Chapter 4: Environmental Consequences

4.1 Introduction

This chapter evaluates the three alternatives on the basis of environmental consequences (effects or impacts) to the environment described in Chapter 3. This evaluation is conducted in three parts. First, there is a discussion of the effects common to all alternatives. Second, the effects of each alternative are analyzed for each of more than 39 physical, biological, and socioeconomic parameters or concerns. A table at the end of the chapter (Table 10 on page 149) helps compare and contrast these effects. Lastly, the cumulative impacts of the alternatives are discussed.

As described in Chapter 2, three alternatives are being considered. Alternative A, No Action, would maintain the current level of effort on fish and wildlife and habitat management. Public use programs and regulations would remain virtually unchanged. Alternative B, Wildlife and Habitat Focus, would increase the level of effort on fish, wildlife, and habitat management. Some public use opportunities would remain the same and others reduced in favor of wildlife and habitat protection. Alternative C, Integrated Public Use, Wildlife and Habitat Focus, would increase the level of effort on fish, wildlife, and habitat management. It would take a more proactive approach to public use management to ensure a diversity of opportunities for a broad spectrum of users, both for wildlife-dependent uses and traditional and appropriate non-wildlife uses. Alternative C is the preferred alternative.

Wood Duck at Trempealeau NWR, ??? Sheldon

4.2 Effects Common to All Alternatives

4.2.1 Climate Change

The U.S Department of Interior issued an order in January 2001 requiring its land management agencies to consider potential climate change impacts as part of long-range planning endeavors.

The increase of carbon within the earth's atmosphere has been linked to the gradual rise in surface temperature commonly referred to as global warming. In relation to comprehensive conservation planning for national wildlife refuges, carbon sequestration constitutes the primary climate-related impact to be considered in planning. The U.S. Department of Energy's report "Carbon Sequestration Research and Development" (U.S.

DOE, 1999) defines carbon sequestration as "…the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere."

Terrestrial biomes of all sorts – grasslands, forests, wetlands, tundra, perpetual ice and desert – are effective both in preventing carbon emission and acting as a biological "scrubber" of atmospheric carbon monoxide. The Department of Energy's report conclusions note that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere.

The actions proposed in all alternatives would preserve or restore land and water, and thus would help mitigate human-induced global climate change through increased vegetation coverage which in turn enhances the removal and storage of carbon.

4.2.2 Air Quality

Prescribed burning has short-term localized negative impacts to air quality that would be similar for all alternatives as similar numbers of acres are burned annually. The impacts are mitigated by small burn unit size (150 acres is the largest unit) and distance from population centers. No smoke management issues exist at present as long as smoke management parameters outlined in the Fire Management Plan (USFWS 2001) are met.

4.2.3 Emergency Response to Contaminant Spills

Under all alternatives the capabilities of the staff to effectively respond to contaminant spills or other emergencies that may jeopardize Refuge resources would be improved. Habitats would be better protected because staff would have the training and ability to respond more quickly and with the best available equipment and expertise. With specific training, the amount of habitat impacted and the severity of the impact could be reduced by quick and effective response.

4.2.4 Management of Wildlife Diseases

Options for mitigating the deleterious effects of wildlife disease outbreaks to either people or animals are often limited. However, under all alternatives the ability of the Refuge staff to respond would be improved. Locations and types of expertise and equipment would be identified and staff would be familiar with proper safety, sampling and containment procedures. Communication channels between responding agencies would be in place and avenues for keeping the public informed would be improved.

4.2.5 Threatened and Endangered Species

All alternatives in the Draft EIS/CCP have objectives to improve habitat conditions for native fish and wildlife including species listed as threatened or endangered under the Endangered Species Act. The required Endangered Species Act consultation has been completed for nearly all habitat activities proposed on the Refuge during the next 15 years. Other projects or activities in the alternatives of the Final EIS/CCP during the next 15 years (new boat ramps, parking facilities, buildings or other structures), are not likely to adversely affect listed species (Bald Eagles). This opinion is based on construction of similar projects in the past; to date, none of these activities have adversely affected federally listed species.

One candidate species recently occurred on or in the vicinity of the Refuge. The eastern Massasauga rattlesnake (*Sistrurus catenatus catenatus*) occurred recently (1970s) within the Refuge, and potential habitat still exists. Alternatives B and C include objectives with both targeted and non-targeted benefits for eastern Massasauga. First, the objectives include restoring sedge meadow, bottomland forest, and reducing the pervasiveness of exotic species throughout the Refuge. All of these actions could have long-term benefits for eastern Massasauga by providing or enhancing potential habitat. Second, the Refuge would investigate developing a plan to reintroduce eastern Massasauga. Although the plan is in the conceptual phase, the commitment would be to:

implement Massasauga-compatible management,
restore or enhance habitat to support a viable population, and
provide long-term protection for such habitat.

Although Massasauga-compatible management would be conducted, unavoidable impacts may occur. These impacts should be rare and minimal in extent, however, as the Refuge is committed to using the best management practices developed specifically for eastern Massasauga.

Bird's foot trefoil. USFWS

For these reasons and given that the goals and objectives in applicable portions of the Draft EIS/CCP directly and indirectly benefit the continued survival of eastern Massasauga, the implementation of the CCP which emerges is not likely to appreciably reduce the survival and recovery of these species. On the contrary, the expectation is for implementation of a Final CCP to perpetuate viability of these species within the Refuge.

Section 4.4.1 on page 131 contains additional information, by alternative, on the potential impacts to currently listed species, namely the Bald Eagle.

4.2.6 Furbearer Trapping

Under all alternatives, the currently approved furbearer trapping program would continue unchanged until a new furbearer trapping plan is completed by October 2009. A description of the current program can be found in Chapter 3, Section 3.5.6 on page 106. Impacts from the current trapping program are summarized in the current compatibility determination available on the Refuge's planning website or at the Refuge office. Until the new furbearer trapping plan is completed, future biological and economic impacts are unknown. A separate environmental assessment will be done in conjunction with preparation of the new plan and all impacts explored. Public involvement will be part of new plan preparation.

4.2.7 Adjacent Landowners

Landowners adjacent to the Refuge may benefit economically from owning property next to the Refuge. A recent report (Boyle et al. 2002) shows that land and property values are typically higher for properties next to a national wildlife refuge, when holding other factors constant. For example, a four-bedroom, two bath house on a quarter-acre lot increases in value as the distance from the refuge decreases. For the four refuges included in the report, property values increased from $351 to $7,469 per mile as the distance of each property to the refuge decreased. The report states on page 19:

> "The significant premium people pay to purchase properties near refuges clearly indicates that [refuges] provide desirable environmental amenities and permanent open space to local residents."

As property value increases, taxes would also be expected to increase. While this may result in increased revenue for the county, it also increases the tax burden for adjacent landowners. However, based on several townships included in the report, the annual tax increase of properties adjacent to refuges is fairly small, with annual tax increases averaging between $88 and $112 per home.

Since the alternatives would not radically change current land and water management direction or preclude any existing public use, it is anticipated that none of the alternatives would have a significant effect on property values in general or on the desirability of owning or buying property adjacent to the Refuge.

4.2.8 Land Use

No significant changes to land use and management would be expected to occur under any of the alternatives. The remaining 340 acres within the existing approved acquisition boundary for the Refuge would be purchased as funds and willing sellers became available. Of the 340 acres, about 20 are presently cropland that would be taken out of production. The rest of the proposed acquisition land is primarily wetland or bottomland forest and would remain so. Stream bank and wetland restorations on private lands would increase under Alternatives B and C, but no land would be taken out of production.

4.2.9 Management of Easements and Right-of-Ways

Under all alternatives impacts to Refuge habitats from management activities in easements and right-of-ways would be reduced. Better communication and coordination would help all parties complete needed work with less disturbance to habitats and wildlife.

4.2.10 Revenue Sharing

These payments are made annually in Wisconsin to compensate local townships and municipalities for loss of tax revenue on federal refuge lands within their jurisdiction. The amount paid for revenue sharing is derived from a formula based on three-quarters of 1 percent of the assessed value of the land or 25 percent of the sale of refuge products, whichever is greater. This formula determines the authorized payment amounts. However, in recent years, Congress has appropriated funds representing varying amounts less than 100 percent.

With eventual acquisition of the remaining 340 acres within the approved Refuge boundary, revenue sharing payments to Trempealeau Township would increase by a modest amount. Assuming all 340 acres were acquired next year and their average assessed value was $1,500 per acre, the maximum additional revenue sharing payment would be $3,825 (340 x $1500 x .0075).

4.2.11 Environmental Justice

Executive order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was signed by President Clinton on February 11, 1994, to focus federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low-income community's access to public information and participation in matters relating to human health or the environment.

Overall, none of the alternatives are expected to disproportionately place an adverse environmental economic, social, or health effect on minority or low-income persons.

4.2.12 Cultural and Historical Preservation

Activities outlined in each alternative have the potential to impact cultural resources, either by direct disturbance during construction of habitat projects and facilities related to public use or administration and operations, or indirectly by exposing artifacts during management actions such as water drawdown or prescribed burning. Although the presence of cultural resources including historic properties cannot stop a federal undertaking, the undertakings are subject to Section 106 of the National Historic Preservation Act, and at times, other laws.

Thus, the Refuge will, during early planning of actions, provide the Regional Historic Preservation Officer a description and location of all projects, activities, routine maintenance and operations that affect ground and structures, details on requests for allowable uses, and the range of alternatives being considered. The regional officer will analyze these undertakings for their potential to affect historic properties and enter into consultation with the State Historic Preservation Officer and other parties as appropriate. The Refuge will notify the public and local government officials to identify concerns about impacts by the undertakings. This notification will be at least equal to, but preferably with, the public notification accomplished for NEPA compliance and compatibility determinations.

4.3 Effects of Alternatives on Physical Parameters/Concerns

4.3.1 Ecosystem

4.3.1.1. Alternative A – No Action

Under this alternative there would be no overall change in the quality or functioning of ecological processes within the ecosystem.

4.3.1.2. Alternative B – Wildlife and Habitat Focus

The addition of a private lands biologist would allow more restoration projects within the headwater tributaries of the Mississippi River. Sediments and nutrients entering the River system would be reduced by a small amount. Overall, the ecosystem would benefit a small amount by reduced sediment loads in a few small tributaries of the Mississippi River.

4.3.1.3. Alternative C – Integrated Wildlife, Habitat, and Public Use Focus

The addition of a private lands biologist would allow more restoration projects within the headwater tributaries of the Mississippi River. Sediments and nutrients entering the River system would be reduced by a small amount. Public use staff would provide more opportunities for the public to learn about the functions of ecosystems and the importance of ecosystem management. Overall, more restoration projects and more public awareness of ecosystem issues would begin to improve the overall system.

Trempealeau NWR

4.3.2 Water Quality

4.3.2.1. Alternative A – No Action

Sediments and agricultural contaminants would continue to flow into the Refuge from the Trempealeau River and its tributaries. Rough fish would be abundant, creating turbid water and limiting the growth of aquatic plants. The large, open pools would continue to be impacted by wind and waves that suspend bottom sediments. Little water quality monitoring would occur, leading to a lack of information on which to base management decisions. Overall, Refuge waters would continue to be turbid with poor clarity and little light penetration, especially in the large pools.

4.3.2.2. Alternative B – Wildlife and Habitat Focus

More work restoring upstream tributaries on private lands would reduce sediments in the Trempealeau River and improve water quality on the Refuge. Routine drawdowns and commercial fishing would reduce rough fish populations and improve water clarity. The pools would be broken into smaller units by dikes and islands, alleviating some of the impacts of wind and waves. Proposed wetland management actions would improve growth of aquatic plants, helping to stabilize bottom sediments and filtering suspended solids and some contaminants. More water quality monitoring would be conducted and data could be used to improve management decisions. Overall, Refuge waters would have less suspended solids, better clarity and improved water quality.

4.3.2.3. Alternative C – Integrated Wildlife, Habitat, and Public Use Focus

Same as Alternative B, but public use staff would include programs on water quality issues in interpretive and educational materials. A better understanding by individuals of how their activities may impact water quality would lay the ground work for long-term improvements to water systems.

4.3.3 Sedimentation

4.3.3.1. Alternative A – No Action

Erosion of lands in northern Trempealeau and Buffalo Counties would continue to contribute sediment to the tributaries that feed into the Trempealeau and eventually the Mississippi River. A few projects each year through Partners for Wildlife

would restore short stretches of degraded streams, but the overall reduction in sediment flow would be minor.

4.3.3.2. Alternative B – Wildlife and Habitat Focus

The Partners for Wildlife Program would be more fully utilized to complete stream restoration projects that would reduce sediments eroding from upstream agricultural lands. This alternative would have the greatest impact at reducing sediments flowing into the Trempealeau River and eventually the Refuge.

4.3.3.3. Alternative C – Integrated Wildlife, Habitat, and Public Use Focus

Same as Alternative B except more opportunities for the public to learn about erosion and sedimentation would help citizens understand their role in reducing downstream impacts to water quality.

4.3.4 Geomorphology

4.3.4.1. Alternative A – No Action

Overall geomorphology would continue to be driven by flood events, off-Refuge land use practices, and Refuge water management operations. Overall there would be little change to geomorphology from this alternative.

4.3.4.2. Alternative B – Wildlife and Habitat Focus

Under this alternative there would be moderate, local changes in floodplain geomorphology as projects involving island and dike construction and water management facilities are completed.

4.3.4.3. Alternative C – Integrated Wildlife, Habitat, and Public Use Focus

Same as Alternative B.

4.3.5 Hydrology

4.3.5.1. Alternative A – No Action

Under this alternative the hydrology of the river systems and the Refuge would continue to function as they currently do. Management practices would remain unchanged and overall there would be no impact to hydrologic processes.

4.3.5.2. Alternative B – Wildlife and Habitat Focus

The additional staffing and funding for watershed-scale technical assistance on private lands in this alternative could lead to a gradual moderation in peak tributary flows during spring runoff and storm events. Improved infrastructure would allow better water management in wetland units, and reductions in sediment loads in the Trempealeau River may change its flooding patterns.

4.3.5.3. Alternative C – Integrated Wildlife, Habitat, and Public Use Focus

Same as Alternative B except that more opportunities would be available for the public to learn about and understand the importance of floodplains to large river systems.

4.3.6 Use of Prescribed Fire

4.3.6.1. Alternative A - No Action

As noted in Chapter 2, a comprehensive Fire Management Plan was approved for the Refuge in 2001 and provides detailed guidance for the suppression or use of fire. The plan outlines wildfire response and prescribed fire objectives, strategies, responsibilities, equipment and staffing, burn units, implementation, monitoring, and evaluation. The complete Fire Management Plan and Burn Unit Maps (USFWS, 2001) are available at the Refuge Office, or on-line at:

www.fws.gov/midwest/planning/Trempealeau.

Physical Fire Effects: Due to the relatively small size of the burn units on the Refuge and anticipated intensity and frequency of the prescribed fires, the effects on soil would be beneficial by hastening the recycling of nutrients and increasing soil fertility. There would also be no impacts to water quality due to location and slope of the burn units. Air quality would only be affected negatively in the immediate

Prescribed burn at Trempealeau NWR. USFWS

vicinity of the prescribed burn, and only for a limited time during the burn. This temporary impact to air quality would be mitigated by small burn unit size, direction of winds, and distance of units from population centers. All burns would be well within air quality parameters. In the event of special air quality alerts by state or local agencies during a planned burn, burning will be deferred until conditions improve. There is potential for archaeological artifacts to be present, but these are generally below the surface and would not be impacted since fire would move relatively quickly through the area and not generate high soil temperatures. Some artifacts could be exposed temporarily by the removal of vegetation, and detection and removal by the public could increase. However, laws and regulations that should minimize such disturbance protect all artifacts on the Refuge. The maintenance of firebreaks around certain burn units will create visual impacts for an indefinite period of time, and a local reduction of optimum habitat. However, the firebreaks are minor in terms of area compared to habitat in the burn unit, and a necessary trade-off to provide overall habitat and wildlife benefits and to minimize fire escape.

Biological Fire Effects: None of the federally listed threatened or endangered species found on the Refuge are known to inhabit or frequent the burn units that would be treated with fire, so there would be no effect. Burn units are also not in the vicinity of active Bald Eagle nests, so prescribed burns would pose no disturbance. Burning removes plant cover for 1-2 weeks and this would decrease the amount of habitat available for food and cover for a variety of grassland wildlife species. However, seasonal and long-term plant vigor and health would be enhanced by prescribed burns, which in turn would make the areas more productive for wildlife. In addition, since many of the burn units contain native tallgrass prairie, a fire-dependent plant community, it is expected that periodic burning will help ensure the continued existence of this rare ecosystem.

Socioeconomic Fire Effects: The use of fire often evokes an emotional response in local residents who have different experiences, fears, and values concerning wildland burning. This social impact can be mitigated to some degree by proactive information, education, and advance notification of a planned burn through media contacts and one-on-one visits with burn unit neighbors. Smoke from prescribed fires is also a concern since it can create a visibility hazard on nearby roads. In addition, smoke can enter private dwellings and businesses depending on wind direction. The fire management plan outlines precautions and specific actions to take to avoid and reduce any impacts from smoke, and contingency plans to be implemented should wind conditions change during a burn. Prescribed burning can have a benefit to the public by creating enhanced wildlife observation, photography, and hunting opportunities through the resulting increase in wildlife populations. Firebreaks put in place for prescribed burning can also help stop an unplanned wildfire and thus provide a measure of protection to any adjacent private habitat or dwellings. In the event that a prescribed fire does jump a firebreak and burn into unplanned areas, there is a high probability of rapid control by staff on-the-ground and thus minimal adverse impact. In addition, prescribed burn units on the Refuge average less than 115 acres, have light fuel loads (.025 to 3 tons per acre), and would be burned under low fuel moisture conditions and specific wind and weather conditions. These factors would help avoid and minimize fire escape.

4.3.6.2. Alternative B – Wildlife and Habitat Focus

Same as Alternative A except removal of pine plantings and invasive shrubs would consolidate burn units making them easier to burn. Removal of black locust and downed timber would also improve burning capabilities.

4.3.6.3. Alternative C – Integrated Wildlife, Habitat, and Public Use Focus

Same as Alternative A but removal of invasive shrubs, black locust, and downed timber would improve burning capabilities.

4.3.7 Flood Protection

4.3.7.1. Alternative A – No Action

The biological resources and infrastructure of the Refuge would be in jeopardy without a predetermined policy on how to deal with extreme flood levels in the Mississippi River. Alternative A would continue to rely on case-by-case negotiations at the time of the event to determine how to manage damage to dikes and other structures. Refuge habitats could be damaged if necessity or political pressures determined how to manage floodwaters. Also, the lessons learned in the 2001 flood could be lost as staff and other partners change. Flood waters could once again be turned into the Refuge, destroying valuable habitats, but providing little protection to

railroad dikes. This alternative would not provide safeguards needed to protect the Refuge from large flood events.

4.3.7.2. Alternative B – Wildlife and Habitat Focus

To the extent possible, habitats and infrastructure would be protected from loss due to flood events on the Mississippi River. Policies would be negotiated and known by partners in advance of flooding. Other alternatives would be explored without considering turning water into the Refuge pools. Over the long-term, emergent vegetation would remain in place around dikes, islands, utility poles and sensitive shorelines providing more consistent protection from wave and ice damage.

4.3.7.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B, but there would be more public understanding of the role of floodplains in large river systems and the need to preserve them to buffer flood damage.

4.4 Effects of Alternatives on Biological Parameters/ Concerns

4.4.1 Threatened and Endangered Species – Bald Eagle

4.4.1.1. Alternative A – No Action

Impacts to Bald Eagles from management actions would not change under this alternative. Forests would continue to be impacted by invasive shrubs that often prevent regeneration of native trees preferred by eagles for nesting. Mature nesting trees would be limiting for Bald Eagles. Food resources would remain adequate, especially with the abundance of carp in the pools. Disturbance to nests from public use would continue to be evaluated on an as need basis, depending on where nests were located and whether they were active. Section 7 consultations with the Service's Ecological Services Branch would continue for any actions likely to impact bald eagles. Overall impacts to Bald Eagle from alternative A would not change.

4.4.1.2. Alternative B – Wildlife and Habitat Focus

Bald Eagles would benefit from removal of invasive understory shrubs and regeneration of large native trees. Restoration of bottomland forests would provide additional nesting and roosting habitat as trees matured. Periodic removal of rough fish may have short-term impacts, but in general fish are abundant in other Refuge pools and on the adjacent Mississippi River. Eagle nests would be better protected from disturbance by a mandatory 100-foot closure around any active nests. Most nests are in remote, hard to reach places and disturbance is generally not an issue. Section 7 consultations with the Service's Ecological Services Branch would continue for any actions likely to impact Bald Eagles. Overall this alternative would provide long-term habitat improvements for nesting and roosting Bald Eagles.

4.4.1.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B.

4.4.2 Waterfowl

4.4.2.1. Alternative A – No Action

Habitat conditions would continue to slowly improve for waterfowl, especially if drawdowns are completed as scheduled. Aquatic plants and invertebrates would be abundant in some pools and lacking in others. Nesting habitat would also be adequate for over-water nesting species unless vegetation were destroyed by a major flood on the Mississippi River. Nesting cavities for species like Wood Ducks would continue to decline as forests mature with little recruitment of new trees. Fall migrants would experience some disturbance from recreational boating. Canoeing, kayaking or boats with electric motors would be allowed in all pools during daylight hours. Generally boating use is light, with one or two boaters per week on the main pools. Overall impacts from recreational boating would continue to be minor.

4.4.2.2. Alternative B – Wildlife and Habitat Focus

Aquatic insects and plant resources would be enhanced with improved water management capabilities afforded by smaller pools and additional water control structures. Aquatic habitats would be further improved with reductions in invasive plants and animals, and improved water quality. Waterfowl, especially dabbling ducks and Canada Geese, would benefit from additional foraging habitat. The pools would be closed to recreational boating in the fall so disturbance from boating would be eliminated during migration. However, since only one or two boats per week currently enter the Refuge pools,

the benefits of reduced disturbance would be minor. Nest sites for cavity nesting ducks would become more abundant with better forest management practices. Grassland nesting species would find larger blocks of dense grass cover and would be less prone to depredation. Overall, production, foraging, and resting habitat would improve and waterfowl use would increase.

4.4.2.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B except that pools would remain open to non-motorized, or electric motor recreational boating in the fall. Waterfowl migrating in the fall would experience some disturbance. Overall, boating use would be light and displacement of birds would be minor.

4.4.3 Waterbirds

4.4.3.1. Alternative A – No Action

In general habitat conditions for most waterbirds would be similar to what currently exists. Drawdowns in pools A and E would enhance foraging and nesting habitats for bitterns, rails, and Black Terns. Other pools would continue to have few aquatic plants or invertebrates and would provide poor foraging or nesting habitats for most waterbirds. Foraging habitats for fish-eating birds like pelicans, cormorants, herons and egrets would be sufficient because of high carp populations. Overall, habitat conditions for most waterbirds would remain unchanged under this alternative.

4.4.3.2. Alternative B – Wildlife and Habitat Focus

Better wetland management in all units, especially drawdowns, would increase abundance and diversity of aquatic and emergent plants and invertebrates. Nesting for over-water nesting terns, grebes, and bitterns and rails would be significantly enhanced. Foraging and hiding cover would be abundant for these secretive marsh species. Nesting success would also be better safeguarded because water levels could be maintained so that nests would not flood. Herons, egrets, pelicans, and other fish-eating birds would see initial decreases in large fish numbers. Eventually, as overall vigor of the wetlands increased, smaller, native fish would become more abundant and the food base for fish-eating birds would improve. Overall, nesting, foraging, and hiding habitat for waterbirds would improve significantly with this alternative.

4.4.3.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B

4.4.4 Shorebirds

4.4.4.1. Alternative A – No Action

Under this alternative, shorebirds would find few shallow water or mudflat habitats during migration. In general shorebird use would remain low due to poor foraging and lack of resting or staging habitats.

4.4.4.2. Alternative B – Wildlife and Habitat Focus

Smaller pools and more water control structures would allow more flexibility in timing and frequency of pool drawdowns. Shallow water and mudflat could be created early in the spring or fall to better accommodate migrating shorebirds. Aquatic invertebrates, a major food resource for shorebirds would become more abundant as wetland habitats become more productive.

4.4.4.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B.

4.4.5 Raptors/Owls

4.4.5.1. Alternative A – No Action

Under this alternative, raptors or owls would not be impacted by any changes to management actions.

4.4.5.2. Alternative B – Wildlife and Habitat Focus

In general, improved forest and grassland management would provide more food and nesting resources for raptors and owls. Control of invasive shrubs would especially benefit species that capture prey from the forest floor. Cavity nesters would benefit from long-term management of uneven-aged stands. Removal of pine plantations would reduce roosting and wintering cover, especially for owls, but appropriate habitat is available in other forest types on the Refuge. Overall this alternative would benefit production and survival of raptors and owls.

4.4.5.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B, although some roosting habitat would remain in pine plantations that would be thinned versus entirely removed.

4.4.6 Upland Game Birds

4.4.6.1. Alternative A – No Action

Under this alternative, turkeys, grouse and pheasants would persist at current low levels. Management actions would not impact upland game birds.

4.4.6.2. Alternative B - Wildlife and Habitat Focus

Restoration of oak savanna and upland forest would increase foraging and nesting habitats for turkeys, grouse, and pheasants. Larger, less fragmented blocks of grassland cover would improve nesting success of grassland nesting species. Increased abundance and survival of mast producing trees would provide a better food base, especially during the winter months. Removal of invasive shrubs and pine plantings may change habitat conditions for some species that roost or find thermal shelter in dense understory vegetation. Eventually native understory species would return and provide similar conditions. In general, this alternative would have positive impacts on reproduction and survival of upland game species.

4.4.6.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B.

4.4.7 Songbirds

4.4.7.1. Alternative A – No Action

In general, songbirds find rich and abundant resources on the Refuge for foraging, breeding, and migrating. Habitat conditions under this alternative would not change and there would be little overall impact to songbirds.

4.4.7.2. Alternative B – Wildlife and Habitat Focus

Changes to habitats proposed in this alternative would have mixed impacts to songbirds depending on the types of habitat each species uses. Many songbirds utilize the thick understory of invasive shrubs to find food, shelter, and nesting habitat. Removal of the shrub understory would have negative impacts for these species until native plants returned. In some areas species assemblages might change to more forest interior or forest floor foraging species. An overall decrease in fragmentation of habitats, especially oak savanna and prairie, would improve nesting success for grassland species. Forest interior species would likely experience less "edge-effect" depredation and parasitism as pine planting and invasive black locust stands were removed. The diversity of habitats on the Refuge would continue to provide excellent habitat for a diverse assemblage of songbirds. Overall, this alternative would benefit native songbirds.

Indigo Bunting. USFWS

4.4.7.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B, although grassland habitats would remain fragmented into smaller blocks and forest edge habitat would not be reduced. Grassland and forest interior nesting species would continue to experience high depredation or parasitism rates associated with edge habitats.

4.4.8 Fish

4.4.8.1. Alternative A – No Action

Refuge involvement in fishery management would remain limited under this alternative since there would be little fishery planning, no clear Refuge-specific fishery objectives, and no increase in monitoring. Opportunities for integrating fishery management with Refuge management would remain limited and opportunities would be lost for improving fish habitat. Without more private land and watershed work in the tributaries, silt, nitrates and other contaminants would continue to enter the river system at current rates and impact fish. Future increases in exotic fish and plants may prove

detrimental to some native fish. Overall, this alternative would not improve conditions for fish on the Refuge.

4.4.8.2. Alternative B – Wildlife and Habitat Focus

Refuge involvement in fishery management would increase under this alternative. A Fishery Management Plan, Refuge-specific fishery objectives, and an increase in monitoring, opportunities for integrating fishery and wildlife management with Refuge administration and operations would help increase fish populations. Coordination and sharing of expertise with the Service's fisheries resource office would increase to the benefit of fish initiatives and management. Private lands work in the tributaries would help reduce silt, nitrates, and other contaminants improving fish health and productivity. In general, implementation of habitat projects would improve water quality and habitat for most fish. Increased attention to invasive aquatic plants and animals could lead to improved fish carrying capacity on the Refuge. Removal of rough fish would enhance habitats for native fish. Overall, this alternative would have a positive influence on fish populations on the Refuge

4.4.8.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B.

4.4.9 Freshwater Mussels

4.4.9.1. Alternative A – No Action

Under this alternative there would be no overall change in habitat conditions for freshwater mussels. Freshwater mussels would continue to be limited to soft substrate adapted species such as floaters, papershells and heelsplitters. Poor water quality and sedimentation would limit reproduction and growth rate of mussels. Under Alternative A freshwater mussels would occur in limited abundance and species diversity.

4.4.9.2. Alternative B – Wildlife and Habitat Focus

Improved water quality and reduced sedimentation would improve conditions for filter feeding mussels. However, species diversity would be limited to soft substrate adapted species because the impounded pools generally do not support enough flow or have sand-gravel substrates. Better monitoring may provide further insight into the needs of mussels on the Refuge. Overall, improved water quality would increase productivity of freshwater mussels, but in general species diversity would remain limited.

4.4.9.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B.

4.4.10 Reptiles and Amphibians

4.4.10.1. Alternative A – No Action

High nutrient loads and siltation would continue to stress aquatic reptiles and amphibians. A lack of knowledge about the distribution and life history of turtles, frogs, and snakes on the Refuge would continue to hamper sound decisions regarding impacts of human activities. Limited drawdowns may improve emergent and submerged habitats important for amphibians and turtles. However, improvements would likely be short-lived without increased attention to invasive aquatic plants which can choke important foraging and travel areas for turtles and frogs. Under this alternative there would be no overall change in habitat conditions for reptiles or amphibians.

4.4.10.2. Alternative B – Wildlife and Habitat Focus

Water quality would improve as more work is done with private landowners along the tributaries to curb contaminants, nutrients, and sediment entering the river. Increased use of drawdowns would improve the health and vigor of emergent and submerged habitats to the benefit of loafing and foraging turtles and frogs. Invasive plants would be monitored and controlled, improving both aquatic and terrestrial habitats that reptiles and amphibians use for foraging and reproducing. Forest resources would be monitored and actively managed to the benefit of frogs, toads and turtles. Forest practices could include efforts to improve sedge meadow openings for Massasauga rattlesnake habitat. Improved monitoring and research would facilitate more informed decisions regarding land use and impacts to turtles and frogs. Public education programs would be limited and support for conservation of more obscure species like frogs and turtles may suffer. Overall, reptile and amphibian populations and productivity would likely increase under this alternative.

4.4.10.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B, except that a focus on public education would increase awareness of the conservation needs of reptiles and amphibians.

4.4.11 Control of Invasive Species

4.4.11.1. Alternative A – No Action

Invasive plants and animals would continue to spread on the Refuge and have negative effects. The current modest level of removal would not outpace the spread of invasives into new areas. Aquatic habitats would be severely degraded without rough fish control. Monitoring of new species and outbreaks would not be sufficient to detect new invasions.

4.4.11.2. Alternative B – Wildlife and Habitat Focus

Aggressive removal and control of new outbreaks would slow the spread of invasive plants. Some habitats would begin to see a return of native species. Close monitoring and mapping would detect the abundance and distribution of existing invasives and detect new outbreaks. Quick removal of new outbreaks would decrease costs associated with control of large, ubiquitous stands of invasives. Better management of rough fish would improve wetland habitats. Programs on private lands would begin to help area landowners stop the spread of invasive plant on their properties.

4.4.11.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B, except public awareness of the impacts of invasive species and the public's role in their spread may reduce new invasions and promote support and funding for control efforts.

4.4.12 Invertebrates

4.4.12.1. Alternative A – No Action

Water quality and plant abundance and diversity are critical habitat components for most insects. Aquatic invertebrate populations would remain unchanged or slightly decline as wetland habitats remain turbid with limited aquatic plant diversity and abundance. Upland insects would continue to thrive in the grasslands where diverse prairie grasses and forbs occur. Periodic prescribed fire would continue to benefit terrestrial invertebrates in grasslands. Overall, this alternative would not change invertebrate populations significantly.

4.4.12.2. Alternative B – Wildlife and Habitat Focus

Improvements in water quality and wetland management, especially drawdowns, would improve conditions for reproduction of aquatic insects. As the abundance and diversity of aquatic plants improved, so would feeding and breeding habitats for insects. Crayfish, a keystone species that provides resources for many other species, would benefit from improved management of bottomland forests. Terrestrial insects would benefit from active grassland management, reduction of invasive plants and regular prescribed burns. Overall this alternative would improve the diversity and abundance of invertebrates using Refuge habitats.

4.4.12.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B.

4.4.13 Mammals

4.4.13.1. Alternative A – No Action

This alternative would have little effect on current management of mammals. Trapping to protect dikes and structures would continue as in the past. Deer harvest would also continue as in the past, as a tool for controlling over-browsing of vegetation. No changes in impacts to mammals would occur from this alternative.

4.4.13.2. Alternative B – Wildlife and Habitat Focus

Harvest management of mammals would be more fine tuned based on population monitoring and harvest returns. Populations of harvested mammals would be maintained at more stable, healthy levels that limit damage to habitats and structures. In

Trempealeau NWR point. USFWS

general improved habitats would benefit all life stages for mammals using the Refuge.

4.4.13.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B.

4.4.14 Wetlands

4.4.14.1. Alternative A – No Action

Aquatic plants and wetland habitats would improve slightly under current management scenarios in some pools. Other pools would continue to be too turbid for the germination of aquatic plants because of foraging rough fish, and disturbance of bottom sediments by wind and waves. Aquatic plants, dikes and other infrastructure would be in jeopardy during major flood events if water was turned into the Refuge from the Mississippi River. Few private lands projects would not appreciably alter the amount of sediment entering downstream river systems. Overall, this alternative would have slightly positive benefits for those pools with current water management capabilities. Other pools would continue to decline in productivity.

4.4.14.2. Alternative B – Wildlife and Habitat Focus

Wetland plants and wildlife would benefit from improved infrastructure and better water management capabilities. A broader range of wetland habitat types would be provided at appropriate times to benefit the lifecycles of migrating and breeding birds. Water quality would improve and aquatic plants would flourish with removal of rough fish, reduced upstream sediment loads and less wind and wave action. More emphasis would be placed on restoring tributaries upstream of the Refuge, further reducing sediment loads. A Habitat Management Plan and better monitoring would improve the manager's abilities to make timely and more informed management decisions. Flood protection policies would better protect wetlands from catastrophic loss during major flood events. This alternative would improve water quality, plant and animal diversity and abundance, and overall productivity and vigor of wetland systems.

4.4.14.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B except that the public would appreciate and understand water quality and wetland habitats through enhanced opportunities for interpretation and education.

White-tailed deer. USFWS

4.4.15 Forests

4.4.15.1. Alternative A – No Action

Black Locust, silver maple, and ash will continue to dominate the bottomland forests because of poor regeneration of mast producing trees, and the shading of pioneer species like cottonwood and willow. Any opening in the forest canopy would likely result in the invasion of reed canary grass. Forest habitats would improve slightly under this alternative with purchase of an additional 340 acres, the modest removal of invasive shrubs and restoration of bottomland forest at River Bottoms Road. In general, however, forest coverage, density, diversity, and structure would continue to gradually decline under this alternative.

4.4.15.2. Alternative B – Wildlife and Habitat Focus

Forest resources would be actively managed with the goal of maintaining a healthy forest that contains sufficient diversity of tree species, sizes, and ages to provide a wide array of habitat structure and food (mast) resources. Nonnative pine plantings would be removed and restored to native prairie or oak savanna, creating larger, less fragmented habitats for an array of prairie species. Invasive understory shrubs would be aggressively controlled, improving recruitment of native hardwoods. Overall, this alternative would result in an increase of native forest habitats with more diverse assemblages of native understory plants.

4.4.15.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B except that prairies and oak savanna habitats would continue to be frag-

mented by nonnative pine plantings. Overall, grassland wildlife would benefit less from the fragmented habitat, but pine forest species would persist.

4.4.16 Grasslands

4.4.16.1. Alternative A – No Action

Management of 335 acres of prairie and oak savanna habitats would not change. Prairie units would be burned on a 3-year rotation to limited encroachment of woody plants and encourage warm season grasses. A continuous, focused effort would be required to prevent black locust from encroaching on the prairies. Funding and staff to control black locust would be limited and some areas may have to be abandoned. Overall this alternative would result in a gradual decrease in the acres of prairie as the spread of black locust out-paced the ability of the staff to control it.

4.4.16.2. Alternative B – Wildlife and Habitat Focus

Under this alternative 60 percent (250 more acres than Alternative A) more prairie/oak savanna habitat would be created by removing pine plantings, non-native trees and invasive shrubs. Additional staff and funds would be directed towards black locust removal and biological control of leafy spurge. Larger, more contiguous prairie units would improve burning capabilities. Edge habitat that favors nest predators and parasites, would be reduced, improving nesting success of both forest and grassland birds. Better monitoring of both plants and wildlife would improve decision making and habitat management. Overall, this alternative would restore and maintain the most acres of grasslands and have the greatest benefit for birds and other wildlife using grasslands.

4.4.16.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

About 30 percent more prairie/oak savanna would be restored, 100 acres more than would be restored under Alternative A. Some grassland units would remain small and fragmented because pine plantings would be thinned rather than removed. Species favoring the pine plantings such as owls would continue to inhabit them. Edge habitat and associated problems with depredation and parasitism of nesting birds would continue unchanged. Better monitoring of both plants and wildlife would improve decision making and habitat management. Overall, this alternative would restore and maintain a medium amount of grasslands and have benefits for birds and other wildlife using grasslands, while preserving habitat for pine forest species.

4.5 Effects of Alternatives on Socioeconomic Parameters/ Concerns

For the complete economic data that is the source for this section, refer to Erin Henderson's 2004 report entitled "The Economic Impacts of the Alternatives for the Trempealeau NWR CCP/EIS." The report is available at the Refuge office in Trempealeau or is on-line at http://midwest.fws.gov/planning/tremp/index.html.

4.5.1 Hunting

4.5.1.1. Alternative A – No Action

This alternative would have little effect on waterfowl hunting opportunities on the Refuge. A minimum of 500 acres of land and water would remain available to hunters with disabilities for a limited hunt of approximately 8 days. Restoration of bottomland forests in the hunt area would benefit Wood Ducks and may provide improved hunting opportunities. Since this alternative involves no change in regulations or hunting methods or practices, hunters should find little disruption to their normal expectations and routines. For some waterfowl hunters, however, this alternative will not alleviate their concerns such as the feeling of exclusion in managed hunts and intense competition with waterfowl hunters in other areas.

In Alternative A the managed hunt for whitetail deer would likewise remain unchanged. Hunters would have an equal opportunity to apply for a limited number of permits based on the need to maintain deer numbers at a level that sustains vegetation vigor and contributes to state management objectives for adjacent lands. Chronic wasting disease, which is present in eastern Wisconsin, would be monitored closely and deer hunting objectives could change if the disease was found near the Refuge or if the State requested special harvest guidelines.

This alternative would continue to have a positive economic impact to local economies as reflected in Table 6. Overall, this alternative would not change the current quality or opportunity for hunting on the Refuge.

Table 6: Comparison of Annual Economic Effects of Alternatives on Hunting, Trempealeau NWR

Category	Alternative A	Change from Alternative A	
		Alt. B	Alt. C (Preferred Alt.)
Activity Days	542	-160	235
Net Economic Value	$24,759	-$7,309	$10,735
Total Expenditures	$6,163	-$3,023	$4,291
Economic Output	$7,787	-$4,021	$5,719
Employment	0.1	-0.1	0.1
Labor Income	$2,159	-$1,075	$1,529
Tax Impact	$928	-$462	$657

4.5.1.2. Alternative B – Wildlife and Habitat Focus

Hunting opportunities would be reduced because waterfowl hunting would be eliminated from the Refuge in favor of providing undisturbed resting habitat for Pool 6 of the Mississippi River. Hunters with disabilities would be disproportionately affected because few nearby areas are accessible to them. Other hunters may perceive the closure as an attempt to limit their use and enjoyment of public lands. Conversely, non-hunting visitors would have improved wildlife viewing opportunities.

The managed hunt for whitetail deer would remain unchanged, although better vegetation and deer population monitoring would enable managers to fine tune harvest levels based on age and sex ratios. Hunters would have an equal opportunity to apply for a limited number of permits based on the need to maintain deer numbers at a level that sustains vegetation vigor and contributes to state management objectives for adjacent lands. Chronic wasting disease, which is present in eastern Wisconsin, would be monitored closely and deer hunting objectives could change if the disease was found near the Refuge or if the State requested special harvest guidelines.

Alternative B would have a less positive economic impact to local economies as reflected in Table 6. Overall, this alternative would reduce hunting opportunities on the Refuge but would enhance wildlife viewing opportunities and improve resting habitat for migrating waterfowl.

4.5.1.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Under this alternative, waterfowl hunting opportunities would be expanded for hunters with disabilities, youth, women and other first-time hunters. About 500 acres would be used to accommodate a special series of managed hunts that would be geared towards recruiting new hunters and providing them with a high quality hunting experience. The sport of waterfowl hunting and the revenues it provides toward preserving and protecting waterfowl habitats would benefit, as new people were encouraged to participate. In general, the hunting regulations on national wildlife refuges hold participants to a high standard of ethics and behavior. The special managed hunts proposed in this alternative would strive to instill sportsmanship and provide a high quality and rewarding hunt for new hunters. Additionally, small, managed hunts would help to limit hunting pressure to a level that maintained bird use of the area and thus quality hunting opportunities.

The managed hunt for whitetail deer would remain unchanged, although better vegetation and deer population monitoring would enable managers to fine tune harvest levels based on age and sex ratios. Hunters would have an equal opportunity to apply for a limited number of permits based on the need to maintain deer numbers at a level that sustains vegetation vigor and contributes to state management objectives for adjacent lands. Chronic wasting disease, which is present in eastern Wisconsin, would be monitored closely and deer hunting

Table 7: Comparison of Annual Economic Effects of Alternatives on Fishing, Trempealeau NWR

Category	Alternative A	Change from Alternative A	
		Alt. B	Alt. C (Preferred Alt.)
Activity Days	336	-10	100
Net Economic Value	$5,785	-$172	$1,722
Total Expenditures	$2,364	--	$703
Economic Output	$3,066	--	$937
Employment	0.0	--	0.0
Labor Income	$845	--	$250
Tax Impact	$364	--	$108

objectives could change if the disease was found near the Refuge or if the State requested special harvest guidelines.

Alternative C would have the most positive economic impact to local economies as reflected in Table 6. Overall this alternative would provide more hunting opportunities and have long-term benefits to the sport and associated conservation initiatives.

4.5.2 Fishing

4.5.2.1. Alternative A – No Action

This alternative would have little effect on current fishing opportunities on the Refuge. Fishing contributes only slightly to the area economy as reflected in Table 7.

4.5.2.2. Alternative B – Wildlife and Habitat Focus

Fishing opportunities would decrease in the fall when pools would be closed to minimize disturbance to migrating waterfowl. Some wetland management techniques may decrease the prevalence of rough fish and improve habitats for sport fish, thereby improving fishing success. The economic output from fishing under this alternative would be similar to Alternative A.

4.5.2.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Fishing opportunities would be improved and enhanced with upgrading of existing facilities and the installation of new fishing platforms. Some wetland management techniques may decrease the prevalence of rough fish and improve habitats for sport fish, thereby improving fishing success. The economic output from fishing under this alternative would be slightly more positive than Alternative A as reflected in Table 7. Overall this alternative would provide additional fishing opportunities on the Refuge.

4.5.3 Interpretation

4.5.3.1. Alternative A – No Action

Interpretive and staff led programming would be continued at the current level. Existing signs and brochures would be used with few changes or additions. The trend toward increased visitation would continue as tourism in the area is promoted. However, opportunities for the public to enjoy and understand the Refuge would be limited to existing facilities.Overall, the visitor experience would be low quality and the perception of the Refuge as a well kept, professional and valuable institution would be diminished.

4.5.3.2. Alternative B – Wildlife and Habitat Focus

The impacts discussed in Alternative A would also apply to this alternative, but with the additional impacts of fewer staff led programming as staff were directed to wildlife and habitat projects.

4.5.3.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Interpretive facilities and materials would be updated and improved. Additional signs, trails and staff led programming would be developed. The staff would be better equipped to accommodate increased visitation and the visitor would leave with a better understanding of Refuge resources and an

River Education Days at Trempealeau NWR. USFWS

appreciation for the professionalism and value of the Refuge System. Overall this alternative would provide interpretation in line with demand and current visitor service standards.

4.5.4 Environmental Education

4.5.4.1. Alternative A – No Action

Under this alternative, the current trend of increased requests for environmental education programs would continue. However, limited staff, facilities, and funding resources would continue to limit the number of students and teachers that the Refuge could accept. This alternative would not meet the demand for environmental education as gauged by past use and inquiries. Overall environmental education programs would continue to be offered at the current level of accommodation.

4.5.4.2. Alternative B – Wildlife and Habitat Focus

Under this alternative, there would be a marked decline in environmental education opportunities, as the emphasis of staff and funding would be shifted to more wildlife-based work. Facilities to accommodate groups would not be constructed and existing facilities would not accommodate traditional teaching methods. The gap between public demand and Refuge capability would continue to widen and students and teachers would be turned away. This alternative could have long-term consequences in terms of public and political support that could negatively impact projects and funding for improving the quality of fish and wildlife habitat. Overall minimal environmental education programs would be conducted as staff and resources would be focused on habitat management.

4.5.4.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Staff and facilities would be increased to provide more environmental education programs. Specific curriculum based programming would allow staff to train teachers to deliver programs independently. Facilities would accommodate groups and allow staff to use new technologies to better deliver their message. Volunteers would be trained as docents and additional teacher training programs would further expand educational capabilities. The gap between demand for programming and Refuge capabilities would be decreased, with fewer students turned away. Increased facilities and visitation could cause some displacement or disturbance to habitats, but avoiding sensitive or high use areas would minimize this. This alternative could have long-term consequences in terms of public and political support that could positively impact projects and funding for improving the quality of fish and wildfire habitat. Overall, this alternative would significantly improve the Refuges ability to provide environmental education.

4.5.5 Wildlife Observation and Photography

4.5.5.1. Alternative A – No Action

Opportunities to view and photograph wildlife would continue unchanged. New facilities would not be added, but general improvements in habitat could encourage more wildlife use and improve viewing opportunities. This alternative would generally not meet the demands for facilities related to observation and photography (trails, tour routes, blinds, overlooks) as gauged by inquiries, past visitation trends, and growing tourism interests. This alternative would continue to have positive economic impacts as shown in Table 8. Overall wildlife observation and photography opportunities would remain the same.

4.5.5.2. Alternative B – Wildlife and Habitat Focus

Under this alternative, opportunities to view and photograph wildlife would be reduced as areas were closed to limit disturbance to migrating waterfowl. New facilities would not be added, but general improvements in habitat would encourage more wildlife use and improve viewing opportunities. This

Table 8: Comparison of Annual Economic Effects of Alternatives on Wildlife Observation, Trempealeau NWR

Category	Alternative A	Change from Alternative A	
		Alt. B	Alt. C (Preferred Alt.)
Activity Days	64,857	-1,500	4,520
Net Economic Value	$589,064	-$13,624	$41,053
Total Expenditures	$179,743	-$5,336	$15,955
Economic Output	$239,702	-$7,124	$21,275
Employment	3.7	-0.1	0.3
Labor Income	$64,070	-$1,904	$5,687
Tax Impact	$27,539	-$818	$2,444

alternative would generally not meet the demands for facilities related to observation and photography (trails, tour routes, blinds, overlooks) as gauged by inquiries, past visitation trends, and growing tourism interests. Existing facilities would degrade more quickly as staff were directed to higher priority fish and wildlife related projects. This alternative would continue to have positive economic impacts as shown in Table 8. Overall opportunities to view and photograph wildlife would decline.

4.5.5.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Opportunities to view and photograph wildlife would increase under this alternative due to habitat improvements and an increase in related facilities. Additional staff would be focused on public use programs and facilities that could enhance the quality and quantity of observation and photography visits. Increased facilities and visitation would cause some displacement of habitat and increase disturbance to wildlife, although avoiding important habitats and wildlife use areas would minimize this. This alternative could have long-term positive consequences in terms of public and political support that could positively impacts projects or funding for improving quality of fish and wildlife habitat. This alternative is predicted to have a corresponding increase in positive economic impact as reflected in Table 8. Overall, opportunities to view an photograph wildlife would increase.

4.5.6 Other Uses

4.5.6.1. Alternative A – No Action

Most other uses such as berry and mushroom picking, biking, cross-country skiing, and hiking would continue unchanged.

4.5.6.2. Alternative B – Wildlife and Habitat Focus

Fewer and poorer quality biking opportunities would occur because certain dikes would be closed seasonally to reduce disturbance to wildlife. The bike trail would remain as is with no improvements or extensions. Hiking and skiing trails would not be improved or extended and other access restrictions may reduce opportunities for mushroom and berry picking. Overall, most other uses would continue, but the ease of access and the quality of the experience would be reduced as staff and resources became more focused on biological monitoring and habitat improvements.

4.5.6.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Opportunities and quality of biking and other activities would improve with additional facilities and extension of the bike, skiing, and hiking trails. Opportunities for berry and mushroom picking would remain unchanged. Overall, visitors would have more and better opportunities to enjoy the Refuge in ways that are compatible with the needs of wildlife.

4.5.7 Protection of Archeological Resources

4.5.7.1. Alternative A – No Action

Artifacts would continue to be compromised by soil disturbance, wave action, and illegal collection. The location, extent and identity of artifacts would remain unknown. Law enforcement coverage would remain inadequate to protect resources. Public closures to protect certain sites would continue indefinitely. Overall archeological resources would continue to be lost, and restrictions to public access and habitat management activities would impede attainment of other Refuge goals.

4.5.7.2. Alternative B – Wildlife and Habitat Focus

Same as Alternative A.

4.5.7.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

An Archeological Resource Protection Plan would guide management actions and define needed physical or administrative protection to known resources. Goals for future survey work would be identified and funding could be sought to investigate priority sites. Protection techniques would be defined for individual sites that would have the least impact on habitats, visitor services, or management actions. Law enforcement coverage would be increased and the problems of illegal collection would be addressed. Public use staff would be available to design and implement programs to help the public become more aware of the historical significance and value of the archeological resources on the Refuge. Overall, archeological resources would be better identified, protected and valued.

4.5.8 Refuge Access

4.5.8.1. Alternative A – No Action

Public access to the Refuge would continue to be limited during spring due to flooding of the main access road. Visitors would be prevented from witnessing much of the spring songbird migration, one of the most opportune wildlife viewing events on the Refuge. Certain sites with archeological significance would remain closed to protect them from vandalism. Overall, Refuge access would be limited during the times of the year when some of the best wildlife viewing occurs.

4.5.8.2. Alternative B – Wildlife and Habitat Focus

Same as Alternative A, with the additional restrictions of limited public access on dikes and pools during the fall migration. Fall migrants would be better protected from disturbance, but the public would have a more difficult time enjoying viewing opportunities. Public access would be the most restricted by this alternative.

4.5.8.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Access to the Refuge would be dramatically improved with the construction of a bridge to replace the section of entrance road that floods each spring. Visitors would have year-round access to most portions of the Refuge. Specific closures to protect archeological sites would be minimized with the development of an Archeological Resource Protection Plan. Overall, public access would be significantly improved.

4.5.9 Community Outreach

4.5.9.1. Alternative A – No Action

Community awareness, participation, and support for Refuge events and issues would continue to be minimal as staff make limited effort to reach out to citizen groups or community leaders.

4.5.9.2. Alternative B – Wildlife and Habitat Focus

Same as Alternative A, with staff focused on wildlife monitoring and habitat management rather than community outreach.

4.5.9.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Additional public use staff would become involved in community organizations and events to showcase the Refuge and the Refuge System. The Refuge would have an identity, and become known and appreciated as an asset to the local area. Citizens would value the Refuge and realize the benefits of their natural resources.

4.5.10 Partnerships

4.5.10.1. Alternative A – No Action

Work on private lands through the Partners for Wildlife program would continue at the current level, with a few small projects accomplished each year. Some improvements to tributaries in the watershed above the Refuge would be realized, but the rate of degradation would far out pace the rate

of improvements. Partnerships with other agencies, universities, communities, and private organizations would continue at the current low level on an as-need basis. The Refuge would not fully realize the benefits of shared expertise, labor, equipment or finances.

4.5.10.2. Alternative B – Wildlife and Habitat Focus

The addition of a staff position dedicated to restoration work on private land would significantly increase partnership building capabilities and facilitate work to reduce erosion in the upper watershed of the Mississippi River. More work would be accomplished to reduce invasive plants on private land by expanding the Refuge's biological control program. Additional staff would facilitate better communication and coordination with universities, state and local agencies, and other non-profit groups. More partnership building would improve public recognition and support for the Refuge System, and for habitat and wildlife management programs.

4.5.10.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B.

4.5.11 Friends/Volunteers

4.5.11.1. Alternative A – No Action

No changes would be made to the current way the Friends and Volunteer groups are managed. The Refuge would continue to have a consistent and dedicated group of volunteers accomplishing a variety of biological, maintenance and public use tasks. The Friends of Upper Mississippi River Refuge would continue to represent Trempealeau NWR, as well as their own interests.

4.5.11.2. Alternative B – Wildlife and Habitat Focus

The volunteer program would be improved and more attention would be paid to encouraging and recognizing the significant contributions of the volunteers to the Refuge. The volunteer program would flourish with volunteers sufficiently trained and supported with the tools they need to effectively accomplish their jobs with a sense of ownership and identity. Under Alternative B the volunteer program would emphasize tasks oriented to biological monitoring and habitat.

Trempealeau NWR volunteer assisting with education program. USFWS

The Refuge would establish its own "Friends of Trempealeau Refuge" that would build support for issues specific to Trempealeau NWR. The Refuge's relationship with the community would be strengthened.

4.5.11.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative B except the volunteers program would emphasize public use, maintenance, administrative, and biological programs.

4.5.12 Regional Economics

For the complete economic data, the basis for this section, refer to Erin Henderson's 2004 report entitled "The Economic Impacts of the Alternatives for the Trempealeau NWR CCP/EIS." The report is available at the Refuge office in Trempealeau or is on-line at:

www.fws.gov/midwest/planning/Trempeaulea.html.

4.5.12.1. Alternative A – No Action

Most Refuge funding comes from the federal government and other sources external to the local economy. The Refuge's payroll and other expenditures comprise net revenue for the local economy and have a direct effect on the regional economy. Every federally supported job at the Refuge results in local expenditures and indirectly supports additional employment in the region. Under the No

Action Alternative, the Refuge's annual base budget and staffing are expected to remain comparable to recent funding and staffing levels. In 2006, the Refuge base budget supported four full-time employees. Assuming little change in base budget, the Refuge would indirectly support at least 11.6 regional jobs and therefore continue to have positive effects on the regional economy (Appendix F).

4.5.12.2. Alternative B – Wildlife and Habitat Focus

Same as Alternative A except that staffing would increase to 7.5 full-time employees, indirectly supporting 13.2 jobs in the area. The Refuge base budget would increase over 100 percent to $685,000.00 to support the new positions. The positive effect on the regional economy would be significant, especially in the sectors of environmental management

4.5.12.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Same as Alternative A except that the staff would increase to 6.5 full-time employees and indirectly support 12.8 regional jobs. The positive effect on the regional economy would be significant, especially in the sectors of environmental management, education, and tourism.

4.5.13 Refuge Administration and Operations

4.5.13.1. Alternative A – No Action

Under this alternative, the overall Refuge budget is expected to increase in accordance with inflation adjustments, but Refuge staffing levels would remain the same as current, or four full-time employees. With levels of public use and interest continuing to rise, meeting the information needs of the public will likely fall short of public expectation in terms of personal contact, programs, leaflets, and other media work. Coordination with various agencies and partners will continue at current levels, resulting in gaps in Refuge presence on community and resource issues.

The Refuge office and visitor facility would remain the same, but the 70-year-old shop facility would be replaced to address safety issues. Visitor facilities would remain inadequate to meet increasing demands of environmental education, especially for group programming.

Annual salary and operations expenditures would continue to have a positive economic impact, with current economic output estimated at $310,000.00 (Henderson, 2004).

4.5.13.2. Alternative B – Wildlife and Habitat Focus

Under this alternative, the overall annual Refuge budget would increase substantially, mainly due to increases in staffing to an eventual 7.5 full-time equivalents. This increase in staffing would dramatically increase biological monitoring, soundness of decisions, and direct habitat work. Personal service to the public and coordination with other agencies and partners would increase, especially in terms of habitat and biological programs that would be the priority under this alternative.

The Refuge office and visitor facility would remain the same, but the 70-year-old shop facility would be replaced to address safety issues. Visitor facilities would remain inadequate to meet increasing demands of environmental education, especially for group programming.

Annual salary and operations expenditures would result in a positive economic impact commensurate with increases. Staff salary expenditures alone could increase by 90 percent by the end of the planning period in 2022, resulting in a similar economic increase.

4.5.13.3. Alternative C – Integrated Wildlife, Habitat and Public Use Focus

Under this alternative, the overall annual Refuge budget would increase substantially, mainly due to increases in staffing to an eventual 6.5 full-time equivalents. This increase in staffing would dramatically increase biological monitoring, soundness of decisions, and direct habitat work. Personal service to the public and coordination with other agencies and partners would increase, especially in terms of habitat and biological programs and public use and education that would be a priority under this alternative.

The Refuge office would be enlarged to accommodate new staff and the 70-year-old shop facility would be replaced to address safety issues. Visitor facilities would be improved to meet increasing demands of environmental education, especially for group programming. Construction of new facilities would increase public accessibility, information, and programs, and improve employee productivity and recruitment.

Annual salary and operations expenditures would result in a positive economic impact commensurate with increases. Staff salary expenditures alone could increase by 90 percent by the end of the planning period in 2022, resulting in a similar economic increase.

4.6 Cumulative Impacts

4.6.1 Cumulative Impacts – Physical Environment

Alternatives B and C, and to a lesser extent Alternative A, call for increased attention to habitat restoration and/or enhancement projects, floodplain and adjacent land acquisition, and improvement in water quality in terms of both chemistry and reduced sediment. Collectively and over time, these actions will improve the ability of the wetland system to process nutrients and store carbon and along with other basin-wide regulations and initiatives, contribute to improvements in hypoxia in the Gulf of Mexico and overall climate change. Physical changes through projects will restore tributaries and improve water management capabilities in Refuge pools, resulting in a more diverse and dynamic system.

Although the rates and amounts of sediment entering the Refuge and eventually the Mississippi River may be reduced over time, none of the alternatives will adequately address the movement of sediments to the mouth of the Mississippi River. Thus, the actions in the alternatives will not cumulatively improve the continued deficit of sediment on the Mississippi River delta.

Canada Geese on frozen Refuge pools at Trempealeau NWR. USFWS

To slightly varying degrees, all alternatives emphasize maintaining the integrity of the Refuge boundary and conserving the scenic beauty. Actions taken to ensure long-term forest health, acquire bottomland forest, and preserve and enhance rare prairies will serve as a model for land use planning and zoning adjacent to the Refuge. In addition, when actions on the Refuge are combined with the actions of the State, non-profit organizations, and private landowners, there can be measurable progress in stemming the rate or type of developments which detract from the scenic beauty of the Upper Mississippi River Valley.

4.6.2 Cumulative Impacts – Biological Impacts

Although the degree of habitat quantity and quality is different under the alternatives, all should continue to improve fish and wildlife habitat, and thus populations. For migratory birds, the Refuge will likely grow in importance as other habitats become scarcer. Reduced habitat for migrating waterfowl in the Midwest, for example, has made the Upper Mississippi River an important stopover for large portions of the continent, Canvasback and Tundra Swans. In this regard Alternative B provides the largest area of undisturbed habitat and may best meet the needs of large numbers of migrating birds thereby having the most positive cumulative impact on continental populations.

Habitat improvements under the alternatives should also benefit rare and declining species and species listed as threatened or endangered. Along with conservation actions for these species on other public and private lands, the Refuge actions across all alternatives, but especially Alternatives B and C, will have a positive cumulative impact. For some species, the Refuge may provide a source for populations expanding onto adjacent lands or, conversely, may provide habitat for expanding populations searching for new habitats to exploit. An example would be the endangered Whooping Crane. Although population restoration efforts were started elsewhere, some birds are now using nearby

Table 9: Comparison of Annual Economic Effects of Alternatives on Public Use, Trempealeau NWR

Category	Alternative A	Change from Alternative A	
		Alt. B	Alt. C (Preferred Alt.)
Activity Days	65,735	-1,670	+4,855
Net Economic Value	$619,607	-$21,105	+$53,509
Total Expenditures	$188,269	-$8,429	+20,949
Economic Output	$250,555	$-11,243	+$27,931
Employment	3.8	-0.2	+0.4
Labor Income	$67,074	-$3,005	+$7,466
Tax Impact	$28,831	-$1,291	+$3,209

areas and may in the future breed on the Refuge, thus adding to wild populations and eventual recovery.

The area surrounding the Refuge is principally agricultural lands. Before European settlement (pre-1850s), these lands were prairie and oak savanna habitat. Now they are gradually being developed into residential areas. Within 50 years, it is likely that aside from existing goat prairies and a few private lands, the Refuge will have the only remaining expanse of prairie in the area. Efforts to restore prairie and oak savanna habitat on the Refuge will help to secure this habitat type in the local area. Alternative B would make the greatest strides in this effort by restoring 150 acres in 15 years, and Alternative A would have the least impact by restoring about 15 acres. In the preferred Alternative C, 100 acres would be restored with the intent of restoring the remaining 90 acres of non-native forest within the following 30 years.

In all alternatives, 55 acres of bottomland hardwood forest would be restored. These habitats are in decline in the Mississippi River backwaters, and this restoration would recover a small amount of that lost habitat.

Although Alternatives B and C provide an increase in the monitoring and control of invasive plants and animals, infestations are expected to continue to increase and expand to new areas.

Alternatives B and C also have a strong biological monitoring component, with increases in species and habitats surveyed, and research and coordination with others. This increased information would not only aid decision making that benefits fish and wildlife on the Refuge, but add to the body of knowledge collected by other agencies which can affect resource decision-making over a broader landscape.

4.6.3 Cumulative Impacts – Socioeconomic Environment

A variety of objectives in Alternatives B and C will have varying degrees of impact on recreational use of the Refuge. Earlier sections detailed specific impacts on individual uses such as hunting, fishing, wildlife observation, and photography. Cumulatively, each alternative has a different economic impact since it affects the level of public use. Table 9 summarizes this cumulative impact by alternative.

Each alternative takes a different approach to managing the variety of recreational uses that occur on the Refuge, ranging from status quo (Alternative A) to an integrated approach (Alternatives C) that seeks to conserve wildlife and habitat while providing a diversity of recreational opportunities for visitors. These varying alternatives will have cumulative impacts given that demand for nearly all recreation is expected to grow while the amount of Refuge space and natural resources is relatively finite.

In Alternative A, current uses would continue without much change. Alternative B might be perceived as too restrictive in terms of recreation and too liberal in emphasizing wildlife monitoring and habitat improvement. Alternative C attempts to strike a reasonable balance to ensure that the Refuge remains a destination of choice for both wildlife and people. If successful, this integrated approach

may prove more sustainable and have positive, long-term natural resource, social, and economic impacts both on the Refuge and beyond.

Alternatives B and C also involve an approximate 250 percent increase in the Refuge's base operations and maintenance budget over the next 15 years, plus additional maintenance and construction funding for new facilities. Although budgets are impossible to predict, this increase could impact operations funding at other refuges and wetland management districts in the Region if it came from existing allocations. This would result in delaying or forgoing habitat and facility improvements and other work at these stations, although the change would be small at any particular station.

Working relationships with the State of Wisconsin, area colleges and universities, private landowners and others should improve in terms of responsiveness to inquiries and speed of joint projects under Alternatives B and C. This improvement would be mainly the result of increased staffing in key areas such as biology, public use, and law enforcement.

Overall coordination and communication with the general public should improve under Alternative C due to new staff positions dealing with public use and public information. Since some may oppose changes in one or more of the alternatives, or likewise support them, the cumulative impact on public perception of the Refuge and the Fish and Wildlife Service could be negative or positive. More emphasis on public education and information in Alternative C should foster more understanding and appreciation of resource issues and needs, and could lead to increased political support and funding which could positively affect fish and wildlife resources on the Refuge and the Mississippi River as a whole. Increased outreach of these alternatives could also positively impact land use decisions outside of the Refuge by local governments and private landowners, and thus lead to increased fish and wildlife populations over a broader area.

4.7 Short-term Uses and Long-term Productivity

Habitat protection and restoration actions across all alternatives often entail short-term negative impacts to ensure long-term productivity of the Refuge. Construction of islands and dikes entail intense disturbance to fish, wildlife, and plants, and

Brown bat. USFWS

increased water turbidity and disruption of public uses. However, these impacts are site-specific and relatively short duration, more than offset by increasing the long-term productivity of the sites and surrounding plant and animal communities. Given the altered nature of the floodplain within the Refuge due to locks and dams and other development, it is unlikely that the long-term productivity of the Refuge can be sustained in many areas without such short-term uses and impacts.

Many of the cyclic management actions in the alternatives, namely pool drawdowns, prescribed burning, invasive plant and animal control, and forest management, can have dramatic short-term impacts. These impacts include the direct mortality of some plants and animals, displacement of species, and cessation of certain types of public use. However, these short-term impacts are generally offset by near-term and long-term benefits of these practices, practices that often mimic the natural and thus sustainable processes necessary for long-term habitat health. Many of these long-term benefits were described in more detail earlier in this chapter under the applicable parameters or concerns.

As discussed in Section 4.6.3 (cumulative impacts), the short-term disruption in current means, locations, and timing of public uses inherent in Alternatives B and C, should, in the long-term,

help sustain the greatest diversity of opportunity for the greatest number of people. Also, diversity of opportunity for public use should provide the best long-term positive economic impact to local communities. This mirrors the widely accepted premise that maintaining diversity in natural systems helps ensure the long-term resiliency of these systems.

4.8 Unavoidable Adverse Effects

As noted previously, many of the habitat and facility construction projects in the alternatives have a certain level of unavoidable adverse effects, especially during the actual construction. These effects are mitigated to some degree by the use of practices and precautions that safeguard water quality, avoid sensitive or irreplaceable habitats, or time actions or include features to avoid or minimize impacts to fish and wildlife. Adverse effects are generally short-term and more than offset by the long-term gains in habitat quality and resulting fish, wildlife, and plant productivity. Some projects may have an adverse impact on cultural resources. The process for dealing with these impacts on a case-by-case basis is discussed in Section 4.2.12 (cultural and historical preservation).

Some existing habitat types on the Refuge will be adversely affected. For example, there will be a loss of open water habitat on portions of the pools within the Refuge as new islands are constructed. Also, drawdowns will increase emergent aquatic vegetation such as bulrush and cattail, converting many areas to marsh habitat versus open water. Forest habitat is also likely to undergo change in species composition and structure as invasive understory plants are. Some forested areas may be converted to grassland, while some grassland areas may be converted to forest depending on the outcome of more site-specific planning. All of these unavoidable adverse effects will be relatively local in nature and more than offset by the long-term diversity and ecological health of the broader landscape.

Land acquisition entails an unavoidable impact to local units of government due to the loss of tax revenue as lands transition from private to public ownership. This unavoidable effect, along with mitigation measures, is discussed more fully in Section 4.2.10 (revenue sharing).

All alternatives, to varying degree, will have adverse impacts to a certain segment of the public that does not desire change to current public use programs and regulations, or that may have differing views on the course of action to be taken. Some visitors will see a loss of opportunity in terms of time and space restraints for certain uses such as boating, fishing, and hunting, or means of use restraints by limiting types of watercraft in certain areas. These impacts to individuals or groups are unavoidable given the diversity and number of publics, inherent conflicts between and within user groups, continued increase in use numbers, and relatively finite nature of land and waters available on the Refuge for public recreation. Alternative C, the preferred alternative, represents the most balanced alternative in terms of minimizing and mitigating these adverse impacts to citizens and reflects public involvement and input of the planning process.

Table 10: Summary of Environmental Consequences, Trempealeau NWR

Parameter	Alt. A No Action (Current Management)	Alt. B Wildlife and Habitat Focus	Alt. C Integrated Wildlife and Public Use (Preferred Alternative)
- - - 0 + ++ Most Negative Neutral or No Impact Most Positive			
Physical			
Ecosystem	0 No change	+ Sediment and contaminant inputs reduced in headwaters of Tremp. and Buffalo Rivers.	++ Sediment and contaminant inputs reduced in headwaters of Tremp. and Buffalo Rivers. More opportunities provided for public education on ecosystem issues
Climate Change	+ Increases in protection and restoration of bottomland forests, grasslands and emergent marsh would increase carbon sequestration.	+ Same as A	+ Same as A
Water Quality	– Sediments and contaminants continue to flow into Refuge from headwaters of Tremp. River; rough fish, wind and waves continue to impact clarity and suspension of solids; littlemonitoring;	+ Sediments and contaminants reduced in watershed; rough fish control and construction of dikes and islands improves clarity and suspension of solids; monitoring improved.	++ Sediments and contaminants reduced in watershed; rough fish control and construction of dikes and islands improves clarity and suspension of solids; monitoring improved;more opportunities provided for public education on water quality issues
Air Quality	0 No change	0 No change	0 No change
Sedimentation	– Sediments flow would increase from unabated erosion in headwaters of Tremp.and Buffalo Rivers	+ Private lands projects would reduce sediment loads in watershed	++ Private lands projects would reduce sediment loads in watershed; more opportunities provided for public education on sediment issues

Table 10: Summary of Environmental Consequences, Trempealeau NWR (Continued)

Parameter	Alt. A No Action (Current Management)	Alt. B Wildlife and Habitat Focus	Alt. C Integrated Wildlife and Public Use (Preferred Alternative)
- - - 0 + ++ Most Negative Neutral or No Impact Most Positive			
Geomorphology	0 Overall geomorphology would continue to be driven by flood events and off-Refuge land use practices	+ Moderate, local changes in floodplain geomorphology with construction of dikes and islands; watershed restoration could reduce peak river flows and sediment deposition.	+ Same as B
Hydrology	0 No change	+ Watershed restoration could reduce peak river flows; improved infrastructure would allow better water management in wetland units; reductions in sediment loads in Tremp. River may change flooding patterns on adjacent lands.	++ Watershed restoration could reduce peak river flows; improved infrastructure would allow better water management in wetland units; reductions in sediment loads in Tremp. River may change flooding patterns on adjacent lands; opportunities to inform public about floodplain issues would be improved.
Use of Prescribed Fire	0 No change	++ Removal of pine plantations and invasive shrubs would reduce fragmentation of burn units; removal of black locust and downed timber would improve burn capabilities	+ Removal of invasive shrubs from understory and removal of downed timber would improve burn capabilities.
Flood Protection	– Flood events would have the potential to severely damage habitat and infrastructure	+ To the extent possible, habitats and infrastructure would be protected from loss due to flood events; policies would be clear and known by partners in advance of flooding.	++ To the extent possible, habitats and infrastructure would be protected from loss due to flood events; policies would be clear and known by partners in advance of flooding;opportunities to educate the public about the importance and functions of floodplains would be improved.

Table 10: Summary of Environmental Consequences, Trempealeau NWR (Continued)

Parameter	Alt. A No Action (Current Management)	Alt. B Wildlife and Habitat Focus	Alt. C Integrated Wildlife and Public Use (Preferred Alternative)
- - - 0 + ++ Most Negative Neutral or No Impact Most Positive			
Emergency Response to Contaminant Spills	+ Spill response training and capabilities would be improved.	+ Same as A	+ Same as A
Biological			
Threatened and Endangered Species	0 No change	+ Bottomland forest would be improved for Bald Eagle nesting; nests protected from human disturbance; management and monitoring plans would consider state listed species; reintroduction of Massassagua would be considered	+ Same as B
Waterfowl	+ Periodic drawdowns would improve forage base and nesting habitat for waterfowl.	++ Periodic drawdowns would improve forage base and nesting habitat for waterfowl; wetland management would increase amount and quality of habitat; public access restrictions would reduce disturbance.	+ Same as B
Waterbirds	0 No change	+ Waterbirds would benefit from improved wetland health, increased food base, and more secure nesting habitats; water management would help reduce flooding of nest sites.	+ Same as B
Shorebirds	0 No change	+ Periodic drawdowns would provide additional foraging habitats for migrating shorebirds; improved wetland health would increase food base.	+ Same as B

Table 10: Summary of Environmental Consequences, Trempealeau NWR (Continued)

Parameter	Alt. A No Action (Current Management)	Alt. B Wildlife and Habitat Focus	Alt. C Integrated Wildlife and Public Use (Preferred Alternative)
- - - 0 + ++ Most Negative Neutral or No Impact Most Positive			
Raptors/Owls	0 No change	+ In general improved forest and grassland habitats would provide more food and nesting resources for raptors and owls.Removal of pine planting would decrease roosting habitat for owls.	+ Same as B
Upland Game Birds	0 No change	+ Restoration of oak savanna and upland forests would improve food base and nesting opportunities for these species.	+ Same as B
Songbirds	0 No change	++ Removal of invasive shrub understory, restoration of bottomland forest, removal of pine plantings, and an overall decrease in fragmentation and edge habitats would improvehabitats for songbirds	+ Forest habitats would be improved for songbirds by reducing invasive shrubs, restoring prairies and bottomland forests.Prairie units would be more fragmented and smaller than in alternative B and grassland songbird and edge species would be impacted.
Fish	0 No change	+ Removal of rough fish, improved water quality, and wetland health would improve habitats for fish.	+ Same as B
Freshwater Mussels	0 No change	+ Improved water quality and rough fish management would improve mussel habitats.	+ Same a B

Table 10: Summary of Environmental Consequences, Trempealeau NWR (Continued)

Parameter	Alt. A No Action (Current Management)	Alt. B Wildlife and Habitat Focus	Alt. C Integrated Wildlife and Public Use (Preferred Alternative)
- - - 0 + ++ Most Negative Neutral or No Impact Most Positive			
Reptiles and Amphibians	0 No change	+ Reducing water levels periodically would improve wetland habitats for reptiles and amphibians; Restoration of bottomland forests would provide better habitats.	+ Same as B
Control of Invasive Species	– Modest level of removal would not outpace spread into new areas; aquatic habitats would be severely degraded without rough fish control; monitoring of new species and outbreaks would not be sufficient to prevent invasion.	+ More aggressive removal and control would outpace new invasions and begin to restore some habitats;better management of rough fish would improve wetland habitat quality; programs on private lands would raise awareness and slow spread of invasives; better monitoring would slow spread of new species and new infestations.	++ Same as B with improved public understanding of the vectors that promote invasion and the public's role in preventing the spread of invasives.
Invertebrates	0 No change	+ Wetland management, especially drawdowns would improve conditions for reproduction of aquatic insects. Upland insects would benefit from restored prairies with a more abundant forb component.	+ Same as B

Table 10: Summary of Environmental Consequences, Trempealeau NWR (Continued)

Parameter	Alt. A No Action (Current Management)	Alt. B Wildlife and Habitat Focus	Alt. C Integrated Wildlife and Public Use (Preferred Alternative)
- - - 0 + ++ Most Negative Neutral or No Impact Most Positive			
Mammals	0 No change	+ Better management of harvest would help maintain healthy, stable populations at levels that would limit damage to habitats. In general improved habitats would benefit all life stages for mammals.	+ Same as B
Wetlands	+ Aquatic plants and wetland habitats would improve slightly under current drawdowns and other management actions; wetland habitats would not be protected from severe flood events; invasive plants would continue to impact wetlands.	++ Improved infrastructure, drawdowns, and better monitoring and aggressive control of invasive plants would improve wetland habitats.Water quality would improve with removal of rough fish, reduced sediment loads, less wind and wave action and more consistent monitoring.	++ Same as B and, the public would appreciate and understand water quality and wetland habitats through better interpretation and education.
Forests	+ Forest habitats would improve slightly with modest removal of invasive shrubs and restoration of bottomland forests	++ Aggressive removal of invasive shrubs would restore the most acres of forests; bottomland restoration would continue, but with more emphasis on uneven age trees and a mix of native species;all pineplantings would be returned to prairie or oak savanna	++ Same as B although pine plantings would continue to fragment prairie units.
Grasslands	– Prairie lost to encroaching black locust as staff and funding are insufficient to treat existing acres.	++ Maximum acres of oak savanna and prairie would be restored; grassland units would be larger and less fragmented with removal of pines.	+ Fewer acres restored and grassland units would be smaller and more fragmented by pine plantings than in alternative B; public would be more aware of the uniqueness and benefits of prairie habitats.

Table 10: Summary of Environmental Consequences, Trempealeau NWR (Continued)

Parameter	Alt. A No Action (Current Management)	Alt. B Wildlife and Habitat Focus	Alt. C Integrated Wildlife and Public Use (Preferred Alternative)
- - - 0 + ++ Most Negative Neutral or No Impact Most Positive			
Management of Wildlife Diseases	+ Staff ability to respond to outbreaks in an efficient and safe way would be improved; coordination with the public and other partners would be improved	+ Same as A	+ Same as A
Socio-economic			
Hunting	0 No change	– Fewer waterfowl hunting opportunities; no change in deer hunting.	+ Increased opportunities for waterfowl hunting; no change in deer hunting.
Fishing	0 No change	– Fishing opportunities would decline in the fall because of pool closures to protect migratingwaterfowl	+ Improve existing and provide new facilities; increase interpretive and educational programs on fishing.
Furbearer Trapping	0 No change	0 No change	0 No change
Interpretation	0 No change	– Fewer staff led programs; existing facilities maintained, but no new ones added	+ More opportunities for the public to enjoy and understand wildlife and habitats through increased staff and interpretive facilities and materials.
Environmental Education	0 No change	– Minimal environmental education programs would be conducted; staff and resources would be focused on habitat management	+ More educational opportunities would be provided through and expanded EE program; an outdoor learning shelter would be constructed and teacher and volunteer led curriculums developed;

Table 10: Summary of Environmental Consequences, Trempealeau NWR (Continued)

Parameter	Alt. A No Action (Current Management)	Alt. B Wildlife and Habitat Focus	Alt. C Integrated Wildlife and Public Use (Preferred Alternative)
– – – 0 + ++ Most Negative Neutral or No Impact Most Positive			
Wildlife Observation and Photography	0 No change	– Access would be limited on dikes and pools during peak migration resulting in fewer opportunities to view or photograph wildlife.	+ New hiking trail, cross-country ski trails, and other new facilities would provide additional and improved viewing and photography programs
Other Uses	0 No change	– Fewer and poorer quality biking opportunities; trail and facilities not improved or extended; access restrictions during migration may reduce opportunities for berry and mushroom harvest.	+ Opportunities and quality of biking experience would be improved with additional facilities and extension of the bike trial; opportunities for harvest of berries and mushrooms would not change.
Protection of Archeological Resources	– Artifacts would continue to be compromised by soil disturbance, wave action and illegal collection	– Same as A	+ A protection plan would guide management actions, define needed physical protection, and address illegal collecting; the public would be more aware of the historical significance and value of archeological resources
Refuge Access	– Public access would continue to be limited by flooding of the entrance road;	– – Public access would continue to be limited by flooding of the entrance road and restrictions to dikes and pools during migration.	+ Public would have year-round access with the construction of a new entrance road bridge.
Land Use	0 No change	0 No change	0 No change

Table 10: Summary of Environmental Consequences, Trempealeau NWR (Continued)

Parameter	Alt. A No Action (Current Management)	Alt. B Wildlife and Habitat Focus	Alt. C Integrated Wildlife and Public Use (Preferred Alternative)
- - - 0 + ++ Most Negative Neutral or No Impact Most Positive			
Adjacent Landowners	+ Staff would improve communication and problem solving with neighboring land owners	+ Same as A	++ Staff would improve communication and problem solving with neighboring land owners; landowners would be invited to at least one annual event on the Refuge geared towards their interests.
Community Outreach	0 No change	0 No change	+ Staff would become more involved in community organizations and events, showcasing the Refuge and the Refuge System and helping citizens realize the benefits of preservingnatural resources
Partnerships	0 No change	+ Additional staff would work on developing partnerships with private land owners; better communication and coordination with universities, State and local agencies, and other special interest groups would improve public support and opportunities for habitat management	+ Same as B
Friends/Volunteers	0 No change	+ Volunteer program would be improved; new friends group would focus on supporting Tremp. NWR needs.	+ Same as B

Table 10: Summary of Environmental Consequences, Trempealeau NWR (Continued)

Parameter	Alt. A No Action (Current Management)	Alt. B Wildlife and Habitat Focus	Alt. C Integrated Wildlife and Public Use (Preferred Alternative)
- - - 0 + ++ Most Negative Neutral or No Impact Most Positive			
Management of Easements/Right of Ways	+ Better communication and coordination would help all parties complete needed work with less habitat impacts.	+ Same as A	+ Same as A
Regional Economics	0 No change	+ More staff and habitat management projects would contribute to economic growth of the area; eco-tourism would increase contributing to local and regional economies.	++ Increased staff, construction and habitat management projects would improve regional economics; large increases in public use and eco-tourism would boost local and regional economies.
Revenue Sharing	+ Small increase if additional properties are added to Refuge	+ Small increase if additional properties are added to Refuge	+ Small increase if additional properties are added to Refuge
Refuge Administration and Operations	0 No change	+ Refuge budget would increase due to increased staffing; existing facilities would remain inadequate in terms of staff productivity and public use.	++ Refuge budget would increase due to increased staffing; improved facilities would increase staff productivity and accommodate needs of visiting public
Environmental Justice	0 No change	0 No change	0 No change
Cumulative Impacts	+ Habitat quality would continue to slowly improve; public use would continue without much change	++ Habitat quantity and quality would improve over time and fish and wildlife populations would benefit; public use would continue, but some restrictions would change the timing and amount of visitation.	++ Habitat quantity and quality would improve over time and fish and wildlife populations would benefit; compatible public use would increase and the quality of the experience would improve.