effort would be taken to simulate natural flow rates and water depths. For instance, a meandering channel and other modifications to the topography of wetland units would be undertaken, in addition to modifications to water control structures, along a series of wetland units to simulate the effects of Stillwater Slough running the length of Stillwater Marsh under natural conditions (e.g., enhanced water distribution along the length of the marsh). Consideration would be given to doing this along the following route: Tule Lake (assuming a canal connecting it with the West Canal) to (Swan Check) to Pintail Bay to Carson Sink. This would require major modifications.

Water levels would rise beginning in late winter or early spring and continue through May in most years.

Water levels throughout most of the marsh would begin declining starting in June. Declining water levels would proceed through December, January, or February in many wetland units. The strategy of allowing water levels to decline during the late summer and fall would benefit fall migrating shorebirds by concentrating and exposing invertebrates as water levels decline.

In the other wetland units, declining water levels would be curtailed in September or October due to reductions in evapotranspiration and increased inflows. From October through early spring, water levels in most units would rise or would remain constant, and few would experience declining water levels during this period.

Monitoring Elements: Water receipts, wetland inflows by source (e.g., drainwater, deliveries, spill water, groundwater) by month.

Carson River and Stillwater Slough(A.b.2(c))

Objective A.b.2(c)(i): Attain and sustain a long-term average of 50 to 100 acres of riverine wetland habitat on Stillwater NWR.

Objective A.b.2(c)(ii): Restore cottonwood, mesic shrub (e.g., willow, rose, buffaloberry), wet meadow, riverine aquatic communities to their natural distribution and extent along the lower Carson River and Stillwater Slough.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Objective A.b.2(c)(iii): Restore or approximate the natural geomorphology of the Carson River and side channels, and Stillwater Slough to facilitate the approximation of natural hydrologic patterns.

Basis of Objectives: The geomorphology of riverine systems, in combination with hydrology, determine the riverine and riparian habitats that can be produced.

Strategies to Achieve Objectives: The difference between this objective and those under Alternative C is that the above objective focuses on the restoration of geomorphology features as an objective, rather than as a strategy to achieve river and riparian habitat objectives. Strategies for restoring the natural geomorphology and hydrologic functioning of the Carson River and side channels, and of the Stillwater Slough would be developed as a step down management plan. A more detailed assessment would be made of the natural conditions of relevant features, including further examination of archaeological field notes and ethnographies.

A more thorough assessment would be made of the native plant species occurring in the Stillwater area, including a review of existing archaeological reports, field notes, and museum collections, and possibly through additional examination of archaeological deposits. Objective levels of each attribute would be based on estimated natural conditions and the anticipated maximum, minimum, and frequency of surface water flows.

Monitoring Elements: Seasonal acreage of wetland habitat, distribution and acreage of each riparian vegetation type, and riverine geomorphological features.

Carson River Delta (A.b.1(d)):

Objective A.b.2(d)(i): Attain and sustain a long-term minimum average of 400 acres of wetland habitat in the Carson River delta.

Objective A.b.2(d)(ii): During years when water reaches the Carson River delta via the Carson River (spill years), approximate natural habitat conditions (*see objectives under Subgoal A.d., Monitoring and Management Studies*).

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Upland Areas (A.b.1(e)):

Objective A.b.2(e)(i): Restore, approximate, and maintain the natural distribution and abundance of upland plant communities and habitat types that would exist naturally, according to location, throughout upland portions of the refuge (same as Alternative C).

Basis of Objectives: Upland communities are a major component of the Lahontan Valley's biological diversity. Approximating natural vegetation characteristics is key in restoring these communities. The plant communities have been impacted by the introduction of nonnative invasive species and livestock grazing, which in turn has impacted native fauna associated with these habitats.

Strategies to Achieve Objectives: Removing livestock grazing from upland areas on the refuge would be the main strategy for restoring these habitats. Thus, upland areas would be permitted to recover more or less on their own.

Limited efforts may be employed to control nonnative vegetation in localized areas. The approach would be similar to Alternative C, except that herbicides and prescribed burning would not be used under this alternative, and only limited use of mechanical treatments would be used. Native insects, currently found in the area, would continue to provide biological control. Native insects would not be manipulated or moved under this alternative, nor would nonnative insects be introduced for biological control.

All previously farmed areas acquired by the Service within the refuge would be revegetated to native plant communities and no farmland or other agricultural fields would be maintained.

Monitoring Elements: Distribution and acreage of upland habitats types and plant communities.

Objective A.b.3: Approximate, within each habitat type and plant community, a natural species composition; emphasizing the domination of these communities by one or more native species representative of the community (Table 2.2) and reduce, or eliminate, if possible, the number of nonnative species. (Same as Alternative C.)

Objective A.b.3(a): For each habitat type and plant community, determine the approximate proportion that each of the major plant species should comprise within the community, and develop targets based on this assessment.

Objective A.b.3(b): Prevent the establishment of any nonnative species not already present within the boundaries of Stillwater NWR, especially species listed as a noxious weed (e.g., purple loosestrife, Eurasian water milfoil).

Objective A.b.3(c): Curtail the spread of noxious weeds and other nonnative invasive vegetation within Stillwater NWR, and reduce the amount of area dominated by saltcedar and perennial pepperweed, including reducing their composition in plant communities.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Strategies to achieve these objectives would be similar to those outlined for Alternative C, except that: (1) cattle grazing would be eliminated from the refuge and would not be used as a management tool, even for integrated weed management; (2) herbicides would not be used under any circumstances and mechanical treatments would be minimized; (3) fire would not be used except to simulate natural fire.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.b.4: Approximate, within each habitat type and plant community, the vegetative structure of plant communities that would occur under natural operation of ecological processes, such as spring flooding, drought, succession and competition, accumulation of residual plant material, herbivory, seed caching, long intervals between fires, including:

Stillwater Marsh and Carson River delta (A.b.4(a)):

- (i) A natural pattern of emergent vegetation and open water areas in the marsh that is maintained by deeper channels and by disturbances such as spring flooding and muskrat grazing, or secondarily, a mosaic that simulates natural disturbances; and
- (ii) Portions of the marsh having residual vegetation that has accumulated for five years or more.

<i>Basis of Objective:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> The strategies to achieve these objectives would be similar to those of Alternative C, except that muskrat trapping would not be used to control grazing of marsh vegetation, and livestock grazing and prescribed burning would not be used.
<i>Monitoring Elements:</i> Same as Alternative C.

Lower Carson River and Stillwater Slough (A.b.4(b)):

- (i) An overstory of cottonwoods and/or willows along most stretches;
- (ii) An understory of native grasses and grass like plants, forbs, and young cottonwoods and mesic shrubs (e.g., willows, rose, buffaloberry); and
- (iii) Some areas dominated by grasses and grass like plants (i.e., no woody overstory);
- (iv) Carryover of native herbaceous plant material (residual vegetation) from season to season and year to year during most periods, recognizing that spring flooding would naturally have matted some vegetation and induced decomposition, and that fires (late summer or fall) would have been infrequent.

Basis of Objective: Same as Alternative C.
Strategies to Achieve Objectives: Strategies would be similar to Alternative C, except that prescribed grazing and burning would not be used.
Monitoring Elements: Same as Alternative C.

Uplands (A.b.4(c)):

- (i) An overstory of native shrubs in many communities, with some communities having an extensive understory of Indian ricegrass and other native bunchgrasses;
- (ii) Extensive amounts of bare soil between shrubs in many communities;
- (iii) A buildup of residual plant material from native bunchgrasses and forbs, allowed to accumulate naturally over the years (i.e., not grazed or trampled by livestock, crushed by off road vehicles, etc.).

Basis of Objectives: Same as Alternative C.
Strategies to Achieve Objectives: Same as Alternative C.
Monitoring Elements: Same as Alternative C.

Objective A.b.5: Approximate water conditions that would occur naturally, according to location of wetland habitat (i.e., fresh in riverine and the upper end of marsh, and brackish at the lower end of marsh), in a way that contributes toward the approximation and maintenance of the natural extent, distribution, composition, and structure of plant and animal communities.

Objective A.b.5(a): Maintain the lowest possible total dissolved solids levels in all upper Stillwater Marsh (generally <600 mg/L during February-June and <1,000 mg/L during the remainder of the year) and portions of the mid and lower Stillwater marsh that are within the flow route of water through the wetland units (<5,000 mg/L); and simulate other key hydrologic factors of the natural marsh such as large volumes of water flowing through the marsh. Wetlands lower down in the system and off channel areas would at times have much higher levels of total dissolved solids, possibly approaching 100,000 mg/L in some locations.

Objective A.b.5(b): Manage wetland water on Stillwater NWR to maintain concentrations of potentially toxic trace elements below effect levels, identified below, while recognizing that maintaining concentrations below these levels in the refuge’s wetlands may not be attainable in all wetland units (e.g., wetlands lower on the hydrologic gradient) at all times of year (e.g., later in the summer when wetland habitat acreage shrinks), or during all time periods (e.g., regional drought conditions). (See list under Objective A.b.5(b) of Alternative C.)

Objective A.b.5(c): Minimize the amount of mercury entering Stillwater NWR wetlands and reduce mercury levels in wetland sediments and biological tissues to nonhazardous levels.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Subgoal A.c: Allow and provide for natural types, levels, rates, and distributions of biotic processes, such as herbivory, granivory, predation, population fluctuations of resident wildlife, and production; minimize or exclude processes not natural to the area or that are above or outside the levels, rates, locations, or communities that would occur naturally. Exceptions to this include: (1) diseases such as botulism and cholera, which would be minimized; and (2) browsing by deer and other wildlife may be controlled, to allow the reestablishment of native vegetation. (Same as Alternative C.)

Objectives A.c.1. and 2. and strategies

Objective A.c.1: Prevent grazing and browsing by nonnative herbivores above natural levels (use and distribution) for any given plant species and community, and season for these species and communities, and prevent fires in upland areas.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.c.2: Allow native herbivores to graze and browse at natural levels (use and distribution).

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C, except that fewer exceptions would be made for muskrat trapping. Muskrat trapping would only be permitted within 100 feet of dikes, water control structures, and other facilities that could be damaged by muskrats.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.c.3: Prevent excessive depredation of nests or wildlife species when depredation of nests or predation of young or adults poses a threat to the population.

Basis of Objectives: Although predator control would be de emphasized in this alternative, there are emergency situations where it may be needed.

Strategies to Achieve Objectives: Predator control measures would not be implemented unless production of a species of special concern was significantly impaired by predation or nest depredation. In these cases, a targeted program to resolve the immediate threat would be designed and implemented with the appropriate level of NEPA documentation. The least invasive technique available would be used in all such control efforts.

Monitoring Elements: Monitoring would only be undertaken in conjunction with a predator control program.

Objective A.c.4: Prevent human disturbances that would materially affect the use of the refuge by native wildlife, nest success of waterbirds and riparian birds, overall production, daily activity patterns of birds, use of important feeding habitats by waterbirds during migration and winter and the nutritional status of these birds, and other biotic processes.

Objective A.c.4(a): Maintain a minimum of 4,000 acres of sanctuary in a way that ensures that the full range of life history requirements of all major waterbird guilds are contained in the selected areas.

Objective A.c.4(b): Minimize human activity impacts to wildlife in areas outside the sanctuary while still providing opportunities for compatible wildlife-dependent recreation.

Basis of Objectives: Same as Alternative C.

Strategies to Achieve the Objective: Same as Alternative C, except the following differences during the hunting season.

During the hunting season, water flowing into Stillwater Marsh would be apportioned in the following way:

- the first 4,000 acres^A of wetland habitat would be maintained in the sanctuary; and
- each additional 3,500 acres would be distributed as follows, in this order:
 - N general public use area (1,000 acres),
 - N hunt area (2,000 acres), and
 - N sanctuary (500 acres).

The following units would be maintained as year round sanctuary: Stillwater Point Reservoir (except immediately adjacent to the wildlife viewing site and interpretive trail), Upper and Lower Foxtail Lakes, Doghead Lake, Dry Lake, Cattail Lake, Division Pond, and East Alkali Lake (Map 3.9; public use management section). No public access would be permitted in these units year round. The amount of wetland habitat available for flooding in the sanctuary would be about 5,000 acres under this alternative. Areas open for wildlife viewing would provide additional areas that would provide at least some level of security for hunted species of birds. When they have water during the fall and winter, the Carson River corridor and its delta wetlands in the area now encompassed by Fallon NWR would provide additional wetland habitat in a nonhunt area.

Motorized boats (except those powered by electric motors) would not be permitted on the refuge, although nonmotorized boats and boats with electric motors would be permitted in wetland units open to hunting during the hunting season, and two units in the general public use area would be open to limited nonmotorized boat use. All lands and waters that are currently within the Stillwater WMA and Fallon NWR would be closed to hunting. As compared to Alternative C, the West and East Pasture units would not be flooded to mitigate the effects of hunting elsewhere on the refuge.

^A To mitigate possible adverse impacts to waterfowl hunting opportunities in the near term (due to the restrictions identified above), the minimum sanctuary size would be phased in over a period of six years. For the first three years, the minimum sanctuary size would be 2,500 acres of wetland habitat, followed by another three years in which the minimum sanctuary size would be 3,500 acres. After six years, the minimum sanctuary size would be increased to 4,000 acres.

Monitoring Elements: Same as Alternative C.

Subgoal A.d: Fill information gaps with knowledge gained through monitoring, management studies, and research (including archaeological and paleoenvironmental investigations, and assessment of historical records), and assess the effectiveness of management actions and identify needed modifications to the management program. Key information items are as follows.

Objective A.d.1: Within five years, estimate the natural, relative level of abundance of all native species of fish and wildlife within Stillwater NWR (e.g., rare, accidental, uncommon, common, abundant), including natural variability over time.

Objective A.d.2: Design management studies and modify the monitoring program, as needed, to ensure that major components of biodiversity, including key taxa of wildlife and vegetation diversity, are being adequately monitored and to evaluate the effectiveness of management actions undertaken by the Service.

Objective A.d.3: Design and implement baseline inventories of birds, amphibians, aquatic and terrestrial invertebrates (e.g., butterflies), and plants within three years along the lower Carson River and its delta, Stillwater Slough, dunes, and nearby salt desert shrub areas to provide baseline information to assess the effects of habitat restoration efforts, including exclusion of cattle from riparian and upland areas.

Objective A.d.4: Estimate the natural geomorphology, hydrology, and habitat composition of the lower Carson River and its delta in the Battleground area, in a way that recognizes natural year to year variations.

Objective A.d.5: Estimate the natural composition, structure, and distribution of upland plant communities, and design and implement an inventory to determine the existing conditions of these parameters.

Objective A.d.6: Assess whether the adopted sanctuary and other areas managed to provide security for waterbirds are of sufficient size, encompass adequate breeding habitat for waterbirds and feeding and loafing habitat for migrating and wintering waterfowl; and whether an adequate amount of secure habitat is provided.

Objective A.d.7: Ascertain whether Nevada viceroy and Carson wandering skippers (butterflies) inhabit Stillwater NWR, and determine more precisely their habitat requirements.

<p>Basis of Objectives: Additional information is needed to achieve refuge goals, subgoals, and objectives, and to assess the effects of Alternative D on particular species. Some of the objectives were adopted from the Nevada Partners in Flight Plan (e.g., A.d.7-9), and would also contribute to approximating a natural diversity of wildlife.</p>

<p>Strategies to Achieve Objectives: Specific strategies would be outlined in a biological monitoring program for Alternative C (Appendix D).</p>
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<p>Monitoring Elements: Completion of investigations and tracking of monitoring efforts.</p>

Goal B: Contribute toward the fulfillment of obligations of international treaties and other international agreements with respect to fish and wildlife.

Under Alternative D, it would be assumed that this goal would be accomplished to the extent that Goal A is achieved; i.e., no additional objectives would be needed to accomplish this goal.

3.4.D.2.2.2 Visitor Services Management

Guiding Principles

Guiding principles would be the same under this alternative as under Alternative C, except uses other than the six priority uses would not be allowed, such as camping, bicycling, off road vehicle use, and horseback riding.

Goals, Objectives and Strategies

All of the subgoals, objectives, and their basis for Alternative D would be the same as Alternative C. The subgoals and objectives are repeated for clarification purposes, but the basis for each of the subgoals and objectives and the monitoring elements are not repeated.

Goal C: Provide opportunities for environmental education and wildlife-dependent recreation that are compatible with refuge purposes and the Refuge System mission.

Subgoal C.a: Provide opportunities for high quality hunting experiences.

Objective C.a.1: Provide opportunities in which hunters would have a reasonable chance of success in uncrowded conditions and would meet the needs of a broad spectrum of users.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objective: Under Alternative D, hunting would be permitted in Stillwater Marsh only, and would be limited to waterfowl and California quail hunting. The hunt program would be maintained in the following areas: West Marsh, Swan Lake, Pintail Bay, North Nutgrass, and Big Water (Map 3.9). At the completion of the water rights acquisition program, it is anticipated that up to about 1,000 acres of the fall and winter wetland habitat in Stillwater Marsh would be consistently open to waterfowl hunting during nonspill years under this alternative. In spill years (one of four years) and years following a spill year, it would be as high as 6,500 acres.

Hunter densities would be monitored in part to maintain relatively low density hunting opportunities now available on Stillwater NWR. “Uncrowded conditions” would be further defined.

Nonmotorized water craft or those powered by electric motors would be allowed in open areas. Opportunities for camping and overnight stays would not be provided on refuge lands. As in Alternatives B and C, a cooperative effort would be sought to provide camping opportunities near the wetlands.

Under this alternative, hunting opportunities for California quail would be allowed during the appropriate season in the hunt area of Stillwater Marsh. Lead shot would not be permitted.

Monitoring Elements: Number of hunters, demographics, feedback on the quality of hunting experience.

Objective C.a.2: Ensure that hunting experiences are safe.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

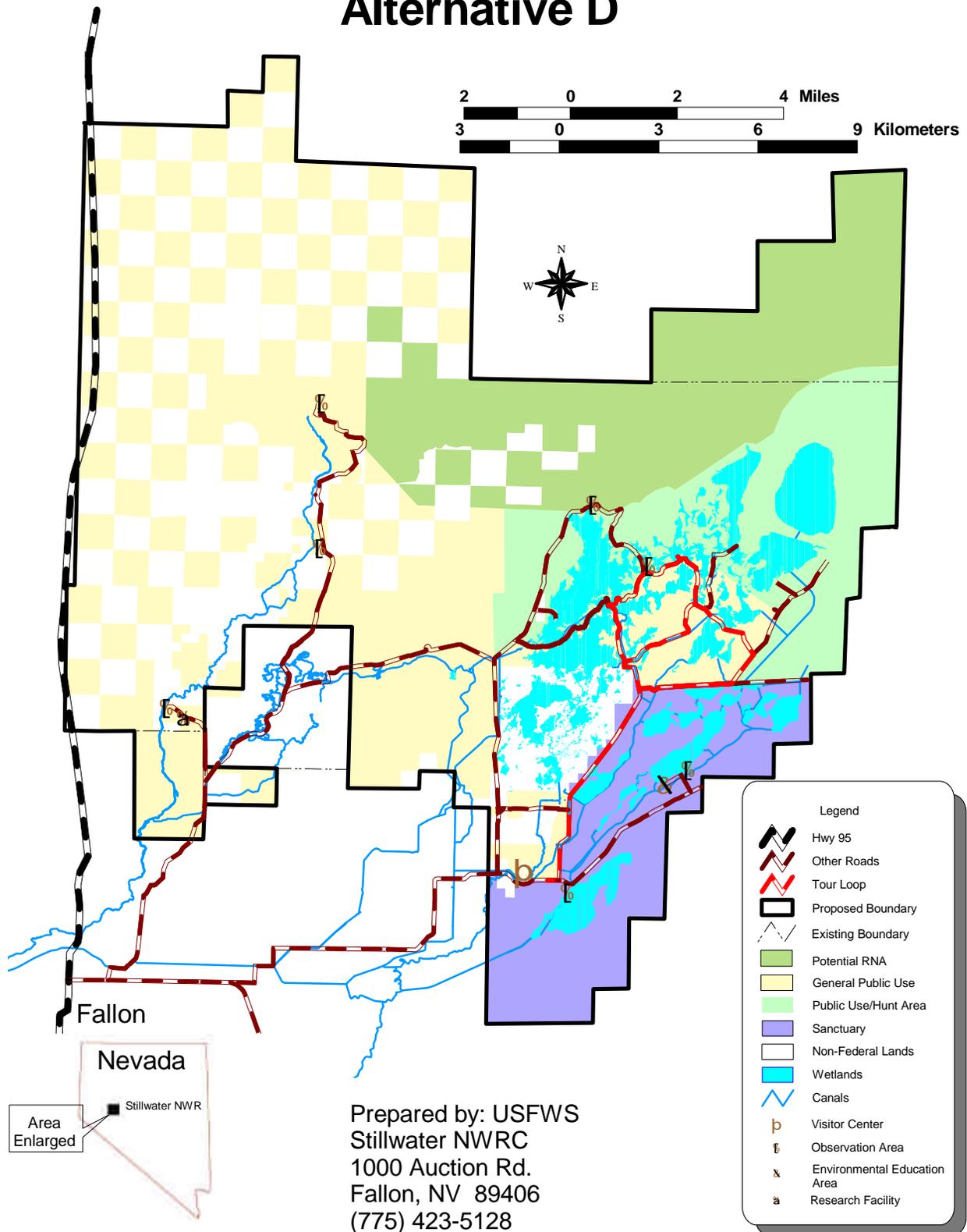
Subgoal C.b: Provide opportunities for environmental education and interpretation that meet requirements of a broad spectrum of users.

Objective C.b.1: Provide adequate facilities, equipment, and staffing for environmental study and interpretation, including facilities within the nonhunt public use area of the refuge.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objective: An accessible two story facility to support environmental education and orient visitors would be constructed at Stillwater Point Reservoir. The second story would provide optimum viewing of the marsh habitat located on and around the Stillwater Point Reservoir. The first story would contain an audio/visual auditorium, two classrooms, interpretive exhibits and storage area. The facility would be staffed with volunteers seven days a week. Interpretive trails and wildlife observation structures would be designed and constructed at the north end of Stillwater Point Reservoir to allow access into the marsh. A portion of the interpretive trail could be shaded to accommodate outdoor study. Parking areas would be improved to accommodate a number of busses and private vehicles simultaneously. The road to this complex would be improved to provide all weather accessibility.

Map 3.9 - Stillwater NWR Public Use Zones Alternative D



The property formerly owned by the Alves family would be developed to provide an increased opportunity for scientific research and on site learning. Existing structures would be evaluated for utility and unnecessary structures removed. A kiosk would be designed and constructed at the Alves property to serve as a trailhead to the riparian area along the Carson River. An accessible trail would be designed with an accompanying leaflet depicting trail route and location and resident and migrating bird species. A site north of the Stillwater Marsh would be equipped with an accessible interpretive trail and viewing structure to overlook the unique system of dunes and the Carson Sink.

Interpretive panels would be developed to help visitors gain an understanding of the natural biological diversity of the refuge and the geologic functions that shaped the natural resources. The kiosk would also provide an explanation of some of the area's cultural history. Similar facilities would be developed at Battleground Point.

At the property formerly owned by the Weishaupt family, an office and maintenance facilities would be constructed. The existing homestead would be retrofitted to accommodate offices, while a new maintenance facility would be developed to the south of the office building capable of housing refuge maintenance vehicles and boats and providing sufficient work area.

The off-site environmental education program would be similar to that described in Alternatives B and C.

Monitoring Elements: Same as Alternative C.

Objective C.b.2: Provide for the needs of students and teachers and make refuge and Service programs available to them.

Basis of Objectives: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Objective C.b.3: Provide adequate interpretation of natural and cultural aspects of the area to satisfy the curiosity, and broaden the awareness, of a wide spectrum of visitors.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objective: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Subgoal C.c.: Provide high quality opportunities for wildlife viewing and photography.

Objective C.c.1: Provide high quality viewing opportunities throughout the distinctive habitats of the refuge.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objective: An all weather auto tour route would be developed from the visitor facility to the interior of Stillwater Marsh. The tour route would be the same as under Alternative B, except that it would also extend around Tule Lake (Map 3.9).

Other roads throughout the refuge would be improved so the public could easily access the entire refuge, from the visitor facility to the dunes, to Timber Lakes and Battleground Point. The interpretation of the tour route would be accomplished by directional signs with occasional information kiosks that point out and describe natural features and wildlife. Two nature trails would be developed along the tour route. The need to close roads during the nesting season would be periodically assessed.

Nature trails would also be developed along the Carson River and in upland habitats. Wildlife viewing trails would be developed at Timber Lakes as in Alternative C.

A cooperative effort would be sought with entities such as those mentioned in the hunting section of Alternative B to provide camping opportunities near Stillwater NWR.

Monitoring Elements: Same as Alternative C.

Objective C.c.2: Provide opportunities for high quality experiences in wildlife photography.

Basis of Objectives: Providing facilities for viewing wildlife (e.g., roads, pullouts, observation sites) is important for providing high quality viewing opportunities. Achievement of this objective would provide the public with the opportunity to view wildlife and the relationships between resource management, wildlife and habitat, and people.

Strategies to Achieve Objectives: In addition to strategies under Objective C.c.2, a photography blind would be designed and constructed near the Lower Foxtail Lake unit to facilitate photographing waterfowl and the great blue heron rookery. To ensure impacts to wildlife are kept to a minimum, access would be allowed by reservation only.

Monitoring Elements: Same as Alternative C.

Subgoal C.d: Encourage and provide opportunities for research by other agencies (e.g., USGS, Agricultural Research Service), universities, and other institutions, especially as they relate to the management goals and objectives of Stillwater NWR.

Objective C.d.1: Foster relationships with government agencies, conservation groups, and institutions of higher education and communicate the most critical research needs of the refuge.

Basis of Objectives: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Objective C.d.2: Facilities, equipment, and refuge lands would be maintained for potential use by researchers.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objective: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

3.4.D.3 ANAHO ISLAND NWR

3.4.D.3.1 Management Program

Guiding principles and strategies for Anaho Island NWR would be the same as Alternative C.

3.4.D.4 OTHER PROGRAM AREAS

The management of other programs would be carried out as described under Alternative A, as modified in Alternative C, and as further noted below.

3.4.D.4.1 Fire Management

Prescribed burning would not be used under this alternative.

3.4.B.4.2 Other Public Uses

The only public uses that would be permitted on Stillwater NWR are those listed in refuge purposes and in the priority public uses identified in the Refuge System Administration Act. Nonwildlife-dependent public uses would not be permitted under this alternative.

3.4.D.4.3 Budget and Administration

Several projects have been identified for implementation under Alternative C. The largest would be a refuge administrative complex which would include a visitor facility and maintenance shop (an estimated \$5,234,500 under this alternative). Other projects include development of additional public use facilities such as auto tour routes, nature trails, observation areas and interpretive signs (an estimated \$6,446,400 under this alternative). Total capital costs of the water rights acquisition program are presented in the WRAP EIS (USFWS 1996a). Funding for these projects varies greatly depending on Congressional appropriations and the refuge's ability to obtain special project funds from sources such as grants, and Transportation Equity Act funds and, therefore, predicting the actual "nonsalary" funding is difficult.

The projected annual costs of managing the Stillwater NWR Complex under Alternative C would be an estimated \$3.37 to \$3.57 million/year upon completion of the water rights acquisition program. Projected annual expenditures include salaries; refuge operation and maintenance costs; water delivery and operation and maintenance charges; refuge revenue sharing payments; and water rights leasing costs. Annual expenditures related to the water rights acquisition program were discussed in Section 3.3.1.1, Features and Assumptions Common to all Alternatives. Refuge salaries and operations and maintenance costs would be an estimated \$1.77 million/year under this alternative.

Refuge staff under Alternative D would be similar to Alternative A, except two additional positions would be added: a park ranger (GS-9 law enforcement) and an Archaeologist (GS-9/11), bringing the total number of permanent full-time positions to fifteen, which is the same as Alternative C.

3.3.4.E ALTERNATIVE E Service Preferred Alternative

Alternative E represents a modified, Alternative C (option 2) approach to managing the Stillwater NWRC. Modifications were made primarily to water management and visitor services objectives based on comments received on the Draft CCP EIS. These modifications all fall within the range of objectives analyzed in Draft CCP EIS Alternatives A through D; however, the objectives presented in Service preferred Alternative E in this Final CCP EIS incorporate elements from all of these Alternatives into a composite Alternative for analysis. Where the objectives and strategies have not deviated from Alternative C, the reader is referred back to Alternative C in this Final CCP EIS. Where the content has been modified in response to comments, the text has been expanded to incorporate all elements of the objective.

Alternative E is the Service's preferred alternative and it would emphasize restoring the diversity of native wildlife and habitats associated with a naturally functioning Great Basin wetland ecosystem while making modifications to provide habitat for key groups of wetland-dependent wildlife in an altered environment. Ecological processes, such as high spring flows, that naturally shaped and maintained this ecosystem would be mimicked, and this overall approach would be adjusted to ensure benefits to native wildlife. Breeding habitat for wetland birds would be emphasized, but fall management would be focused on providing fall and winter habitat. Declining water levels during the late summer and fall would greatly benefit fall migrating shorebirds. Monitoring of species of special interest, especially those identified as priority species in international bird conservation plans, would provide a check on management to ensure that the needs of these and other species are being adequately met.

The Alternative E boundary revision is the same as that proposed in Alternative C and would most significantly add an 18 mile stretch of river riparian habitat along the lower Carson River and a 21 mile long dune complex to the Refuge System. The southern portion of Fallon NWR, encompassing much of the Carson River delta, would be incorporated into Stillwater NWR, as would a vast area of salt desert shrub that is now in the Stillwater WMA.

Under this alternative, opportunities for wildlife-dependent recreation would be enhanced considerably over existing conditions. Although waterfowl hunting would remain an integral part of the program, with uncrowded hunting conditions and a variety of opportunities being promoted, other recreational opportunities including the environmental education program would be enhanced and several areas for wildlife observation and environmental interpretation would be developed. Under this alternative, the Service would strive to balance opportunities for wildlife-dependent recreation. Cultural resource management would become a proactive program under this alternative.

Anaho Island NWR would be managed much as it has in the past, with an emphasis on protecting and monitoring the nesting colony of American white pelicans and other colonial nesting birds that use the island.

3.4.E.1 BROAD MANAGEMENT DIRECTION

3.4.E.1.1 Refuge Purposes

Same as Alternative C.

3.4.E.1.2 Refuge and Program Goals

Refuge goals step down directly from refuge purposes, as influenced by applicable laws, executive orders, and Service policy. For each refuge, they are listed in priority order.

Stillwater NWR Goals

- A. Conserve and manage fish, wildlife, and their habitat to restore and maintain natural biological diversity.
- B. Contribute toward fulfilling obligations of international treaties and other international agreements with respect to fish and wildlife.
- C. Provide opportunities for scientific research, environmental education, and wildlife-dependent recreation that are compatible with refuge purposes.

<i>Basis of Goals:</i> Same as Alternative C.
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Anaho Island NWR Goals

- A. Protect and perpetuate colonial nesting birds and other migratory birds.
- B. Restore and maintain natural biological diversity.

<i>Basis of Goals:</i> Same as Alternative C.
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In addition to refuge goals, which identify what was hoped to be accomplished by establishing the refuges, many refuges have other programs that are peripheral to the core programs (i.e., wildlife and wildlife-dependent recreation). Many of these are integrally related to other parts of the core programs. Goals were developed for two of these programs. Although they do not directly relate to the purposes for which the refuges were established, they are important programs that can contribute indirectly toward the achievement of refuge goals in a number of ways.

Outreach Program Goal

Enhance public awareness of the Service and the Service's mission and role in wildlife conservation.

Basis of Goal: Same as Alternative C.

Cultural Resource Management Program Goal

Manage cultural resources for the educational, scientific, and cultural benefit of present and future Americans.

Basis of Goal: Same as Alternative C.

Other Program Areas

Several other programs would be maintained or enhanced under Alternative E. As yet, goals have not been established for these programs. The programs identified below are described in more detail later:

- Partnerships and Other Cooperative Efforts
- Water Rights Acquisition and Land Disposal Program
- Fire Management
- Other Visitor Services
- Monitoring and Research Program
- Facilities Maintenance and Safety
- Law Enforcement
- Administration

3.4.E.2 STILLWATER NWR

3.4.E.2.1 Boundary

Under Alternative E, the boundary of Stillwater NWR would be revised to encompass much of Stillwater WMA and Fallon NWR, the management and operation of the remaining portions of each would remain under the jurisdiction of the Bureau of Reclamation¹ or public land status (Map 3.10). The revised boundary would also include six sections south of Stillwater WMA along the Carson River and 26 sections north of Stillwater NWR following the chain of sand

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

dunes. This would be done in order to restore and maintain the natural biological diversity associated with the lower Carson River and its delta, the sand dune complex along the southern “shore” of the Carson Sink, and salt desert shrub uplands representative of the Carson Desert. Map 3.10 depicts the ecological zones that would be included within Alternative E’s boundary of Stillwater NWR, as compared to the ecological zones that now exist within Stillwater NWR, Stillwater WMA, and Fallon NWR. All ecological zones would continue to be represented under this alternative.

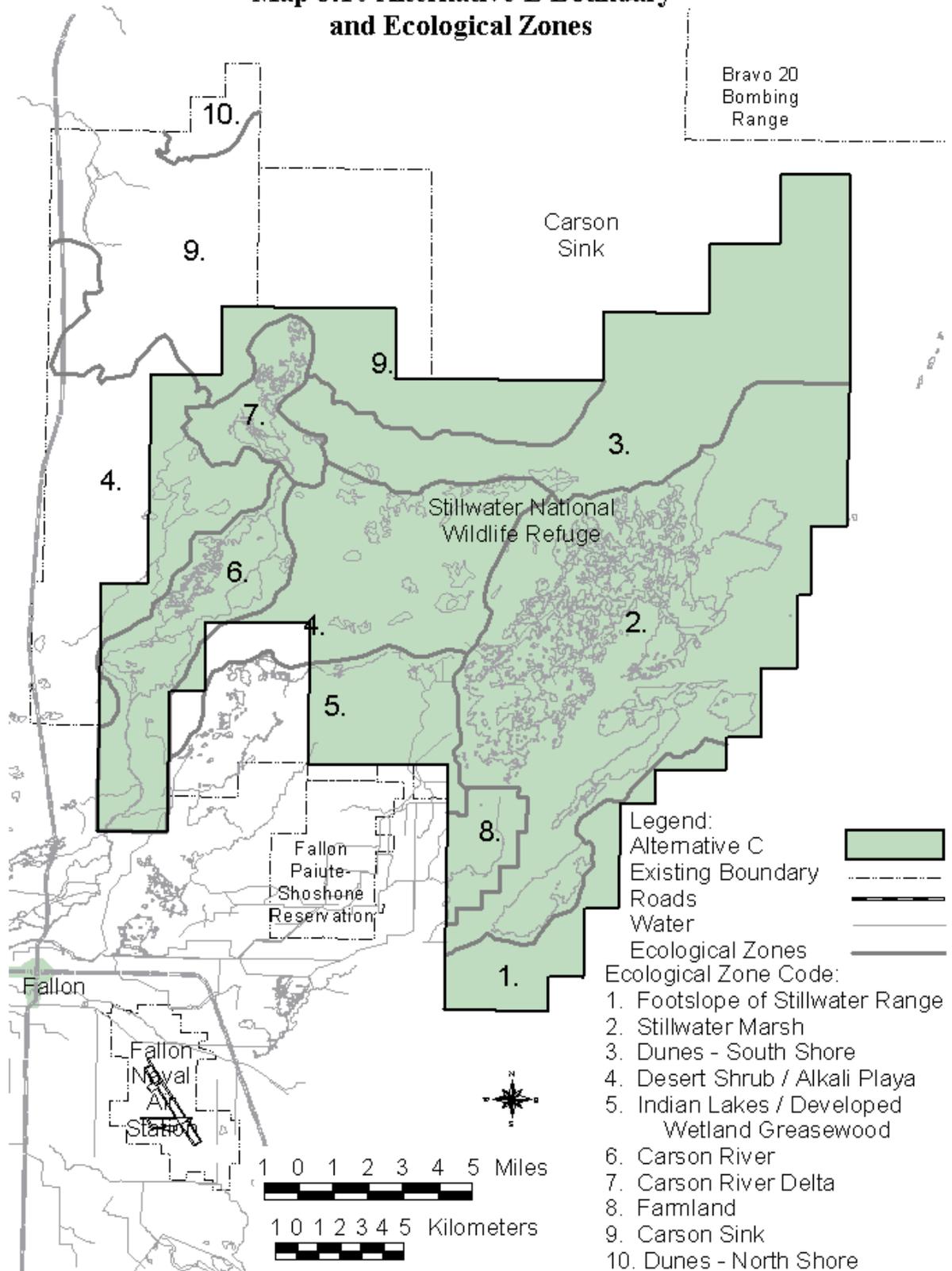
Consistent with Public Law 101-618, the Service intends to recommend that Congress, through special legislation, revoke (1) the wildlife reservation on BOR withdrawn lands on those portions of Fallon NWR identified in this boundary alternative, (2) the name Fallon NWR, and (3) establish the Service with primary jurisdiction on those portions of Stillwater WMA and the former Fallon NWR which the Service proposes to include in the revised Stillwater NWR boundary. The Bureau of Reclamation’s primary withdrawal on these lands would end. The remaining portion of Fallon NWR (those sections not added to Stillwater NWR, totaling about 7,030 acres located in T22N, R30E, alternating sections 2, 4, 6, 8, 10, 14, 16, 18, 20, and 26) would, under this alternative, continue to be withdrawn by the Bureau of Reclamation for Newlands Project irrigation purposes.

The portion of Fallon NWR proposed for disposal from the National Wildlife Refuge System contributes minimally toward its original purposes. These alternating sections of land are located in the Carson Sink and are representative of habitats already well represented within the proposed boundary. The lands comprise less than 5 percent of the Carson Sink. Most of the remaining portion of the Carson Sink consists of public lands withdrawn by the Bureau of Reclamation for Newlands Project irrigation drainage purposes. Disposal of Fallon NWR lands from the Refuge System would require Congressional approval.

Upon the expiration of the 1948 Tripartite Agreement extension, management and operation of the Federal lands within Stillwater WMA not added to Stillwater NWR, will be returned to the jurisdiction of the Bureau of Reclamation or public land status. Possible exceptions include the Indian Lakes area and certain lands north of the Fallon Paiute-Shoshone Indian Reservation. It is possible that the Indian Lakes area will be transferred to Churchill County and subsequently to the City of Fallon, as authorized under subsection 206(g) of P.L. 101-618. The portion of the WMA just north of the Fallon Paiute-Shoshone Indian Reservation that is not proposed for addition to the Stillwater NWR (Map 3.10) is of interest to the Tribe as they explore options for expanding the boundary of the reservation.

The existing 1987 MOU with the U.S. Navy would be revised to reflect that the proposed northward extension of the boundary toward the Bravo 20 Bombing Range would not affect the 3,000 foot ceiling. It would remain at the northern limit of the existing, P.L. 101-618 boundary of Stillwater NWR. The designations of Stillwater WMA and Fallon NWR would no longer exist under this alternative. The boundary of Anaho Island NWR would remain unchanged.

Map 3.10 Alternative E Boundary and Ecological Zones



3.4.E.2.2 Management Program

Goals, subgoals, and objectives of Stillwater NWR are long-term; some could be achieved and maintained within a few years, whereas others may require several decades to accomplish. One driving force behind many of the wetland related subgoals and objectives is the completion of the water rights acquisition program, which, although it could possibly be completed within 15 years, could take 20 years or more to complete. Furthermore, restoration of the composition, structure, and functioning of riparian communities would take longer than 15 years. Goals and objectives are presented in the long-term because of the difficulty in estimating what can be accomplished within the 15 year planning horizon, and, more importantly, because long-term, eventual goals and objectives are needed to adequately show the direction of management. Fifteen year objectives must be developed within the context of long-term goals and objectives. Chapter 4 identifies the estimated progress that would take place toward meeting long-term goals and objectives. The CCP, when completed, would identify 15 year objectives, as well as long-term goals and objectives.

This section is divided into two main parts: (1) Native Fish, Wildlife, and Vegetation Conservation; and (2) Visitor Services Management. For each of these parts, guiding principles, the refuge goals (identified earlier), subgoals, objectives, and strategies are outlined.

3.4.E.2.2.1 Native Fish, Wildlife, and Vegetation Conservation

Guiding Principles

The management of fish, wildlife, and vegetation on Stillwater NWR, under this alternative, would be guided by the following principles.

Habitat Conditions. This alternative would focus on approximating natural habitat conditions as the primary means to conserve and manage the refuge's wildlife, restore its natural biological diversity, and fulfill international treaty obligations with respect to fish and wildlife, with the understanding that events occurring over the past 100 years have substantially altered habitat conditions. The needs of particular species, including species highlighted in regional conservation plans, may be used to adjust management practices where this is deemed necessary and within the general framework established by this alternative. Consistent with the natural swell in springtime wetland habitat, providing spring migration and breeding habitat for wetland birds and other wetland wildlife would be emphasized under this alternative. This would complement the management of other wetland areas in the Lahontan Valley (e.g., Carson Lake), which typically emphasize fall and winter habitat for these birds.

Another principle inherent to this alternative is that natural vegetative structure is an important component of the natural biodiversity in meadow, marsh, riparian, and upland habitats, and it is in short supply in many of these habitats in the Lahontan Valley. In contrast, the availability of shallowly flooded pasture and other areas of short vegetation is abundant in the Lahontan Valley

during the spring. It is acknowledged that native habitat conditions have been altered and that in some instances, nonnative plants have filled niches long since vacated by native species. Because the refuge is operating under reduced water availability which may not allow for producing conditions capable of restoring or supporting native species in some instances, nonnative species occurrence will be allowed. In no instance will invasive species occurrence (e.g., saltcedar, tall whitetop, hoary cress) be considered acceptable.

General Approach to Producing these Habitat Conditions. An underlying principle of refuge management under this alternative is that mimicking natural processes is a fundamental and necessary part of restoring the biological integrity and health of the ecosystem, and its natural biodiversity (USFWS 1999). However, it would be recognized under this alternative that mimicking natural hydrologic patterns with a limited water supply (among other factors, such as occurrence of nonnative plants and contaminants) would not result in the exact habitat conditions that would occur under natural conditions. Although peak wetland habitat acreage would occur during early spring, the natural hydrologic patterns would be adjusted to minimize nest flooding, enhance winter waterfowl habitat, and to provide additional acres for waterfowl hunting (as compared to mimicking the natural seasonal flow pattern; i.e., Alternative D). The adjustments take into account the significant reduction in wetland habitat acreage in the Interior Basins Ecoregion and its effects on wetland-dependent migratory birds.

Under this alternative, it is assumed that natural ecological conditions and processes, including the hydrologic regime, produced a particular range of conditions in the Carson Desert, and that these are the conditions under which particular communities of plants, animals, and microorganisms were formed and sustained. This alternative recognizes that the assemblages under natural conditions were in a dynamic flux over time in response to ever changing ecological conditions.

Therefore, fluctuations in plant and animal populations would be expected and allowed. This alternative places habitat management in the context of process management and it recognizes our limited understanding of the diversity of plants, animals, and microorganisms, and the diversity of biotic processes that would occur under natural conditions. By focusing efforts exclusively on providing habitat for taxa for which we have adequate information (e.g., waterfowl, certain shorebirds and other waterbirds), we may be managing against species for which information is limited or nonexistent, or simply against species that were not selected as key species.

To the extent practical and feasible, construction, maintenance activities, and habitat management practices would be designed and undertaken so that the appearance of naturalness is restored and maintained. This may include mitigating past actions, such as eliminating or substantially lowering the piles of soil dredged from canals.

Special Area Designation: If the Alternative E boundary is formally adopted and approved, the area within this boundary would be further evaluated for its value as a Research Natural Area and

its wilderness potential. Given this alternative's management direction in the contiguous sand dunes and adjoining salt desert shrub communities, either of these designations would contribute to the goal of restoring and maintaining natural biological diversity.

Compatibility: This alternative recognizes a need for the visitor services program to manage human activity impacts. The visitor service program would focus on ensuring that negative impacts resulting from refuge visitation do not impair the achievement of wildlife goals. Human disturbance management, the primary subject of compatibility determinations, would be addressed within both the biological and visitor services monitoring program. This approach would allow both visitor and wildlife managers to work as a team to ensure that the refuge continues to provide high quality habitat for wildlife while remaining a destination for recreational activities. Under this alternative, attempts would be made to proactively manage human activity impacts in a way that avoids future compatibility problems, minimizing the extent to which changes have to be made to visitor services in response to problems.

Monitoring: Recognizing the importance of a sound monitoring program in a successful management program, increased emphasis would be placed on monitoring the status and trends of fish, wildlife, and plant populations and their habitat on each refuge (Refuge System Admin. Act, Sec. 5(3)(N)). Priority in the monitoring program would be given to tracking long-term wetland habitat acreage, long-term waterfowl and shorebird data sets, and habitat, while ensuring that representatives of each guild and habitat type occurring on the refuge complex are monitored, at least at some level.

Goals, Objectives and Strategies

Goal A: Conserve and manage fish, wildlife, and their habitat to restore and maintain natural biological diversity.

Subgoal A.a: Approximate natural diversity within and among animal communities on Stillwater NWR.

This subgoal and the accompanying objectives below would be achieved primarily through strategies outlined under Subgoals A.b and A.c. In other words, wildlife would be managed in large part through managing their habitat. The boundary revision proposed under this alternative would also contribute to the accomplishment of this subgoal and objectives. Migratory waterbirds and landbirds are important components of the area's natural biological diversity. Several population and use level objectives have been identified for some birds and groups of birds at the flyway, regional, state, and local levels in international bird conservation plans, including the Intermountain West Joint Venture Implementation Plan (Intermountain West Joint Venture 1995) and Nevada Partners in Flight Bird Conservation Plan (Neel 1999). Although population or use level objectives would not be established for Stillwater NWR under Alternative E, objectives and strategies under Goal A would generally support the population targets

identified in the bird conservation plans. Objectives and strategies of these plans are further addressed in Goal B.

Objective A.a.1: Restore and perpetuate the presence of native species and native guilds of birds, mammals, reptiles, amphibians, fish, and invertebrates, according to season (Appendix B).

Objective A.a.2: Approximate the relative (e.g., rare, uncommon, common, abundant) population levels (or, use level of the refuge) of native wildlife species that would exist under natural conditions, according to season and recognizing natural fluctuations in populations, through the use of representative species (for monitoring purposes).

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.a.3: Minimize distribution and abundance of nonnative animal species and their prominence in fish and wildlife communities, in the near term focusing on:

- (a) Reducing, to the greatest extent possible, populations of European carp and other nonnative fish populations in Stillwater Marsh wetland units, while maintaining high populations of tui chub,
- (b) Exploring and identifying practical and cost effective ways to significantly reduce bullfrog numbers in designated areas (e.g., Stillwater Point Reservoir, delivery canals).
- (c) Determine whether other nonnative species should be controlled, and implement needed control measures.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Subgoal A.b: Approximate, within a natural range of variability, a natural diversity within and between plant communities and habitat types (the latter including nonvegetated habitat types and physical attributes of habitat such as water depth and water chemistry).

Objective A.b.1: Restore and perpetuate the presence of native plant species (Appendix B) and native plant communities in Stillwater Marsh, Carson River corridor and its delta, Stillwater Slough corridor, dune complex, and salt desert shrub uplands.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.b.2: Approximate and perpetuate the mix of plant communities and habitat types that would occur on Stillwater NWR under natural conditions, within a natural range of variability, including representation by all native plant communities and habitat types, amount of area occupied by each plant community and habitat type, and the distribution and pattern (shape) of each.

<i>Basis of Objective:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.b.2(a): Attain and sustain a long-term average of 14,000 acres of wetland habitat on Stillwater NWR, including marsh (palustrine), shallow lake (lacustrine), and riverine wetland habitat as described in more detail below.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Stillwater Marsh (A.b.2(b)):

Objective A.b.2(b)(i): Attain and sustain a long-term average of 13,500 acres of wetland habitat in Stillwater Marsh in a way that attains the following seasonal targets (see table below for actual acreages for representative inflow volumes):

- 60-100 percent of annual peak acreage during April-June, with the peak occurring in late March or early April prior to major nest initiation;
- 40- 70 percent of annual peak acreage during July-September (>50 percent in July);
- 50-90 percent of annual peak acreage during October-February.

<p><i>Basis of Objective:</i> This objective and the following strategies support Objectives A.b.1-A.b.2(a). It addresses one of the core problems facing the refuge and would be emphasized. Maintaining a long-term average of 13,500 acres of wetland habitat would contribute toward the target of 14,000 acres for the refuge.</p> <p>Mimicking the seasonal pattern of wetland acreage is one key to approximating the natural diversity of plants and animals occupying the marsh. Peak acreage under natural conditions typically occurred between April and June, and the low point was generally in August/September. The natural seasonal pattern was adjusted somewhat to minimize nest flooding during April-June, and to ensure that an acceptable amount of wetland habitat is provided in the fall and winter. Fall and winter wetland habitat was extensive in the Lahontan Valley under natural conditions, and Stillwater Marsh is important to migrating and wintering waterbirds in the Great Basin. By tailoring management to achieve the above stated objective, important hydrologic functions would be simulated, such as declining water levels during July-September, rising water levels during the early spring, and to some extent higher springtime flow rates into and through selected wetland units.</p>
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At a regional and flyway level of restoring natural biological diversity, the objective also contributes toward wetland habitat goals and objectives of the Intermountain West Joint Venture, Nevada Partners in Flight, and U.S. Shorebird Conservation Plan Intermountain West Region.

Strategies to Achieve Objectives: A natural seasonal flow volume pattern and natural seasonal fluctuations in water levels would be approximated, modified to minimize impacts to nesting waterbirds and accommodate fall migration and wintering habitat for waterfowl and for waterfowl hunting, through the following strategies. Deliverable water, including acquired and leased water rights, would be delivered to Stillwater NWR in the following proportions of the annual volume (this does not include spill water, drainwater, or groundwater pumping):

	<u>Dec-Feb</u>	<u>Mar-Jun</u>	<u>Jul-Sep</u>	<u>Oct-Nov</u>
Low water year	0%	- - Adaptive Management Strategies ² - -		
Full water year	0%	50-70%	20-30%	10-25%
Spill year	0%	30-60%	20-40%	10-30%

Water levels would be raised above operational levels temporarily in March and early April, prior to the onset of nesting by most waterbirds, to recharge wet meadow shoreline habitat, thus, simulating a naturally occurring pulse. This would require up to about 20 percent of the annual allocation to be delivered in March. (In spill years, this spring pulse could occur anytime between November and June.) Starting in mid April, attempts would be made to maintain a constant level through May or June in units targeted to receive spring flows. To achieve habitat objectives, about one fifth of the annual supply of deliverable water would have to be delivered to Stillwater NWR before April 1. The Service would not call for water outside the established irrigation season (March 15 through November 15) unless this approach would benefit affected parties and only if pre season deliveries were authorized by the Bureau of Reclamation and the Newlands Project operator.

During a normal, 100% water year, spring pulses would only be conducted through one of four identified flow corridors representing roughly 25% of refuge wetland units. Water levels would be stabilized to slightly declining during spring in two corridors while wetland units would be allowed to decline, simulating drought conditions, in the fourth corridor. The Service would only initiate spring pulse deliveries when 20,000 acre feet of prime water is available for delivery within a given year.

Water levels throughout most of the marsh would be allowed to decline starting in late June or July, but care would be taken to ensure that sufficient water levels would be maintained in some wetland units, for brooding habitat at least through July. Declining water levels would be permitted to proceed through December, January, or February in some wetland units. The strategy of allowing water levels to decline during the late summer and fall would benefit fall migrating shorebirds by concentrating and exposing invertebrates as water levels decline. In the other wetland units, declining water levels would be curtailed in September or October and flooding of habitats produced during summer drawdown would be initiated.

The preceding discussion addressed the delivery and management of water during full water years. In spill years when sufficient water is available, deliveries could be delayed until after conveyance of spill water onto the refuge ceases to provide additional wetland habitat during the late summer, fall, and winter, which would also result in carryover water to the next year.

In low water years, the Service would maximize use of limited water resources by examining a combination of the existing conditions of habitat in each wetland unit, the chronological needs of key waterbird species, and management practices undertaken at other primary wetland areas within the Lahontan Valley. Flooding schedules during fall would be primarily based on this strategy.

Monitoring Elements: Water receipts, wetland habitat acreage by season.

²Water will be distributed based on the amount available for distribution and the existing condition of wetland habitat. Potential water allocation strategies in low water years will be addressed in the Stillwater NWRC Habitat Management Plan.

Objective A.b.2(b)(ii): Approximate a natural diversity of Stillwater Marsh habitats by targeting the following mix of habitats, with intervening months being managed as transition periods.

Low water Conditions (seasonal range = 2,500 - 7,000 acres of wetland habitat^A)

Habitat Type (and annual-peak depth)	Annual	Apr-Jun	Aug-Sep	Oct-Dec
Deep, unvegetated zone (3-6 ft)	1-2%	1-2%	1-2%	1-2%
Submergent marsh (1-3 ft)	20-45%	20-35%	30-45%	25-40%
Deep emergent marsh (1-3 ft)	20-45%	20-35%	30-45%	20-35%
Shallow emergent marsh (0.1-2 ft)	0-35%	10-30%	0-30%	10-35%
Wet Meadow (0.1-1 ft)	0-15%	5-15%	0%	0%
Moist-soil ^D (0.1-1 ft)	0-15%	5-15%	0-5%	5-15%
Unvegetated Mudflat (0.1-0.5 ft)	5-10%	5-10%	5-10%	5-10%

^A Assumes a full-water year with about 17,000 acre-feet of water available for wetland delivery (20,000 acre-feet of water rights acquired), or a shortage year at a later stage of the acquisition program, equivalent of this annual volume of water.

Moderate Water Conditions (seasonal range = 6,000 - 15,000 acres of wetland habitat)

Habitat Type (and annual-peak depth)	Annual	Apr-Jun	Aug-Sep	Oct-Dec
Deep, unvegetated zone (3-6 ft)	2-4%	1-3%	2-4%	2-4%
Submergent marsh (1-3 ft)	20-40%	20-30%	30-40%	25-40%
Deep emergent marsh (1-3 ft)	20-40%	20-30%	30-40%	20-40%
Shallow emergent marsh (0.1-2 ft)	5-30%	15-30%	5-25%	10-25%
Wet Meadow (0.1-1 ft)	0-20%	10-20%	0%	0%
Moist-soil ^D (0.1-1 ft)	0-15%	10-15%	0-5%	10-15%
Unvegetated Mudflat (0.1-0.5 ft)	5-15%	5-10%	5-15%	5-10%

^B Assumes a full-water year with about 30,000 acre-feet of water available for wetland delivery (35,000 acre-feet of water rights acquired), or a shortage year at a later stage of the acquisition program, equivalent of this annual volume of water.

High-Water Conditions (seasonal range = 7,000 - 18,000 acres of wetland habitat)

Habitat Type (and annual-peak depth)	Annual	Apr-Jun	Aug-Sep	Oct-Dec
Deep, unvegetated zone (3-6 ft)	1-4%	2-4%	1-2%	1-3%
Submergent marsh (1-3 ft)	20-35%	20-30%	25-35%	20-35%
Deep emergent marsh (1-3 ft)	15-40%	15-35%	25-40%	20-35%
Shallow emergent marsh (0.1-2 ft)	10-30%	10-25%	10-20%	10-25%
Wet Meadow (0.1-1 ft)	0-25%	10-25%	0%	0%
Moist-soil ^D (0.1-1 ft)	0-15%	10-15%	5-10%	10-15%
Unvegetated Mudflat (0.1-0.5 ft)	5-15%	0-10%	5-15%	5-10%

^C Assumes a full-water year with about 47,000 of water available for wetland delivery (completion of acquisition program).

^D Moist soil habitat, for the purposes of this objective, includes saltgrass and other shoreline or meadow vegetation that is flooded during the fall to provide food for dabbling ducks.

Basis of Objectives: Second to increasing the acreage of wetland habitat, restoring a natural mix and within community composition of wetland habitat types may have the greatest, positive effect on the Service's ability to approximate a natural diversity of wildlife in Stillwater Marsh. The percentages shown above were based on estimates of the natural composition of the marsh, adjusted in places to account for things such as (1) the fact that it would not be possible to restore the deep water channels to cover the extensive area they historically covered without significant changes to infrastructure, and (2) the percentage of emergent vegetation was at times higher than shown, but this would adversely affect some species of interest. Within community composition is addressed under Objective A.b.3.

Strategies to Achieve Objective: The water management strategies described under Objective A.b.2(b)(i), including seasonal pattern of inflow and rate of flow, would be the primary means to achieve this objective, but the following strategies would also be undertaken.

In establishing annual water management plans, wetland managers would recognize the influence that topography, geomorphology, and soils have on wetland plant communities and habitats, especially as this pertains to mimicking natural habitat conditions. Although these physical elements cannot be managed to any large degree, wetland managers would take these factors into consideration when deciding which wetland units would receive water. The natural geomorphology and topography of the historic marsh and surrounding area would be emphasized, which may require action such as: (1) recontouring certain wetland units to create deeper channels; (2) removing spoil banks along canals; and (3) removing certain dikes, after a detailed analysis of whether they are needed and whether their adverse impacts outweigh the benefits of maintaining them. The criteria would include water management efficiency and other issues (efficient use of limited water, impediments to water movement, necessity to achieve habitat objectives and to carry out other strategies) and biological issues (habitat quality and diversity, predation and nest depredation rates, human disturbance). Creating deeper channels may be needed to produce deep water habitats that were once prevalent in the marsh, especially along the main flow routes in the center of the marsh.

To take maximum advantage of deliverable water, to restore habitats such as wet meadows and create moist soil habitat in some areas, the Service may also consider targeted additions of levee's and water control structures. Additionally, a rice levee plow would be acquired and used to create temporary levee's in limited water conditions or to create additional habitat. Rice levee's would generally follow natural contours.

Other tools for mimicking a natural mix of plant communities and habitat types may include prescribed burning, disking, cattle grazing and trampling, as well as allowing muskrats to graze unabated.

Monitoring Elements: Seasonal acreage of each wetland habitat type.

Objective A.b.2(b)(iii): Within five years, examine the feasibility and, if appropriate, develop a plan to restore native wet meadow habitat on the properties formerly owned by the Kents and Weishaupts.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objective: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Carson River and Stillwater Slough (A.b.2(c)):

Objective A.b.2(c)(i): Attain and sustain a long-term average of at least 100 acres of riverine wetland habitat on Stillwater NWR.

Objective A.b.2(c)(ii): Restore cottonwood, mesic shrub (e.g., willow, rose, buffaloberry), wet meadow, riverine aquatic communities to their natural distribution and extent along the lower Carson River and Stillwater Slough (*see objectives under Subgoal A.d., Monitoring and Management Studies*).

Basis of Objectives: Same as Alternative C.
Strategies to Achieve Objectives: Same as Alternative C
Monitoring Elements: Same as Alternative C.

Carson River Delta (A.b.2(d)):

Objective A.b.2(d)(i): Attain and sustain a long-term minimum average of 400 acres of wetland habitat in the Carson River delta.

Objective A.b.2(d)(ii): During years when water reaches the Carson River delta via the Carson River (spill years), approximate natural habitat conditions (*see objectives under Subgoal A.d., Monitoring and Management Studies*).

Basis of Objectives: By maintaining the Carson River delta within a primary wetland area, it would contribute to attaining the valley wide target of 25,000 acres of primary wetland habitat. Approximating natural habitat conditions would contribute to the approximation of natural wildlife diversity.
Strategies to Achieve Objectives: The Service would continue to work with the Bureau of Reclamation and its contractor, TCID, to provide the highest possible flow volumes down the Carson River to its delta during precautionary releases and spills from Lahontan Reservoir, as outlined in the Emergency Release Criteria for Lahontan Reservoir (USBOR 1997b). In the near term, this would be the only water reaching the marsh. Through examination of historical and archaeological information, estimates of Carson River and Humboldt River hydrologic regimes, topography of the Battleground area, known relationships between hydrologic conditions and vegetation response, and other information, a better estimate of natural habitat conditions in the Carson River delta would be obtained (see Subgoal A.d). Long range objectives would be developed based on this information. Prior to development of specific long range objectives for the Carson River delta area, the following strategies would be carried out. The natural timing and flow rate through the delta wetlands would be approximated by: (1) maximizing the amount of water flowing through the wetlands during Lahontan Reservoir precautionary releases and spills up to approximately 800 cfs (the present maximum which can flow through the Carson River at Bafford Lane); (2) providing input into the U.S. Army Corps of Engineer’s study of the Fallon flood abatement study and participating in the development of any subsequent plans based on the study; (3) allowing the Carson River to flow into the Carson River delta unabated during years of Lahontan Reservoir precautionary releases and spills; and (4) allowing water levels to decline through evapotranspiration following cessation of water inflow. As flow levels begin to subside, the Service would close the structure located on the levee at Battleground Point to maintain water at the Carson River Delta into summer.
Monitoring Elements: Seasonal wetland habitat acreage, acres of habitat types.

Upland Areas (A.b.2(e)):

Objective A.b.2(e)(i): Restore, approximate, and maintain the natural distribution and abundance of upland plant communities and habitat types that would exist naturally, according to location, throughout upland portions of the refuge.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.b.3: Approximate, within each habitat type and plant community, a natural species composition; emphasizing the domination of these communities by one or more native species representative of the community (Table 2.2) and reduce, or eliminate, if possible, the number of nonnative species.

Objective A.b.3(a): For each habitat type and plant community, determine the approximate proportion that each of the major plant species should comprise within the community, and develop targets based on this assessment.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.b.3(b): Prevent the establishment of any nonnative species not already present within the boundaries of Stillwater NWR, especially species listed as a noxious weed (e.g., purple loosestrife, Eurasian water milfoil).

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.b.3(c): Curtail the spread of noxious weeds and other nonnative invasive vegetation within Stillwater NWR, and reduce the amount of area dominated by saltcedar and perennial pepperweed, including reducing the composition in plant communities.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.b.4: Approximate, within each habitat type and plant community, the vegetative structure of plant communities that would occur under natural operation of ecological processes, such as spring flooding, drought, succession and competition, accumulation of residual plant material, herbivory, seed caching, long intervals between fires, including:

Stillwater Marsh and Carson River delta (A.b.4(a)):

- (i) A natural pattern of emergent vegetation and open water areas in the marsh that is maintained by deeper channels and by disturbances such as spring flooding and muskrat grazing, or secondarily, a mosaic that simulates natural disturbances; and
- (ii) Portions of the marsh having residual vegetation that has accumulated for many years (e.g., five years or more).

Basis of Objectives: Horizontal structure (e.g., pattern, shape of plant communities and habitat types) and vertical structure are major components of an area's biological diversity and they have a considerable influence on wildlife diversity, further affecting biodiversity.

Strategies to Achieve Objectives: Beyond the strategies for achieving Objective A.b.2(b)(ii), which focused on approximating geomorphology of the marsh and other physical attributes, the following actions would be undertaken to achieve this objective.

Muskrats would be allowed to graze on emergent vegetation, unabated. However, the following factors would be considered: (1) muskrat control measures may be necessary while emergent vegetation is recovering in some units, or possibly to avoid over grazing by the muskrats if this is deemed undesirable; (2) muskrat control may be needed to protect levees and other water delivery infrastructure components; and (3) a study would be initiated to examine the relationships between muskrats and marsh ecology, to ascertain whether environmental conditions would allow muskrat populations to reach deleterious levels (part of the study may involve allowing the population to climb without any control to see what happens to the habitat and population). The study would include a review of existing literature on muskrat management. Any muskrat control program would recognize their natural role in the wetland ecosystem.

Livestock grazing and browsing would be used as a management tool to fulfill specific habitat management objectives. This may include specialized grazing systems (e.g., high intensity/short duration techniques) but would no longer include continuous, growing season long grazing as has occurred under the Tripartite Agreement (1948). Livestock grazing would generally be excluded from Stillwater Marsh and the Carson River delta, except as prescribed under the strategies described under Objectives A.b.3(c) and B.e.1, which would require boundary fencing along the external boundary and certain inholdings. Livestock grazing on the entirety of Stillwater NWR in any given year would not exceed 500 AUMs under this alternative.

The frequency and extent of fires on the refuge would be minimized, except as needed to achieve wildlife habitat objectives, and a fire suppression program (especially for upland areas invaded by cheatgrass) would be developed and implemented as part of the Stillwater NWRC Fire Management Plan (Appendix K). However, fire could be used to manage farmland vegetation and to manage emergent vegetation when it has become dense and decadent in significant parts of what could be managed as shallow emergent, deep emergent, and submergent aquatic marsh. Prescribed burning efforts would recognize that dense stands of marsh vegetation, lasting season after season is a significant component of the natural marsh environment and important to invertebrates, small

mammals, and many nesting waterbird species. Habitat management zones would be established for prescribed burning and other practices. As noted above, prescribed fire would be an important component of the integrated pest management plan.

Monitoring Elements: Acreage and distribution of marsh plant communities and habitat types, acreage and distribution of areas having residual vegetation, vegetation height, density, and age of decadent plant material.

Lower Carson River and Stillwater Slough (A.b.4(b)):

- (i) An overstory of cottonwoods and/or willows along most stretches;
- (ii) An understory of native grasses and grass like plants, forbs, and young cottonwoods and mesic shrubs (e.g., willows, rose, buffaloberry); and
- (iii) Some areas dominated by grasses and grass like plants (i.e., no woody overstory);
- (iv) Carryover of native herbaceous plant material (residual vegetation) from season to season and year to year during most periods, recognizing that spring flooding would naturally have matted some vegetation and induced decomposition, and that fires (late summer or fall) would have been infrequent.

Basis of Objectives: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C

Monitoring Elements: Same as Alternative C.

Uplands (A.b.4(c)):

- (i) An overstory of native shrubs in many communities, with some communities having an extensive understory of Indian ricegrass and other native bunchgrasses;
- (ii) Extensive amounts of bare soil between shrubs in many communities;
- (iii) A build up of residual plant material from native bunchgrasses and forbs, allowed to accumulate naturally over the years (i.e., not grazed or trampled by livestock, crushed by off road vehicles, etc.).

Basis of Objectives: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Objective A.b.5: Approximate water chemistry conditions that occurred naturally in Stillwater Marsh and the lower Carson River and its delta, according to location of wetland habitat (i.e., freshwater in riverine and the upper end of the marsh, and brackish at the lower end of marsh), in a way that contributes toward the approximation and maintenance of the natural extent, distribution, composition, and structure of plant and animal communities.

Objective A.b.5(a): Maintain the lowest possible total dissolved solids levels in all upper Stillwater Marsh wetland units (generally <600 mg/L during February June and <1,000 mg/L during the remainder of the year) and portions of the mid and lower Stillwater marsh that are within the flow route of water through the wetland units (<5,000 mg/L); and simulate other key hydrologic factors of the natural marsh such as large volumes of water flowing through the marsh. Wetlands lower down in the system and off channel areas would at times have much higher levels of total dissolved solids, possibly approaching 100,000 mg/L in some locations.

Basis of Objectives: Simulating natural water conditions is one of the most important elements of approximating a natural diversity of fish, wildlife, and plants, given the relatively high level of information available on this component of the ecosystem and the comparatively low amount of information on habitat conditions and wildlife diversity. This objective is also based on the assumption that hydrologic functioning is one of the most critical factors that influences habitat and wildlife diversity in wetland systems. Focus of water chemistry objectives is on the upper wetland units in Stillwater Marsh because this is where water generally enters the marsh, fresh water habitats would be produced in these units, and progressively more saline and alkaline habitats would be produced down gradient of these units. Achievement of these objectives depends on completion of the water rights acquisition program (e.g., acquisition of 42,000 acre-feet of water rights for Stillwater NWR in addition to other sources as identified).

Strategies to Achieve Objectives: The following strategies would be carried out to contribute toward achieving these objectives. The main strategy would be the completion of the ongoing water rights acquisition program, which would contribute most significantly toward achieving objectives. Drainwater and water from groundwater pumping would be mixed with irrigation quality water. Flushing flows through the marsh would be maximized during precautionary releases and spills from Lahontan Reservoir by implementing strategies described previously to flush salts and other dissolved solids. Large volumes of water would be delivered during relatively short periods of time to the extent possible, as prescribed under strategies described above.

Stillwater Point Reservoir would be used to store water to be delivered to other parts of the marsh at strategic times to more closely approximate natural inflow patterns; however, habitat management strategies would be designed and implemented to ensure production of aquatic plants; the Service would work with the Bureau of Reclamation and TCID to use Harmon Reservoir, S-Line Reservoir, and possibly Sheckler Reservoir (with modification) to store water for delivery to the refuge, when necessary.

To accommodate the delivery of larger volumes of water and to allow larger volumes of water to flow through the marsh during precautionary releases and spills from Lahontan Reservoir, the following strategies would be undertaken. Water control structures, internal canals, and other facilities would be modified to accommodate up to 750 cubic-feet per second (cfs) from the upper end of the refuge (Stillwater Point Reservoir, West Canal, etc.) through Pintail Bay and/or Big Water into the Carson Sink. The West Canal would be enlarged (to accommodate up to 250 cfs) and extended to West Marsh. East and Center Canals would be enlarged to accommodate 250 cfs each, and water control structures and conveyance between wetland units would be enlarged to accommodate significantly higher flows. During peak flows in any given year, water flow would be concentrated in one pathway to the extent possible, although this could change among years. Modifications to infrastructure would account for continued inflow of up to 120 cfs from the D-Line Canal at the northwest end of Stillwater Marsh.

The need for small units (such as created by subdividing Lead Lake into North, South, and East units), would be evaluated and eliminated where deemed nonessential (the more units there are, the more potential constrictions); however, the Service would also consider developing new levees (either permanent or temporary by means of a rice levee plow), to maximize utilization of limited water resources. Options for outlets of Pintail Bay and/or Big Water to the Carson Sink would be analyzed and designed in a way that these units would not restrict the amount of water that can be conveyed into and through the historic marsh. The Service would work with Bureau of

Reclamation, TCID, and other contractors to analyze options for increasing the capacity of delivery canals leading to Stillwater Point Reservoir and West Canal in order to accommodate flows of 400 cfs (during normal water years) and up to 750 cfs (during spill years) from the southern end of Stillwater NWR.

Water management strategies would be undertaken in a way that maximizes the volume of flow per surface acre of wetland habitat to more closely approximate natural flow rates through the marsh, which can be accomplished in part by: (1) limiting peak wetland acreage to about 18,000 acres, to the extent possible even in spill years, unless the volume of excess water exceeds 150,000 acre-feet (i.e., flood no more wetlands than necessary to prevent damage to the infrastructure); (2) modifying the infrastructure to allow a flow rate of at least 500 cfs through the marsh without the use of bypass canals, which likely would require the construction of spillways between units in addition to enlarged water control structures; (3) conveying water from unit to unit in the historic marsh during precautionary releases and spills, only using bypass canals when this is needed to avert damage to the infrastructure; and (4) concentrating the majority of the flow through one chain of units in the historic marsh, which may require spillways in addition to enlarged water control structures.

Monitoring Elements: Specific conductance, pH, turbidity, and dissolved oxygen would be monitored monthly in major wetland units, water delivery canals (both on and off-refuge), and major drains entering the refuge.

Objective A.b.5(b): Manage wetlands water on Stillwater NWR to maintain concentrations of potentially toxic trace elements below effect levels, identified below, while recognizing that maintaining concentrations below these levels in the refuge’s wetlands may not be attainable in all wetland units (e.g., wetlands lower on the hydrologic gradient) at all times of year (e.g., later in the summer when wetland habitat acreage shrinks), or during all time periods (e.g., regional drought conditions).

Basis of Objectives: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Objective A.b.5(c): Minimize the amount of mercury entering Stillwater NWR wetlands and reduce mercury levels in wetland sediments and biological tissues to non hazardous levels.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Subgoal A.c: Allow and provide for natural types, levels, rates, and distributions of biotic processes, such as herbivory, granivory, predation, population fluctuations of resident wildlife, and production; minimize or exclude processes not natural to the area or that are above or outside the levels, rates, locations, or communities that would occur naturally. Exceptions to this include: (1) diseases such as botulism and cholera, which would be minimized; and (2) browsing by deer and other wildlife may be controlled, to allow the reestablishment of native vegetation.

Fish and wildlife concern and effect concentrations for contaminants of concern on Stillwater National Wildlife Refuge, Churchill County, Nevada.

constituent	effect concentration ^a	concern concentration ^a	reference ^b
ammonia (mg/L)	0.4	0.04	1
arsenic (: g/L)	40	-	2
boron (: g/L)	1,016	200	3, 4
copper (: g/L)	10	5	6
lead (: g/L)	3.5	1.0	7, 8
mercury (: g/L)	0.1	0.0006	9
molybdenum (: g/L)	790	28	5
selenium (: g/L)	3.0	1.0	10
zinc (: g/L)	32	-	11

^a Effect were identified as such in literature or were associated with a major adverse effect (i.e., mortality), concern concentrations were identified as such in literature or were associated with non lethal effects (i.e., reduce growth).

^b 1, Russo (1985); 2, U.S. EPA (1985a); 3, Birge and Black (1977); 4, Birge et al. (1979); 5, Eisler (1997); 7, U.S. EPA (1985b); 8, Wong et al. (1981); 9, Schwarzbach (1998); 10, Skorupa (1998); 11, U.S. EPA (1987)

Objective A.c.1: Prevent grazing and browsing by nonnative herbivores above natural levels (use and distribution) for any given plant species and community, and season for these species and communities, and prevent fires in upland areas except as prescribed.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective A.c.2: Allow native herbivores to graze and browse at natural levels (use and distribution).

<i>Basis of Objectives:</i> Same as above. Also, muskrats are a natural part of the marsh ecosystem and have influenced marsh vegetation dynamics for many thousands of years.
<i>Strategies to Achieve Objectives:</i> Muskrats would be allowed to graze unabated on emergent vegetation. However, the following factors would be considered: (1) muskrat control measures may be necessary while emergent vegetation is recovering in some units, or possibly to avoid over grazing by the muskrats if this is deemed undesirable; (2) muskrat control may be needed to protect levees and other water delivery infrastructure components; and (3) a study would be initiated to examine the relationships between muskrats and marsh ecology,

to ascertain whether environmental conditions would allow muskrat populations to reach deleterious levels (part of the study may involve allowing the population to climb without any control to see what happens to the habitat and population). The study would include a review of existing literature on muskrat management. Any muskrat control program would recognize their natural role in the wetland ecosystem.

Monitoring Elements: Acreage of deep emergent vegetation, muskrat lodge index, outside research to elucidate muskrat/marsh interactions specific to Stillwater Marsh.

Objective A.c.3: Prevent depredation of nests above natural levels when caused by unnaturally high populations of predators.

Basis of Objectives: It has been surmised that the common raven population is well in excess of natural levels and that this is causing excessive nest depredation on many waterbird species.

Strategies to Achieve Objectives: Natural predation rates would be studied to gain a better understanding of: (1) the role of common ravens, coyotes, and other predatory species in a naturally functioning system, and (2) relationships between changes in predator populations and changes in waterbird production, including assessments of changes in habitat conditions, human disturbance, and other factors that could potentially affect production. In addition to addressing the above factors, the information would be used to identify predation thresholds.

Under this alternative, a predator control program would recognize the natural role that predators play in the refuge ecosystem. Furthermore, nonlethal techniques would be of highest priority, including the elimination of poles, spoil piles, and other perches near waterbird nesting locations, and egg aversion methods. However, if production of a species of special concern was considerably impaired by predation or nest depredation, a targeted program to resolve the immediate threat would be designed and implemented with the appropriate level of NEPA documentation. The least invasive technique available would be used in all such control efforts.

Monitoring Elements: These would include production levels and nest depredation rates for selected species, and spring populations of common ravens and coyotes, but factors to consider would be further refined through research.

Objective A.c.4: Prevent human activity disturbances that would materially affect the use of the refuge by native wildlife, nest success of waterbirds and riparian birds, overall production, daily activity patterns of birds, use of important feeding habitats by waterbirds during migration and winter and the nutritional status of these birds, and other biotic processes.

Objective A.c.4(a): Maintain a minimum of 40 percent of the refuge's wetland habitat in areas providing relatively secure habitat (e.g., sanctuary, general public use areas), combined, such that (i) the full range of life history requirements of all major waterbird guilds are contained in the selected areas, and (ii) a minimum of 3,000 acres are in sanctuary (restricted public access)

Objective A.c.4(b): Minimize human activity impacts to wildlife in areas outside the sanctuary while still providing opportunities for compatible wildlife-dependent recreation.

Basis of Objectives: The presence of people and human activity can, depending on a variety of factors, influence the distribution, behavior, health, production, and survival of wildlife.

This has the potential to impair the Service's ability to achieve refuge goals A and B. However, given the desire by the Service to encourage more people to learn about the marsh, its wildlife, and wildlife conservation issues (refuge goal C), it is imperative that this is done in a way that minimizes adverse impacts to wildlife.

Providing areas for wildlife where the density of refuge visitors is low or nonexistent would ensure that birds have a place to rest, feed, and find shelter from the weather in an area where they won't be flushed or otherwise impacted by human activity. Providing a "core reserve" (or sanctuary) is a fundamental principle of conserving natural biological diversity. These objectives link the wildlife related goals and the visitor services goal of the refuge.

Strategies to Achieve the Objective: Several requirements would be implemented under Alternative E to minimize adverse impacts associated with human activity in wildlife habitat. A minimum of 3,000 acres of the refuge's wetland habitat would be maintained in sanctuary during the waterfowl hunting season. During the nonhunting season, access in the vicinity of wetlands would be limited to open roads and trails except in designated areas. New observation areas, trails, and other developed sites would be located and managed to minimize adverse impacts to wildlife. Although the acreage of wetland habitat would vary through the hunting season and from season to season, the actual boundaries of the sanctuary and hunt area would not change (Map 3.11 located in the visitor services management section).

During the hunting season, water would be apportioned in the following way:

- the first 3,000 acres^A of wetland habitat would be maintained in the sanctuary south of Division Road;
- the next 3,000 acres^A of wetland habitat would be maintained in the hunt area north of Division Road;
- remaining acreage would be distributed equally between the sanctuary and hunt area until 5,000 acres of wetland habitat are available in the sanctuary.

If it is determined that 3,000 acres or less of wetland habitat can be maintained during the waterfowl hunting season with remaining deliverable water, then through consultation with the Nevada Division of Wildlife, the Service would seek to close the marsh to all use and deliver remaining water to the best available habitat (north or south of Division Road). Other options such as access, day, or time of day restrictions would also be considered to allow limited waterfowl hunting under low water conditions.

The following units would be maintained as year round sanctuary: Stillwater Point Reservoir (except immediately adjacent to the wildlife viewing site and interpretive trail), Lower Foxtail Lake, Doghead Lake, Dry Lake, Cattail Lake, Division Pond, and East Alkali Lake (Map 3.11). No public access would be permitted in these units throughout the year. The amount of wetlands available for flooding in the sanctuary would be about 5,000 acres under this alternative.

During the hunting season, no boats would be allowed in Swan Lake, the north 1/3 of Pintail Bay, and the north 1/3 of North Nutgrass. This would exclude all watercraft and mechanized forms of travel; however, floating blinds and or carts could be used to transport gear in no boating areas.

The Carson River corridor would be open to hunting on Federally owned lands except that a small portion of the Alves property and Timber Lakes would be closed to establish wildlife observation trails. Hunting would be allowed at the Battleground wetlands (previously Fallon NWR). Recreation in these areas would be managed to minimize adverse impacts to wildlife. The Carson River delta is anticipated to provide less than 100 acres of wetland habitat during the fall and winter except on rare occasions.

A monitoring program would be designed to assess the effectiveness of maintaining disturbance below acceptable levels. The monitoring program would identify human activity thresholds and would include success criteria and triggering mechanisms, whereby additional restrictions would be considered.

Boating regulations to minimize human activity impacts to wildlife and cultural resources would be developed and implemented. These regulations would include: (1) prohibiting all watercraft (including float tubes) on the refuge

except during the waterfowl season (2) restrict portions of the hunt area where motorized and nonmotorized boats are allowed. An exception would be Swan Check Lake, in which non motorized boating would be allowed to facilitate wildlife observation and environmental education all year.

During waterfowl hunting season, no boats would be allowed on Swan Lake, the north end of Pintail Bay, and the northeast corner of North Nutgrass. Non motorized boats would be allowed on Swan Check Lake, West Nutgrass, West Marsh, and all units open to boating. Motorized boats would be allowed on Lead Lake, Tule Lake, Goose Lake, South Nutgrass, the open portion of North Nutgrass, and the open portion of Pintail Bay. Airthrust boats would be allowed on Goose Lake, South Nutgrass, the open portion of North Nutgrass, and the open portion of Pintail Bay.

Further protection from human disturbance would be provided by: (1) limiting land based vehicles to roads, parking areas, and vehicle pullouts; and (2) maintaining road closures to some portions of wetland units in public use areas (i.e., no land based vehicle access), including seasonal closures. Service activities would be conducted in such a way that they minimize adverse impacts to wildlife, while still allowing sufficient access to accomplish the goals and objectives of the refuge. To minimize disturbance to upland wildlife species, off road vehicles, bicycles, and horseback riding would be restricted to open roads only.

The West and East Pasture units would be developed to maintain moist soil habitat to enhance the wetland complex within the sanctuary, which would provide additional food for dabbling ducks. Foods that currently do not easily grow in the existing sanctuary could be produced.

A monitoring program would be designed to assess effectiveness of maintaining disturbances and their effects below acceptable levels. The monitoring program would include success criteria and triggering mechanisms.

Monitoring Elements: Wetland habitat acreage inside sanctuary and general public use areas, by season; distribution and use of habitats by waterbirds; other measures to assess disturbance; and distribution and density of refuge visitors, by activity and season (from visitor services monitoring program).

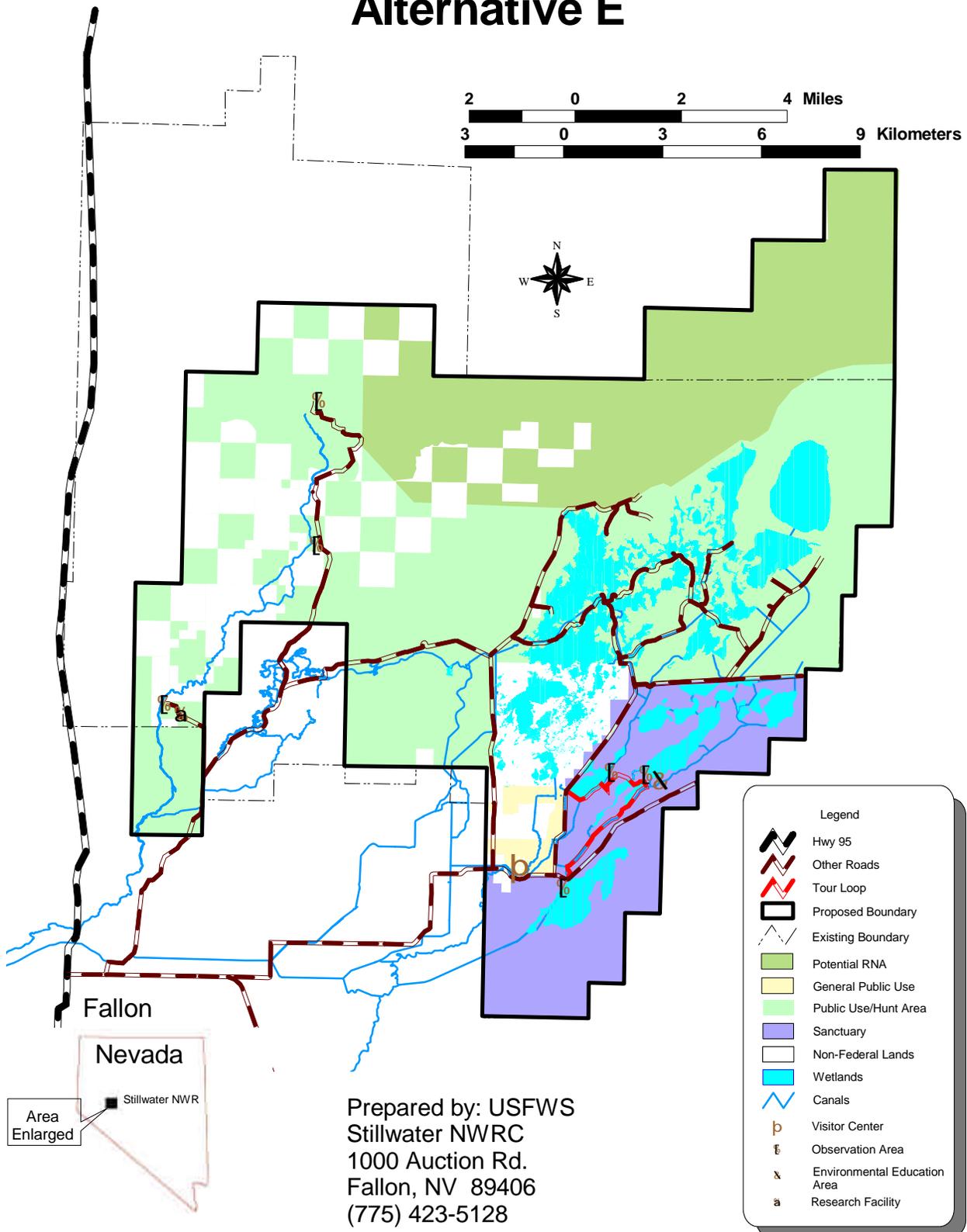
Subgoal A.d: Fill information gaps with knowledge gained through monitoring, management studies, and research (including archaeological and paleoenvironmental investigations, and assessment of historical records), and assess the effectiveness of management actions and identify needed modifications to the management program. Key information items are as follows.

Objective A.d.1: Within five years, estimate the natural, relative level of abundance of all native species of fish and wildlife within Stillwater NWR (e.g., rare, accidental, uncommon, common, abundant), including natural variability over time.

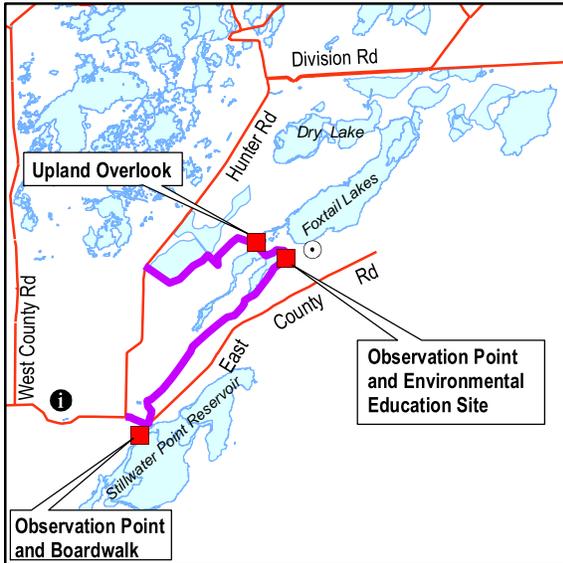
Objective A.d.2: Design management studies and modify the monitoring program, as needed, to ensure that major components of biodiversity, including key taxa of wildlife and vegetation diversity, are being adequately monitored and to evaluate the effectiveness of management actions undertaken by the Service.

Objective A.d.3: Design and implement baseline inventories of birds, amphibians, aquatic and terrestrial invertebrates (e.g., butterflies), and plants within three years along the lower Carson River and its delta, Stillwater Slough, dunes, and nearby salt desert shrub areas to provide

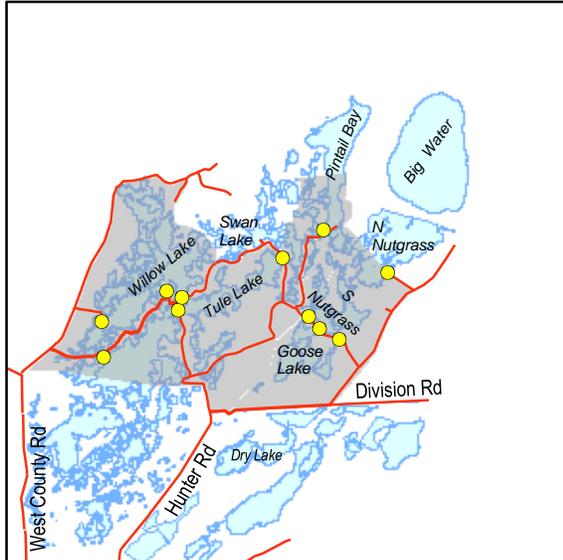
Map 3.11 - Stillwater NWR Public Use Zones Alternative E



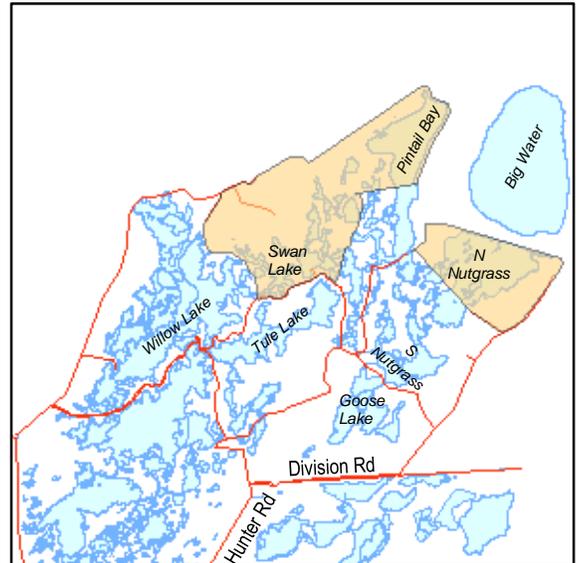
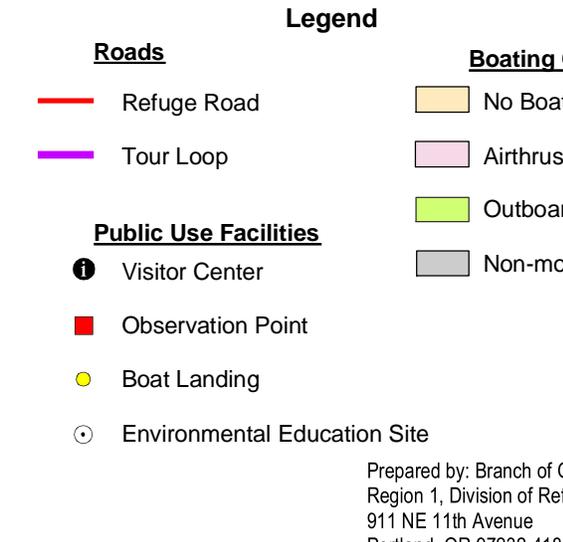
MAP 3.12 Boating Access Options Alternative E



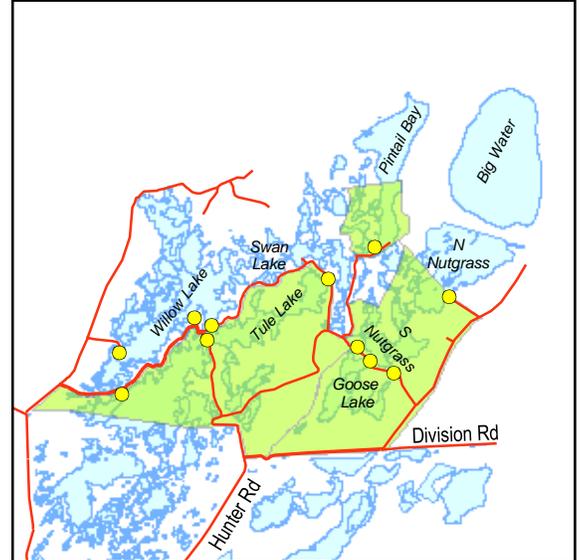
Inset 1: Visitor Center and Tour Loop



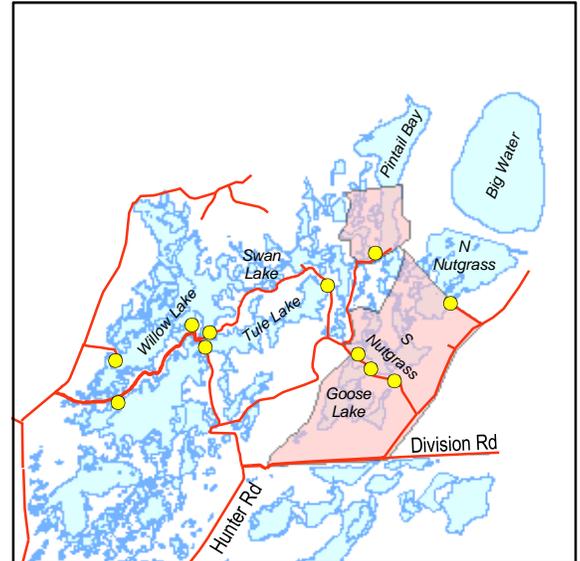
Inset 3: Non-motorized Boats



Inset 2: No Boats



Inset 4: Outboard Motor Boats



Inset 5: Airt thrust Boats

Legend

- | | | | |
|------------------------------|------------------------------|------------------------|---------------------|
| Roads | | Boating Options | |
| | Refuge Road | | No Boats |
| | Tour Loop | | Airt thrust Boats |
| Public Use Facilities | | | Outboard Boats |
| | Visitor Center | | Non-motorized Boats |
| | Observation Point | | |
| | Boat Landing | | |
| | Environmental Education Site | | |

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baseline information to assess the effects of habitat restoration efforts, including exclusion of cattle from riparian and upland areas.

Objective A.d.4: Estimate the natural geomorphology, hydrology, and habitat composition of the lower Carson River and its delta in the Battleground area, in a way that recognizes natural year to year variations.

Objective A.d.5: Estimate the natural composition, structure, and distribution of upland plant communities, and design and implement an inventory to determine the existing conditions of these parameters.

Objective A.d.6: Assess whether the adopted sanctuary and other areas managed to provide security for waterbirds are of sufficient size, encompass adequate breeding habitat for waterbirds and feeding and loafing habitat for migrating and wintering waterfowl.

Objective A.d.7: Research ways to provide wetland unit drawdowns during July September in ways that mimic natural water level declines and that accomplish habitat objectives, but do not contribute to significant avian botulism outbreaks (adapted from Nevada Partners in Flight Plan).

Objective A.d.8: Investigate the habitat needs, especially nesting habitat, of snowy plovers.

Objective A.d.9: Participate in the comprehensive state wide survey of potential nesting sites of black terns using professional and volunteer personnel, as well as conduct an assessment of the role that Stillwater Marsh played in black tern ecology in the Great Basin (from Nevada Partners in Flight Plan).

Objective A.d.10: Conduct an inventory of the fish occurring on the refuge, with an emphasis on determining the status of Lahontan red shiner and speckled dace.

Objective A.d.11: Ascertain whether Nevada viceroys and Carson wandering skippers (butterflies) inhabit Stillwater NWR, and determine more precisely their habitat requirements.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Goal B: Contribute toward fulfilling obligations of international treaties and other international agreements with respect to fish and wildlife.

Subgoals addressed under Goal A: The following subgoals pertaining to international treaty obligations would be achieved to the extent that the subgoals and objectives of Goal A are accomplished.

Subgoal B.a: Prevent and abate pollution and detrimental alterations of habitats of native plants and animals, including (1) preventing the introduction of nonnative plants and animals, (2) preventing the spread of introduced species that have become established, and (3) eradicate, to the extent possible, existing populations of nuisance species.

<i>Basis of Subgoal:</i> Same as Alternative C.
<i>Strategies to Subgoal:</i> See strategies under Objectives A.a.3, A.b.3(b)(c), and A.b.4(b).
<i>Monitoring Elements:</i> See monitoring elements under these objectives.

Subgoal B.b: Restore, preserve, and conserve natural ecosystems and habitats for migratory birds, other animals, plants, other components of biodiversity, and for the protection and conservation of natural areas.

<i>Basis of Subgoal:</i> Same as Alternative C.
<i>Strategies to Subgoal:</i> See objectives and strategies under Goal A.
<i>Monitoring Elements:</i> See monitoring elements under Goal A.

Subgoal B.c: Ensure that visitor activities do not detract from the Service’s ability to achieve wildlife related refuge purposes and that they are consistent with conservation and sustainable use principles; and ensure that sufficient sanctuary is provided for waterfowl using the Lahontan Valley, which may require additional study.

<i>Basis of Subgoal:</i> Same as Alternative C.
<i>Strategies to Subgoal:</i> See strategies under Objectives A.c.4.
<i>Monitoring Elements:</i> See monitoring elements under Objectives A.c.4.

Subgoals not fully addressed under Goal A: The following subgoals and objectives are additions that may be necessary to address international agreements regarding fish and wildlife conservation (e.g., Western Hemispheric Shorebird Reserve Network and international bird conservation plans). They supplement the objectives listed under Goal A, but would be used to fine tune the objectives and strategies outlined under Goal A. The following subgoals, objectives, and strategies were developed in consideration of the goals, objectives, strategies, and actions outlined in the Intermountain West Joint Venture Plan (Intermountain West Joint Venture 1995), Nevada Partners in Flight Plan (Neel 1999), and the U.S. Shorebird Conservation Plan, Intermountain West Region Report (Oring and Neel 1999), hereafter referenced as the Intermountain West Shorebird Conservation Plan.

Subgoal B.d: Provide for the needs of migrating and breeding shorebirds as part of the Western Hemispheric Shorebird Reserve Network in ways that are consistent with the overall approach prescribed under Goal A.

Objective B.d.1: Provide high quality nesting and brood rearing habitat for shorebirds, in consideration of habitat availability in other parts of the Lahontan Valley and throughout the Interior Basins ecoregion.

Basis of Objectives: Stillwater Marsh and other wetlands in the Lahontan Valley are components of the Western Hemispheric Shorebird Reserve Network, meaning that the Service should make a diligent effort to contribute to this international effort to conserve shorebird populations. In some years the Lahontan Valley wetlands provide stopover habitat for about half of North American's population of long-billed dowitchers, and Stillwater NWR is a key area for snowy plovers, a species of special concern. Providing high quality habitat for shorebirds would also contribute toward accomplishment of goals and objectives of the U.S. Shorebird Management Plan and Nevada Partners in Flight Plan, two international planning efforts. The Convention on Wetlands of International Importance calls for contracting parties to endeavor to increase waterbird populations on appropriate wetlands.

Strategies to Achieve Objectives: It is anticipated that this objective would be accomplished through the achievement of objectives under Goal A, especially the objective to sustain a long-term average of 13,500 acres of wetland habitat in Stillwater Marsh. Carrying out the strategies outlined under Goal A would also contribute to the habitat goal for marshes and lakes in the Intermountain West Shorebird Conservation Plan and the objectives and strategies in the Nevada Partners in Flight Plan for snowy plover and American avocet. Particular attention would be paid to flooding at least one major alkaline playa or similar habitat for snowy plover nesting each year (an action in the Nevada Partners in Flight Plan), see also Objective B.g.2. It is expected that a sufficient amount of flooded saltgrass meadow, submergent vegetation, and other suitable habitats would be provided on Stillwater NWR during the breeding season to adequately contribute toward the Nevada Partners in Flight Plan population objective for American Avocet in the Lahontan Valley, even though a breeding population objective would not be adopted for Stillwater NWR.

To the extent that suitable habitat is not being provided for these species, the Service would consider adjusting wetland management to better provide for their needs. This could possibly include actions identified in the Nevada Partners in Flight Plan that deviate from the approach outlined under Goal A to include maintaining one saltgrass pasture flooded at a constant depth between 2 and 6 inches from April 15 through August 1 (wet meadow communities typically did not remain flooded after mid June). The location of this habitat would change annually to ensure that emergent vegetation did not become well established within the habitat through perennial flooding. This practice would be further evaluated to determine if it is needed given the expanse of other suitable wetland habitat that will be available on Stillwater NWR and Carson Lake. Specifically, Carson Lake may provide enough of this habitat for Lahontan Valley.

Predator control would generally not be practiced under this alternative, except as described under Objective A. If production rates are significantly lower than estimated natural production rates for a particular species of shorebird and predation is determined to be the ultimate factor causing reduced production, predator control may be used to enhance shorebird production. Snowy plover, due to their low and possibly declining population in Nevada, would be a primary example of a species where predator control may be used to enhance production.

Monitoring Elements: Acreage of breeding habitat types, nest production. A shorebird breeding population survey would be coordinated with other agencies (Nevada Partners in Flight Plan).

Objective B.d.2: Provide high quality shorebird habitat during spring and fall migration, including rising water levels during spring and declining levels during the late summer and fall.

Basis of Objectives: same as above
Strategies to Achieve Objectives: Same as Alternative C.
Monitoring Elements: Same as Alternative C.

Subgoal B.e: Provide high quality habitat for migrating, breeding, and wintering waterfowl and other birds associated with marshes in ways that are consistent with the overall approach prescribed under Goal A.

Objective B.e.1: Provide high quality nesting and brood rearing habitat for waterfowl and other waterbirds.

Basis of Objective: Same as Alternative C.
Strategies to Achieve Objectives: Same as Alternative C.
Monitoring Elements: Same as Alternative C.

Objective B.e.2: Provide high quality habitat for waterfowl during fall and winter.

<p>Basis of Objectives: The Intermountain West Joint Venture Plan set objectives for providing migrational and staging habitat to support a fall migration of at least 20 million ducks, 60,000 tundra swans, 700 trumpeter swans, and 90,000 geese; and habitat to support a midwinter population of at least 2.5 million ducks and 90,000 geese. Lahontan Valley, including Stillwater NWR, is an emphasis area within the Intermountain West. In many years, up to about 70 percent of the waterfowl migrating and wintering in Nevada, pass through and use Stillwater NWR and other Lahontan Valley wetland areas.</p>
<p>Strategies to Achieve Objectives: This objective would be met through objectives and strategies outlined under Goal A, especially the objective to sustain a long-term average of 13,500 acres of wetland habitat in Stillwater Marsh. However, few details were provided on one aspect of fall and winter habitat for waterfowl, that is the flooding of moist soil vegetation during this time period. In certain wetland units (which may differ from year to year), the process of allowing water levels to decline during the summer would be curtailed in September or October. At this time, water levels in designated units would be slowly raised to flood areas containing seed producing annual plants, which would provide carbohydrates and fat for the higher maintenance requirements of dabbling duck species during winter and migration.</p> <p>This process, which would continuously provide new habitat at optimum depths (eight inches or less), would be continued through late fall or early winter. Previously exploited habitat (depleted of seeds and/or invertebrates) would become deeper while unexploited habitat would become available. An important component of this strategy would be to take advantage of the natural lowering of water levels from June through September (accomplished through previously discussed strategy), which would saturate wetland soils, and would promote germination of annual plants.</p> <p>Willow Lake, Swan Lake, and other northern refuge wetland units would be included in the wetland units to receive this treatment. To supplement these units, West and East Pastures would also be flooded during the fall and winter to provide access to moist-soil vegetation inside the existing sanctuary.</p> <p>High water levels would be maintained in a few wetland units into late summer or fall, at which time they would either be stabilized or permitted to decline through late winter or early spring.</p>

Wetland units targeted for this approach would be those in the upper marsh containing marked potential for producing aquatic vegetation (e.g., Lower Foxtail), although it is recognized that these units were not part of the historic Stillwater marsh except in years where the Carson Sink would have backfilled this area. This likely occurred in the upper marsh under natural conditions (north of the town of Stillwater) and would be, in part, undertaken to facilitate feeding by diving ducks and swans.

Upon completion of the water rights acquisition program (i.e., long-term average of 70,000 acre-feet of water per year), annual water plans would be written to provide a minimum of 10,000 acres of wetland habitat during October-December to benefit waterfowl and to provide waterfowl hunting opportunities.

The Service would work to provide up to 300 acres of alfalfa, wheat, oats, or other crop for wintering Canada geese. However, water and water rights acquired under subsection 206(a) of P.L. 101-618 would not be used to irrigate crops in the farmland area, except possibly after water rights have been acquired but before they have been transferred to the wetlands. Because the Service would not acquire additional water rights for use on farmlands or for other agricultural purposes, other sources of water would be needed for these crops, such as temporary transfers by farmers in a cooperative farming program.

Haying, prescribed burning, and livestock grazing would be used to provide the crop vegetation at a low height. Although cattle grazing may be used to enhance goose browse in the farmland area of the refuge, it would not be used for this purpose outside the farmland area. Livestock grazing in any given year would be limited to 500 AUMs for the entire refuge.

Monitoring Elements: Acres and density of submergent aquatic vegetation available to waterfowl, acres of moist soil habitat and its quality, acres of farmland cultivated for the purpose of providing goose forage, and the waterfowl response to this acreage would be a measure of habitat effectiveness.

Objective B.e.3: Minimize the occurrence, spread, and severity of botulism and cholera outbreaks.

Basis of Objectives: Waterbird diseases such as type C botulism and fowl cholera have the potential to impact populations of waterbirds using the Stillwater NWR Complex. These diseases occur seasonally. Cholera typically occurs during late winter/early spring and botulism during hot summer months. Past die offs have been as high as 55,000 birds, which resulted from a suspected combination of botulism and cholera. Botulism and fowl cholera can diminish the contribution of Stillwater NWR wetlands to achieving Intermountain West Joint Venture goals and objectives.

Strategies to Achieve Objectives: Botulism and cholera monitoring and cleanup would be continued as it has in the past, with botulism patrols initiated by early July and continuing into early fall. Wetland units with a history of botulism problems would be identified and targeted for regular airboat patrols, with more frequent patrol efforts initiated as outbreaks are discovered. Fall, winter, and early spring patrols would be conducted in more remote areas such as the Carson Sink and where large waterfowl concentrations are identified through aerial surveys. Carcasses would be immediately removed from wetland units and sick birds would be transported to the refuge “duck hospital” where rehabilitation would be conducted using fresh uncontaminated water in the holding pen.

To meet other objectives under this alternative, water levels would decline in many wetland units during late summer months through evapotranspiration, which could increase the potential for botulism outbreaks. To address this problem, options would be explored to minimize the potential for botulism outbreaks while meeting other objectives requiring drawdowns during July-September (e.g., Objective A.d.7 and Nevada Partners in Flight

Plan). Where outbreaks occur, wetland unit flushing or draining could be used to either dilute contaminated units (through flushing) or to reduce the desirability of the unit to susceptible waterbirds (e.g., through draining the unit). Portable Cristafulli pumps would be used to facilitate wetland unit draining.

Monitoring Elements: Botulism and cholera occurrence by wetland unit, number of waterbirds, by species, that die annually due to botulism and cholera.

Objective B.e.4: Ensure that suitable wetland habitat is provided for other marsh dependent species, using white-faced ibis, black terns, white pelicans, Clark’s grebes, and short-eared owls as indicator species.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Subgoal B.f: Provide high quality habitat for migrating and breeding birds in riparian areas and salt desert shrub communities in ways that are consistent with the overall approach prescribed under Goal A.

Objective B.f.1: Provide high quality habitat for neotropical migratory birds associated with riparian areas in ways that are consistent with the overall approach prescribed under Goal A, using yellow-billed cuckoos, ash-throated flycatchers, blue grosbeaks, yellow-breasted chats, and western bluebirds as indicator species.

Basis of Objectives: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Objective B.f.2: Provide high quality habitat for birds associated with salt desert shrub areas in ways that are consistent with the overall approach prescribed under Goal A, using loggerhead shrikes and burrowing owls as indicator species.

Basis of Objectives: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Subgoal B.g: Restore, enhance, and protect habitat for threatened and endangered species, species of special concern, and other sensitive, rare, or endemic species inhabiting the refuge.

Basis of Subgoal: Same as Alternative C.

Objective B.g.1: Within the next five years, reestablish, in a way favorable for future roosting by bald eagles (including a suitable distance from areas accessible by the public), cottonwood trees in the Timber Lake area, and reestablish similar stands along other parts of the Carson River as additional lands are acquired.

<i>Basis of Objective:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective B.g.2: During the interim, until their habitat needs are better delineated, provide shallowly flooded, unvegetated playa habitat for snowy plover nesting in areas they have used in the past.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

Objective B.g.3: Within the next five years, reestablish native willow and mesic shrub communities along the Carson River in the Timber Lake area for the benefit of Nevada viceroy and other riparian shrub dependent species of special concern, and reestablish such communities along other parts of the Carson River as additional lands are acquired and along the Stillwater Slough.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

3.4.E.2.2.2 Visitor Services Management

Guiding Principles

Visitor services management would be guided by the following principles. Visitor management on Stillwater Refuge would recognize the importance of national wildlife refuges in providing opportunities for compatible wildlife-dependent recreational activities. Wildlife-dependent activities would be managed to provide a balance between hunting, environmental education and interpretation, wildlife observation, wildlife photography, and scientific research which are the priority public uses of Stillwater NWR under this alternative. Based on the specific reference to environmental education and research in refuge purposes, and given the lack of facilities on the refuge for these uses, emphasis would be given to locating sites and developing adequate facilities for viable programs.

Visitation would be managed in a way that recognizes that wildlife will not prosper without high quality habitat, and without wildlife, wildlife-dependent uses cannot be sustained on refuges. Wildlife-dependent recreation helps foster stewardship and a connection with the resources, and direction for encouraging wildlife-dependent public uses is clearly spelled out in the Service's vision document "Fulfilling the Promise"(USFWS 1999) and in the National Wildlife Refuge Administration. Education is key, and will be a focal point of all facets of the visitor services program within this alternative. It is through education, both on and off site, that the public will gain an understanding of the role of humans within their environment. Through on site programs demonstrating wildlife needs and requirements, people will learn how to practice proper wildlife viewing etiquette and the importance of management strategies and techniques. It is through education and interpretation that negative human wildlife interactions can be minimized, by teaching the reasons behind facility design and why certain methods of observation are adopted.

Outreach will be another key component of the visitor services program. Little marketing of Stillwater NWR has been done in the past, which has resulted in low visitation numbers. With an increase of awareness through media attention, visitation should increase.

A visitor services monitoring program will be developed guided by Service wide procedures, which are now in the development stages. Current monitoring techniques used on Stillwater NWR, such as road counters and visitor observations, are anticipated to be key elements in the forthcoming national standards.

Goals, Objectives and Strategies

Goal C: Provide opportunities for environmental education and wildlife-dependent recreation that are compatible with refuge purposes and the Refuge System mission.

Subgoal C.a: Provide opportunities for high quality hunting experiences.

Basis of Subgoal: Hunting is a wildlife-dependent recreational activity, and one of the purposes of Stillwater NWR is to provide opportunities for wildlife oriented recreation. The Service is encouraged under the Refuge System Administration Act, to find ways to allow wildlife-dependent recreation on refuges, primarily because providing these types of opportunities teaches refuge visitors about wildlife ecology, and this ultimately facilitates the conservation mission of the Refuge System.

Objective C.a.1: Provide opportunities in which hunters would have a reasonable chance of success in uncrowded conditions and would meet the needs of a broad spectrum of users.

Basis of Objective: Given Stillwater NWR's location, the landscape and size of wetland units, and the types of opportunities that Stillwater NWR has provided in the past, Stillwater NWR would be well suited for providing uncrowded hunting opportunities where there is a reasonable chance of success.

Strategies to Achieve Objective: Alternative E would continue to maintain hunting as an integral part of the recreation program:

The following Stillwater Marsh units would be open to waterfowl hunting during the state designated hunting season: Swan Lake, Pintail Bay, North, South, and West Nutgrass, Willow Lake, Lead Lake, Tule Lake, Goose Lake, and Swan Check.

Opportunities for waterfowl hunting would also be available along the D-Line Canal (between the Indian Lakes area and the existing western boundary of Stillwater NWR), at Battleground Point, and along the lower Carson River as lands are acquired (except for small tracts at Timber Lakes and the former Alves property). At present, very little of this land is owned by the Federal government. Hunter densities would be monitored in part to maintain the relatively low density hunting opportunities now available on Stillwater NWR. “Uncrowded conditions” would be further defined.

No boats would be allowed on Swan Lake, the north end of Pintail Bay, and the northeast corner of North Nutgrass. Non motorized boats would be allowed in all other units located north of Division Road. Airboats would be allowed in Goose Lake, South Nutgrass, open portion of North Nutgrass, and open portion of Pintail Bay. All other motorized boats would be allowed in the units open to airboats, Lead Lake, and Tule Lake. Airboat operation would require obtaining a special use permit from Stillwater NWR and airboats would be clearly marked on both tail rudders with a Service issued operator number.

Overnight stays would be allowed in designated areas only. These areas would contain few amenities. A cooperative effort would be sought to provide camping opportunities near the wetlands as described in section 3.4.E.4.1 Partnerships and Other Cooperative Efforts.

Under this alternative, hunting of all migratory, upland, big game, and other unprotected species would be allowed throughout the refuge boundary with the exception of designated sanctuary (**see Map 3.11**). Legal weapons would include shotgun and non toxic shot, muzzle loaders, and archery equipment as appropriate per state regulations. The use of rifles, pistols, or other weapons not listed previously would not be allowed on the Refuge.

Monitoring Elements: Number of hunters, demographics, feedback on the quality of hunting experience.

Objective C.a.2: Ensure that hunting experiences are safe.

Basis of Objective: Beyond being a vital consideration in the management of any recreational activity, the Refuge System Administration Act, requires that wildlife-dependent recreation be allowed only to the extent that implementation of uses is consistent with public safety.

Strategies to Achieve Objectives: A average of 1 hunter per 30 acre limit would be established for safety purposes, however; the Service is currently attempting to “identify thresholds of disturbance for visitor services programs and develop associated standards and mitigative techniques that can be applied, as appropriate, by individual refuges to reduce conflict and achieve balance between public use and wildlife” (USFWS 1999).

Policy could alter the density limit of an average of 1 hunter per 30 acres. A combined effort between state and Federal agencies would be maintained to provide hunters with sufficient opportunity to attend hunter education courses and ad hoc hunter safety programs. Monitoring hunter density would provide the Refuge Manager with information to determine unsafe conditions.

Monitoring Elements: Number and types of reported and observed injuries per hunting season, observations by staff of unsafe practices and law enforcement infractions.

Subgoal C.b: Provide opportunities for environmental education and interpretation that meet requirements of a broad spectrum of users.

Basis of Subgoal: Same as Alternative C.

Objective C.b.1: Provide adequate facilities, equipment, and staffing for environmental study and interpretation, including facilities within the nonhunting area of the refuge.

Basis of Objective: Providing adequate facilities and staffing is imperative to providing environmental education and environmental interpretation opportunities to a wide spectrum of users. Service policy requires that environmental education be conducted outside the hunting areas.

Strategies to Achieve Objective: A visitor facility and outdoor classroom would be located on or near the property formerly owned by the Kent family. Restoration of the Stillwater Slough and a demonstration wetland unit would attract waterbirds to the area and support environmental education and interpretation activities. The facility would include a classroom, audio/visual, and interpretive displays. Volunteer docents, with the aid of Service personnel, would supply the bulk of the manpower, and would be well versed in all aspects of refuge management in order to provide a wide range of information.

The environmental education program would have a mobile component (as in Alternative B) and an environmental education location on site would be developed in the southeastern portion of the Upper Foxtail unit. This site would include an area for study, (e.g., a shaded table area), a boardwalk, and a small, but permanent, restroom facility. Interpretive signs at this facility would provide information on wildlife and habitat occurring at the site, current Refuge management practices, facilities, and opportunities, and cultural resources to broaden the awareness of a wide range of visitors.

Interpretive kiosks would be designed and placed at the visitor facility and Stillwater Point. These kiosks would provide guidance and information on important natural and cultural features of the surrounding area. Housing for volunteers, temporary staff, and research personnel, as well as a storage facility would be provided to the extent possible. Trailer pads would be made available to accommodate a growing workforce of volunteers.

The property formerly owned by the Alves family would be developed to provide additional opportunities for scientific research and on site learning. Existing structures would be evaluated for utility and unnecessary structures removed. A kiosk would be designed and constructed to serve as a trailhead to the riparian area along the Carson River. An accessible trail would be designed to facilitate wildlife viewing and photography of riparian species. An accompanying leaflet depicting trail route and location as well as resident and migrant bird species would be developed.

Monitoring Elements: Number, type, and location of facilities, and response by refuge visitors (e.g., number and type of visitor/group using each facility or location).

Objective C.b.2: Provide for the needs of students and teachers and make refuge and Service programs available to them.

Basis of Objectives: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Objective C.b.3: Provide adequate interpretation of natural and cultural aspects of the area to satisfy the curiosity, and broaden the awareness, of a wide spectrum of visitors.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objective: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Subgoal C.c.: Provide high quality opportunities for wildlife viewing and photography.

Basis of Subgoal: Providing opportunities for wildlife oriented recreation is one of the purposes of Stillwater NWR. The Refuge System Administration Act identified wildlife viewing and photography as two of the six wildlife-dependent recreational uses to be facilitated in the Refuge System, and the act encourages the Service to provide opportunities for these uses. When the public is provided opportunities to view and photograph wildlife, plants, and wildlands, awareness, understanding, and appreciation of ecosystem functioning and the benefits of ecosystem conservation to fish, wildlife, and people will increase. This ultimately contributes to the mission of the Refuge System.

Objective C.c.1: Provide high quality viewing opportunities throughout the distinctive habitats of the refuge.

Basis of Objective: Providing facilities for viewing wildlife (e.g., roads, pullouts, observation sites) is important for providing high quality viewing opportunities. Achievement of this objective would provide the public with the opportunity to view wildlife and the relationships between resource management, wildlife and habitat, and people.

Strategies to Achieve Objective: The road between the town of Stillwater and Stillwater Point Reservoir would be paved, and an accessible interpretive trail and wildlife observation structure constructed to facilitate viewing of the wetland unit. A self guided interpretive trail would be developed along the eastern side of the reservoir. Stillwater Point Reservoir is a regulating reservoir for Stillwater NWR wetland units and, as such, water levels can fluctuate widely at times in the reservoir. This results in lower quality wetland habitat for wetland wildlife. However, due to the ease of access, it is an area that would be useful for the development of facilities to support viewing the marsh and wildlife.

A one way all weather tour route would be developed from Stillwater Point, along the east side of Upper Foxtail Lake, through a point between Upper and Lower Foxtail Lakes, then northwest along the canal until reaching Hunter Road. From this point, visitors could then exit the refuge by turning south on Hunter Road or they could turn north and venture into the interior of the refuge.

Initially the tour loop through the existing sanctuary would be closed during the waterfowl hunting season; however, all or portions of this loop could be opened at the Project Leader's discretion during periods of low hunting pressure or if monitoring data indicate that it is prudent.

Interpretation of refuge resources along the tour route would be accomplished by placing markers at vantage points for viewing wildlife and important habitat, geologic, and cultural features. Cassette tapes, tactile displays, and brochures could be used to describe resources of interest, as well as wildlife that might be seen or heard at each site.

A trail at the Timber Lakes area would be developed to facilitate wildlife viewing and photography. The trail would be designed to minimize impacts to nesting species during the spring and bald eagle roosting during the winter. This could be done by altering the trail route each season and by providing an interpretive sign that designates the current route and explains why changes and closures are needed.

An accessible trail would be designed along the Carson River near the new refuge entrance to facilitate wildlife viewing and photography of riparian species. An accompanying leaflet depicting trail route and location as well as resident and migrant bird species would be developed.

A looped wildlife and habitat viewing trail would be developed off the south side of the tour loop above Upper Foxtail Lake in the upland area, and a wetland observation point would be developed on the naturally occurring high ground between Upper and Lower Foxtail.

Monitoring Elements: Number, type, and location of facilities constructed, and response by refuge visitors, e.g., number of visitors using each of the facilities (e.g., tour loop, wildlife viewing trails, boardwalks) by season.

Objective C.c.2: Provide opportunities for high quality experiences in wildlife photography.

Basis of Objectives: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Subgoal C.d: Encourage and provide opportunities for research by other agencies (e.g., USGS, Agricultural Research Service), universities, and other institutions, especially as they relate to the management goals and objectives of Stillwater NWR.

Basis of Subgoal: Same as Alternative C.

Objective C.d.1: Foster relationships with government agencies, conservation groups, and institutions of higher education and communicate the most critical research needs of the refuge.

Basis of Objectives: Same as Alternative C.

Strategies to Achieve Objectives: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

Objective C.d.2: Facilities, equipment, and refuge lands would be maintained for potential use by researchers.

Basis of Objective: Same as Alternative C.

Strategies to Achieve Objective: Same as Alternative C.

Monitoring Elements: Same as Alternative C.

3.4.E.3 ANAHO ISLAND NWR

3.4.E.3.1 Management Program

Guiding Principles

Guiding principles for Anaho Island NWR would be the same as under Alternatives A and B, except that management efforts would be expanded to include maintaining and restoring the island's natural biological diversity, to the extent that no conflicts with refuge purposes are created.

Goals, Objectives, and Strategies

Objectives for Anaho Island NWR would be the same as under Alternatives A and B, except the following goal and objectives would be added. This goal would be of secondary importance to the primary goal of the refuge (i.e., actions taken to accomplish Goal B would only be done to the extent that they do not conflict with Goal A).

Goal B: Restore and maintain natural biological diversity.

Objective B.1: Restore and maintain a natural composition and structure of vegetation.

Objective B.2: Provide research opportunities to obtain information on the other species of birds, mammals, reptiles, invertebrates, and plants present on Anaho Island, and to provide better understanding of the effects of red brome, cheatgrass, and other invasive nonnative plants on native plant communities and possible ways to control these species.

<i>Basis of Objectives:</i> Same as Alternative C.
<i>Strategies to Achieve Objectives:</i> Same as Alternative C.
<i>Monitoring Elements:</i> Same as Alternative C.

3.4.E.4 OTHER PROGRAM AREAS

The management of other programs would be carried out as described under Alternative A, as modified in Alternative E, and as further noted below.

3.4.E.4.1 Partnerships and Other Cooperative Efforts

The guiding principles and strategies would be similar to those described under Alternative A, except that the following would be added. Members of the Fallon Paiute-Shoshone Tribe would be allowed periodic access to designated areas, for the purpose of conducting religious

ceremonies or to teach their traditional ways. These areas would be delineated in a MOU, to be signed by the Tribe and the Service, and would be covered by a special use permit.

Under Alternative E, the Service would enter into an agreement with the U.S. Navy (Naval Air Station-Fallon) to the effect that the 3,000 foot ceiling over Stillwater NWR would remain along the existing northern boundary of the refuge and would not include the additional 26 sections that would be added between the existing boundary and the Bravo 20 Bombing Range under this alternative.

Special events, highlighting refuge resources, would include any number of partners, such as; National Audubon Society, Lahontan Audubon Society, Great Basin Bird Observatory, Nevada Division of Wildlife, Nature Conservancy, State of Nevada, City of Fallon, Churchill County, and local and area schools and other learning institutions.

3.4.E.4.2 Fire Management

The guiding principles, goals, objectives, and strategies of the fire management program would be the same as outlined under Alternative A, except that “and farm” would be added to Objective 4, and an objective would be added to use prescribed fire as a management tool to simulate natural ecological processes.

3.4.E.4.3 Other Visitation

Guiding Principles

Nonwildlife-dependent recreation would not be promoted nor encouraged on Stillwater NWR, but may be permitted if a use is found to be appropriate and compatible with refuge purposes and the Refuge System mission.

Strategies

Horseback riding, bicycling, and licensed off road vehicles, would be permitted on open roads and/or designated trails only and as outlined in a compatibility determination. A draft compatibility determination is included in Appendix O. Other non wildlife-dependent uses would not be permitted on the refuge until they are determined to be appropriate and compatible. A cooperative effort would be sought to provide camping opportunities during the nonhunting season through the Fallon Paiute-Shoshone Tribe, Bureau of Land Management, the City of Fallon, Churchill County, or private organizations with land near or adjacent to Stillwater NWR.

3.4.E.4.4 Cultural Resources Management

Guiding Principles

Under Alternative E, the goal of the cultural resource management program would be to manage cultural resources for the benefit of present and future generations. Almost all management activities that disturb the ground at Stillwater NWR would invoke the National Historic Preservation Act (NHPA). However, cultural resource management would be more than simple compliance to the law. Several other laws, refuge needs, and Service policy compel a proactive approach to cultural resource management at Stillwater NWR. The Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and Section 110 of the NHPA call for an active cultural resource program. Ways to increase our understanding of the Cattail Eaters culture would be explored with the Fallon Paiute-Shoshone Tribe and the Region's Cultural Resources Team. This would include funding sources. Stillwater NWR and the surrounding Lahontan Valley have a strong tradition of archaeological and ethnographic research, and this would be continued. The local Fallon Paiute-Shoshone Tribe has maintained a vital interest in its traditional culture and archaeology.

In addition to providing information about the local Tribe, environmental data contained in archaeological sites have contributed to our understanding of the natural ecological processes and biological diversity of the Stillwater area. This information was used in ascertaining natural ecological conditions described in Goal A of Stillwater NWR.

Given the fragile and nonrenewable nature of archaeological resources, a cultural resource management program would include development and implementation of programs and activities for cultural resource education and interpretation on Stillwater NWR. Increased emphasis would be placed on interpreting cultural resource information to refuge visitors, including educating the public of the need to preserve cultural resources. Interpretation of cultural resources can be integrated with Goal C of Stillwater NWR, to provide opportunities for scientific research, environmental education, and wildlife oriented recreation. By sharing knowledge of the Northern Paiute legacy at Stillwater Marsh, the Service would contribute to the development of partnerships in historic and wildlife conservation.

Reconnaissance surveys at Anaho Island NWR have failed to identify any significant prehistoric cultural resources (archaeological sites). However, Anaho Island figures prominently in the spiritual beliefs of the Pyramid Lake Paiute Tribe. Given the limited access to the island by visitors (it is closed to public access) and the largely passive management of the land and its wildlife, cultural resource management is not a significant issue at Anaho Island NWR.

Goals, Objectives, and Strategies

Goal A: Manage cultural resources for the educational, scientific, and cultural benefit of present and future Americans.

Objective A.1: Preserve archaeological resources for present and future cultural and scientific research.

Objective A.2: Preserve cultural resources to contribute to the Service's trust responsibilities to the Fallon Paiute-Shoshone Tribe.

Strategies to Achieve Objectives: The Service would take all necessary steps to comply with applicable laws and policies pertaining to the protection of cultural resources. A program would be established to monitor archaeological sites to record deterioration from erosion and vandalism, and to identify sites in need of special protection from erosion. Targeted archaeological sites susceptible to erosion could be stabilized with plantings or erosion cloth, as appropriate, and to the extent it is compatible with refuge goals. A plan would be prepared to protect and salvage data from archaeological sites in the event of serious flooding of cultural resources.

Visitor services, especially hunting and wildlife observation, can cause impacts to cultural resources. Some impacts are direct and obvious, such as those associated with the construction of a road or facility to accommodate wildlife-dependent recreation. These impacts are easy to identify, avoid, and mitigate, because cultural clearance is required before infrastructure improvements are completed.

Facilitating access and use of the refuge by the public poses subtle but equally serious impacts to cultural resources. Some impacts, such as trampling of archaeological sites by wildlife observers and hunters, overnight stays associated with wildlife-dependent recreation, boat landing and launching, and erection of blinds, constitute unintentional impacts. Other impacts are opportunistic, such as artifact collecting while hunting or observing wildlife. Professional and avocational archaeologists and the Fallon Tribes are particularly concerned with illegal artifact collection at Stillwater NWR archaeological sites.

To minimize potential impacts, the refuge will carefully consider the location and availability of roads, observation trails, canoe trails, and other wildlife observation and hunting areas, so that cultural resources are adequately protected. Where direct or indirect impacts are identified but cannot be avoided, the refuge would implement mitigation to reduce or eliminate impacts to cultural resources. Mitigation could include, archaeological data recovery, interpretation, environmental education, and if severe, the refuge could take necessary steps to administratively close particularly sensitive areas until such sites are excavated.

Cultural resource data would be incorporated into road planning and maintenance. For instance, existing roads that conflict with cultural resource preservation would be identified. Locations where barriers, guard rails or other devices could be installed to prevent off road vehicle traffic and to otherwise protect cultural resource sites would also be identified. This information would be used in deciding whether to close certain roads. Roads to be closed permanently would be targeted, as would roads to be closed or monitored in the event of flooding that expose considerable cultural resources. Sensitive archaeological areas and procedures for avoiding these areas during refuge projects, hunting programs, and other public use activities would be identified. Cultural resource site locations and elevations would be incorporated into the refuge Geographic Information System (GIS) database so that managers would have easy access to such data to determine the effects of refuge management activities on cultural resource protection, including water management.

A component of the program would be to identify, in various wetland units, water elevations above which archaeological sites could suffer erosion. This information could then be forwarded to water managers, so that they would have access to this information when making water management decisions. The information could also be used in deciding whether particular sites especially susceptible to erosion, should be stabilized with plantings, erosion cloth, or other means. Before plantings or other erosion control measures are undertaken, compatibility with habitat objectives would be assessed.

An Adopt-A-Site program, to monitor selected archaeological sites, would be promoted and implemented given sufficient interest. Refuge law enforcement officers would be trained in the implementation of the Archaeological Resources Protection Act and cultural resource protection, and the Service would coordinate with law enforcement personnel in other agencies and Tribes to provide a law enforcement presence for cultural resource protection. Service law enforcement personnel would attend specific training in cultural resource protection, identification, the Archaeological Resources Protection Act, and Tribal consultations.

Objective A. 3: Conduct archaeological research to further goals of refuge management.

Strategies to Achieve Objective: Several actions could be taken that would contribute to a better understanding of the northern Paiute culture, as well as natural ecological conditions, hydrologic functioning, and composition of plant and animal communities. Environmental data contained in archaeological and geological sites could be recovered and interpreted to provide information on natural biological diversity and ecological processes of the Stillwater wetlands. Research results contained in existing reports, field notes and museum collections could be compiled and synthesized. Research questions related to other goals and objectives of the CCP could be identified and potentially be answered by examining archaeological and other environmental deposits on the refuge. Data could be recovered from archaeological and environmental deposits that contain environmental data identified in other investigations. Surveys for archaeological sites conducted on refuge should be done in the context of the predictive model (Zeanah 1995).

Opportunities to accomplish cultural resource research with third parties such as universities, volunteers, and museums would be developed. Results of archaeological research would be published in ways that are usable and accessible by scholars and the public. Research of other cultural resource questions identified in the “Wetland Element” of the *Nevada Historic Preservation Plan* would be encouraged.

Objective A. 4: Implement programs and activities for cultural resource education and interpretation.

Strategies to Achieve Objective: Cultural resource education and interpretation would be coordinated with environmental education and interpretation on and off refuge. Other educational and interpretation programs on Stillwater NWR would be reviewed to assess whether cultural resources could be incorporated into them (e.g., boardwalks, interpretive signs, auto tour route). Classroom presentations on archaeology, prehistory, and conservation would be conducted in the Fallon school district and at Naval Air Station-Fallon. A program of guided tours of refuge habitats and traditional *Toedokado* use of the wetlands would be developed in concert with other guided tours. Opportunities to provide internships, volunteer opportunities, and modest stipends for researchers, volunteers, and special lab analyses for graduate students would be pursued. Assistance would be sought from local museums and other agencies and institutions in developing displays, exhibits, brochures, and interpretive activities. The refuge would actively participate in Nevada Archaeological Awareness Week.

Objective A. 5: Provide opportunities for the Fallon Paiute-Shoshone Tribe to learn about and enhance their traditional cultural heritage in the Stillwater Marsh.

Strategies to Achieve Objectives: All cultural resource research, interpretation, education, and preservation would be conducted in consultation with the Fallon Paiute-Shoshone Tribe (and Nevada State Historic Preservation Office as appropriate). The refuge would facilitate opportunities for the Fallon Tribe to learn about and enhance their traditional cultural heritage. These opportunities would be pursued so they remain compatible with refuge purposes. Strategies would include encouraging the Fallon Tribe to identify traditional and sacred places on the refuge pursuant to the sacred Sites Executive Order #13009.

The Service would facilitate, under special use permits, visitation and ceremonial activities by the Fallon Tribe at these places, and would protect the sites from adverse effects. The Service would work with the Fallon Tribe to identify cultural items that need treatment according to the Native American Graves Protection and Repatriation Act.

The Service would also work with the Fallon Tribe to facilitate the harvest and use of traditional plant and animal resources. Such harvest and use would be for educational, ceremonial, artistic, and allied purposes necessary to learn about, or enhance, traditional culture. Harvest and use for subsistence and commercial purposes would not be allowed. For example, the Fallon Tribe in consultation with the Service would identify traditional plants and their gathering locations and establish a protocol for their protection, harvest, and use. The Service could also work with the Fallon Tribe to permit them to harvest other traditional resources, such as, rabbits and coots, for educational and ceremonial purposes.

Objective 6: Ensure that cultural resource protection is integrated into all visitor services facilities and programs.

Basis of Objectives: The Nutgrass, Pintail Bay, Goose Lake, Swan Lake, and Big Water units within the area open to visitor services, contain some of the most valuable cultural resources at Stillwater NWR. Visitor Services programs such as hunting, wildlife observation, and photography and associated canoe trail, road access, and parking areas, all increase access and therefore, the threat to fragile cultural resources. These activities can provide cover for artifact collectors.

Strategies to Achieve Objectives: The refuge archaeologist will work with refuge staff to aid in planning facilities construction and visitor services programs that minimize potential conflicts with cultural resources. The primary strategy will be to utilize interpretive media such as brochures and fliers that explain the sensitivity of these sites and provide information regarding laws and policies related to cultural resources.

In addition to compliance with the NHPA, and other legal mandates, the refuge would incorporate knowledge of archaeological sites in road planning; take additional steps beyond law enforcement to stop off road vehicle activity (e.g., signs and vehicle barriers); and would incorporate cultural resource information into specialized pamphlets and/or brochures describing refuge visitor services programs. Archaeological sites which are susceptible to repeated, unlawful artifact collecting, would be excavated and cataloged.

Monitoring Elements: Number of ARPA violations documented.

3.4.E.4.5 Monitoring and Research Program

Guiding Principles

Guiding principles would be similar to those described under Alternatives A and B, except more emphasis would be given to monitoring a wider range of species and plant communities.

Strategies

The monitoring program of Alternative A would be revised to more accurately reflect the objectives that would be adopted under this alternative. Adjustments would be needed due to the shift in management direction. Long-term data sets of the existing monitoring program would be evaluated to determine if they should be continued. It is anticipated that most, if not all, long-

term data sets would be continued. Under this alternative, monitoring wetland habitat acreage would be conducted quarterly (January, April, July, and October).

Given the focus on biological diversity, additional components would be added to the monitoring program (summarized in Appendix D). The monitoring program would encompass at least two main parts: monitoring of representative components of biological diversity and habitat parameters addressed in refuge objectives. Because of the many aspects of biological diversity, a hierarchical system would be adopted. Of most importance would be the monitoring of species richness in each major phylum, although this would not have to be done each year. Species observed would be compared, to the extent possible, to native species richness. Monitoring the relative abundance of representative (indicator) species within each phylum would also be undertaken.

With respect to habitat management, quarterly monitoring of wetland habitat acreage would be the most critical factor. Next in importance would be monitoring the relative mix (in acres) of habitat types within marsh, riparian, upland, and farmland areas. As part of this effort, the distribution of nonnative dominated communities and riparian communities would be tracked. Within community composition and structure would also be monitored, emphasizing marsh, riparian areas, and revegetated areas.

In addition to the core biological monitoring program, additional emphasis would be placed on monitoring the effects of all recreational activities and management techniques that involve special use permits (for example, livestock grazing and muskrat trapping). In particular, a monitoring program would be designed to assess whether a sufficient amount of high quality habitat is being provided in secure areas (free of human disturbance or of limited disturbances) for waterbird breeding, feeding, and resting.

Visitor Services monitoring would include the components listed in Alternatives A and B, except that there would be an improved method for determining what percent of road use results from refuge vehicle travel. Volunteers or staff members would monitor all vehicles entering and exiting the refuge on a monthly basis to assess a more accurate accounting of how many persons per vehicle should be assumed. Combined with road counter data, this information can be used to extrapolate a more accurate visitor count. The above described method would coincide with a national standard for assessing visitation, now in draft. The resulting visitor numbers would be correlated with wildlife monitoring numbers to assess level of human disturbance. Appendix D describes the visitor services monitoring program of this alternative.

3.4.C.4.6 Budget and Administration

Several projects have been identified for implementation under Alternative E. The largest would be a refuge administrative complex which would include a visitor facility and maintenance shop, an estimated \$4,687,200 under this alternative. Other projects include development of additional public use facilities such as auto tour routes, nature trails, observation areas and interpretive signs, an estimated \$3,602,700. Total capital costs of the water rights acquisition program are

presented in the WRAP EIS (USFWS 1996a). Funding for these projects varies greatly depending on Congressional appropriations and the refuge's ability to obtain special project funds from sources such as grants, and Transportation Equity Act funds and, therefore, predicting the actual "nonsalary" funding is difficult.

The projected annual costs of managing the Stillwater NWR Complex under Alternative E would be an estimated \$3.3 to \$3.4 million per year upon completion of the water rights acquisition program. Projected annual expenditures include salaries; refuge operation and maintenance costs; water delivery and operation and maintenance charges; refuge revenue sharing payments; and water rights leasing costs. Annual expenditures related to the water rights acquisition program were discussed in Section 3.3.1.1, Features and Assumptions Common to all Alternatives. Refuge salaries and operations and maintenance costs would be an estimated \$1.7 million/year under this alternative.

Refuge staff under Alternative E would be similar to Alternative A, except two additional positions would be added: a park ranger (GS-9 law enforcement) and an Archaeologist (GS-9/11), bringing the total number of permanent full-time positions to fifteen. An additional term position would also be added: a wildlife biologist (GS-7/9).

3.5 SUMMARY OF POTENTIAL IMPACTS OF THE ALTERNATIVES BEING CONSIDERED

Potential impacts of the alternatives being considered in this Final EIS are presented in Table 3.3.

Table 3.3. Summary of potential impacts of Alternatives A, B, C, D, and E.							
Resource/Issue	Existing Conditions	Baseline Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	
			Long-term Average Change from Baseline Conditions^{1,2}				
PHYSICAL ENVIRONMENT (EIS Study Area)							
Irrigated Acreage Base (acres)	59,075	59,075	similar ³	similar	similar	similar	
Headgate Demand Deliveries	174,500	170,100	170,100	170,100	170,100	170,100	
	169,200	167,530	167,340	168,750	161,780	167,760	
Project Efficiency (%)	63.8	71.0	71.0	71.1	70.8	71.1	
Lahontan Reservoir Releases	265,320	235,820	235,640	236,030	228,560	236,020	
	June 30 Storage	213,860	227,860	230,890	226,050	225,410	225,500
	November 30 Storage	103,180	125,030	121,280	129,060	144,470	129,780
Hydropower Resources	Power (GWh)	21,860	19,260	18,940	18,880	18,550	18,880
	Revenue (\$)	893,600	782,910	738,160	671,220	724,490	700,350
Newlands Project Canal Capacities	EC ⁴	increase needed	similar	similar-MH	SH-MH	similar-MH	
Truckee Canal at Derby Dam	88,180	66,250	67,660	65,700	61,570	65,590	
Supply to Lahontan Reservoir	49,750	30,510	30,900	30,070	26,410	29,990	
Lower Truckee River at Derby Dam Pyramid Lake Elevation (feet)	475,760	497,440	496,900	497,480	502,190	497,610	
	3,836.84	3,842.11	3,841.97	3,842.11	3,843.27	3,842.14	
Air Quality (micrograms/meter ³)	EC	111	similar	similar	similar	similar	
PHYSICAL ENVIRONMENT (ON REFUGE)							
Service Lands Acreage Base							
Stillwater NWR/WMA and Fallon NWR (acres)	163,021	163,021	97,418	137,504	167,806	137,504	
Anaho Island NWR (acres)	(490 ac. in 1999)	245	<1% lower	<1% higher	2% lower	<1% higher	
Refuge Wetlands							
Average Wetland Habitat Acreage	overall	9,000	14,000	14,000	14,000	14,000	14,000
	Stillwater Marsh only	8,700	13,500	13,500	13,500	13,500	13,500

3

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.

4

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.

Resource/Issue	Existing Conditions	Baseline Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
			Long-term Average Change from Baseline Conditions ^{1,2}			
Wetland deliveries and incidental inflows (ave.)	39,900	70,000	70,000	70,000	70,000	70,000
Seasonal Wetland Habitat (Stillwater Marsh)	Apr-Jun 8,000 Oct-Dec 9,600	12,900 14,600	11,300 15,900	15,300 13,400	20,500 8,600	16,200 13,400
Flushing Action Total Dissolved Solids Mercury	limited EC potential problem	limited BC ¹ similar	similar similar similar	SH-MH ¹ similar SH	SH-MH similar SH	SH-MH similar SH
BIOLOGICAL COMMUNITIES						
VEGETATION						
Marsh Plant Communities (Peak acreage / Season of Peak Acreage) ⁵						
Submergent Vegetation	870-3480 / similar	2700-5400 / similar	1695-4770 / similar	2700-4725 / similar	2700-4300 / similar	2700-4725 / similar
Deep Emergent Vegetation	1305-2610 / similar	2025-4050 / similar	1695-4770 / similar	2025-5400 / similar	2025-6075 / spring	2025-5400 / similar
Shallow Emergent Vegetation	1305-2610 / similar	1350-3375 / similar	1130-4770 / fall	1340-4590 / spring	0-7175 / spring	1340-4860 / spring
Moist-Soil Vegetation	800-2880 / fall	645-2190 / fall	1695-4770 / fall	1340-3825 / spring	0-4100 / spring	1340-3825 / spring
Wet Meadow Vegetation	0-1600 / spring	0-1290 / spring	565-2385 / fall	1340-3825 / spring	0-6150 / spring	1340-3825 / spring
Wetland Shrub Vegetation	0-435 / similar	0-675 / similar	0-477 / fall	0-765 / spring	0-1025 / spring	0-765 / spring
Unvegetated Alkali Mudflat Habitat	435-870 / similar	675-1350 / similar	565-1590 / fall	670-2295 / late spring	0-3075 / late spring	670-2295 / late spring
Deep, Open-Water Habitat	0-80 / spring	0-129 / spring	0-113 / spring	134-612 / spring	172-1025 / spring	0-648 / 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	0-6,450 / 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	30 miles protected Maximum 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	44,600 acres protected Enhanced understories
Agricultural Vegetation	0 acres	0 acres	300-400 acres alfalfa, small grains	200-300 acres alfalfa, small grains	0 acres	200-300 acres alfalfa, small grains

⁵ Seasonal ranges in vegetation acreages are a component of vegetation dynamics. This table considers only an average range in acreage and the season when the peak acreage would be anticipated to occur.

Resource/Issue	Existing Conditions	Baseline Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	
			Long-term Average Change from Baseline Conditions ^{1,2}				
Composition of Plant Communities	65 % native species	65-70 % native species	similar proportion, but different species	moderately higher	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	moderately lower distribution of saltcedar and tall whitetop in marsh, meadow, and riparian habitats	
WILDLIFE							
Birds							
Waterfowl	Waterfowl Use Days Waterfowl Produced	8 - 10 million 3,000 - 5,000	10 - 20 million 5,000 - 10,000	MH Similar	Similar - SL Similar - SH	SL - CL SL - CL	Similar - SL Similar - SH
Shorebirds	Peak Spring Population Breeding Population Fall Migration	50,000 EC 25,000-50,000	50,000 - 100,000 BC 25,000 - 100,000	Similar similar to SL similar to SH	MH similar to SH SH	CH CH SH	MH similar to SH SH
Wading Birds	Migratory Population Breeding Population	EC EC	BC BC	similar (spring)to SL (fall) similar to SL	SH (spring) MH (fall) SH	MH (spring) similar (fall) MH	SH (spring) MH (fall) SH
White pelicans nests/year on Anaho Island		2,000 - 5,000	2,000 - 5,000	similar	similar	similar	similar
Other Waterbirds	Spring Fall	EC EC	BC BC	SH SH	MH Similar	CH ML	MH Similar
Passerines	Riparian Upland	EC EC	BC BC	similar similar	SH- MH similar to SH	SH-MH similar to SH	SH- MH similar to SH
Raptors	Bald Eagles (winter) Marsh Raptors Riparian/Upland Raptors	up to 30 EC EC	up to 50 BC BC	SH-MH MH similar	SH MH-CH SH-MH	similar to SL CH-MH SH-CH	SH MH-CH SH-MH
Other Bird Species		EC	BC	similar - SH	SH	SH	SH
Avian Diseases	number birds lost /year	1,000 - 10,000	1,000 - 10,000	similar	similar	similar - SL	similar
Mammals	Marsh Riparian Upland	EC EC EC	BC similar to EC similar to EC	similar similar similar	SH SH SH	SH-MH SH-MH SH	SH SH SH
Reptiles		EC	similar to EC	similar	SH	SH	SH
Amphibians		EC	similar to EC	similar	similar - SH	SH-MH	similar - SH

Resource/Issue	Existing Conditions	Baseline Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
			Long-term Average Change from Baseline Conditions ^{1,2}			
Fish Native Game Fish (non-native) Carp and Mosquito Fish (non-native)	EC EC EC (common-abund't)	BC BC BC	Similar to SH SL-ML Similar to SL	SH - MH SL - ML Similar to SL	Similar to SL ML ML	SH - MH SL - ML Similar to SL
Invertebrates Aquatic (Diversity/Abundance) Riparian (Diversity) Dune (Abundance)	Moderate/Moderate EC EC	Moderate/High similar to EC similar to EC	SH/similar to SH similar similar	SH-MH/similar -SH SH - MH similar to SH	MH/similar SH - MH similar to SH	SH-MH/similar -SH SH - MH similar to SH
Endangered/Threatened Species On-refuge Truckee River basin (cui-ui index ⁶) Truckee River basin (Lahontan cutthroat trout)	EC 677,793 EC	up to 50 bald eagle 1,570,045 BC	similar 1,508,827 SH (spring) SL (fall)	similar 1,521,195 SL (spring) SH (fall)	similar 1,723,060 MH (spring) SH (fall)	similar 1,523,912 SL (spring) SH (fall)
Fish and Wildlife Toxicity	EC	BC	similar	similar	similar	similar
Natural Biological Diversity	EC	BC	similar - MH	MH	similar to SH	SH - MH
RECREATIONAL OPPORTUNITIES						
Hunting	EC	BC (MH than EC)	MH-CH	Option 1: ML Option 2: SL	ML-CL	similar to SL
Environmental Education and Interpretation	600-800 individuals reached/year through leader-cond'd activities	600-800 individuals reached/year through leader-cond'd activities	SH	MH	CH	MH
Wildlife Observation and Photography	EC	BC	SH	SH-MH	MH	SH-MH
Fishing Stillwater Marsh Indian Lakes	EC (very few anglers) EC	BC BC (similar to EC)	ML similar	ML similar	ML similar	ML similar
Camping	EC	BC (similar to EC)	similar	ML	CL	ML
Other Uses Stillwater Marsh/Fallon NWR area Stillwater WMA area	EC EC	BC (similar to EC) BC (similar to EC)	ML similar	SL ML	SL ML	SL ML
CULTURAL RESOURCES/INDIAN TRUST ASSETS						
Cultural Resources	Cultural resources adequately protected	BC (similar to EC)	SH (increased law enforcement)	MH (law enforcement, education, and more info)	MH (law enforcement, education, and more info.)	MH (law enforcement, education, and more info)
Indian Trust Assets						

⁶The 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.

Resource/Issue	Existing Conditions	Baseline Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
			Long-term Average Change from Baseline Conditions ^{1,2}			
Fallon Paiute-Shoshone Indian Reservation	EC	BC (similar to EC)	similar	SH	SH	SH
Pyramid Lake (refer to Truckee River, Pyramid Lake and cui-ui resources addressed earlier)	EC	BC (SH than EC)	SL	similar - SH	SH	similar - 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	7,200 AUMs 7,200 AUMs	60-80% lower 20-30% lower	90-95% lower 37-47% lower	100% lower 40-50% lower	90-95% lower 37-47% lower
Muskrat Trapping (number trapped annually)	4,000 - 40,000	4,000 - 40,000	similar	up to 90% fewer	up to 100% fewer	up to 90% fewer
Commercial Fishery (Indian Lakes area)	Carp and Blackfish	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	40-65% lower
Outdoor Recreation Expenditures	EC	\$740,000/year	1% higher	17% higher	5% higher	17% 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	5.2-11.8% higher
NAVAL AIR STATION-FALLON OPERATIONS						
EC	EC	BC (similar to 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	similar SH - MH MH
Ability of the Service to Meet Legal Mandates	Limited	Limited	SL	CH	MH	CH

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