Bison. CREDIT: USFWS

5.0 PLAN IMPLEMENTATION AND MONITORING

The CCP will serve as the primary management reference document for Refuge planning, operations, and management for the next 15 years or until it is formally revised or amended within that period.

The effectiveness of any management plan is dependent on a multitude of factors that change over time. This chapter describes a number of these factors in further detail, including the funding, staff, projects, compliance requirements, partnerships, monitoring, and additional planning associated with CCP implementation. Adaptive management will also be necessary to meet new, unforeseen challenges and to take advantage of new opportunities.

As noted in the inside cover of this document, this CCP does not constitute a commitment for additional staffing or increases in operational and maintenance resources. These decisions are at the discretion of Congress in overall appropriations, and in budget allocation decisions made at the national and regional levels of the Service.

5.1 Personnel and Budget Needs

Table 5-1 and 5-2 show the existing and additional staff needed to implement the projects identified later in this chapter.

5.1.1 Personnel

In fiscal year 2011, Attwater Prairie Chicken NWR had a staff of 8 permanent full-time employees. The Refuge also hires approximately 4–6 interns, and 3–4 individuals volunteer their time to conduct work each year

Table 5-1. Existing Personnel

Function / Program	Title	Series	Grade	Type
Administration	Refuge Manager	GS-485	13	FT Permanent
Administration	Wildlife Refuge Specialist	GS-485	12	FT Permanent
Biology	Wildlife Biologist	GS-486	12	FT Permanent
Administration	Wildlife Refuge Specialist	GS-485	5/7/9	FT Permanent
Biology	Wildlife Biologist	GS-486	9/11	FT Permanent
Maintenance	Engineering Equipment Operator	WG-5716	10	FT Permanent
Maintenance	Maintenance Worker	WG-4749	9	FT Permanent
Administration	Administrative Technician	GS-303	7	FT Permanent

Table 5-2. Additional Personnel Beyond Current Levels Needed to Implement the CCP

Function / Program	Title	Series	Grade	Type
Biology	Private Lands Biologist/Realty Specialist	GS-485/486	11/12	FT Permanent
Biology	Recovery Coordinator	GS-485/486	11/12	FT Permanent
Visitor Services	Visitor Services Specialist	GS-0025	9	FT Permanent
Biology	Biological Technician	GS-404	7	PT Permanent

5.1.2 Budget

5.1.2.1 Existing Budget

The Refuge's base operational budget in fiscal year 2010 was $832,816. Additional funds necessary to operate Refuge programs were received for annual maintenance ($66,578), fire operations ($25,000), APC captive breeding facilities ($150,000), and APC recovery (approximately $100,000). Table 5-3 reflects the funds needed to maintain current programs in the short term. Long-term adjustments to the base operational budget reflect not only short-term adjustments, but also implementation of projects currently identified in the Refuge Operational Needs System (RONS) and Service Asset Maintenance Management (SAMMS) databases.

Refuge Operational Needs System

The Refuge Operational Needs System (RONS) is the mechanism the Refuge uses to justify

needed funds and personnel for new programs and projects necessary to meet legal mandates, Refuge plans, and Department and Service directives. This database is used by all refuges to compete for dollars needed to adequately fund programs. The needs currently listed in Attwater Prairie Chicken NWR's RONS database dated January 25, 2010 consist of 11 projects totaling $1,576,826 and 3.5 staff positions. Additional RONS projects will be submitted for funding to achieve the management direction identified in this CCP.

Service Asset Maintenance Management System

The Service Asset Maintenance Management System (SAMMS) is a database the Refuge uses to document and justify significant maintenance projects and equipment replacement. Attwater Prairie Chicken NWR's SAMMS project list currently has 15 projects identified, which include deferred maintenance and construction projects for a total of approximately $9,754,653. Additional SAMMS projects will be submitted for funding to achieve the management direction identified in this CCP.

5.1.2.2 Additional Budget Needs

Table 5-3 identifies budget needs, beyond current levels, to fully implement the management direction presented in this CCP. The projected amount does not include funding for larger projects, such as construction, that are normally funded from other sources. Also, it does not include funding needed for land acquisition, a dedicated APC captive breeding facility, or a new administrative facility.

Table 5-3. Current Budget and Additional Budget Needs

Source	Budget (FY 2010)	Full Implementation of Plan (Projected over the 15-year life of the CCP)[1]
Refuge Base Operational Budget	$832,816	$16,625,000
Annual Maintenance	$66,578	$1,050,000
Fire Operations	$25,000	$450,000
Captive Breeding Facilities	$150,000	$4,100,000
APC Recovery	$100,000	$7,150,000
Land Acquisition		$16,070,000
Total Budget	**$1,174,394**	**$45,445,000**

[1] All budget amounts are approximations and subject to change. These approximations are for the entire 15-year life of the document.

5.2 Appropriate Refuge Uses and Compatibility

5.2.1 Appropriate Refuge Uses

As described in Chapter 1, Section 1.3.2.1, all uses of a national wildlife refuge over which the Service has jurisdiction must be evaluated under the Appropriate Refuge Uses policy (603 FW 1).

If an existing use is not appropriate, the Refuge manager will eliminate or modify the use as expeditiously as practicable. If a new use is not appropriate, the Refuge manager will deny the use without determining compatibility. If a use is determined to be an appropriate Refuge use, the Refuge manager will then determine if the use is compatible (see Compatibility Policy section that follows). Although a use may be both appropriate and compatible, the Refuge manager retains the authority to not allow the use or modify the use. Uses that have been administratively determined to be appropriate are the six wildlife-dependent recreational uses (hunting, fishing, wildlife observation and photography, environmental education, and interpretation) and take of fish and wildlife under State regulations.

A review of appropriateness of existing and proposed uses was conducted as part of the CCP process. Grazing management, prairie seed harvesting, and scientific research were found to be appropriate uses of the Refuge.

5.2.2 Compatibility Determinations

As described in Section 1.3.2.1, all uses of a national wildlife refuge must comply with the Service Compatibility Policy.

Compatibility determinations (CDs) are not required for Refuge management activities (e.g., conducting bird surveys) except economic activities (e.g., grazing). Economic uses of a natural resource must contribute to achieving Refuge purposes and the Refuge System mission. If a use is found to be incompatible, the Refuge will follow normal administrative procedures for stopping the action.

When a determination is made as to whether a proposed use is compatible or not, this determination is provided in writing and is referred to as a compatibility determination. An opportunity for public review and comment is required for all CDs. Compatibility determinations for existing wildlife observation and photography, environmental education, and interpretation must be re-evaluated with the preparation or revision of a Comprehensive Conservation Plan or at least every 15 years. Compatibility determinations for all other uses must be re-evaluated every 10 years or earlier if conditions change or significant new information relative to the use and its effects becomes available. Refuge managers must complete a written CD for each use, or collection of like-uses, that is signed by the manager and the regional refuge chief.

Appendix D contains six CDs that have been drafted as part of this comprehensive conservation planning effort, including:

- Wildlife Observation/Wildlife Photography
- Interpretation
- Environmental Education
- Grazing Management
- Prairie Seed Harvesting
- Scientific Research

5.3 Intra-Service Section 7 (Endangered Species Act Consultation)

An Intra-Service Section 7 consultation was conducted for the implementation of Plan objectives and strategies with the Clear Lake Ecological Services Field Office (see Appendix F).

5.4 Step-Down Management Plans

Implementation of this CCP will be accomplished, in part, through various step-down management plans (see sections 5.4.1 and 5.4.2). Each step-down plan has its own program focus, identifying and directing the implementation of strategies (i.e., actions, techniques, and tools) designed to achieve programmatic objectives outlined in the CCP.

5.4.1 Current Step-Down Plans

- Attwater's Prairie-Chicken Recovery Plan (2010)
- Safety Plan (2009)
- Fire Management Plan (2001)
- Pest Control Plan (1989)
- Grassland Management Plan (1987)
- Interpretive Plan (1984)

5.4.2 Future Step-Down Plans

The following identifies step-down management plans that will be drafted to guide management of specific Refuge programs and the anticipated completion date.

- Integrated Pest Management Plan (to include brush removal) (2016)
- Fire Management Plan (2017)
- Visitor Services Plan (date dependent on hiring Visitor Service Specialist)
- Biological Inventory and Monitoring Plan (2013)
- Grazing Management Plan (2016)
- Predator Management Plan (2018)
- Habitat Management Plan (2014)
- Hydrologic Plan (2016)

5.5 Refuge Projects

The following list of Refuge projects have been identified as needed to fulfill the goals and objectives indentified in Chapter 4: Management Direction.

5.5.1 Existing Projects

5.5.1.1 Habitat Management Projects

Project 1. *Invasive Species Control Using Prescribed Fire*

Currently, the Refuge is burning 2,000–3,000 acres annually using Balcones Canyonlands NWR fire crew and Refuge fire-qualified employees. The Refuge uses prescribed fire in combination with cattle and/or bison grazing, herbicide use, and mechanical manipulation for invasive species control. Implementing this project reduces brush and invasive species. In addition, the combination of prescribed fire and grazing maintains native prairie habitat ($25K annually). This project supports achievement of Goal 1: Objective 1, 3, and 4 as identified in Chapter 4: Management Direction.

Project 2. *Invasive Species Control Using Chemical Treatments*

The Refuge treats 500–600 acres annually for Macartney rose, deep-rooted sedge, and Chinese tallow. For Macartney rose, treatment in a particular area is necessary every 3–4 years. Chinese tallow is treated mostly by cut stump and spray method. Treatment to date has been focused on problem areas rather than systematic control to minimize infestations before they become problematic ($60K annually). This project supports achievement of Goal 1: Objective 1 and 4 as identified in Chapter 4: Management Direction.

Project 3. *Re-seeding of Native Grasses*

Native grass seed collection has been inconsistent primarily due to the vagaries of weather. To date, collection of seed on the Refuge has been conducted either by combine on a sharecrop basis, with the Refuge receiving 15 percent of seed back, or by contract haying. Seed is planted to restore habitat on the Refuge in the spring or fall ($25K annually). This project supports achievement of Goal 1: Objective 2 and 3 as identified in Chapter 4: Management Direction.

5.5.1.2 Wildlife Management Projects

Project 1. *Attwater's Prairie-Chicken Recovery*

The Refuge is the lead station for APC recovery. Recovery duties for APCNWR include: coordinating APC captive breeding program (six facilities; $150K annually); APC releases at three different release sites (approximately $100K annually); and organizing APC recovery team meetings. Management activities that occur on the Refuge for APC recovery include: intensively managing APC broods that hatch on APCNWR to determine why broods do not survive past first 7–10 days of life (approximately $100K annually); treating and monitoring the red imported fire ant (RIFA) population to determine if and how they impact APC broods ($50K); managing predator populations before and during APC nesting ($7.5K annually); and providing food plots annually ($35K annually). Habitat management activities supporting APC recovery include prescribed burning, closely controlled grazing, providing wildlife food plots, and invasive species control. Grazing and prescribed fire are integrated on much of the Refuge using patch burning (Fuhlendorf and Engle 2001, Bidwell et al. 2003, Fuhlendorf et al. 2006). This project supports achievement of Goal 2: Objective 1, 2, 3, and 4 as identified in Chapter 4: Management Direction.

5.5.1.3 Visitor Services Projects

Project 1. *Visitor Services Program (Outreach, Interpretation, and Environmental Education)*

The Refuge currently provides limited outreach and interpretation to the media, public, and stakeholders when possible, based on available staff and workload ($20K). One targeted outreach and interpretive event (annual Attwater's Prairie-Chicken Festival) is planned at the Refuge each year over a two-day period ($7K). The Refuge also provides limited environmental education opportunities to local schools, scouts, and conservation groups. Groups seeking environmental education must schedule a time when staff is available for this purpose and provide their own transportation to the Refuge. Fewer than 10 environmental education events are conducted by Refuge staff each year for about 100 students ($6K). This project supports achievement of Goal 3: Objective 1 as identified in Chapter 4: Management Direction.

5.5.2 Future Projects

(*Note: All costs associated with future projects are estimates and are subject to change when project is implemented*)

5.5.2.1 Habitat Management Projects

Project 1. *Invasive Species Control Using Prescribed Fire*

The use of prescribed fire may be expanded as a tool for invasive species control. The Refuge does not foresee an increase in funding needed to implement these actions outside of normal annual increases in cost (i.e., increase in fuel costs, salaries, etc.). This project supports achievement of Goal 1: Objective 1, 2, 3, and 4 as identified in Chapter 4: Management Direction.

Project 2. *Invasive Species Control Using Chemical Treatments*

A systematic treatment of the entire Refuge to control invasive species (Macartney rose, deep-rooted sedge, and Chinese Tallow) will make it easier to control future infestations. Addressing larger portions of the Refuge annually will allow for more systematic and complete treatment, along with follow-up monitoring and proactive spot treatments of new plants ($100K annually). This project supports achievement of Goal 1: Objective 1, 2, 3, and 4 as identified in Chapter 4: Management Direction.

Project 3. *Re-seeding of Native Grasses*

The Refuge will pursue partnerships with Katy Prairie Conservancy (KPC) and USDA's Plant Materials Office to produce consistent native grass seed amounts annually. The Refuge will provide funding through an agreement to provide staff and start-up costs. Refuge staff will conduct

planting of seed on the Refuge produced from KPC and USDA ($150K start-up; $50K annually after first year). This project supports achievement of Goal 1: Objective 2, 3, 6, and 7 as identified in Chapter 4: Management Direction.

Project 4. *Consolidation of Pastures*

In an effort to reduce prairie fragmentation on the Refuge, and in communication with Refuge grazing permittees, a consolidation of pastures by removing fences or changing fence lines as necessary will more effectively provide for APC life requisites and manage prairie habitat through grazing. As applied on the Refuge, pastures are divided into 4–16 patches, with 25 percent burned each year on a 4-year rotation. Continuous grazing within pastures results in preferential selection of more recent burns for grazing and avoidance of older burns. This fire-grazing interaction has led to the patch burning system, also referred to as rotational grazing without fences (Bidwell et al. 2003). The removal of fences will also reduce the concern for APC fence collisions (Wolfe et al. 2007) and improve prairie hydrology. As livestock travel along fence lines, compacting soil it can affect runoff. Additionally, more dense vegetation tends to grow under fences, which can also affect runoff. Further, fence lines attract woody vegetation. Costs will be minimal, using permittees' or large workforce groups such as Youth Conservation Corps (YCC) to effect the changes. The Refuge will potentially remove approximately 10 miles of fence. This project supports achievement of Goal 1: Objective 1 and 3, and Goal 4: Objective 4, 5, and 6 as identified in Chapter 4: Management Direction.

Project 5. *Removal of Agricultural Features*

The Refuge will identify and prioritize features that need to be removed (e.g., levees, irrigation canals, drainage ditches, water control structures, roads, fences) and restore those areas to a functional level of hydrology that will allow for successful native plant restoration ($50K annually). This project supports achievement of Goal 1: Objective 3, and Goal 4: Objective 3, 5, and 6 as identified in Chapter 4: Management Direction.

Project 6. *Removal of trees along Coushatta Creek and Woodlots*

This project will entail the removal of trees and/or brush along Coushatta Creek to resemble the historic vegetation structure (i.e., grass only to the water's edge) of 40-plus years ago. The Refuge will also remove trees associated with woodlots found around old home sites, which have encroached on prairie grasslands ($750K). This project supports achievement of Goal 1: Objective 3 and 4 as identified in Chapter 4: Management Direction.

Coushatta Creek in 2010. CREDIT: USFWS

Historical photo of Coushatta Creek (1971). CREDIT: USFWS

Project 7. *Removal of Man-made Impoundments*

The Refuge will remove infrastructure associated with the Teal and Pintail Marsh impoundments (levees, water control structures, etc.); restore functional hydrology of the area, to include ephemeral wetland component; and plant native grasses. The Refuge will incorporate this area into fire and grazing rotations as habitat

conditions indicate necessary for APC management. This project supports Goal 1: Objective 1 and 2, and Goal 2: Objective 1 as identified in Chapter 4: Management Direction.

5.5.2.2 Wildlife Management Projects

***Project 1**. Attwater's Prairie-Chicken Recovery*

The Refuge will continue its RIFA project and expand treatment of RIFAs to include the entire Refuge ($210K first year, then $210K every other year) and beyond ($500K first year, then $500K every other year), as indicated by ongoing research. The captive breeding program will continue, adding at least one additional facility to increase the number of breeding pairs from an average of 60 to about 100 ($1.3 million for new facility, additional $200K annually for O&M). APC broods that hatch on APCNWR will continue to be intensively managed for another 3–5 years to determine why broods do not survive past the first 7–10 days of life (approximately $100K annually). Captive-bred birds will continue to be released on existing sites and new areas ($200K total annually). Predator populations will continue to be managed before and during APC nesting ($8K annually). The number of food plots will be expanded as needed, and a means to irrigate each food plot will be provided ($25K). The Refuge will expand a "patch burn" approach in combination with cattle or bison grazing to maintain coastal prairie habitat for the APC and other prairie-dependent species. Additional Refuge lands acquired in the late 1900s and newly acquired lands will be added to the "patch burn" rotation as feasible. A full-time Private Lands/Realty Biologist (GS 11/12) will be hired to pursue a means to advance the Refuge's land acquisition and protection program (approximately $1M for land acquisition annually). A full-time Recovery coordinator (GS-11/12) will be hired to coordinate all aspects of APC recovery ($100K/annually). Currently, APCNWR's Refuge manager serves as APC recovery team leader/coordinator. This project supports achievement of Goal 1: Objective 5, and Goal 2: Objective 1, 2, 3, and 4 as identified in Chapter 4: Management Direction.

Public use kiosk. CREDIT: USFWS

5.5.2.3 Visitor Services Projects

***Project 1.** Visitor Services Program*

The Refuge will hire a full time GS-7/9 Visitor Services Specialist to develop a coordinated outreach and interpretation program that includes presentations to local schools, community organizations and other stakeholders, guided Refuge tours, and coordination with State and non-profit prairie conservation efforts ($75K annually). The visitor services program will also be focused on developing a universal awareness and understanding of the status and future needs of the Attwater's prairie-chicken. More guided viewing opportunities of the Attwater's prairie-chicken will be offered (approximately $5K). This project supports achievement of Goal 3: Objective 1, 2, and 4 as identified in Chapter 4: Management Direction.

***Project 2.** Develop Environmental Education Program*

With the addition of a full time GS-7/9 Visitor Services Specialist, the Refuge will provide a more proactive approach toward environmental education. The Refuge will coordinate closely with each of the four local school districts (Eagle Lake, Sealy, Wallis, and Columbus) to deliver targeted environmental education to over 1,000 students annually, promoting an appreciation and

understanding of the Attwater's prairie-chicken and native coastal prairie. Annual environmental education programs in each local district for school children will be developed, and the Refuge will reach out to conservation organizations to coordinate education activities. Events will be scheduled at the Refuge to conduct native prairie education. The Refuge will explore the potential for developing an outdoor classroom on the Refuge (approximately $50K). This project supports achievement of Goal 3: Objective 3 as identified in Chapter 4: Management Direction.

Project 3. *Trail Construction and Wildlife Observation and Photography Opportunities*

The Refuge will leave the Sycamore Trail largely unchanged but add some interpretive signage and a short spur trail into the San Bernard River ($20K). The Pipit Trail will be replaced with a new trail that begins at the Coushatta Creek bridge, leads visitors by Horseshoe Lake, and winds back along the creek to the bridge, providing a diverse trail that includes wetland, prairie and riparian habitat viewing opportunities within its one-mile length. A boardwalk and viewing platform will be constructed for the new trail from the bridge to Horseshoe Lake to provide visitors with disabilities a quality wildlife-viewing opportunity. Trail construction could be accomplished with Refuge staff and Youth Conservation Corps labor. Approximately $150K will be needed for materials and tools to construct the observation platform, interpretive signage, boardwalk and foot bridges, and to purchase a viewing telescope for the platform. This project supports achievement of Goal 3: Objective 2 as identified in Chapter 4: Management Direction.

5.5.2.4 Facilities Management Projects

Project 1. *Relocation of Auto Tour Route*

The Refuge will construct a new auto tour route alignment using existing roads that will lead Refuge visitors through high quality native prairie and offer broader views of prairie habitat. This will enhance their appreciation for the prairie and give visitors an open prairie experience without the safety concerns associated with the current tour route. This new alignment will also return visitors to the headquarters and visitor contact station to allow for feedback and quality interpretive opportunities based on their wildlife viewing experience. The new alignment will follow approximately four miles of existing Refuge service roads, and will include interpretive signage. Pull-outs will be installed every half mile and improvements and maintenance performed (approximately $400K) to bring the existing service roads up to an appropriate standard, including sections that need to be widened for two-way traffic. This project supports achievement of Goal 3: Objective 2, and Goal 4: Objective 2 as identified in Chapter 4: Management Direction.

Project 2. *Construction of New Headquarters*

The new facility will include a visitor center and reception area, room for displays, and a small theatre to view videos about the Refuge and APC. Adequate office space and a professional, appropriate, and efficient lab facility to house the biological program will also be included. Parking, sidewalks, kiosks and a trailhead for the Sycamore Trail will be incorporated into the overall site plan as well. The facility will be build to meet LEED standards ($1.5M). This project supports achievement of Goal 4: Objective 1 as identified in Chapter 4: Management Direction.

Project 3. *Rehabilitate Entrance Road*

The Refuge will coordinate with Colorado County officials to rehabilitate and maintain the existing county road or pursue abandonment by the county to allow the Refuge to assume maintenance responsibility for the road. Restoration and maintenance will cost approximately $250K for the initial one-mile length of entrance road. The overhead power line will be buried along the first half mile of this entrance road ($50K). This project supports achievement of Goal 4: Objective 2 as identified in Chapter 4: Management Direction.

Project 4. *LCRA Irrigation Canal Relocation*

The Refuge will coordinate with neighboring landowners and the Lower Colorado River Authority (LCRA) to find an alternative to transporting irrigation water across the Refuge ($200–300K depending on strategy). The canal corridor will be rehabilitated by pushing levees back into ditch, leveling ground, and planting to native prairie (approximately 45 acres total area at $150K). This project supports achievement of Goal 1: Objective 1 and Objective 7 as identified in Chapter 4: Management Direction.

Project 5. *Service Roads Removal*

The Refuge will reduce maintenance needs and restore prairie by removing more than 15 miles of unnecessary service roads on the Refuge. Roads will be strategically removed to maximize connectivity, and reduce impacts to drainage and disturbance to wildlife. Road corridors will be restored to native prairie. This project supports achievement of Goal 1: Objective 3 and Goal 4: Objective 3 as identified in Chapter 4: Management Direction.

Project 6. *Restore and Improve Service Roads*

This project will restore, improve, and maintain Refuge service roads that remain in use following the review and removal of unnecessary roads. Approximately 37 miles of priority service roads will require repair and maintenance of varying degrees (approximately $370K or $10K per mile). A combination of Refuge and contract staff and equipment will be used to bring all service roads up to a reasonable standard that can be maintained by Refuge personnel and equipment. This project supports achievement of Goal 4: Objective 3 as identified in Chapter 4: Management Direction.

Project 7. *Railroad Bed Removal*

Issues caused by an abandoned railway on the Refuge include prairie fragmentation, poor drainage, spread of invasive species, and an unsightly landscape view in the part of the Refuge most often visible to the visiting public. The Refuge has already removed approximately 750 feet of abandoned railroad bed. The material is used, when possible, to improve Refuge roads. The Refuge needs to acquire the remaining 5,200 feet of railroad easement inholding to remove and restore the entire length of the abandoned railway on the Refuge. Surplus gravel and road base could be utilized elsewhere on the Refuge to improve service roads. This project supports achievement of Goal 1: Objective 5 as identified in Chapter 4: Management Direction.

5.6 Partnerships

Partnerships area an essential element for the successful accomplishment of goals, objectives, and strategies at APCNWR. The objectives outlined in this CCP need the support and the partnerships of Federal, State, and local agencies, nongovernmental organizations, and individual citizens. Refuge staff will continue to seek creative partnership opportunities to achieve the vision of the Refuge. The importance of cooperation, collaboration, and partnerships in the successful implementation of this CCP is heavily emphasized throughout this document.

With approximately 34 percent of the acquirable Refuge lands in Service ownership, Refuge staff spend a great deal of time and effort communicating with and supporting adjacent landowners in their stewardship of the land. Additionally, since the Refuge is responsible for coordinating APC recovery efforts, partnerships throughout the landscape are essential for the recovery of APC. The Refuge will continue to work diligently with multiple partners on this effort (a list of APC Recovery Partners can be found in Section 3.6.1.4 Partnerships).

Partnerships are among the best ways for the Refuge to accomplish its work and fulfills its mission by seeking opportunities with others. APCNWR will continue to be an engaged and committed partner to the recovery of the endangered Attwater's prairie-chicken.

5.7 Monitoring and Evaluation

The Refuge will monitor the implementation of the CCP to evaluate its efficiency and effectiveness. The goals of Refuge monitoring are to:

- Evaluate, document, and report how well the CCP is applied,
- Determine how well the CCP meets its stated goals, and,
- Determine if the CCP's purpose and direction remain appropriate.

Inventorying and Monitoring Table

Table 5-4 displays proposed inventory and monitoring projects for fish, wildlife, and their habitats, and monitoring indicators for public use. These proposed monitoring techniques will be refined as various step-down management plans are drafted or revised.

CCP Evaluation Table

The Evaluation Table (in Appendix G) summarizes the extent to which management actions stated in the CCP were achieved and the reasons for any variances noted. The Evaluation Table will also identify the factors that have resulted in desired conditions not being met. The Evaluation Table will be completed during the annual review of the CCP. Together, the Inventorying and Monitoring Table and the Evaluation Table assess the level of the CCP's implementation.

Adaptive management allows the use of alternative solutions to meet desired conditions. It includes defining measurable objectives, monitoring, learning and making changes, and recognizing uncertainties of outcomes. Monitoring and evaluating CCP implementation is critical to adaptive management. The use of adaptive management will be crucial to address arising issues due to climate change.

5.8 Plan Amendment and Revision

Periodic review and change of this CCP will be necessary. As knowledge of Refuge resources, user groups, and use evolves, changes in management may be identified. Fish and wildlife populations, user groups, adjacent land users, and other management considerations change with time, often in unforeseen ways. Challenges also may be encountered in trying to implement some portions of the CCP. Plan revision is a necessary part of the adaptive management approach used by the Service. This means that objectives and strategies identified to reach goals can be adjusted.

Service policy calls for an annual review of these CCPs and revision when significant events or new information necessitate change in order to achieve the Refuge purposes, vision, and goals (602 FW 3). It may be reviewed during routine inspections or programmatic evaluations. Results of the reviews may indicate a need to modify the CCP. The monitoring of objectives is an integral part of the CCP, and management activities may be modified if desired results are not achieved. If minor changes are required, the project leader will determine the level of public involvement and associated NEPA documentation. This CCP will be formally revised at least every 15 years.

Table 5-4. Inventorying and Monitoring

Objective Number	Effectiveness Measures	Monitoring Techniques	Reliability	Time Factors	Cost Factors[2]	Personnel	Link to regional monitoring
Habitat Objective 1, 2, 3, 6	% of grassland, % of woody cover	Line intercept transect method, dot board and range pole (structure of vegetation), professional judgment (observation), remote sensing	Excellent, standard methods (published techniques)	Line intercept transect every 1-2 years, structural assessments quarterly, remote sensing approximately every 5 years	$$ (SCA salaries) $$$ (remote sensing)	Biological staff and interns/ volunteers	Attwater's prairie-chicken Recovery Plan
Habitat Objective 2	# of acres converted from wetland impoundments to grassland	Professional judgment to keep track of restoration progress Map prairie species as area is being restored	Good (previous restoration projects have been completed on the Refuge)	Every 3-5 years	$	Biological staff and interns/ volunteers	Attwater's prairie-chicken Recovery Plan
Habitat Objective 3	% of acreage restored through native seed planting	Professional judgment to keep track of restoration progress Map prairie species as area is being restored	Good (previous restoration projects have been completed on the Refuge)	Every 3-5 years	$$ (SCA salaries)	Biological staff and interns/ volunteers	Attwater's prairie-chicken Recovery Plan

[2] Cost factors are highly dependent on budget any given year. $-can accomplish with existing Refuge funding; $$-some additional funding needed; $$$-significant funding needed, such as a special grant.

Objective Number	Effectiveness Measures	Monitoring Techniques	Reliability	Time Factors	Cost Factors[2]	Personnel	Link to regional monitoring
Habitat Objective 4	% of Macartney rose, deep-rooted sedge, Chinese tallow, and other invasive species	Remote sensing	Excellent, standard method	2-4 year after an area is treated	$$$ (remote sensing)	Biological staff, regional office staff (Biological Services), and interns	Attwater's prairie-chicken Recovery Plan
Habitat Objective 5	# of acres protected	Keep track of lands purchased fee title, under conservation easements, safe harbor agreements, etc.	Good	As needed	$$$ (salary of private lands biologist)	Private Lands Biologist	Attwater's prairie-chicken Recovery Plan
Habitat Objective 6	Changes in prairie habitat condition	Analysis of weather and vegetation data and observing habitat Collect precipitation on site	Good	Every 20 years	$	Refuge staff	TBD
Wildlife Objective 1	# of breeding individuals	Booming ground count (males)	Good	Every breeding season	$ (as numbers of prairie-chickens increase, more funding may be needed)	Refuge staff and partners	Attwater's prairie-chicken Recovery Plan

Objective Number	Effectiveness Measures	Monitoring Techniques	Reliability	Time Factors	Cost Factors[2]	Personnel	Link to regional monitoring
Wildlife Objective 1 (RIFA)	Insect biomass and numbers	Sweep net samples	Good	Twice per year	$$	Refuge staff and interns/ volunteers	Attwater's prairie-chicken Recovery Plan
Wildlife Objective 2	Presence/ absence	Observation	Good	Every year	$	Refuge staff	Attwater's prairie-chicken Recovery Plan
Wildlife Objective 4 (RIFA)	Index of RIFA activity	Fatty lure assessments	Good	One time per year	$	Biological staff and interns	Attwater's prairie-chicken Recovery Plan
Wildlife Objective 4 (Feral Hog)	Assessment of damage, population index	Rooting activities, spotlight counts	Good	One or two times per year	$	Biological staff and USDA Wildlife Services Staff	Attwater's prairie-chicken Recovery Plan
Visitor Services Objective 1	% of visitors	Survey, tally at visitor contact station	Good	Daily, as visitors come into visitor contact station	$	Administrative staff and volunteers	N/A
Visitor Services Objective 3	# of students	Identify # of students in program annually	Good	Annually	$	Visitor Services staff and volunteers	N/A
Visitor Services Objective 4	% of visitors	Survey, tally at visitor contact station	Good	Daily, as visitors come into visitor contact station	$	Administrative staff and volunteers	N/A