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Publication Date

2001-09-24

LONG-RANGE MULTI-SPECIES ADVANCE MITIGATION: CDOT'S SHORTGRASS PRAIRIE INITIATIVE PROCESS AND BENEFITS

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Abstract: In January 2000, the Colorado Department of Transportation, Colorado Department of Natural Resources Division of Wildlife, the Federal Highway Administration, and the Fish and Wildlife Service (FWS) and partners at public and private resource organizations came together to design an alternative way to address species impacts in the eastern third of the state, on the central shortgrass prairie. Previously consultations on listed and proposed species had been very time-consuming for all the agencies involved, without yielding noticeable benefits for the species, particularly in the case of "no-effect" and "may effect-not likely to adversely affect" decisions. At the same time, Colorado was facing increasing listings in the shortgrass prairie, including some very widespread species with the likelihood to have large economic impacts. A process leading to a programmatic agreement among the agencies was developed to deal with the driving issues detailed below and produce benefits for the environment and proactively recover and avoid federal listing of a large number of declining species.

The Shortgrass Prairie Initiative provides programmatic clearance for CDOT activities on the existing road network in the eastern third of Colorado for the next 20 years, addresses three listed and over 20 declining species with the greatest likelihood of being listed, and covers 90,000 acres of right-of-way in four of CDOT's six regions. As part of this initiative, the FWS, FHWA, and CDOT are investing resources that would otherwise be spent a project-by-project clearance process in more comprehensive and proactive species conservation. Methodologically, the project focused on impacts to habitats rather than species individuals and estimates potential impacts using best available data in GIS, supplemented by expert opinion. The resulting project offers programmatic clearance with 1:1 habitat conservation, greater predictability in project timelines, cost savings in several categories, and more effective habitat/species preservation. The project's uniqueness stems from its primary focus on declining rather than listed species, coverage of major as well as minor projects, and the scale at which conservation is being pursued, including planned preservation of over 20,000 acres over the next two years.

Driving Issues and Opportunities

CDOT's Shortgrass Prairie Initiative emerged from common understandings of the problem at hand, a shared commitment to species recovery and environmental stewardship, opportunities presented by ready analyses of priority conservation areas across the central shortgrass prairie ecosystem, and willingness among the partners to utilize all regulatory flexibility to undertake a new approach to conservation and streamlining.

Drivers

Species in Peril and an Ecosystem in Decline

The central shortgrass prairie ecoregion encompasses approximately 90,700 square miles of rolling plains and tablelands dissected by streams, canyons, badlands and buttes in seven states, from southeastern Wyoming and southwestern Nebraska to northeastern New Mexico, northern Texas and northwestern Oklahoma. The ecoregion is dominated by shortgrass, mixed-grass and sand sage prairie, of which approximately 90 percent is privately owned. Grasslands are considered to be one of the most imperiled ecosystem types in North America and worldwide; Samson and Knopf wrote in 1994 that "in the larger context of conserving biological diversity in agricultural and natural ecosystems in North America, prairies are a priority, perhaps the highest priority." At least 50 percent of the endemic grassland birds are exhibiting significant declines in numbers over large parts of their range; as a result, grassland birds have shown steeper, more consistent, and more geographically widespread declines than any other behavioral or ecological grouping of North American species. Bison, once the most significant herbivore on the Plains, has been largely extirpated from the ecoregion. The black-tailed prairie dog, the second most important herbivore on the western Great Plains, has significantly declined since the turn of this century. The black-footed ferret (*Mustela nigripes*) is now considered the rarest mammal in North America. In all, the ecoregion contains 54 known species considered globally imperiled by state Natural Heritage Programs. Of these, 10 species are listed as threatened or endangered, one species is proposed for listing, and six are candidates for listing as threatened or endangered under the federal Endangered Species Act; another 58 species are endemic, declining, or disjunct in the ecoregion.

The Results of NLAAs under a Project-by-Project Approach

The professionals involved in the Endangered Species Act (ESA) section 7 consultation process at FWS, FHWA, and CDOT shared an observation that the project-by-project process frequently involved a great deal of time and resources, often to less benefit than desired for the species involved. Specialists and engineers work hard to minimize project effects so that a “no effect,” or more often a “may affect—not likely to adversely affect” conclusion is possible; however, accumulated MA-NLAAs often do little to assist the species in question, which may continue to decline. Addressing species’ needs on a project-by-project basis can yield scattered and fragmented habitat conservation or improvement, contributing little to the viability of individual species and the habitats and ecosystems on which those species depend. Habitat impacts are more effectively addressed by mitigation off-site, when opportunities exist and when on-site habitats may be degraded. Analysis of rangewide species needs and allocation of mitigation dollars to those highest priorities and bottlenecks can yield greater benefits to listed species, associated declining species, and their habitats.

Rising Listings, Staffing Demands, Project and Land Costs

Rising listings, increased staffing demands and the complexity of projects with impacts to widespread threatened or endangered species have become highly visible components of an environmental regulatory process that is often blamed for project delays. As listings have expanded with the population and development in the state, CDOT has expanded staffing in order to spend an increasing amount of time clearing projects—researching species potential to occur at a given site, performing site visits, conducting or contracting out habitat assessments or surveys, drafting Biological Assessments for FWS Opinions, and developing mitigation plans. The cost of one project delay or temporary shutdown can equal the costs of mitigation for a large number of projects. To cope with the requirements for scoping, evaluation, and documentation of impacts for more and more species, CDOT decided that creating ways to streamline the regulatory process in project development was more important than ever. With project costs increasing at an average rate of six percent annually, redesign costs time and money and headaches. Potential project shutdowns, with the contractor already on-site, have even more implications. Though the cost of a potential project shut down is difficult to estimate due to the large number of factors involved, CDOT asked: what is the cost of one project shutdown over 20 years or multiple project shutdowns over 20 years?

Land costs in Colorado are also escalating rapidly. Prices in remote areas of Colorado’s Eastern Plains have risen over 50 percent annually for the past three years over 100 percent annually in many cases. As land was least expensive and unique conservation opportunities existed for prairie dog complexes in the southeastern portion of the state (CDOT Region 2), conservation efforts focused in that area. In one example, a ranch on the New Mexico/Colorado border going for \$65/acre in 1996 went for \$220/acre by 2000. In another case, adjacent ranches in a conservation target area that sold for \$100/acre in 1997 went for \$250/acre in 2001. Land prices on the exurban fringe (Region 4) along the Front Range started at a higher level and have also risen steeply, increasing the costs of mitigation adjacent to the right of way. Limits on water in more remote counties are likely to hinder upward movement of prices for agricultural land in the longer term; these and other factors will make a linear projection inaccurate. However, a conservative projection based on CDOT right-of way’s expected land price increases of four to ten percent annually in remote rural areas, taking into consideration limited water and development potential, still led CDOT to estimate that mitigation costs could double in the next five years, especially considering recent price increases that were larger than anticipated.

Listing Threats and Species with Potential for Widespread Impact

Of particular interest in Colorado is the black-tailed prairie dog, described as a “noxious rodent pest” under Colorado state law and regularly exterminated by farmers, ranchers, and increasingly, developers including CDOT. Following a listing petition in 1998 by the National Wildlife Federation, the FWS concluded that the black-tailed prairie dog was “warranted but precluded,” but warned state resource agencies that without a concerted and successful conservation effort, the species would be listed.

The black-tailed prairie dog is one of five prairie dog species in North America, of which two were already listed (Utah, listed as a threatened species in 1973) and the Mexican prairie dogs (listed as endangered in 1970). Black-tailed prairie dogs existed as part of an historical ecosystem with large herds of bison, covering millions

of acres of prairie landscape.¹ The FWS estimates that the species range has been diminished by 99 percent, primarily due to poisoning and agricultural conversion, and vulnerability to the sylvatic plague. While the listing petition noted that the “role of black-tailed prairie dogs in maintaining the short-grass prairie ecosystem is increasingly hard to evaluate, as that ecosystem has been so extensively fragmented and modified by human activities,” Reading et al. (1989) provided a listing of the over one hundred vertebrate species that have been found associated with colonies of black-tailed prairie dogs and concluded that the diversity of animal species, especially birds, was directly correlated with size and proximity of prairie dog colonies. Prairie dogs have been found to increase both animal and plant diversity on the plains. Grazing by prairie dogs and large ungulate species provide access to soil and insects, unobstructed sight-lines and relative safety for a wide range of migratory bird species. The prairie dog serves as a prey base for the endangered black-footed ferret, swift fox, badger, and ferruginous hawk. They leave vacant burrows for the Burrowing Owl, the Black-footed Ferret, the Texas Horned Lizard, rabbits, hares and snakes. Furthermore, the burrowing and grazing activities of prairie dogs affect many other ecosystem functions and processes, including vegetation structure, plant composition, nutrients available in soil for plants, soil turnover, soil chemistry, energy flows, nutrient quality of plants, and plant succulence.

Declining Mitigation Opportunities

Viable populations of many species, including the prairie dog, require a large land base and some opportunities are simply lost as parcels develop. Meanwhile, agricultural land conversion continually diminishes conservation opportunities and species status as well; 1.4 million acres or over 5% of the Eastern Plains were converted from agriculture, including the ranching compatible with many declining species, to other land uses between 1987 and 1997, at an accelerating pace according to the State Department of Agriculture. The scarcity of prime mitigation parcels with very large prairie dog complexes also had the potential to increase project costs. CDOT realized that project-by-project mitigation over the next 20 years would be likely to cost much more, to be less environmentally valuable, and require a higher mitigation ratio than advance mitigation.

Opportunities

Identified Conservation Priorities

Informal and formal conservation plans recently developed by the Colorado Division of Wildlife (DOW) as part of their Legacy program and The Nature Conservancy's (TNC) ecoregional planning effort provided a jumping off point for discussions on how CDOT could partner with these entities to direct mitigation resources to areas of greatest benefit. Based on field observations and research on populations of over a hundred declining plant and animal species and communities, the conservation plans outlined large-scale bubble areas where viable communities existed. Utilizing the research already performed, these conservation target areas became the starting point for CDOT and FHWA's multi-species advance mitigation effort.

New Regulatory Vehicles under the Endangered Species Act

The FWS's new regulatory vehicle, Candidate Conservation Agreements with Assurances (CCAA) are designed to protect species not yet listed as threatened or endangered, but considered to be in decline and could be listed in the future. With the 1982 amendments, Congress allowed the federal government to provide regulatory assurances to non-federal property owners through the section 10 incidental take permit process. A CCAA is designed to contribute to recovery efforts and identifies actions the landowner commits to take to conserve declining species, including habitat protection. Participating non-federal landowners receive assurances from the agencies that no additional conservation measures above and beyond those contained in the CCAA will be required and that no additional land, water, or resource-use restrictions will be imposed upon them should the species become listed in the future. As the Federal Register announcement noted, “a major incentive for property owner participation in the...Candidate Conservation program is the long-term certainty the programs provide... Much of the nation's current and potential habitat for listed, proposed and candidate species exists on property owned by private citizens, States...and other non-federal entities. Conservation

1 “[a plain] is intirely occupied by the burrows of the barking squirrel hertefore described; this anamal appears here in infinite numbers and the shortness and virtu[r]e of grass gave the plain the appearance throughout it's whole extent of beatifull bowling-green in fine order. it's aspect is S.E. a grea number of wolves of the small kind, hawks [hawks] and some pole-cats were to be seen. I presume that those anamals feed on this squirril.” Merriwether Lewis, Journals of Lewis and Clark, Sept. 17, 1804.

efforts on non-federal lands are critical to the long-term conservation of declining species...a collaborative stewardship approach is critical for the success of such an initiative. Permits issued to provide assurances for activities to be conducted under a CCAA become effective upon the effective date of a final rule listing any of the covered species as threatened or endangered.” The final rule allows more flexibility where the permittee is a State or local governmental entity.” FWS’s special cooperative relationship with states is further clarified in the agency’s July 1994 interagency policy on the role of State agencies in activities undertaken by the Services under the authority of the ESA and associated regulations in title 50 Code of Federal Regulations. That policy recognizes States’ “unique position to assist the Services in implementing all aspects of the Act. In this regard, section 6 of the Act provides that the Services shall cooperate to the maximum extent practicable with the States in carrying out the program authorized by the Act.”

Methodology

Identification of Target Species

The initial analysis area, the area from the foothills east to the Kansas border (roughly I-25 and east), covered 27 million acres or 42,717 square miles, including an estimated 89,446 acres of CDOT right-of-way (ROW) in four of CDOT’s six Regions. The CDOW, TNC and the Colorado Natural Heritage Program (CNHP) identified 95 declining animal and plant species within that area. CDOT and CNHP-CSU assembled existing biological information from the various public and private resource and conservation organizations in the state including DOW, TNC, and CNHP’s own databases. This information was supplemented with individual and group consultation with the state’s top species experts and researchers, working for resource agencies, universities, independently, and for private conservation groups. Species occurring in the central shortgrass prairie, were included in the analysis if they met two criteria:

- Potential for impact by CDOT transportation projects, maintenance actions, and bridge replacements.
- Potential for the species in question to be listed as threatened or endangered under the Federal Endangered Species Act.

The initial list of species was developed and reviewed by the Director of Conservation for The Nature Conservancy of Colorado, Colorado Natural Heritage Program biologists, the FWS Colorado Division Manager, and the Colorado Division of Wildlife’s Endangered Species Manager. After all existing information was collected and assembled in a geographic information system, CDOT and CNHP met with the top bird, mammal, amphibian, reptile, plant, invertebrate, and fish experts in the state, individually and in groups to gather input.

Impact Analysis

The partners developed an estimate of the collective impacts to the habitats of declining species in the Eastern Plains from proposed transportation projects over the next 20 years. The agreement and programmatic Biological Assessment cover the full gamut of CDOT project types on the existing road network and existing bridges in need of repair over the next 20 years. CDOT’s 20-year plan anticipates safety, reconstruction, capacity, and other transportation improvements for 22% of the highway network in Colorado’s central shortgrass prairie (over and above overlay projects, which are expected to have minimal impacts). Any new alignment to be constructed by CDOT in this period is beyond the scope of the agreement and programmatic Biological Assessment, and would require its own Biological Assessment and appropriate management practices or conservation measures.

There were two primary components to the impact analysis: 1) identification of range and distribution and 2) calculation of impacted acres based on defined impact zones. According to interagency discussion and decision to use best available data, in accordance with the ESA, the analysis was conducted using existing GIS data only, supplemented with consultation with widely recognized experts in each taxonomic group (herpetiles, birds, fish, mammals, invertebrates, and plants) on range and distribution for each species. Current understanding of range and distribution was mapped as “assumed presence.” Experts also provided guidance and direction on the types of impacts that might be expected from routine highway maintenance and reconstruction on the existing network. This guidance was used to conservatively estimate “impact zones,” or spatial representations of assumed impact that can be used to calculate total impacted acres of habitat for each species.

Conservation Site Identification

A panel headed by state biologists and including TNC and the Rocky Mountain Bird Observatory identified priority habitat conservation sites that could serve as large-scale conservation/mitigation areas for the target species. CDOT is evaluating this information as it becomes available and then recommending sites to FHWA and FWS for approval. CDOT will then purchase real property interests in selected sites from willing sellers, with the intent that federal-aid projects will reimburse the state for mitigation credits as they are used. The site identification panel is developing site-specific management plans and agreements for the preferred habitat and real property interests, on behalf of CDOT, and making recommendations on which entity could best manage the site(s). Subsequent agreements will be executed detailing the administration, management, and reporting/monitoring for the acquired property interests, in accordance with applicable state and federal laws.

Approach to the Programmatic Agreement

CDOT, FHWA, and FWS had the following primary considerations in choosing and/or developing a regulatory vehicle to implement the Shortgrass Prairie Initiative. The agencies aimed to develop an agreement and accompanying regulatory document that would:

- Allow resources to go to habitat conservation, instead of ongoing process/reporting
- Explicitly acknowledge and accommodate federal participation in the state initiative
- Offer an incentive, such as regulatory assurances, for conservation of candidate or declining species in advance of listing
- Minimize/avoid through programmatic agreement the biological surveying that would otherwise be required on a project basis
- Mitigate by ratio of impact area to conservation area, with associated accounting/reporting
- Resist legal challenge to the maximum extent practicable.

Using All Regulatory Flexibility

As they encountered challenges, CDOT and FHWA staff utilized agency policies supporting a proactive ecosystem and outlining the DOTs ability to work with quasi-public resource conservation entities to accomplish the plan's objectives. Of particular use was FHWA's July 1995 *Guidelines for Federal-aid Participation in the mitigation of Impacts to Upland Ecosystems and the Establishment of Ecological Mitigation Banks*. That guidance supported the formation of partnerships among levels of government and with non-governmental stakeholders, including partnering with non-profit resource management interests or agencies for land management and ownership; established a preference for mitigation activities providing multi-species or ecosystem benefits; and promoted utilization of existing authorities to perform advance mitigation.

The team also drew on *National Wildlife Federation v. Babbitt*, a particularly influential case decided in October 2000. Though that case overturned an incidental take permit issued by the FWS, Judge Levi's ruling upheld several key approaches utilized in the Shortgrass Prairie Initiative:

- a habitat approach to mitigation for listed and unlisted species,
- a flat less than 1:1 mitigation ratio for all impacts regardless of quality,
- targeting of mitigation dollars to higher quality and higher priority conservation lands in the area under consideration,
- general assessments of the impacts of development on habitat rather than quantitative information on individual species members, and
- that use of "best available scientific and commercial data" under the ESA does not require complete or perfect data.

For the Shortgrass Prairie Initiative, FWS staff actively utilized their prerogative to move the analysis and agreement forward using best available; i.e. currently existing data, for an area that had relatively few comprehensive biological inventories, relative to other ecoregions. Use of best available data allowed the team to reach conclusions and move the project forward in a timely fashion that contributed greatly toward the momentum and practicability of the project for all parties. The team also learned from weaker aspects of the subject of the case, and planned to locate and fund all conservation parcels in advance of impacts, to increase certainty of implementation of the conservation measures.

Anticipating and Avoiding the Need for Reinitiation of ESA Section 7 Consultation

CDOT, FHWA, and FWS structured the scope of the analysis and the conservation area to anticipate and avoid the need for reinitiation of ESA section 7 consultation to the maximum extent possible for the impacts of federal actions/transportation improvement projects (including reconstruction, safety or capacity improvements, bridge improvements, or resurfacing) on the existing roadway network over the next 20 years. As provided in 50 CFR 402.16, reinitiation of formal consultation is required if:

- A. The amount or extent of incidental take is exceeded;
- B. New information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in the Biological Opinion (BO);
- C. The action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in the BO; or
- D. A new species listing or critical habitat designation occurs that may be affected by the action.

The agencies sought to avoid reinitiation of formal consultation in the following ways. With regard to 1) above, the possibility of exceeding the amount or extent of incidental take was minimized by conducting the analysis planning for section 7 compliance on the entire State and Federal Highway systems in the Eastern Plains. Buffer distances were proposed and approved by statewide experts in each taxonomic group, leaving only the construction of new alignment that would add to the extent of incidental take. In the case of construction of new alignment, FHWA agreed to initiate site-specific consultation with FWS as necessary.

With regard to 2) the partners sought to overestimate the manner and extent in which agency action could affect threatened, endangered, or candidate species and critical habitat, to compensate now, to the extent possible, for information that is currently unknown about subject species and habitats. The impact assessment treated all highway ROW as habitat, regardless of quality or presence of individual species in any particular place, and irrespective of current maintenance practices (e.g. mowing the entire ROW is standard practice). Furthermore, avoidance and minimization of impacts, as required by the ESA, was agreed to be accomplished via minimization of the project footprint and through BMPs minimizing direct and indirect impacts. CDOT, FHWA, and FWS agreed to work together to institute more beneficial practices and to incorporate the new information if subsequent information reveals that CDOT management practices can be improved to benefit or minimize harm to threatened, endangered or candidate species.

With regard to 3) above, since the initiative covers only ongoing activities on existing roads and no new road construction, the partners agreed that it is unlikely that the agency action will be modified to such a degree that any of the covered species will be affected in a manner or to an extent not anticipated in the CNHP/CDOT impact assessment. The partners were aware that planned transportation improvements will change as the Transportation Commission of Colorado considers needs and priorities over the next 20 years; however, by including the whole highway network and associated bridges, each species' range across the Eastern Plains, and areas of potential impact for each species in the impact assessment, they agreed that the "action" subject to section 7 will likely not be modified except by the addition of new alignment, which would most likely require its own section 7 consultation or reinitiation of the section 7 consultation for such a project.

Finally, with regard to 4) above, the partners noted that species could be listed or critical habitat could be designated that their agreement neither anticipates nor includes, and that initiation of section 7 consultation could be required at the time of such listing. The initiative addresses a primary shortlist of species. CDOT and FHWA took the conservative approach of treating all vegetation and habitats associated with the included species as potential habitat for those species, regardless of condition or presence of those species. Therefore, species presence was overestimated. Compliance with future designation of critical habitat should be likewise streamlined. The process and agreement was based on the best available information about the species and habitats in question, to which the parties have added the best available knowledge of recognized state experts in shortgrass prairie species and ecosystems, covering all taxonomic groups.

Choice of Regulatory Document

The FWS, FHWA, and CDOT decided on a modified or programmatic section 7 approach, whereby a conventional BA and BO would address listed species and an addendum to both documents would describe how non-listed declining species were incorporated and addressed with conservation measures in similar fashion. The layout of the regulatory document follows the FWS's new guidance for programmatic section 7 consultation with FHWA, issued in November 2000. According to the plan outlined by the agencies, CDOT's

and the FWS Region's executive directors will sign on to a conservation strategy for all the listed and non-listed species, contained within the BA and the BO.

Current Status

At this point, executive directors of all the partnering agencies and organizations have signed a Memorandum of Agreement outlining the purposes of the effort, the methodology described herein, and the process under which they will proceed. The agreement is somewhat unique among the small number of programmatic ESA section 7 agreements in place around the country for DOT impacts, in that it focuses on declining as well as listed species and covers the full range of projects a DOT may undertake and the impacts that may occur. Most often, programmatic agreements are developed and implemented for "No effect" projects or for "Not Likely to Adversely Affect" projects. Here, taking a broader scale approach with a longer timeframe, CDOT and FHWA will cover bridge replacements and four-laning highways and still benefit the species in question, with the intention of making a tangible contribution to species recovery. Property and easement purchases for the Shortgrass Prairie Initiative are currently in process and scheduled to be completed in 2002.

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