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## **A PROGRAMMATIC SECTION 7 CONSULTATION TO RESTORE HABITAT CONNECTIVITY AND ACHIEVE RECOVERY FOR A FEDERALLY THREATENED SPECIES: PREBLE'S MEADOW JUMPING MOUSE**

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**Abstract:** The Colorado Department of Transportation (CDOT), the Federal Highway Administration (FHWA) and the U.S. Fish and Wildlife Service (USFWS) have recently completed a programmatic consultation under section 7 consultation of the Endangered Species Act (ESA). The consultation addresses all currently known transportation projects anticipated to affect Preble's meadow jumping mouse (*Zapus hudsonius preblei*) in the Monument Creek watershed, El Paso County, Colorado. It establishes a mitigation process largely divorced from individual projects. Instead of compensating for impacts to habitat with conventional mitigation methods of replacing, restoring or creating habitat based on ratios, programmatic conservation commitments focus on promoting recovery of a listed species. Also, by establishing protocols for developing subsequent projects and site-specific biological assessments, the programmatic process provides a framework for developing highway projects along predictable schedules.

### **Introduction**

Rapid population growth along the Rocky Mountain Front Range in Colorado has created excessive demands on infrastructure and highways. It has also encroached upon the riparian ecosystem inhabited by Preble's meadow jumping mouse (*Zapus hudsonius preblei*). Preble's was listed as threatened under the Endangered Species Act on May 13, 1998. The listing was prompted by concerns of habitat loss and fragmentation due to human land use. As part of an effort to meet transportation demands, the Colorado Department of Transportation (CDOT), the Federal Highway Administration (FHWA) and the U.S. Fish and Wildlife Service (USFWS) have recently completed a programmatic consultation under Section 7 consultation of the Endangered Species Act (ESA). The consultation addresses all currently known transportation projects anticipated to affect Preble's in the Monument Creek watershed, El Paso County, Colorado.

### **Background**

Preble's is found only along foothill streams of the Rocky Mountains in southeastern Wyoming and Colorado. In Colorado, it occurs along the rapidly developing Front Range from the Wyoming border to El Paso County. The southernmost population of Preble's is found in the Monument Creek watershed of El Paso County. Preble's lives in moist riparian lowlands, usually in close proximity to water. Its habitat typically consists of a matrix of riparian vegetation with associated upland grasslands. The mouse is nocturnal and hibernates underground from September to May.

In 1999, CDOT prepared for a series of transportation projects in northern El Paso County that would directly impact this newly listed species. Proposals called for major reconstruction of about 29 miles of I-25, a major north-south transportation corridor in Colorado. Plans included six new interchanges and addition of new lanes. Also planned was the continued extension of Powers Boulevard, a roadway east of I-25. The proposed extension would eventually intersect with I-25 north of Colorado Springs. Several smaller projects, including bridge replacements and intersection improvements were also planned or already scheduled for construction. Together, construction activities would affect nearly every small stream running from the highlands east of I-25 into Monument Creek, and several of the tributaries would be adversely affected in more than one location. CDOT estimated that the total impacts from all projects on Preble's habitat could exceed 40 ha (100 acres).

Under Section 7 of the Endangered Species Act, federally funded projects that may affect a listed species require consultation with the USFWS. Because each of the proposed transportation corridor improvements would receive substantial funding from the FHWA, CDOT and FHWA expected to consult with the USFWS on every construction project in Northern El Paso County. CDOT anticipated that construction would begin in 2004, last 4-10 years, and be distributed over an undetermined number of projects, depending on available funding.

Experience with Section 7 consultations had taught CDOT and FHWA that each consultation can take considerable amounts of time, in some cases more than a year. First, the agencies need to prepare a biological assessment (BA) that includes a precise project description and a determination of effect. This frequently takes a long time since impacts to the species and its habitat may not jeopardize the species' continued existence or preclude its recovery. Designing projects to avoid jeopardy sometimes involves extraordinary measures to avoid and minimize impacts to habitat and is accompanied by informal consultations with the USFWS. After FHWA submits the BA to the USFWS, the ESA requires the USFWS to issue a biological opinion within 145 days. In practice the USFWS frequently exceeds that time for various reasons, including the need for more information, as well as insufficient staffing to deal with tremendous workloads.

A successful Section 7 consultation is based on the premise that the action, or transportation project, will not further jeopardize the species or preclude its ability to recover. Conservation measures designed to mitigate project impacts are invariably incorporated into the consultation as binding conditions. As mitigation for impacts to Preble's, the Colorado Field Office of the USFWS had adopted mitigation requirements – issued as guidelines – modeled upon wetland mitigation practices. In that system, the method of compensating for unavoidable impacts is assigned a ratio based on the perceived value of the mitigation method. Accordingly, creation of new habitat is thought to have the highest value and is assigned a ratio of 2:1. That is to say, for each acre of habitat impacted by an activity, the USFWS requires at least two acres of newly created habitat as compensation. Similarly, restoration is valued at ratios of 3:1, and preservation of existing, occupied, habitat ranges from 10:1 to 14:1.

CDOT recognized it would have significant problems meeting the requirements of a ratio-based system. By 1999 CDOT had started to work through several Section 7 consultations on Preble's, some of them in El Paso County. The department had, therefore, started to appreciate that it would be exceedingly difficult to compensate for 40 ha (100 acres) of impact, even if there were no competing interests for suitable land. Because of ecosystem complexity, creation of new habitat is nearly impossible at any scale. Restoration of habitat is feasible and even desirable; however, CDOT would have to find about 120 ha (300 acres) of restorable habitat. That amount is not likely to exist in El Paso County. Similarly, acquisition and preservation of 400 ha (1000 acres) of existing, occupied habitat poses the serious logistical challenges of finding willing sellers of suitable land amid escalating real estate prices.

### **Development of a Programmatic Alternative**

After deliberation, CDOT and FHWA decided to pursue a two-fold strategy. First, they would seek to develop a program for consolidating all possible consultations into one programmatic document. The document would establish procedures and conservation measures to cover all possible transportation projects in the Monument Creek watershed. Second, they would establish a firm scientific basis for assessing the effects of impacts on habitat from all possible projects. As part of this strategy, the agencies planned to evaluate the effectiveness of various conservation strategies.

### **Panel Process**

CDOT began by convening a panel of scientists to provide a comprehensive review of the best available science on Preble's. The panel consisted of Preble's experts, a population geneticist, natural resource specialists and a member of the USFWS. The purpose of the panel was to identify and evaluate at the landscape level the biological issues most significant and beneficial to the continued viability and persistence of the mouse. The broad picture gained by looking at conservation issues at the landscape scale was to inform decisions and approaches at the project level.

The panel reviewed all existing habitat and distribution information on the mouse in El Paso County. The panel also considered effects of habitat fragmentation, changes in habitat, changes in population size and behavior, and it developed initial population estimates. Among other findings, the panel concluded that isolation of small populations was the greatest threat to long-term persistence of the mouse in the Monument Creek watershed.

Following the work of the science panel, project biologists conducted additional habitat and population modeling exercises. The results indicated that there were at least six separate Preble's populations in the watershed and that restoration of habitat linkages would be the most important strategy for achieving recovery. At about the same time, the USFWS also developed a draft recovery plan for the species (USFWS 2001). In the Monument Creek watershed, the recovery plan called for one large Preble's population consisting of at least 2500 individuals distributed over 50 or more contiguous stream miles.

In view of recovery goals, the findings of the panel, and the distribution of the isolated Preble's populations in the Monument Creek watershed project, biologists concluded that ratio-based mitigation is an inadequate mechanism to assure the recovery of Preble's. Restoring or creating habitat within or adjacent to an area already occupied by an isolated population is not likely to increase Preble's populations to recovery levels, unless habitat restoration includes restoration of habitat linkages. In addition, ratio-based mitigation does not provide sufficient incentives for the restoration of linkages. For instance, a large dam designed to detain floods on one of the tributaries effectively separates a population estimated to consist of more than 500 individuals from a population of similar size on Monument Creek. I-25 is immediately adjacent to the dam. A jumping mouse has been observed on the I-25 side of the dam. The mouse most likely crossed over the dam, which consists of large boulders, only to end up next to an impassable Interstate highway. CDOT biologists had previously observed Preble's using culverts to pass under I-25 from one side to the other (Ensign 1999). The idea of creating a mouse friendly passage through this system of barriers is, therefore, not unreasonable.

Connecting the two populations would nearly achieve recovery, but is not a practicable solution under ratio-based mitigation. One method of connecting the two isolated populations involves bridging the dam with a green strip of shrubby vegetation and constructing a culvert acting as a mouse passage under I-25. However, the effort to restore a linkage would create, at best, 1.2 ha (3 acres) of restored habitat at a significant cost. Under the ratio-based system, such restoration would compensate for only 0.4 ha (1 acre) of impact. For a project that affects 40 ha (100 acres), an additional 39.6 ha (99 acres) of restorable habitat would be needed. This creates little incentive to undertake the requisite planning, coordinate with land management agencies, and assume construction expenses to overcome the nearly absolute barrier of the dam and the Interstate highway. For this reason, ratio based mitigation may be a convenient way to sustain Preble's populations at current levels, but it does not aid in recovering the species.

### **Programmatic Consultation**

On the basis of their own findings and the recommendations of the USFWS draft recovery plan, CDOT proposed a program to the USFWS that targets the recovery of mouse populations in the watershed. Instead of compensating for impacts to habitat with ratio-based mitigation methods, conservation commitments focus on reestablishing linkages between populations to promote recovery of the species. In addition, the program establishes numerous conditions and best management practices (BMPs), as well as reporting requirements and procedures for changing and permitting future actions. Details of the program were worked out in informal and formal consultations with the USFWS field office, and are described in the subsequent programmatic biological assessment (Ensign 2003) and opinion (USFWS 2003). A few of the most important elements contained in the documents are as follows.

### **Structure of the Programmatic Process**

CDOT, FHWA and the USFWS worked out a process that addresses all currently known transportation projects that may affect Preble's meadow jumping mouse in the Monument Creek watershed. The programmatic is based on guidelines developed and signed by the USDOT and the USFWS (U.S. DOT 2000). It establishes a mitigation process largely divorced from individual projects, and provides protocols for developing subsequent projects and site-specific biological assessments. The agreement reviews the maximum impacts resulting from completion of all foreseeable construction affecting Preble's in the Monument Creek watershed. Because incidental take of Preble's through direct killing or injury may be difficult to detect, the USFWS established a limit to habitat impacts from all projects at approximately 28 ha (61.9 acres). Most importantly, the consultation established a process for dealing with subsequent, site-specific consultations, as outlined below.

### **Tracking Database**

CDOT will maintain a database that includes project information for activities covered in the PBA/BO. The database tracks project status, the nature of allowable activities that conform with the incidental take statement, progress on projects, and conservation measures.

### **Annual Reports**

CDOT will provide to the USFWS an annual report on the progress on reestablishing linkages, on-site conservation actions including habitat acres disturbed, acres revegetated, acres restored, research progress and outcomes, and coordination actions and outcomes.

### **Template Biological Assessments for Site-Specific Projects**

Each project covered by the programmatic consultation needs to be documented by a site-specific BA before the USFWS can issue a consultation document. The format of each site-specific BA is standardized and includes: project description, timing of construction, habitat to be affected, effects of project and how addressed, and a determination that the site-specific project conforms to the conditions of the programmatic biologic opinion.

### **Conservation Measures**

Throughout the current phase of project planning, FHWA and CDOT have sought to avoid and minimize impacts to Preble's habitat and populations. Despite efforts to avoid and minimize disturbances, some habitat impacts will be unavoidable. These impacts will be off set through various conservation measures, as described below.

### **Onsite Actions**

On-site habitat actions include all steps that will be taken to avoid and minimize impacts, as well as enhance, create or restore habitat within or near project areas. CDOT is currently planning to enhance or restore almost four acres at several different tributaries to Monument Creek.

## **Avoidance**

During the preparation of the PBA, CDOT organized workshops attended by designers, environmental staff and project biologists to develop approaches for avoiding and minimizing impacts to Preble's habitat in the Monument Creek Watershed by nearly 30 percent to about 28 ha (62 acres), and CDOT continues to explore ways to avoid and minimize impacts.

## **Minimization**

Minimization of impacts includes numerous best management practices. A few of these are: scheduling construction in habitat during the hibernation period of the mouse (November 1 to April 30), use of native seed mixes in all revegetation efforts, and placement of bridge girders from existing pavement to the extent possible. One measure involves sequencing of construction in an area where four of the tributaries pass under I-25 in close proximity to each other. Preble's may move from any one of these drainages to another. As a measure to minimize impacts during construction, CDOT will maintain at least one of the creeks as a movement corridor at all times. Such a movement corridor will either be undisturbed or will be restored to the extent that movement of animals will not be affected.

## **Offsite Actions**

Off-site actions are conservation measures that will be taken to restore, create, or enhance habitat linkages, as well as the purchase of properties that are needed to create habitat linkages.

1. CDOT will re-establish at least two habitat linkages to reconnect at least four small to medium size populations within the watershed that are currently separated from each other. This will allow individual jumping mice to move between populations with greater facility.
2. CDOT will acquire key parcels of habitat on two tributaries to Monument Creek. These acquisitions are for the purpose of enhancing, restoring or creating habitat connectivity, and amount to about 50 acres of land.
3. CDOT will coordinate conservation actions and information with other agencies and landowners. El Paso County is engaged in developing a regional habitat conservation plan and the U.S. Air Force Academy is pursuing habitat restoration on lands under its management. CDOT is sharing information with these agencies to aid their efforts and increase the likelihood of recovery of Preble's in the Monument Creek watershed. The cooperation of landowners and developers will also be essential for success, and CDOT will share conservation information and cooperate with other interested parties.

## **Monitoring**

CDOT/ and FHWA will establish and implement programs to monitor Preble's population responses and the success of habitat restoration.

## **Research**

CDOT is funding a research program modeled upon work conducted in Montana where small mammal ledges were shown to enhance movement through culverts (Foresman 2001). CDOT will investigate whether these ideas can be applied to the specific needs of Preble's to improve its rate of passage through culverts under highways.

## **Discussion**

By departing from ratio-based mitigation guidelines, the USFWS provided CDOT and FHWA with the incentive to pursue partnerships with local entities and acquire land for the purpose of establishing and protecting habitat linkages. As a result, CDOT is developing plans to reduce barrier effects between populations. At the dam site discussed above, CDOT is designing culverts to make movement of Preble's under I-25 possible, and working with the responsible land managers to restore habitat downstream of the dam and allow the establishment of vegetative cover on the dam that would lead to the culvert. In other locations, CDOT is working with local ranchers to manage grazing on stream segments with degraded riparian systems. Such efforts, combined with targeted active restoration and permanent conservation easements, will restore habitat linkages and promote the recovery of Preble's.

The conditions of this programmatic process also benefit CDOT and the FHWA. With the programmatic in place, CDOT is now able to plan and schedule construction projects according to its needs and the availability of funding. By avoiding prolonged consultations with the USFWS, CDOT achieves the flexibility it needs to respond to the vagaries of funding and changing priorities, thereby saving time and money. CDOT and FHWA will also be able to focus their efforts where they have the greatest effect: habitat linkage restoration. This provides a greater benefit to the species than using the same resources to attempt to purchase large tracts of land.

The Monument Creek watershed, as a whole, benefits as well. Restoration of habitat linkages restores vital watershed functions and returns wetland and riparian systems to more natural conditions. In Colorado, as in other states of the arid South-West, many imperiled species depend on riparian systems. Therefore, by recreating a connected riparian habitat, this conservation program benefits a number of riparian dependent species.

### **Conclusion**

CDOT, in partnership with the FHWA and the USFWS, developed a programmatic process that promotes recovery of the Preble's meadow jumping mouse. The process also assures predictable development of transportation projects. Lessons from this process can be shared with other parties in the county and can be applied by anyone. CDOT is currently refining its transportation plans and schedules, and is pursuing the acquisition of key parcels of habitat for the purpose of restoring habitat linkages. These efforts should be complete in advance of construction. It is therefore possible that by the time CDOT has built all of its projects in northern El Paso County, the USFWS will be closer to achieving the recovery objectives for Preble's meadow jumping mouse in El Paso County than they are today.

**Biographical Sketch:** Roland Wostl began his career at CDOT in 1992 as wetland scientist. He assumed management of CDOT's threatened and endangered species program when an increasing number of Endangered Species Act issues began to conflict with transportation projects. He has been managing CDOT's Environmental Planning and Policy Unit since 2000. His current responsibilities include resolving environmental conflicts in advance of projects. Roland received a bachelor's degree in biology from the University of California at Santa Barbara.

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