STATUS AND DIRECTION OF THE COLLABORATIVE *TBGPEA ECOSYSTEM MANAGEMENT INITIATIVE*

By Jonathan B. Haufler

INTRODUCTION

As we know from Betty Pellatz and Denise Langley, the Thunder Basin Grasslands Prairie Ecosystem Association (Association) is a non-profit association of landowners in eastern Wyoming with a mission of developing a responsible, common sense, and science-based approach to long-term management of their lands. The Association has elected to use an ecosystem management approach that addresses conservation objectives integrated with economic and social objectives. Association members identified early in their efforts that they did not want to use an approach that addressed the needs of individual species. Instead, they identified a management approach that places a primary focus on providing appropriate ecosystem diversity to provide for the habitat needs of all native species. This will be accomplished by developing an historical reference so as to better understand the ecosystem diversity that historically supported native species of the landscape. The historical reference will be used as a framework for identifying appropriate levels of representation of the historical ecosystem diversity that, if provided within the landscape, will supply sufficient habitat to maintain all native species. Some native species, such as black-tailed prairie dogs (*Cynomys ludovicianus*), are not limited by habitat, but by where their colonies are allowed to occur. For this species, a separate conservation strategy will be developed that will identify appropriate amounts and distributions of prairie dog colonies that will provide for functional prairie dog ecosystems within the landscape.

To achieve these objectives, the Association is conducting an ecological assessment that characterizing historical and existing ecosystem diversity within the landscape and determining the current status of selected species, such as black-tailed prairie dogs. This assessment has been on going, with additional work planned.

In this paper, I describe the current status of the assessment and how it fits into a larger, ecosystem-management planning process.

ECOSYSTEM MANAGEMENT PROCESS

In 2001, at the first TBGPEA Grasslands Symposium, I (Haufler 2001) presented a process for ecosystem management that the Association planned to follow. This process, presented in more detail in other publications (Haufler et al. 1996, 1999), has four basic steps:

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- assessment
- ecosystem management plan
- implementation and agreements
- monitoring

The *assessment* will classify and characterize ecosystem diversity within the planning landscape. It will develop the historical reference that will quantify amounts of each ecological community that occurred under historical disturbance regimes. It will characterize and quantify the existing ecosystem conditions, and compare existing ecosystem conditions to historical conditions. It will also determine the status, particularly on Association lands, of selected species of concern, with particular emphasis on black-tailed prairie dogs.

The *ecosystem management plan* will determine required levels of representation of historically occurring ecosystems. It will describe desired compositions and structures of these ecosystems for them to be considered representative of historical conditions. It will identify management practices and treatments that are compatible with maintenance or enhancement of specifically desired ecosystem conditions. It will determine appropriate sizes and distributions of ecosystems required to meet the ecological objectives, and it will include a conservation strategy for black-tailed prairie dogs. Finally, and importantly, it will integrate the needs of ranchers and energy production companies with the ecological objectives.

Implementation of the ecosystem management plan will occur once appropriate cooperators identify their voluntary roles and responsibilities. Incentive programs will be identified to make voluntary participation economically feasible. Implementation will also depend on establishing appropriate agreements. The Association will seek to establish long-term agreements that will assure conservation objectives and the viability of ranching and energy-production activities.

The Association recognizes that *monitoring* will be an ongoing component of plan implementation. Initially, the Association plans to utilize some active-adaptive management treatments and to monitor these under an experimental design. As effective treatments and management practices become established, monitoring will switch to a more traditional format, although there may be additional questions that an adaptive-management format may continue to address.

ECOSYSTEM DIVERSITY MATRICES

A key tool in this process is the Ecosystem Diversity Matrix (EDM) (Haufler et al. 1996, 1999), which offers a framework for classification of ecosystems. Specifically, it provides a classification of similar ecological communities and associated abiotic factors that occurred under historical disturbance regimes. In any given landscape, up to four interacting ecosystem diversity matrices might be needed:

- Grass/shrub ecosystems
- Forest ecosystems
- Riparian/wetland ecosystems
- Aquatic ecosystems

A major focus of the ecological assessment has been the development of these EDMs, with a particular focus on the grass/shrub EDM. Mehl and Haufler provide more information on the grass/shrub EDM later [in these proceedings]. A framework for the forested EDM has been developed, but this has not been assessed, to date, with field sampling. Similarly, a framework for the riparian/wetland EDM has been developed, but not field sampled, to date. Only a very coarse framework for the aquatic matrix has been developed, to date.

The ecological assessment will utilize these EDMs in several ways. They will form the basis for developing an historical reference for the landscape: The structure of each EDM identifies the primary historical disturbance regimes that shaped the compositions and structures of ecological communities across the different ecological sites. The EDMs will also help determine appropriate sampling designs for the field sampling of existing conditions.

SPECIES ASSESSMENTS

A primary focus of both the ecological assessment and the ecosystem management plan will be on providing appropriate representation of ecosystem diversity. However, species will also factor into the assessment and management plan. As mentioned, the black-tailed prairie dog is not limited by habitat, so providing ecosystem diversity will not specifically address its needs. For this reason, a conservation strategy will be developed for this species in order to provide functional prairie dog ecosystems. These areas will be designed to also provide needed habitat for other species that depend on prairie dogs as ecological engineers.

An additional use of species assessments is to check on the representation of ecosystem diversity (Haufler et al. 1996, 1999). When properly planned, representation of historical ecosystem diversity will provide for the habitat needs of all native species. However, the level of representation that is determined to be appropriate will need to be checked. By selecting certain species, and determining their potential viability in the landscape using a habitat-based species viability approach (Roloff and Haufler 1997, 2002), the ecosystem diversity plan can be tested and validated. These steps will occur during the development of the ecosystem management plan. As part of the assessment, current distributions of selected species will be monitored on Association lands.

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PRAIRIE DOG SURVEYS

The planning landscape has a nearly complete complement of native species associated with short and mixed-grass prairie ecosystems in this region. Black-tailed prairie dogs are numerous, although recent outbreaks of sylvatic plague (*Yersinia pestis*) have reduced numbers in many areas. It was the concern over future management of this species that encouraged initial discussions of the Association. The US Fish and Wildlife Service (USFWS) is very interested in this landscape as a significant conservation area for prairie dogs. The landscape has also been discussed as a potential site for reintroduction of black-footed ferrets. For these reasons, the Association has been conducting surveys of prairie dogs.

Survey methods for black-tailed prairie dogs were derived from federal guidelines as well as from methods outlined in recent scientific studies and conservation assessments. Active colonies were identified by the presence of actively used burrows and associated vegetation changes. In 2001, most members of the Association provided information on locations of colonies. These colonies were mapped at that time. All colonies mapped in 2001 were visited and surveyed for activity in 2003. In addition, new colonies identified by Association members or occurring on new lands added to the Association were also surveyed. Active areas were delineated using a Global Positioning System (GPS). Active colonies were mapped separately within these colonies. One ranching member of the Association collected his own information on prairie dog colonies in 2003; this information is not included in this report. In addition, the three energy production companies that are members of the Association collect information on prairie dog colonies on their lands. However, information from these companies is not included in this report and field crews did not survey these lands.

Active colonies were sampled for prairie dog abundance. Those less than 10 acres in size were completely counted for an estimate of prairie dog numbers. Colonies greater than 10 acres in size were sampled using randomly located 10-acre plots per 50 acres of colony. For each colony or plot, prairie dog abundance was sampled using the following methods:

- Counts of all individuals in the colony were conducted from portable blinds placed on a corner of the plot or colony with the best observation point. Prairie dogs were counted during two 15-minute sampling sessions, which were initiated following a 30-minute acclimation time after the observer set up the blind. Three counts, at least a week apart, were made for each colony.
- Counts were conducted at least 30 minutes after sunrise, during the first four hours of the day or during the last four hours of the day, but more than 30 minutes before sunset. Counts were not conducted during precipitation, winds greater than 20 mph, or temperatures less than 50 F.
- The greatest number of individuals counted at any time period was used as a measure of the relative abundance of each colony. For colonies less than 10 acres in size, this number was expressed as both the total estimate of individuals as well as an estimate of the density/acre. For colonies greater than 10 acres in size, the number counted from randomly located 10-acre plots was extrapolated for the size of the entire colony.

A total of 71 active prairie dog colonies were identified on Association lands in 2003. These colonies ranged from 0.04 acres to 98 acres in size. These colonies totaled 570 acres. As mentioned, these numbers do not include any active colonies of prairie dogs on the lands of energy production companies that are members of the Association, or the lands of the one member that surveyed his own property. The area of active colonies was much less than the area of colonies mapped in 2001, due to the effects of plague.

The highest individual count of prairie dogs at a site (or within a plot) was used as the index of prairie dog abundance. A total of 50 sites were counted three to four times during June through August, with one larger site having two randomly located plots counted within it, and a number of sites having one randomly located plot counted. Two small sites produced counts of 0 despite visual evidence of use. Thus, 50 of the 71 active colonies mapped in 2003 were counted. Total high count of all sites combined was 822 individuals. The total area of active colonies sampled for prairie dog abundance was 369.25 acres. When the 822 prairie dogs counted in the active colonies or plots were extrapolated to the total area of sampled colonies (colonies larger than 10 acres in size were sampled with a randomly-placed 10-acre plot), a population index of 1,304 was estimated. This equated to an average density of 3.53 prairie dogs/acre. An additional 21 active colonies were mapped in August on the lands of new Association members. This increased the total area of active colonies to 570 acres, but time constraints kept these additional colonies from being counted for prairie dogs in 2003. If I assume the same prairie dog density for these areas as those included in the count, the estimated population index for the entire 570 acres would be 2,013 prairie dogs.

SAGE GROUSE SURVEYS

Sage Grouse (*Centrocercus urophasianus*) leks occurring on Association lands were surveyed in April and May. Landowners provided information on where they have observed sage grouse. Sites within these areas that had good lek potential were visited for signs of grouse droppings. Sites suspected of being leks were visited between dawn and two hours after dawn on clear mornings with winds less than 20 mph. Displaying males were counted at each active lek.

Landowners identified 10 sites that were used by sage grouse. Eight potential lek sites were located and surveyed. Only two of these sites were found to be active on Association lands, and a total of 74 males and four females were counted. In addition, sage grouse were observed on four other leks, but two of these were on adjoining public (US Forest Service) lands, and two were on private lands adjacent to those of Association members.

SURVEYS OF OTHER SPECIES

Observations included mountain plovers (*Charadrius montanus*), burrowing owls (*Athene cunicularia*), ferruginous hawks (*Buteo regalis*), golden eagles (*Aquila chrysaetos*), bald eagles (*Haliaeetus leuco-*

cephalus), upland sandpipers (*Bartramia longicauda*), long-billed curlews (*Numenius americanus*), and loggerhead shrikes (*Lanius ludovicianus*). Presence of these species was noted during the 30-minutes of acclimation prior to the counts of prairie dogs, as well as from any incidental observations. Nests or other notable observation points were located with a GPS unit.

In addition, each landowner was provided 11x17" digital, orthophoto quad maps of their ranch at a scale of six inches to the mile. These maps were laminated and placed in a binder for easy transportation. Landowners recorded observations of species of interest on these maps. This information, as well as other information provided by each landowner on pastures, water developments, or other features, will be entered into the GIS for Association lands.

The prairie-dog field crew made numerous observations of other species while surveying Association lands. Observations of some species were found to be too common to record sightings and locations, so the crew stopped recording observations of these species. The species that were too common to record observations were the upland sandpiper, golden eagle other than nest sites, and loggerhead shrike. A total of 87 mountain plovers were observed on two occasions: One was a flock of 30 and another a flock of over 40 birds. A total of 27 burrowing owls were observed, two bald eagles, two ferruginous hawks, and three long-billed curlews.

Many sage grouse [pictured above] and mountain plover were observed during EMRI's survey of Association lands in the Thunder Basin Grasslands Prairie Ecosystem Association landscape. *Photo: S. Yeats 2004.*

Landowners recorded observations of many of the species of concern on their lands. The locations of each species has been recorded on the large-scale, digital, orthophoto quads, and is being digitally entered into the Association's GIS information.

STATUS OF THE ASSOCIATION'S ECOSYSTEM MANAGEMENT INITIATIVE

The Association is five years into its initiative to achieve a responsible, common sense, and science-based approach to long-term management of their lands. Are they successful? To answer this question, one first has to identify criteria for success. Kenney (2001) identifies two types of success for collaborative efforts:

- Success as measures of on-the-ground accomplishments
- Success measured as improved relations, trust, and knowledge among stakeholders

Obviously, one of our goals is to produce on-the-ground accomplishments that can be attributed to an effort—acres of habitat produced, productivity levels maintained, etc. However, Kenny points out that collaborative efforts are also about process, not just end results, so measures of success can include improved relations among partners, increased levels of trust among participants, and increased knowledge of all involved. Though it's too soon for the Association to produce on-the-ground results—it's anticipated that this will take an additional one to three years depending on continued funding availability, as well as the speed of establishing cooperative arrangements and

agreements—the Association can be evaluated as a success in terms of its accomplishments in collaboration. The Association can point to many accomplishments in terms of organizational development, learning by members and cooperators, development of trust, and initiation of the full ecosystem management process. Association Vice-Chair Denise Langley earlier described many of these successes and accomplishments. When evaluated in these terms, the Association has been successful and it can look to the future for even greater success through production of on-the-ground results.

TIMELINES

The Association anticipates the following timelines:

- Ecological assessment: *2003-2005*
- Ecosystem management plan: *2004-2005*
  - Includes ecosystem diversity plan
  - Also includes prairie dog conservation strategy
- Agreements and other management tools: *2005-2006*
  - Identify incentive programs,
- Monitoring 2006 and beyond

CONCLUSIONS

The Association is involved in a complicated, collaborative effort to produce an ecosystem management plan that will provide for long-term management of its lands in cooperation with surrounding land-management programs. A four-step process (assessment, ecosystem management plan, implementation and agreements, and monitoring) has been identified and is in progress. The ecological assessment is progressing well and producing important data, tools, and information. The Association is only partway through this process, but progress to date, particularly in terms of the collaboration, can be viewed as a success. The Association anticipates several more years of effort before substantial on-the-ground results will be realized. Though complex, such voluntary, privately led collaborative efforts represent tremendous potential for effective land management and conservation initiatives.

REFERENCES

Haufler, J. B., C. A. Mehl, and G. J. Roloff. 1996. Using a coarse filter approach with a species assessment for ecosystem management. Wildlife Society Bulletin 24:200-208.

Haufler , J. B. 1999. Strategies for conserving terrestrial biological diversity. Pages 17-30 in:R. K. Baydack, H. CampaIII, and J. B. Haufler, editors. Practical approaches to the conservation of biological diversity. Island Press, Washington, D. C.

Roloff, G. J., and J. B. Haufler. 1997. Establishing population viability planning objectives based on habitat potentials. Wildlife Society Bulletin 25:895-904.

Roloff, G. J., and J. B. Haufler. 2002. Modeling habitat-based viability from organism to population. Pages 673-686 *in:* M. J. Scott, P. J. Heglund, M. L. Morrison, J. B. Haufler, M. G. Raphael, W. A. Wall, and F. B. Samson, editors. Predicting species occurrence. Island Press, Washington, D.C.

Kenney, D. S. 2001. Are community-based watershed groups really effective? Confronting the Thorny issue of measuring success. Pages 188-193 in: P. D. Brick, D. Snow, and S. Van de Wetering, editors. Across the great divide–explorations in collaborative conservation and the American west. Island Press, Washington, D. C.