APC Release Transport Boxes. CREDIT: Moose Peterson

4.0 MANAGEMENT DIRECTION

The Service manages fish and wildlife habitats considering the needs of all resources in decision making.

4.1 Overview of Goals, Objectives, and Strategies

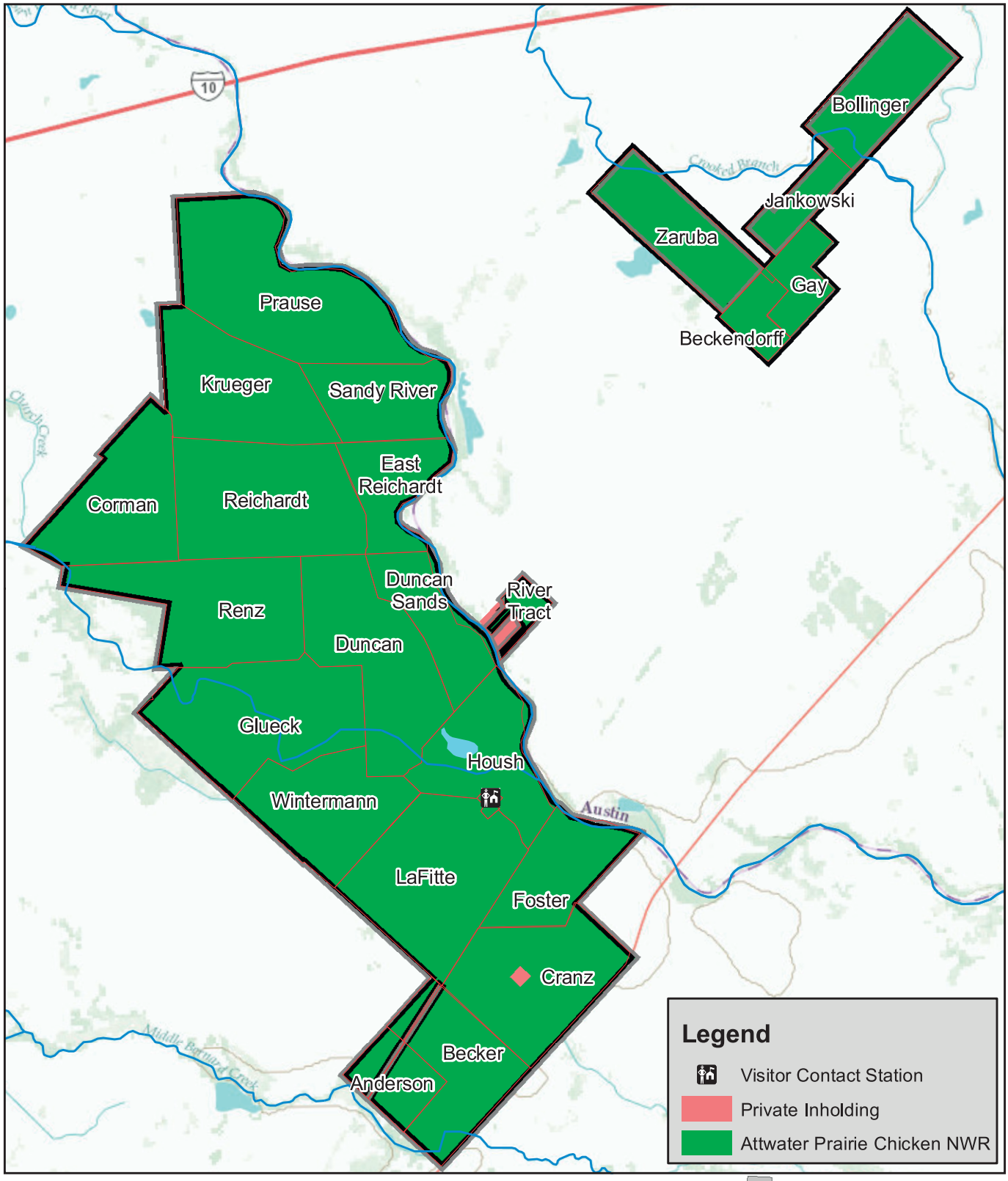
Goals and objectives are the unifying elements of successful Refuge management. They identify and focus management priorities, provide a context for resolving issues, guide specific projects, provide rationale for decisions, and offer a defensible link among management actions, Refuge purpose(s), Service policy, and the National Wildlife Refuge System mission. Goals define general targets in support of the vision, followed by objectives that direct effort into incremental and measurable steps toward achieving those goals. Finally, strategies identify specific tools or actions to accomplish objectives. The goals are organized into four broad categories of habitat, wildlife, visitor services, and facilities. Refuge management units are shown in Map 4-1.

U.S. Fish & Wildlife Service

Attwater Prairie Chicken National Wildlife Refuge

Austin/Colorado County, Texas

Map 4-1. Refuge Units



PRODUCED IN THE DIVISION OF REFUGE PLANNING
ALBUQUERQUE, NEW MEXICO
LAND STATUS CURRENT TO: 5/31/09
MAP DATE: May, 2011
BASEMAP: N/A
MERIDIAN: N/A
FILE: atw_refuge_units_8.5by11_5.3.11_shl

0 0.3 0.6 1.2 Miles

0 0.3 0.6 1.2 Kilometers

Attwater NWR

UTM ZONE 14
NAD 83

Sunrise on the prairie. CREDIT: USFWS

4.2 Goal 1: Habitat Management

Provide quality grassland habitat to support Attwater's prairie-chicken (APC) and other grassland dependent species native to the Gulf coastal prairie ecosystem.

Objective 1. Continue to maintain and improve native coastal prairie grasslands on the Refuge (approximately 7,000 acres) annually with more than 75 percent grassland and not more than 10 percent woody cover, following recommendations in the APC Recovery Plan.

Rationale:
The APC Recovery Plan states that although there is general agreement that quantity of grassland is directly related to prairie-chicken population levels, there is no consensus on the size and composition of management areas required. Hamerstrom et al. (1957) stated, as a rule of thumb, greater prairie-chickens (GPC) occurred on a sustainable basis in areas that were at least 33 percent grassland but were abundant only where grass comprised 50–75 percent of the area. These authors indicated good prairie-chicken habitat should contain less than 20–25 percent woody cover where woody cover is distributed in scattered blocks. Ammann (1957) observed GPCs in Michigan survived best with not more than 10–25 percent woody cover.

Cattle and bison grazing occur on the Refuge based on carrying capacity to provide nesting and brood rearing cover. Grazing is an historical part of prairie management. Numerous studies have documented the beneficial impacts of carefully managed grazing on Attwater's prairie-chicken habitat (Lehmann 1941, Hamerstrom et al. 1957, Chamrad and Dodd 1972, Cogar et al. 1977, Kessler 1978, Jurries 1979, USFWS 2010). The premise of patch burning with regard to prairie-chicken management is that the interaction of burning and grazing creates a diversity of habitat pattern, structure, and plant composition that meet prairie-chicken life requisites (Bidwell et al. 2003). As applied on the Refuge, pastures are divided into 4–16 patches, with 25 percent burned each year on a four-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 being referred to as rotational grazing without fences (Bidwell et al. 2003).

Historically, fire was an important factor in maintaining the open character of grasslands occupied by APC (Lehmann 1965). Prescribed burning is conducted between July 4 and February 1 (but no later than March 1). Fire is used to interrupt natural plant succession to favor indigenous herbaceous species characteristic of the coastal prairie ecosystem and control invasive species by top killing invading woody species. Fire is also used to restore and perpetuate trust wildlife species by maintaining grassland species diversity, composition, and quality. With fire, the removal of accumulated plant litter, mulch, and debris creates habitat structure at ground level, which facilitates access and movement by galliform broods (i.e., APCs, northern bobwhite quail), facilitates nutrient cycling, and improves grazing distribution of livestock and wildlife.

Strategies:

1. Graze cattle and bison using a cow-calf operation to promote clumped grass/forb structure year round.
2. Revise the Grazing Management Plan.
3. Utilize mowing when grazing is not effective on thick vegetation during years with high moisture.
4. Utilize patch burning to burn approximately 25 percent of the Refuge annually on an average 4-year rotation as habitat conditions dictate.
5. Revise Fire Management Plan.
6. Continue to monitor and evaluate the effects of burning and grazing on the grassland landscape to include effects on prairie insect populations (and other related topics) and use adaptive management as necessary

Prescribed Burn. CREDIT: USFWS

Objective 2. Within 10 years of the CCP's approval, restore two man-made impoundments (Teal and Pintail Marshes) consisting of approximately 200 acres to native prairie to meet habitat conditions listed in Habitat Objective 1.

Rationale:

These two impoundments were created for migratory waterfowl when APC populations were much higher. With APC populations critically low, the Refuge would better meet its purpose by returning these areas to native prairie habitat. Native prairie habitat is very scarce in the area. Grassland habitat in the area has declined 83 percent from historic times (Morrow et.al. 1996). The Refuge is one of the last remaining native coastal prairies and only one of three locations where there are still APCs. These impoundments would be restored to native prairie, providing additional essential habitat for APC.

As stated in the APC Recovery Plan, waterfowl, especially geese, should be managed to reduce competition and potential for disease transmission. Removal of these impoundments would help meet recovery objectives for the APC as listed in the APC recovery plan.

Strategies:

1. Remove infrastructure associated with impoundments (levees, water control structures, etc.).
2. Restore functional hydrology of the area.
3. Restore to native prairie grasses.
4. Remove invasive species that occur in these impoundments through mechanical and chemical treatment.
5. Incorporate fire and grazing into these areas as habitat conditions indicate necessary for APC management.

Objective 3. Complete restoration actions on existing Refuge lands (approximately 2,200 acres) of previously cultivated areas to native coastal prairie to meet the same criteria listed in Habitat Objective 1 within the next 15 years as permitted by annual seed availability.

Rationale:

Within the Refuge boundary, there are approximately 3,000 acres of previously cultivated lands. Of that acreage, approximately half has been revegetated with mixed success. About 750 acres of this acreage have been restored; the other half is incomplete. There are approximately 1,500 acres where no restoration has been initiated. These areas were previously cultivated, native species eliminated, and invasive species have been introduced. There have also been permanent changes in hydrology and topography as a result of agricultural practices on these areas. Therefore, active

management is necessary to reverse impacts in these areas. These actions may require removal of roads, irrigation canals, fences, and other infrastructure that impede prairie hydrology. The APC Recovery Plan identifies the need for this restoration. Functional hydrology must be restored to reduce APC nest flooding and impacts to floral and faunal communities. Researchers have reported movement or abandonments of booming grounds in response to natural and/or artificial structures near booming grounds (Hamerstorm et. al. 1957, Anderson 1969, and Toepfer 2003). Robel et al. (2004) reported avoidance of anthropogenic structures (e.g., oil and gas wellheads, center-pivot irrigation, roads, buildings, electric transmission lines) by lesser prairie-chickens in southwestern Kansas, although avoidance of such structures by APC is less evident.

Seed harvest is a difficult task to accomplish on the Refuge. The window for harvesting seed is a very narrow two- to three-week period. The weather highly affects production; too wet or dry conditions do not produce high yields. If the ground is too wet, harvest machinery cannot access the area to harvest prairie seed.

Native Grass Seed Harvest. CREDIT: USFWS

Strategies:

1. Collect native grass seed through haying or combine throughout the Refuge when available for use in grassland restoration.
2. Expand existing staff and equipment for site preparation and planting to increase restoration capabilities.
3. Explore partnerships with Katy Prairie Conservancy and USDA Plant Materials to collect native prairie grass and forb seeds and grow under controlled methods.
4. Explore partnerships and cost share with local farmers to harvest native prairie seed.
5. Continue existing monitoring actions to determine effectiveness of management activities and use adaptive management as necessary.
6. Use prescribed fire and invasive species control determined by need and best available science.
7. Remove trees associated with woodlots found around old home sites that are encroaching on prairie habitat.
8. Cranz Unit: begin grazing as habitat conditions indicate necessary for APC recovery; complete native grass seeding (within five years of CCP's approval).
9. Bollinger Tract: begin invasive control immediately; initiate grazing as habitat conditions indicate necessary for APC recovery; incorporate into patch burning regime.
10. Anderson/Becker Unit: Begin grazing as habitat conditions indicate necessary for APC management; complete native grass seeding; incorporate patch burning as needed.
11. River Tracts: Start burning and invasive species control immediately; initiate grazing as habitat conditions indicate necessary for APC management; revegetate using native grass seed.
12. Zaruba Tract: Incorporate into patch burning regime; begin invasive species control immediately; initiate grazing as habitat conditions indicate necessary for APC management; remove agricultural features including interior fences; restore functioning hydrology and complete native grass seeding.

13. Beckendorff and Gay Tract: Begin invasive species control immediately; initiate grazing as habitat conditions indicate necessary for APC management; incorporate into patch burning regime; remove agricultural features; revegetate using native grass seeding.
14. Jankowski Tract: Incorporate into patch burn regime; begin invasive species control immediately; initiate grazing as habitat conditions indicate necessary for APC management
15. Remove and fully restore 13,000 feet of abandoned railway.

Objective 4. Over the life of the CCP, reduce Macartney rose, deep-rooted sedge, Chinese tallow, and other invading species by 50 percent on the Refuge.

Rationale:
Preventing the introduction and spread of invasive species is an ongoing and serious threat to native habitat. Executive Order 13112 requires, among other things, that Federal agencies use relevant programs, authorities, and funds to monitor, prevent, and control the spread of invasive species. The Refuge annually treats 500–600 acres of invasive species. The predominant invasive species are Macartney rose, deep-rooted sedge, and Chinese tallow.

Attwater's prairie-chicken prefer open prairies that should contain less than 20–25 percent woody vegetation (Hamerstrom et. al 1957). Invasion of prairie grasslands by woody brush and tree species has played a significant role in the continued decline of Attwater's prairie-chickens in historic times (Lehmann 1941).

Strategies:
1. Monitor and map invasive and/or exotic species.
2. Develop an Integrated Pest Management Plan.
3. Develop a systematic approach to treat entire Refuge (one time), followed by monitoring and proactive spot treatments of new plants on an annual basis.
4. Treat Macartney rose and Chinese tallow with a combination of prescribed fire and herbicides.
5. Treat deep-rooted sedge with chemical treatment as appropriate.
6. Remove Chinese tallow and Macartney rose from Coushatta Creek.
7. Contain and remove Renz woodlot and clean up woodlot and homestead area on Bollinger Tract.
8. Identify and treat other invasive species as necessary.
9. Identify prairie-riparian boundary within active floodplain using best available data, and remove trees encroaching onto prairie habitat in Sandy River Unit, Prause Unit, Duncan Sand Unit, Housh Unit, Foster Unit, River Tracts and East Reichardt Unit (within 10 years of CCP's approval).

Objective 5. Throughout the life of the CCP, secure additional prairie habitat (up to 30,000 acres) within the approved acquisition boundary.

APC Nest. CREDIT: USFWS

Rationale:
Current Refuge acreage is not enough to support a viable prairie-chicken population. The Refuge is identified as a core area for APC populations in the 2010 APC Recovery Plan. As defined in this CCP, a core area is an area of habitat capable of supporting a population of 500 APCs, or

approximately 25,000 acres, assuming a carrying capacity of one bird per 50 acres.

Strategies:

1. Continue to coordinate with Regional Office Realty staff to pursue fee title acquisition of lands from willing sellers only within approved Refuge acquisition boundary.
2. Proactively seek out additional land protection options to include: private land conservation easements, safe harbor agreements, NRCS's Grassland Reserve Program, EQIP, Farm Bill, TPWD's Landowners Incentive Program, USFWS's Partners for Fish and Wildlife Program, etc.
3. Hire a private lands biologist (one FTE) to proactively seek out additional options for land protection.
4. Coordinate with Regional Office Realty staff to purchase three inholdings adjacent to River Tract.
5. Coordinate with Regional Office Realty staff to purchase railroad inholding on Anderson/Becker Unit; remove old railroad bed and restore to native prairie.

Objective 6. Throughout the life of the CCP, monitor prairie habitat and condition to determine the effects of climate change on Refuge resources.

Rationale:
Department of the Interior Secretarial Order 3226, signed January 19, 2001, and reinstated on February 22, 2010, by Secretarial Order 3289 Amendment No. 1, states that "there is a consensus in the international community that global climate change is occurring and that it should be addressed in governmental decision making…". This Order ensures that climate change impacts are taken into account in connection with departmental planning and decision making. Each bureau and office of the Department will consider and analyze potential climate change impacts when undertaking long-range planning exercises, when setting priorities for scientific research and investigations, when developing multi-year management plans, and/or when making major decisions regarding the potential utilization of resources under the Department's purview. Departmental activities covered by this order include but are not limited to "programmatic and long-term environmental reviews undertaken by the Department; management plans and activities developed for public lands; planning and management activities associated with oil, gas, and mineral development on public lands; and planning and management activities for water projects and water resources."

Strategies:

1. Coordinate with local groundwater management districts to monitor groundwater quality and quantity.
2. Use best available science to minimize the impacts of climate change.
3. Monitor effectiveness of habitat management tools, such as fire and grazing, and use adaptive management as necessary if habitat conditions change due to climate change.
4. Continue to restore prairie habitat that would sequester carbon.

Objective 7. Within five years of the CCP's approval, coordinate with Lower Colorado River Authority (LCRA) and neighboring landowners to look at possibilities and funding options to relocate or remove irrigation canals that bisect the Cranz and Lafitte Units.

Rationale:
Current irrigation canals leak and damage prairie vegetation by harboring invasive species, impairing prairie drainage, and interrupting the prairie's aesthetics. It is a very intrusive feature on the prairie and impairs the visitor's view of the prairie.

Strategies:

1. Investigate options to realign or remove irrigation canals to minimize impacts on the Refuge.

2. Options may include: assisting neighboring landowners with installation of an irrigation well and pump, installing underground pipeline, or relocating the canal off-Refuge
3. Restoration of this area would include pushing levees back into ditches, restoring proper drainage of the area, and planting to native prairie.

APC Headstart box and predator deterrent fence around nest. CREDIT: USFWS

Captive–bred APC chicks. CREDIT: Fossil Rim Wildlife Center

4.3 Goal 2: Wildlife Management

Maintain and enhance healthy populations of wildlife, with the recovery of Attwater's prairie-chicken being the priority.

Objective 1: By the end of the 15-year life of this CCP, support an Attwater's prairie-chicken population of 500 breeding individuals on Attwater Prairie Chicken NWR.

Rationale:
APC once occupied expansive prairie grasslands of coastal Texas and Louisiana. Habitat destruction and degradation, and to a lesser extent overharvesting, are the primary factors contributing to historic population declines. The APC was listed as endangered with extinction in 1967. This listing was "grandfathered" into the Endangered Species Act of 1973. The species currently occurs in the wild at only three locations—on the Attwater Prairie Chicken NWR, on the Texas City Prairie Preserve, and on private ranches in Goliad County, Texas. Approximately 90 birds were estimated at these locations as of March 2010. In addition, approximately 171 captive individuals were held at six breeding facilities in Texas as of October 2010. Current threats facing APC include extremely small populations, habitat and population fragmentation resulting in genetic isolation, diseases and parasites in both the wild and captive setting, inability of captive breeding facilities to produce large numbers of captive-reared birds, and poor brood survival in wild populations. APC recovery actions are focused on removing and minimizing threats limiting APC recovery in three primary areas: (1) habitat management, (2) captive and wild population management, and (3) public outreach.

Strategies:
1. Continue ongoing recovery activities, including APC nest protection, radio tracking, and brood management.
2. Continue to implement predator management practices to control problem wildlife species including trapping and/or shooting of mammalian predators, use of raptor perch deterrents, removal of woody vegetation and other structures used as perches by avian predators, and use of predator deterrent fences around APC nests
3. Revise Predator Management Plan.
4. Continue invasive species management to include trapping and/or shooting feral hogs and nutria.
5. Continue APC population monitoring.

6. Monitor for potential disease outbreaks such as avian cholera.
7. Assess the impacts of RIFA on insect availability for prairie-chicken broods.

Objective 2. Throughout the life of the CCP, continue to provide APC with at least three wildlife food plots at Corman, Renz, and Exclosure Units (totaling 150 acres) annually.

Rationale:
The Refuge attempts to plant as much of the 150 acres as possible, but conditions are not always favorable. On average, 85 acres are planted annually to provide additional nutrition for APC during the winter months. Remaining acreage is fallow that year. The Refuge plants milo, soybeans, sunflowers, and millet. Food plots also provide cover for APCs. Soybeans provide insects and seed for older chicks and adults. Food plots also seem to facilitate social flocking behavior for APC. The process of cultivating promotes production of native forbs such as croton and signal grass. These native plants produce seed utilized by APC and other wildlife.

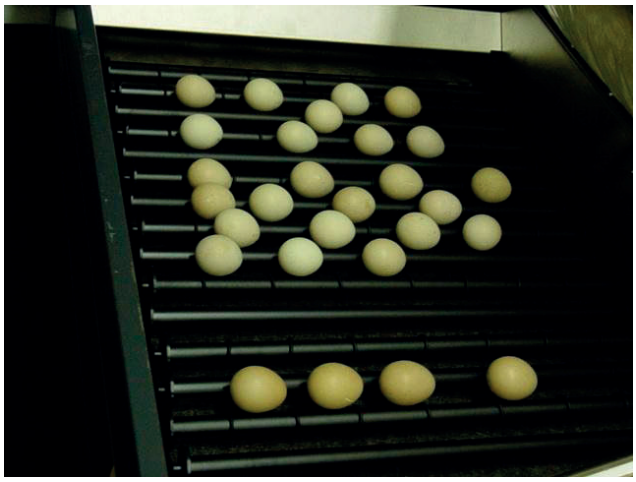
Strategies:
1. Initiate field preparations during late winter months as feasible, and ensure crops are planted in time to maximize production.
2. Mow or knock down crops (i.e., milo) as necessary for use by APC.
3. Investigate the feasibility of installing an irrigation system for each food plot.
4. As APC populations expand on the Refuge, investigate the potential of adding additional food plots in previously cultivated areas.
5. Research the possibilities of realigning food plots to better suit APC needs.

Objective 3. Throughout the life of this CCP, continue to strengthen and develop partnerships to meet Attwater's prairie-chicken recovery goals.

Rationale:
The APCNWR serves as the U.S. Fish and Wildlife Service lead for APC recovery program activities, including implementation of actions outlined in the APC Recovery Plan. Recovery of the APC is highly dependent on participation from other governmental, nongovernmental, and private entities, and from private landowners. Coordination with governmental agencies and private interests is essential in carrying out the objectives of Attwater Prairie Chicken NWR and recovery of the critically endangered Attwater's prairie-chicken. Working with state and Federal agencies, academia, conservation organizations, and private landowners continues to provide positive results in many areas of habitat management, public outreach, and APC recovery. Many of the tasks and responsibilities of the recovery coordinator are performed off-Refuge and that need will increase as recovery of this species occurs. Currently, the Refuge manager serves as APC Recovery Team Leader/Coordinator. The job of managing a national wildlife Refuge and coordinating a recovery program for a critically endangered species are complex and time consuming. A recovery coordinator would obviously manage all APC recovery activities to enhance APC recovery efforts. Separating the Refuge manager and recovery coordinator position will be vital in meeting the Refuge purpose and prairie-chicken recovery goals.

Coordination with several APC breeding facilities is critical to production and release of Attwater's prairie-chickens back into the wild. The U.S. Fish and Wildlife Service does not have the capability or personnel to run a captive breeding facility. The purpose of the captive flock is to produce birds for release to supplement wild populations or to re-establish populations in suitable vacant habitats while maintaining genetic integrity. One of the major obstacles to recovery includes the need to increase the number of breeding pairs in order to increase production in captivity. The 2010 Attwater's Prairie-Chicken Recovery Plan establishes a target of 100 captive breeding pairs with no more than 25 percent of the flock held at

any one facility (to minimize risks for catastrophes). The need for an additional, dedicated captive breeding facility is of critical importance. The Coastal Prairie Conservation Initiative (CPCI) is a cooperative effort undertaken by several agencies, organizations, and private landowners to conserve, restore, and enhance prairie in 19 counties along the Texas coast. All of these relationships need to be continued and, in some cases, strengthened to achieve desired APC recovery results.



APC Captive breeding incubator. CREDIT: FRWC

Strategies:

1. Maintain active participation with APC recovery team.
2. Continue to work with private landowners adjacent to the Refuge and other areas through the CPCI.
3. Coordinate with CPCI partners to improve and increase coastal prairie habitat.
4. Continue to coordinate and oversee production of APCs at several existing captive breeding facilities to increase number of birds to be released into the wild, including proposed expansion of captive breeding facilities.
5. Coordinate and oversee a new, dedicated APC breeding facility.
6. Release captive-bred APCs on public and private lands within APC historic range.
7. Continue scientific research on factors identified in recovery plan (disease management, genetics analysis, nutrition, brood survival, etc.).
8. Hire a full-time Recovery Coordinator to coordinate all aspects of APC recovery

Objective 4. Over the life of the CCP, reduce the number of invasive fauna species by 40 percent on the Refuge.

Rationale:
Feral hogs tend to move through brush corridors and provide a potential threat to nesting Attwater's prairie-chicken. Areas disturbed by hogs become more prone to the establishment of invasive plant species. Nutria burrow through dikes, creating serious safety issues. The adverse impacts of red imported fire ants (RIFA) to a variety of wildlife species are well documented (Allen et. al. 1994, Drees 1994, Allen et. al. 1995, Mueller et. al. 1999, Allen et. al. 2001, Wojcik et. al. 2001, Allen et. al. 2004). They are a threat to ground nesting birds and may affect insect populations that are necessary as food for APC broods. Another invasive ant species, rasberry crazy ants, currently found in the Houston area, also poses a major threat to APCs and other prairie wildlife. They have the potential to further destroy the prairie's biodiversity. Unfortunately, little is known about their biology. Masses of crazy ants affect ground and tree nesting birds and have the potential to cause domestic chickens to die of asphyxia due to ants obstructing the birds' nasal passages (Texas Parks and Wildlife Department 2010).

Strategies:

1. Research impacts of RIFA on insect availability during APC brooding periods on Corman and Reichardt Units.
2. Depending on results of this research, evaluate best control methods and treat entire Refuge for RIFA and APC habitat in other areas (e.g., surrounding APCNWR, Goliad and Galveston Counties).
3. Continue to treat APC nesting areas for RIFA.

4. Monitor area for rasberry crazy ants and determine control methods as needed.
5. Continue feral hog and nutria control as needed to prevent increases in numbers and destruction to habitat and native wildlife by (1) shooting, (2) trapping, and (3) removing brush and artificial water features along water corridors such as Coushatta Creek, canals, and ditches.

Objective 5. Within 10 years of the CCP's approval, conduct a vegetative and wildlife survey on the entire Refuge to determine distribution and abundance of key species.

Rationale:
The information gathered from a full vegetative and wildlife survey would be used to better manage for invasive species and would provide meaningful information relevant to Attwater's prairie-chicken recovery and Refuge management.

Strategies:
1. As part of the Regional Inventorying and Monitoring Program, hire a part-time permanent biological technician to complete a Biological Inventory and Monitoring Plan.

Festival at APCNWR. CREDIT:USFWS

4.4 Goal 3: Visitor Services

Provide opportunities for visitors to enjoy and appreciate the Refuge, its wildlife, and its management activities through compatible wildlife-dependent recreation programs.

Objective 1. Wildlife Observation and Photography - Within five years of the CCP's approval, increase opportunities to view live Attwater's prairie-chickens so that 40 percent of Refuge visitors have some opportunity to view Attwater's prairie-chickens, and continue to provide visitors with reasonable opportunities to observe wildlife that are commonly found on the Refuge.

Rationale:
Currently, approximately only 2–3 percent of Refuge visitors have an opportunity to view APCs. By continuing with the APC Festival, adding more guided tours, using available technology, and having the Visitor Contact Station open on weekends, we can increase interpretation opportunities for the Refuge. An informed public will be more supportive of the Refuge System programs, Refuge specific projects, and APC recovery activities. Many individuals would like to see prairie-chickens. The Refuge needs to identify ways to increase APC viewing opportunities while limiting disturbance to the endangered bird.

Currently, the auto tour route is about 5 miles long and there are about 2.5 miles of trails available on APCNWR. Visitors traveling the current auto tour route are viewing a highly altered landscape that is not representative of the Refuge. A re-routed auto tour route will provide visitors with a more representative view of native prairie resources.

Currently, the Pipit Trail is not highly used, and the presence of this trail degrades the prairie landscape. This trail is not in a convenient location for the visitor since it is situated prior to reaching the Visitor Contact Station. Visitors have to back track from the Visitor Contact Station to use this trail. The new proposed trail installed at Horseshoe Lake will provide viewing opportunities to native prairie and wetland wildlife at Horseshoe Lake. Accessibility to Horseshoe Lake will be by foot and will be universally accessible.

Strategies:
1. Develop Visitor Services Plan.

2. Provide one additional guided tour (possibly more depending on staff and time) mid-February through mid-May to APC booming grounds.
3. Expand opportunities with available technology (e.g., podcasts, live-feed video, etc.) to view prairie-chickens on booming grounds.
4. Initiate a Refuge questionnaire, which would allow visitors to rate their viewing experience.
5. Extend hours of Visitor Contact Station to include weekends during high visitation seasons,
6. Re-route auto tour route through Duncan Unit (south of Coushatta Creek), Glueck Unit (south of Coushatta Creek), and Wintermann Unit to provide a more representative view of the prairie; this would include installing pull-outs with interpretive panels along auto tour route.
7. Develop a new trail near Horseshoe Lake adjacent to the auto tour route (Map 4-2). Trail will include new interpretive signs and kiosks and a viewing platform with interpretive panels and viewing telescope to view wildlife on Horseshoe Lake and the open prairie.
8. Remove underutilized public use trail on Foster Unit (Pipit Trail).
9. Public Use Area: repair fences as needed, fence out livestock from trail area by moving the Housh/Foster fence north (just south of the Sycamore Trail), and installing a new fence from Coushatta Creek/San Bernard River intersection north through Horseshoe Lake to the Housh/Duncan fence (see Map 4-4).

Objective 2. Environmental Education - Within two years of hiring a Visitor Services Specialist, develop an environmental education (EE) program to increase the knowledge and understanding of the Attwater's prairie-chicken and native coastal prairie habitat for approximately 1,000 students annually.

Rationale:
Attwater Prairie Chicken NWR does not have sufficient staff designated to develop an environmental education program. The Refuge staff responds to occasional requests from local schools and other groups for presentations and other environmental education opportunities. This is conducted as time and staff allows. Approximately 150 students are educated annually. The Refuge needs to increase its environmental education program for local communities and schools to build support for the Refuge System, the Refuge, and APC recovery efforts.

Strategies:
1. Develop Visitor Service Plan.
2. Hire full-time Visitor Services Specialist.
3. Develop EE curriculum, incorporating prairie and other ecological concepts such as climate change.
4. Identify school districts to partner with for annual education opportunities; complete demand assessment to determine needs and how program fits into curriculum.
5. Solicit the help of volunteers and educators.

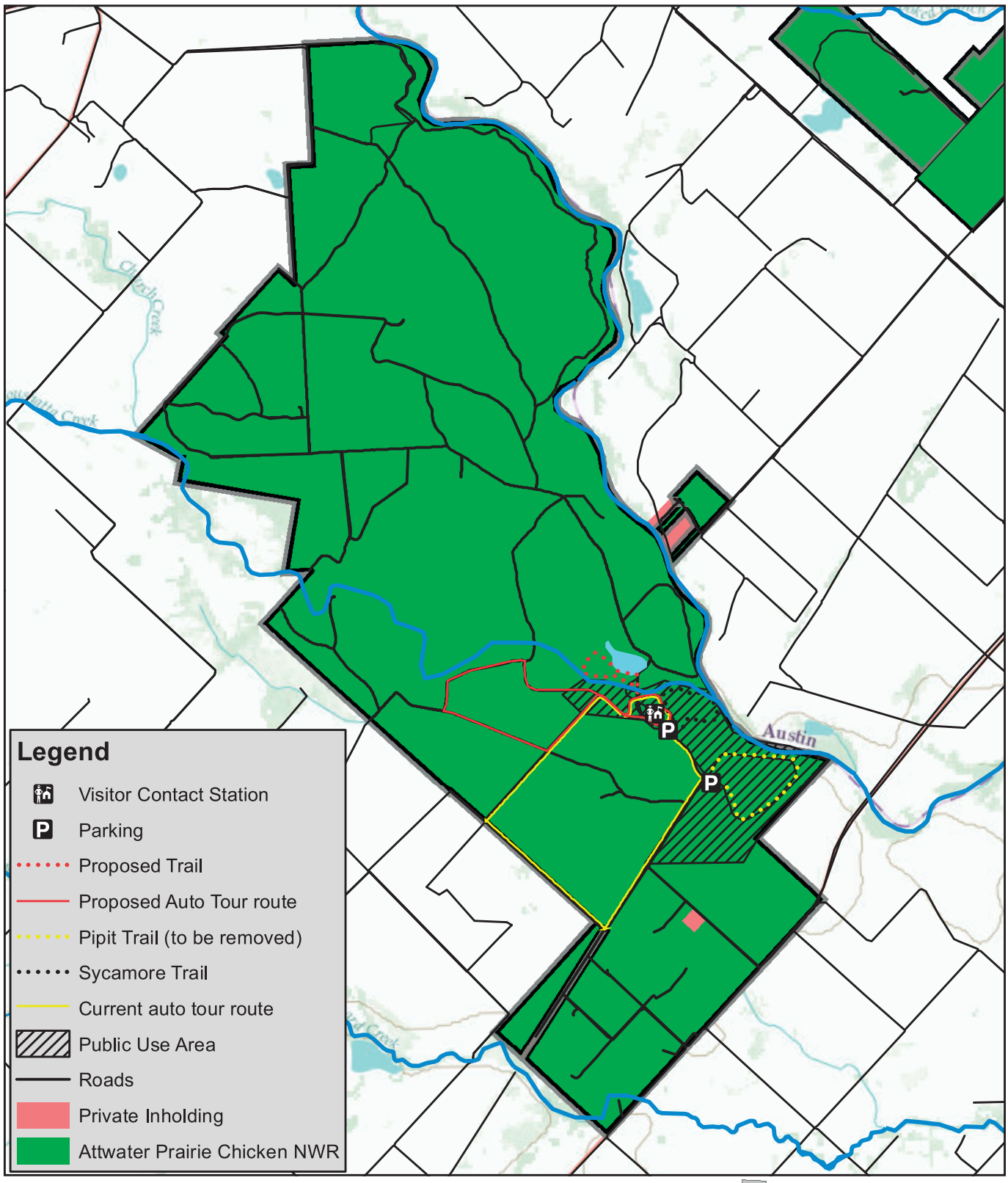
SCA intern demonstrating radio telemetry during annual APC Festival. CREDIT: USFWS

U.S. Fish & Wildlife Service

Attwater Prairie Chicken National Wildlife Refuge

Austin/Colorado County, Texas

Map 4-2. Proposed Public Use Changes



PRODUCED IN THE DIVISION OF REFUGE PLANNING
ALBUQUERQUE, NEW MEXICO
LAND STATUS CURRENT TO: 5/31/09
MAP DATE: Jan, 2012
BASEMAP: N/A
MERIDIAN: N/A
FILE: atw_public_use_changes_1.6.12_sk

0 0.4 0.8 1.6 Miles

0 0.4 0.8 1.6 Kilometers

UTM ZONE 14
NAD 83

Objective 3: Interpretation - Within two years of hiring a Visitor Services Specialist, at least 50 percent of Refuge visitors will understand the purpose of the Refuge.

Rationale:
Currently, the Refuge provides interpretation for approximately 4,000 visitors on the Refuge and approximately 1,000 at off-site locations. Given the critical status of the Attwater's prairie-chicken, there is little opportunity to view prairie-chickens on the Refuge. The current auto tour route does not return to the Visitor Contact Station. Therefore, no feedback is received from visitors to adjust and/or improve interpretation. The proposed relocated auto tour route will contribute to this objective for interpretation by allowing visitors the opportunity to provide feedback to Refuge staff because the new route will return to the Visitor Contact Station. Current displays need to be updated for visitors with more interpretation. All strategies are dependent on the hiring of a full-time Visitor Services Specialist.

Strategies:
1. Develop Visitor Services Plan.
2. Continue annual Attwater's Prairie-Chicken Festival.
3. Increase number of off-site interpretive events, programs, etc., to include the possibility of additional festivals, expos, Earth Day events, etc.
4. Update Refuge brochures.
5. Update Refuge video at Visitor Contact Station.
6. Implement a survey to record visitors' understanding of the Refuge purpose.

Objective 4: Friends Group and Volunteers - Within one year of the CCP's approval, establish a Refuge "Friends" group and continue recruiting volunteers to assist with Refuge programs.

Rationale:
Refuge Friends groups are private non-profit organizations that partner with the Refuge to advocate for the Refuge program needs. In addition to Friends organizations, national wildlife refuges rely on support and help from volunteers for a variety of tasks from habitat and maintenance projects to environmental education.

Strategies:
1. Develop Visitor Services Plan.
2. Utilize Friends group, once established, to assist with outreach, interpretive events, fund-raising, advocacy, and environmental education
3. Recruit volunteers to assist with various projects

Long-horned grasshopper. CREDIT: USFWS

4.5 Goal 4: Facilities Management

Provide high-quality, safe, environmentally responsible facilities to support Refuge operations and enhance visitor experiences.

Objective 1. Within five years of CCP's approval, initiate a site plan to replace current headquarters with a new permanent building to include a biological annex and Visitor Contact Station, staying within the same footprint as the current administrative complex.

Rationale:
Current facilities are inadequate. The lifespan of the current modular structures is not long. These facilities were not designed to be permanent. The current biological lab is not large enough. Equipment is located in separate rooms and, in some cases, separate buildings. The lab needs to be a wing of the administrative complex or a

separate building that is designed to provide all the equipment and space to carry out APC recovery work.

Strategies:

1. Design a site plan to include Visitor Contact Station, office facility, and biological annex. The following elements would be incorporated into the site plan:
    - Require a medium building design.
    - Create energy efficient building to meet Leadership in Energy and Environmental Design (LEED) standards.
    - Design biological annex to meet specific needs of APC recovery activities.
    - Design Visitor Contact Station to include new displays and efficient use of space for interpretive purposes.
    - Design multiple use space that can be used as a meeting room and a classroom for environmental education.
    - Develop a new visitor parking lot to accommodate an increase in visitation.

Objective 2. Within five years of the CCP's approval, reconfigure public use roads to provide and promote a greater understanding of the coastal prairie ecosystem.

Rationale:
The current auto tour route is located in an area that is highly disturbed. The Refuge plans to restore two man-made impoundments located along the current tour route back to native prairie. This restoration would eliminate a portion of the auto tour route since the dike road that creates one impoundment is currently serving as the tour route. The new proposed auto tour route would utilize existing service roads so that impacts to native prairie habitat would be minimal. The current main county road entrance into the Refuge is in dire need of repair. Audeane Road is an Austin County road that leads to the Refuge's Zaruba, Gay, Beckendorff, and Jankowski Tracts. In the past, there have been issues with illegal dumping in this area.

Strategies:

1. Investigate funding sources such as Refuge Roads Program to complete road projects.
2. Coordinate with Colorado County to resurface Refuge entrance road.
3. Coordinate with Austin County on potentially closing Audeane Road to public access.
4. Restore certain portions of current auto tour route to native prairie and upgrade service roads to meet public use standards in proposed alignment for new auto tour route (Map 4-2).

Objective 3. Throughout the life of the CCP, remove about 15 miles of service roads and maintain about 37 miles of service roads through grading to meet access needs and minimize impacts to prairie habitat.

Rationale:
There are currently more service roads than needed on the Refuge. Some roads need to be removed and restored to native prairie. Roads cause fragmentation, introduce and harbor invasives, impact surface hydrology, and pose disturbance issues. Map 4-3 illustrates which roads will be removed within 5, 10, and 15 years of the CCP's approval.

Strategies:

1. Remove service roads and restore to native prairie on Corman Unit (interior roads), Reichardt Unit, Renz Unit, Glueck Unit, and Anderson/Becker Unit, and Housh Unit (within five years of CCP's approval).
2. Remove service road and restore to native prairie on Krueger Unit, Prause Unit, Wintermann Unit, Lafitte Unit, and exterior road around Beckendorff Unit, Gay Unit, Jankowski Unit, and Zaruba Unit (within 10 years of CCP's approval).

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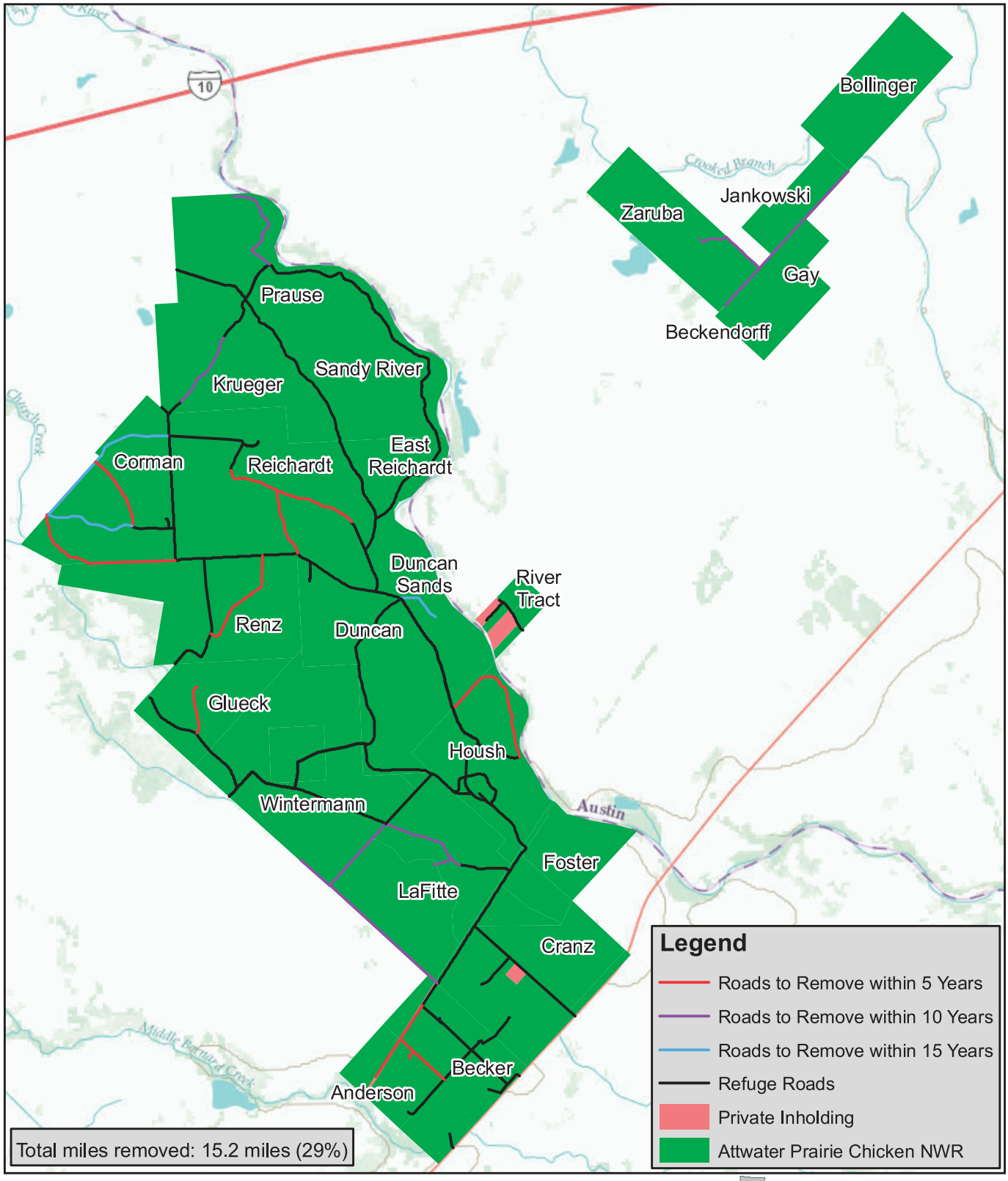
Attwater Prairie Chicken National Wildlife Refuge

Austin/Colorado County, Texas

Map 4-3. Roads to be Removed



PRODUCED IN THE DIVISION OF REFUGE PLANNING
ALBUQUERQUE, NEW MEXICO
LAND STATUS CURRENT TO: 5/31/09
MAP DATE: Jan. 2012
BASEMAP: N/A
MERIDIAN: N/A
FILE: atw_road_removal_1.25.12sk

0 0.5 1 2 Miles

0 0.5 1 2 Kilometers

El Paso Fort Worth Dallas San Antonio Austin Houston

Attwater NWR

UTM ZONE 14
NAD 83

3. Improve service roads and associated culverts on Sandy River Unit, Reichardt Unit, East Reichardt Unit, Renz Unit, Duncan Sand Unit, Glueck/Wintermann Unit, Lafitte Unit, Cranz Unit, Anderson/Becker Unit, Zaruba Unit, and Beckendorff Unit (within 10 years of the CCP's approval)
4. Improve service road through grading on River Tracts (within 10–15 years of the CCP's approval).
5. Remove service roads and restore to native prairie on Corman Unit and Duncan Sand Unit (within 15 years of CCP's approval).

Objective 4. Within eight years of the CCP's approval, repair and replace infrastructure associated with the Refuge's grazing program.

Rationale:
Grazing is a key management tool for Attwater's prairie-chicken habitat. Much infrastructure needs to be maintained, repaired, and/or installed to properly manage herds to support habitat requirements for APC.

Strategies:
1. Repair and/or replace fences, gates, cattle guards, windmills, and solar wells, on each Refuge unit as needed.
2. Remove cattle pens on Prause and Wintermann Units.
3. Repair perimeter fences; install cattle guards, gates, and windmills and/or wells as needed on Zaruba Unit, Jankowski Unit, Gay Unit, Beckendorff Unit, Bollinger Unit, Cranz Unit, Anderson Unit, and Becker Unit.

Objective 5: *Phase I* - Within eight years of the CCP's approval, the Refuge will remove 6.5 miles of Refuge fencing.

Rationale:
Consolidation of pastures by the removal of unnecessary fencing and the addition of new fencing where needed would aid in APC recovery efforts by minimizing effects of drainage, minimizing availability of raptor perches, and minimizing the potential for prairie-chicken collisions. This pasture reorganization will maximize benefits to Attwater's prairie-chickens. 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). A total of 12.5 miles will be removed during Phase I, and 6 miles will be installed (See Map 4-4).

Strategies:
1. The south fence will be removed from the following units: Prause, Corman, Sandy River, East Reichardt, Duncan Sands, Housh, Foster, Glueck, and Zaruba.
2. The east fence will be removed from the following units: Corman, Renz, and Beckendorff.
3. The interior fences will be removed from the following units: LaFitte and Wintermann .
4. Fence will be installed in the following units: Prause (central), Renz (west and central end), Housh (central and south end), Cranz (along both sides of the entrance road) and River Tract.

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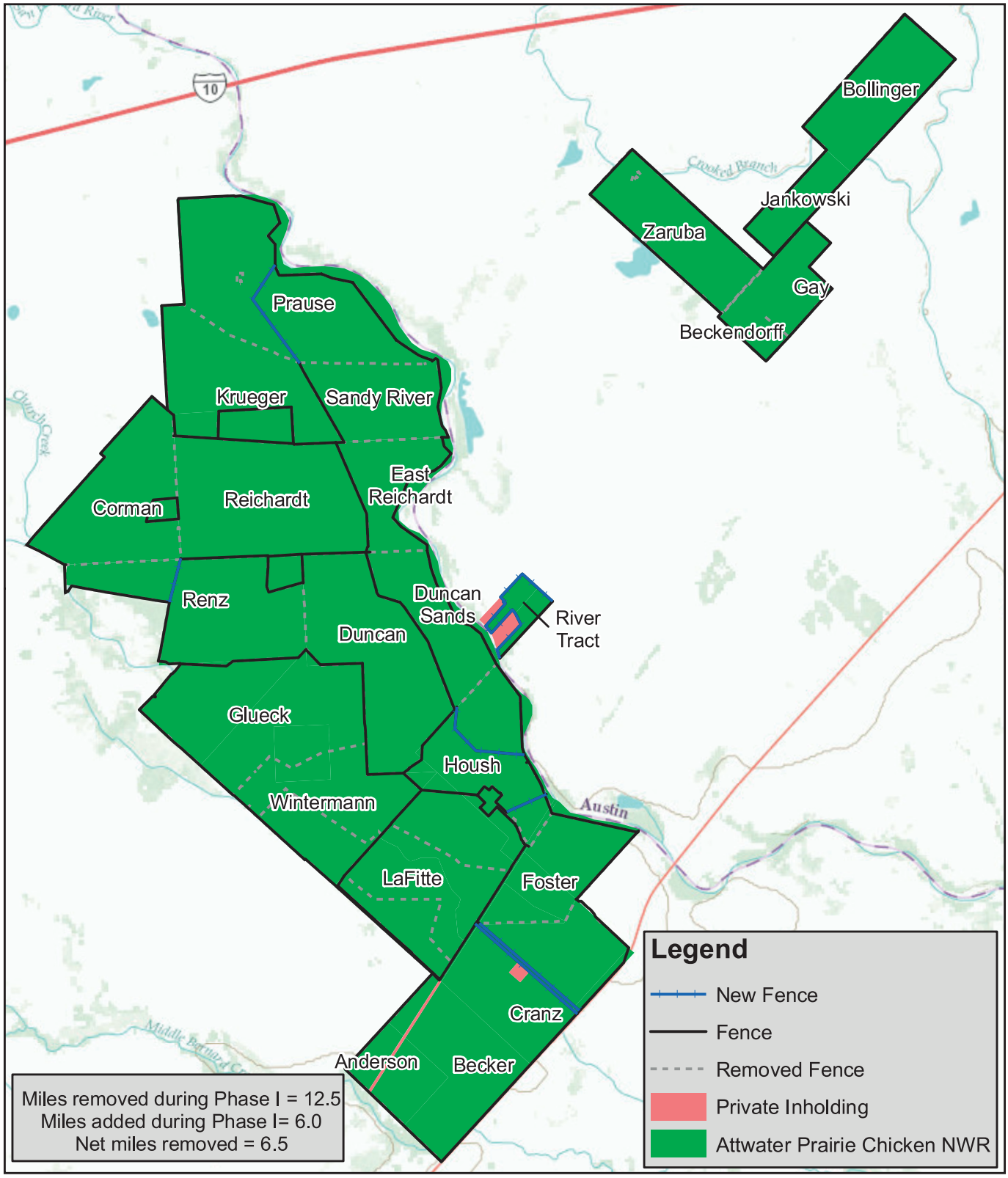
Austin/Colorado County, Texas

Map 4-4. Fence Removal Schedule (Phase I: 8 Year Plan)



PRODUCED IN THE DIVISION OF REFUGE PLANNING
ALBUQUERQUE, NEW MEXICO
LAND STATUS CURRENT TO: 5/31/09
MAP DATE: Jan. 2012
BASEMAP: N/A
MERIDIAN: N/A
FILE: atw_fence_removal_I_1.26.12sk

0 0.4 0.8 1.6 Miles

0 0.4 0.8 1.6 Kilometers

Attwater NWR

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NAD 83

Objective 6. *Phase II* - Within 15 years of the CCP's approval, depending on results from Phase I, the Refuge would remove an additional 3.5 miles of Refuge fencing.

Rationale:
The Refuge would monitor the results of removing fencing and consolidating pastures described in Phase I. The Refuge would use adaptive management to determine if Phase II will be implemented (See Map 4-5).

Strategies:
1. Remove fence on the south end of Krueger (consolidating Prause and Krueger with Reichardt and Corman).
2. Remove fence on the south end of Renz and west side of Duncan (consolidating Renz and Duncan with Glueck and Wintermann).

Objective 7. Prior to any groundbreaking activity, the Refuge will survey and document project areas to ensure that management activities are in compliance with Federal historic preservation mandates and Service policies and procedures.

Rationale:
An archaeological survey of the area is needed to document new and existing sites. Should such resources be discovered, the Refuge will incorporate measures to ensure that such resources are protected from degradation and for future study and investigative research. The Refuge could provide visitors with specific information regarding the historical land use. Interpretation of the history and prehistory of the area and cultural resources oriented activities, consistent with the natural resources and wildlife objectives of the area, would serve to increase the public's awareness and conservation of the cultural resources of the area.

Strategies:
1. Protect any cultural resources on Refuge lands as mandated under the Archaeological Resource Protection Act, including appropriate law enforcement measures.
2. Continue to ensure all Refuge management activities are in compliance with the National Historic Preservation Act.
3. Avoid damage and deterioration to cultural resources that would result from erosion, abandonment, or neglect.
4. Coordinate with Regional Historic Preservation Officer and the State Historic Preservation Office as necessary regarding historical and cultural resources.
5. Provide opportunities for visiting public to learn about the history and prehistory of the area.

Crested caracara. CREDIT: USFWS

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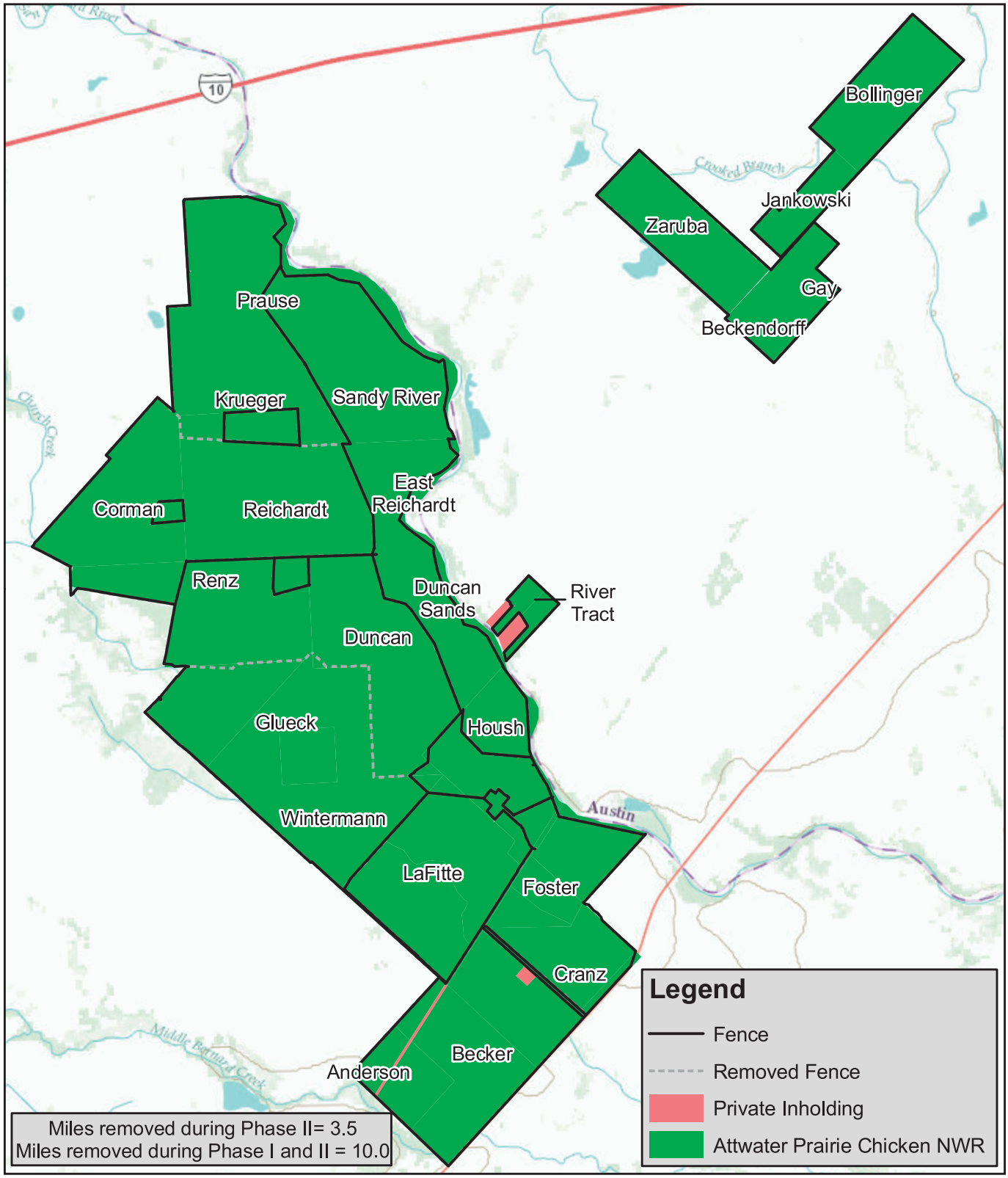
Attwater Prairie Chicken National Wildlife Refuge

Austin/Colorado County, Texas

Map 4-5. Fence Removal Schedule (Phase II: 15 Year Plan)



PRODUCED IN THE DIVISION OF REFUGE PLANNING
ALBUQUERQUE, NEW MEXICO
LAND STATUS CURRENT TO: 5/31/09
MAP DATE: Jan. 2012
BASEMAP: N/A
MERIDIAN: N/A
FILE: atw_fence_removal_II_1.26.12sk

0 0.45 0.9 1.8 Miles

0 0.45 0.9 1.8 Kilometers

Attwater NWR

UTM ZONE 14
NAD 83

Objective 8. Throughout the life of the CCP, continue to annually work closely with companies who oversee oil and gas development and exploration to ensure that activities are conducted in the most environmentally sensitive manner possible.

Rationale:
There are currently eight active oil and/or gas wells on the Refuge. A number of active pipelines cross the southern portion of the Refuge as well. The Refuge does not own the minerals below the surface. The Refuge must allow for their exploration and development through reasonable means. Deed restrictions from tract to tract vary across the Refuge. Some include specific language to protect wildlife resources, while others do not. Refuge personnel work closely with those companies who oversee oil and gas production and have a good working relationship with the operators and their employees. Although issues are rare, occasional spills and worn or abandoned equipment must be cleaned up and removed. Some wildlife disturbance does occur during maintenance operations and regular site visits, but it is infrequent and limited in scope.

Strategies:
1. Coordinate with oil and gas interests on all exploration and development activities on the Refuge; administer such activities under Service policy and regulations through issuance of Special Use Permits.
2. Coordinate with Regional Oil and Gas Specialist to ensure oil and gas operations are in compliance with Service regulations and policy.
3. Work with Texas Natural Resource Conservation Commission to ensure operators are within State compliance.
4. Require each operator to operate under current local, State, and Federal regulations and policies.
5. Require each operator to develop an annual *Development and Operations Plan* that would be reviewed and approved by the Refuge manager.
6. Require each operator to prevent, to the maximum extent possible, releases of hazardous materials and substances, crude oil, and produced water.
7. Ensure that each operator has a current *Oil Discharge Prevention and Contingency Plan* outlining procedure for accidental releases.
8. On a case-by-case basis, the Refuge may request that wells, roads, pipelines, and associated infrastructure and facilities not needed to support operations be removed and the sites restored to the satisfaction of the Refuge manager.
9. Prause Unit: Remove previously abandoned oil and gas structures and pipeline.

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