

Endangered Species UPDATE

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Attwater's Prairie Chicken: The Conservation Challenge and Recommendations

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Abstract

The Attwater's prairie chicken (Tympanuchus cupido attwateri) is an endangered bird native to the Texas Gulf Coast Prairie. Populations have declined from historic levels of over one million individuals to 56 birds in 1998. The recovery plan lists several management efforts—increased habitat management and acquisition, captive breeding and reintroduction, and establishment of public-private partnerships for species recovery. Although many of these efforts have been implemented, the species continues to decline and is in imminent danger of extinction. To supplement the programs, we have four suggestions. First, continue and increase research into causes for continued species decline. Second, expand public outreach and focus on the benefits of the safe harbor agreement to build future partnerships between diverse groups. Third, an independent team of experts should be formed to evaluate all problem-solving and organizational aspects of the recovery program. Fourth, the program needs to continue celebrating small successes and break the recovery process into a series of more attainable efforts. This species' recovery effort illustrates the complexities of endangered species management—even effective partnerships and successful programs must be organized to advance the goal of species recovery.

Foreword

On a windy morning in mid-March, vans of birdwatchers, townspeople, and tourists traveled along the winding 'vehicle loop' at the Attwater Prairie Chicken National Wildlife Refuge. In the middle of the tour, each van stopped and people piled out, hoping to see one of the most endangered birds in North America. Five years ago, they might have been successful; now, there were fewer than 30 Attwater's prairie chickens (*Tympanuchus cupido attwateri*) on the refuge and the current males had not established the 'booming grounds' essential for natural reproduction. No prairie chickens were seen all day, and the only bird heard was one that was captive-bred and in an acclimation pen. On a 3000-hectare refuge, with a recently enacted safe harbor agreement and four centers captive breeding centers, the Attwater's prairie

chicken seemed closer than ever to extinction as a wild species.

Introduction

In many ways, the story of the Attwater's prairie chicken is similar to that of dozens of prairie species. Historically, nearly one-million Attwater's prairie chickens (APC) were distributed throughout 2.4-million hectares of coastal prairie habitat in Texas and Louisiana (Lehmann 1941). As settlers converted the coastal prairie for grazing, agriculture, and urbanization, the APC declined sharply in both range and abundance. In the original ecosystem, occasional wildfires and large grazers such as bison maintained open prairie. Many range-lands, however, have been overgrazed, leading to soil compaction and the spread of invasive plant species. Fire suppression throughout the prairie has encouraged further brush encroachment. The

combination of fire suppression and improper grazing techniques has helped reduce suitable APC habitat by over 97% from historic levels (FWS 1995a). The development of cities such as Houston further fragmented the remaining APC prairie habitat, precluding movement across urban and agricultural barriers. Today, only 56 individuals remain in three geographically isolated populations. At low population numbers, the deleterious impacts of habitat loss and fragmentation intensify (Seal 1994). While there is limited evidence of disease in wild APCs (Peterson et al. 1998), epidemics spread by captive-bred individuals could decimate the remaining birds. Since the APC is confined to three small areas, stochastic events such as fires, storms, or inbreeding could extirpate the populations and cause extinction.

This paper reviews current efforts to restore the APC, examines the re-

covery program as a 'model' partnership, and offers recommendations to improve prospects for this species. We first became involved with this issue in 1997 as part of a habitat conservation plan analysis conducted simultaneously at nine universities. Specifically, we focused our attention on the APC safe harbor agreement (SHA) and associated conservation efforts. We initially researched the scientific basis for the SHA using primary source literature and government documents. In addition, we interviewed many personnel responsible for APC conservation and reintroduction. During the spring of 1998 we visited the Attwater Prairie Chicken National Wildlife Refuge (APCNWR) and met with FWS biologists, refuge employees, SHA coordinators, and local landowners. All participants are dedicated to their mission; each is working hard to achieve the program's goal of habitat restoration or species conservation. Despite their efforts, however, the APC has continued to decline in the wild and would be extinct were it not for continual infusions of captive-bred birds. Although useful partnerships have been formed in APC recovery efforts, progress toward the overarching goal of species recovery needs to be the first and major criterion by which any program is evaluated.

Current efforts at species recovery

Because of the massive loss of its native prairie habitat, the APC has been recognized as a threatened species since the early 1960s and was listed as endangered in 1967 (FWS 1993). With the population declining by approximately 50% every fourteen years (FWS 1995b), it was one of the first species to be listed under the Endangered Species Act. Conservation efforts have focused on five areas: habitat management on the

refuge system, the SHA for the Gulf Coast Prairie ecosystem, captive breeding and release programs to supplement wild populations, increased public awareness of the APC, and the development of management-oriented research (FWS 1993; Terry Rossignol pers. com.).

Shortly after the APC was listed, the APCNWR was established near Eagle Lake, Texas to ensure long-term protection. The site, a combination of native prairie and former agricultural land, had historically been inhabited by the APC and was surrounded by land containing healthy populations of the bird. As late as the mid-1980s, flocks of 25-30 prairie chickens were commonly observed on land adjoining the refuge (Frank Reznicek pers. com.). Although the refuge covers nearly 3,300 ha, most sightings occur in an 1,100 ha 'core' area where public access is restricted (Seal 1994). The smaller Galveston Bay Prairie Reserve was established by the Nature Conservancy of Texas to provide protection for a population on private land. These two refugia and an additional patch of private land hold the remaining APC populations. These areas are separated by urbanization, precluding movement between parcels.

Historically, habitat loss has been the principal cause of APC decline. Theoretically, existing reserves could be buffered by obtaining massive tracts of land. Because 97% of the state is privately owned, however, the amount of land that would have to be purchased makes this alternative impractical. Given this fact, a SHA was created to supplement existing refugia. By providing financial support, coupled with a 'safe harbor' from the Endangered Species Act, the plan encourages landowners to engage in range management, replicating the natural prairie landscape and benefiting the APC. The SHA is a subset of a larger restoration effort, the Native

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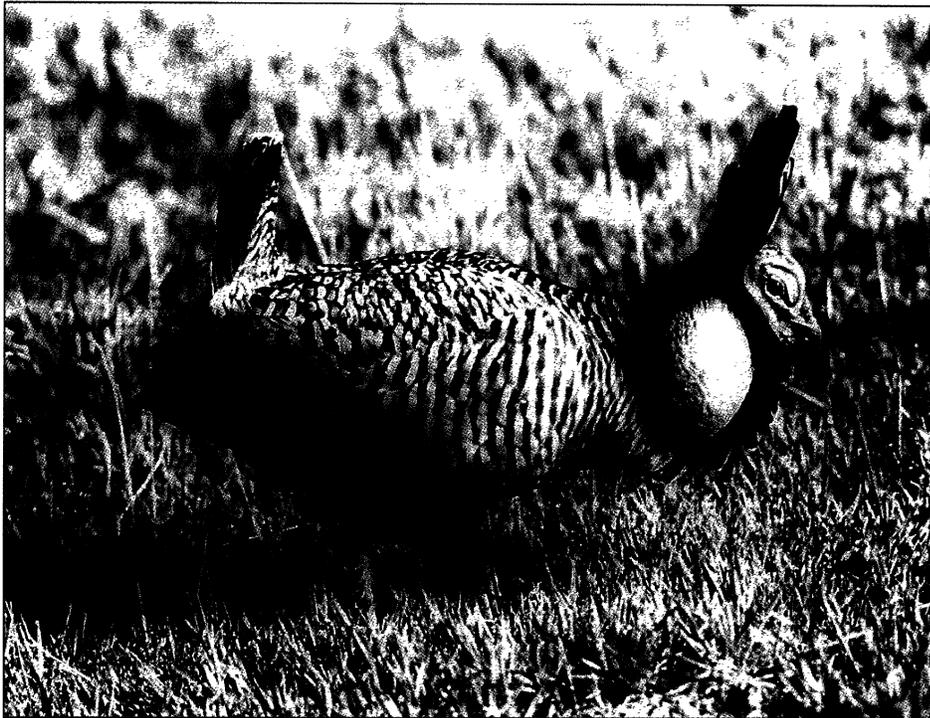
Cover: Attwater's prairie chicken. Photograph by George Levandoski.

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Attwater's prairie chicken (*Tympanuchus cupido attwateri*) Photograph courtesy of George Levandoski

Gulf Coast Prairie Restoration Program (Sam Houston Resource Conservation and Development Area Inc. 1995). Thus, although the SHA targets the APC, the overall goal is prairie habitat restoration. The SHA promotes range management through a cost-share agreement with landowners. The cost-share enables landowners to enhance their property at a reduced rate. Interest in the program has been high, in part because of this financial benefit. There are currently nine agreements, selected from over 50 applications. The genuine interest of landowners will hopefully contribute to the SHA's effectiveness. While official management responsibilities only last ten years, it is anticipated that participant's range improvements will continue for a longer period.

In addition to the refuges and the SHA program, captive breeding of the APC has quickly become a vital part of the recovery effort. Although grouse are difficult to rear in captivity (Toepfer et al. 1990) and there have been problems with disease

(Terry Rossignol pers. com.), the APC breeding centers have successfully produced over three hundred chicks since 1992. Unfortunately, releases have been less successful—survival rates of individuals released into the wild have averaged 36% per year over the last two years (Terry Rossignol pers. com.). In addition, it has proven difficult to maintain the communal breeding habits among released birds. Despite these difficulties, the captive breeding program is essential for maintaining extant wild populations—50 chicks were released in 1997, supplementing a wild population of about 58 birds (FWS 1997b). In addition to captive breeding efforts, the centers engage in disease and pathogen research and are investigating the feasibility of hybridizing the APC with the closely related greater prairie chicken (*Tympanuchus cupido*).

Efforts toward public outreach and management-oriented research have also received attention. In exchange for a financial contribution, participants in the 'Adopt-A-Prairie-

Chicken' program receive quarterly updates on breeding and reintroduction efforts and may be invited to attend special events such as captive releases. The APCNWR and SHA coordinators also participate in the annual 'Attwater's Prairie Chicken Festival' that raises awareness of the APC while providing guided tours of the APCNWR and a forum for promotion of the SHA. Research on habitat requirements of the APC and more effective methods of captive reintroduction are also occurring, although the question of why the birds continue to decline on land managed for the

prairie chicken has not yet been answered. Research is mainly coordinated through academic institutions, and there is no systematic program of refuge-based research.

The APC recovery process as a model partnership

Partnerships for endangered species recovery have flourished in recent years. The recent surge in habitat conservation plans (HCPs) and safe harbor agreements is but one aspect of this regulatory shift from confrontation to cooperation. The use of HCPs and 'incidental take' permits has increased greatly in recent years; as of 1997, 212 HCPs had been approved and over 200 were being developed (FWS 1997). The current trend is toward larger programs involving increasing numbers of participants. By joining financial and educational resources across agencies, partnerships can help maximize possibilities for species recovery (Clark and Brunner 1996).

In many ways, the APC recovery team represents a well-executed and

effective partnership. Biologists, refuge personnel, captive breeding specialists, private land-owners, and other constituents form the APC recovery team. This team has effectively coordinated efforts between groups, and no single participant appears to exert undue influence on the planning process. This spirit of cooperation between refuge personnel and captive-breeding centers is evident in the creation of the 'Adopt-A-Prairie-Chicken' program that funds captive-breeding efforts. By promoting this effort through the APCNWR visitor's center, refuge personnel increase the program's visibility to tourists. At the same time, the captive-breeding centers' promotion of the yearly APC re-introductions increases the number of people involved with refuge activities. The captive-breeding centers, three of which are located at zoos or private wildlife preserves, further enhance public awareness of APC conservation through displays and interpretive exhibits.

The ability of the APC recovery team to work together is especially noteworthy given the track record of other recovery efforts. Since these efforts bring together so many different kinds of organizations, often with widely varying cultures and levels of expertise, there exists a strong tendency for one or a few participants to dominate the proceedings. This problem is especially acute in recovery efforts, since the recovery team determines priorities (and thus, indirectly, funding and work) for each of the participating agencies. In addition, jurisdictional disputes and conflicting organizational 'personalities' (for instance, between environmental groups and government agencies) can often sidetrack the recovery process (Clark and Brunner 1996). Recovery programs like that for the black-footed ferret (*Mustela nigripes*) vividly illustrate what happens when

agencies engage in 'goal substitution' of their own interests for that of the species recovery process (for a review, see Reading and Miller 1994). In this context, the ability of governmental, scientific, environmental, and citizens groups to coordinate their efforts and support each other's initiatives towards APC recovery is quite impressive. Even without formal guidelines defining their roles vis-a-vis each other, APC participants have avoided time- and energy-wasting disputes and exemplify a successful inter-agency partnership.

The APC safe harbor agreement is another element of the effective partnership. The plan aims to enlist landowners as partners in a community where distrust of 'big government' and endangered species legislation is pervasive. Local Natural Resource Conservation Service (NRCS) conservationists work with landowners to implement a management plan consistent with NRCS technical guidelines, fostering a supportive relationship between technicians and landowners. Because landowners already have a working relationship with their NRCS conservationist, they are confident that their best interests are being considered in the plan's design. The local resource conservation and development agency and the FWS in turn approve the plans. Thus, the final plan represents a process that has involved local landowners, the NRCS, and the FWS. The level of trust and cooperation that characterizes the recovery effort is remarkable, especially given the historic antipathy toward regulatory initiatives.

Recommendations for recovery

The APC recovery program has many virtues: valuable partnerships are being formed between the NRCS, FWS and local landowners, captive breeding efforts are steadily improving, and additional land is being pro-

tected for the APC through the SHA. Despite these successes, the population continues to precipitously decline (Figure 1). While we do not suggest terminating these ongoing efforts, the APC's declining status suggests that the existing programs and their strategies may be inadequate. To improve the prognosis for species recovery, we suggest focusing intensive research on the reasons for species decline, increasing education among stakeholders and the public, and celebrating small successes. We also recommend that a genuinely interdisciplinary, external appraisal team be formed to better determine specific recovery strategies, including program organization and basic problem-solving approaches. Such a team is necessary to facilitate introspective and adaptive evaluation of existing efforts.

Although much has been published about the APC, including speculations for its decline, many uncertainties remain. Although captive-bred birds are annually released to both the Galveston and Colorado County populations, only the Galveston population has increased (from 22 birds in 1997 to 36 birds in 1998). Despite annual infusions, the APCNWR population is not using former booming grounds and mortality rates are high. While population supplementation may be practical in the short term, chances for recovery continue to decline as the existing birds abandon traditional breeding behavior and decrease the social stimulation needed for the males to 'perform' (Terry Rossignol pers. comm.). Interestingly, booming and associated behavior continues in the Galveston population—this may be attributable to the smaller size of the refuge forcing birds into closer proximity. Research must examine ways to promote natural breeding and to reduce the high mortality among captive-bred birds.

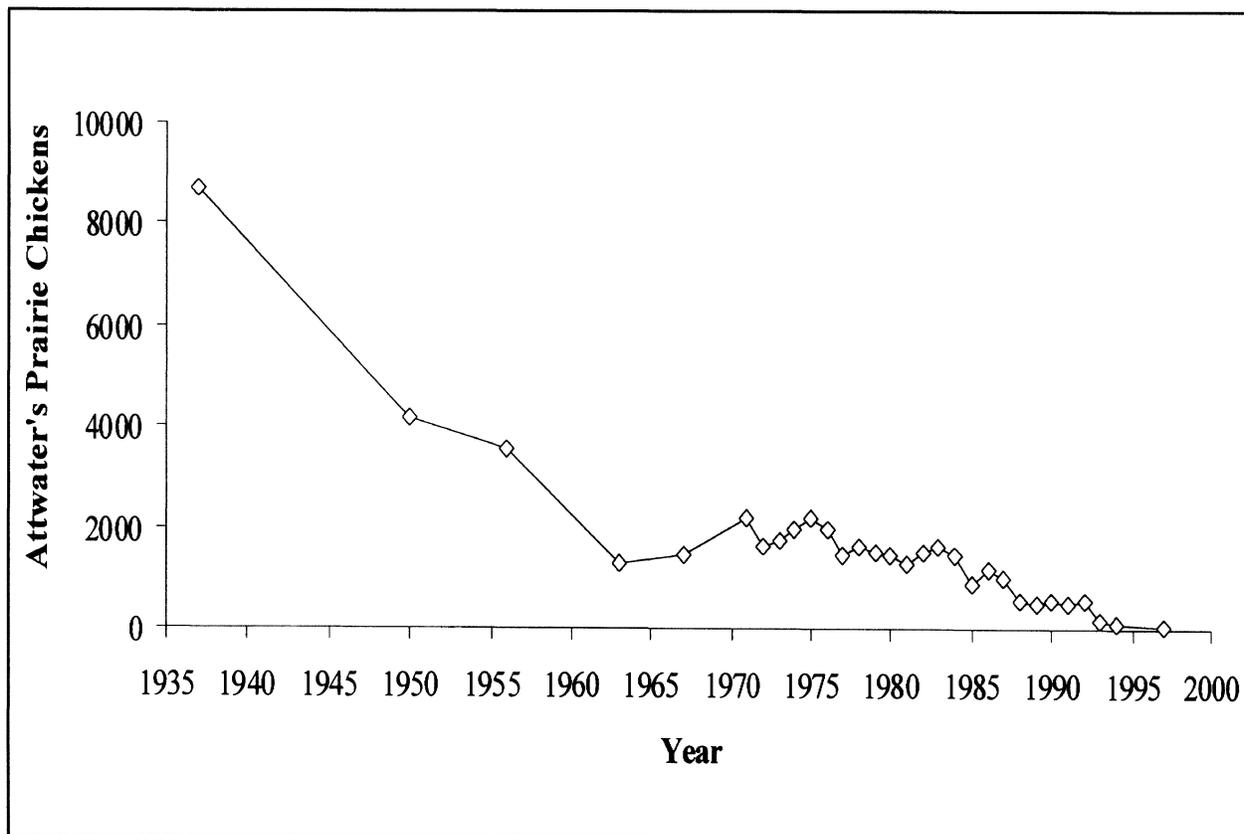


Figure 1. Estimated number of Attwater's prairie chickens throughout their range, 1937 – 1997 (after Peterson and Silvy 1996).

The recovery plan maintains that habitat loss and degradation are the chief causes of APC decline. The SHA addresses these threats; however, APC reproductive success continues to fall on protected reserves that are already managed for the prairie chicken. In addition, suitable habitat for the APC exists that is not being used by existing populations. Thus, habitat loss alone cannot explain the continued decline of APC populations. Fragmentation of APC habitat may be one factor contributing to population decline. The "crash" of the APCNWR population in the mid-1980s correlates with the loss of prairie connectivity in the vicinity of the refuge (McKinney 1996). It is also possible that factors such as fire ants (*Solenopsis invicta*), disease, and adverse weather (e.g., floods and droughts) may have contributed to the reduction in APC numbers. The SHA addresses fragmentation by targeting parcels within five

miles of existing populations; however, it does not commit to a research program to actually determine the cause of decline. While the focus on connectivity is important, planners should follow the recovery plan's mandate and engage in a focused research effort to conclusively determine the cause of extirpations within protected areas.

APC recovery depends upon cooperation between the FWS, NRCS, Texas Parks and Wildlife Department, landowners, captive breeders, research institutions, and the general public. Improved education about the APC and recovery efforts will help strengthen the commitment of these diverse groups. Although programs like 'Adopt-a-Prairie-Chicken' and the APC Festival are a good start, they primarily affect people with a pre-existing interest in APC recovery. Presently, the public outreach efforts at the APCNWR are inadequate. Experiential education programs for

school children will help foster greater interest in prairie chicken recovery. Classes should be taken to the refuge to see the bird's habitat first-hand. Viewing the expansive range that was once populated with prairie chickens may evoke heightened public interest in protection. In addition, the public profile of the APC should be enhanced, and both print and broadcast media sources should be additionally encouraged to cover APC reintroductions and habitat restoration efforts. Increasing education about the ecosystem-level focus of the SHA might be particularly beneficial: it may be easier to secure public commitment to system recovery, rather than focusing on one particular species. In the case of the APC, interest in protecting this 'flagship' species coupled with general concern for protecting prairie habitat seems to be an effective combination. Education efforts might focus on the other prairie species that will also benefit

from the APC recovery effort, and the avoidance of the future expense and regulations inherent in future endangered species listings. Similar educational outreach efforts should be made with neighboring landowners and SHA participants. This will strengthen existing partnerships and encourage the formation of others.

Although the ultimate objective of any recovery effort is to restore viable populations, this may be difficult for species like the APC that are literally on the brink of extinction. Rather, planners should identify short term, tractable goals so that participants remain enthusiastic and optimistic. While both the APC Recovery Plan (FWS 1993) and a population and habitat viability assessment (Seal 1994) conclude that a minimum of 24 to 28,000 hectares of additional prairie habitat is needed for APC persistence, smaller acquisitions may still be beneficial to the species. Similarly, while the recovery plan aims to protect 5,000 birds, short-term successes must still be recognized and celebrated. Participants should continue to establish annual goals for captive breeding, predator management, and outreach. Success at these small-scale goals will encourage constituents to work together to achieve larger objectives.

One of the hardest things for groups to do is to evaluate their own problem-solving performance. Personal biases, disciplinary views, and professional loyalties can get in the way of even the most well-intentioned efforts. Accordingly, an independent working group, formed of outside experts with no professional affiliation to members of the recovery team, should appraise all aspects of the APC recovery process. The entry of such a group into the process will encourage a top-to-bottom appraisal of the program, while allowing an explicit formulation of the common interest in species recovery.

Since the APC is so close to extinction in the wild, an especially important part of the appraisal group's responsibilities would be to encourage debate about the program and its future (Clark and Brunner 1996). Often, popular and socially successful programs may not contribute to the ultimate goal of species recovery as effectively as more technical efforts (such as varied grazing regimes to increase habitat heterogeneity). While the conventional view of the APC recovery process is that successful partnerships have been developed, a basic and more functional view must consider how the structure and operation of the partnerships might be hindering attainment of the overall goal. An outside appraisal team would help develop a more reflective social and decision process that encourages self-evaluation against short- and long-term goals (Clark 1996). In a situation where much is going right, the appraisal team may be able to identify holes or limitations in existing efforts, ultimately suggesting ways of re-focusing current programs for maximum progress towards species recovery. Such a team may help recovery efforts to become more reflective and responsive to new information. Continuous appraisal is needed to help identify flaws in current strategies and determine areas for improvement (see Lasswell 1971). Planners must constantly examine their actions, reframe the conservation problem, and determine appropriate alternatives—reflective learning of this sort leads to policy that is more responsive to changing conditions (Clark 1996).

Conclusion

The suite of activities associated with APC conservation are well organized and impressive. The recovery team and other interest groups seem to work well together, allowing for coordination with a minimum of

wasted effort. In addition, the safe harbor agreement is an excellent example of a successful partnership, building connections between the historically antagonistic groups of land-owners and the government. At the same time, however, these successful efforts have not reversed the APC species decline. To supplement the existing program, an increased research effort to determine why species decline continues and the most effective way to stop this reduction seems imperative. Better use of the APCNWR as an educational resource and a focus on the benefits of ecosystem-level protection are also important. In addition, setting short-term goals and celebrating small successes could encourage and re-invigorate refuge personnel and others who face the difficult task of species recovery. A genuinely interdisciplinary, independent review team, appraising all of the existing efforts, could make recommendations on how to allocate scarce resources—knowledge, problem-solving, and organizational—in a way that best advances APC conservation. A primary concern of refuge personnel was a lack of sufficient funding for additional programs—a comment echoed by many recovery teams. While this is a valid and important issue, many of the recommendations can be addressed either with a shift in existing programs' focus or a re-allocated and more efficient use of current funding. By combining increased self-assessment with a refinement of current program foci, the Attwater's prairie chicken stands its best chance of regaining its status as a wild species.

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