United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4000 Airport Parkway
Cheyenne, Wyoming 82001

In Reply Refer To:
ES-61411/W.17/WY9299BO
ES-6-WY-05-F012

November 7, 2005

Galen W. Hesterberg
Project Development Engineer
Federal Highway Administration, Wyoming Division
2617 East Lincoln Way, Suite D
Cheyenne, Wyoming 82001-5662

Dear Mr. Hesterberg:

This transmits the U.S. Fish and Wildlife Service's (Service) ***FINAL*** programmatic biological opinion based on our review of the Federal Highway Administration (FHWA)/Wyoming Department of Transportation (WYDOT) Programmatic Biological Assessment (PBA) for effects of the Wyoming Statewide Transportation Improvement Program (STIP) of highway projects on endangered, threatened, proposed and experimental non-essential species. The PBA describes the general highway project types, the typical impacts associated with the project types on the listed species in Wyoming, and concludes with determinations for each potential impact. This programmatic biological opinion (PBO) particularly addresses the effects of the Statewide Highway Program on the threatened bald eagle (*Haliaeetus leucocephalus*), the threatened Preble's Meadow Jumping Mouse (*Zapus hudsoius preblei*), the threatened Ute ladies'-tresses orchid (*Spiranthes diluvialis*), and the threatened Colorado butterfly plant (*Gaura neomexicana spp. coloradensis*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act; 50 CFR §402.14). Your March 17, 2005 letter requesting initiation of formal consultation was received on March 21.

This ***FINAL*** programmatic biological opinion is based on information provided in the March 17, 2005 PBA, telephone conversations and meetings with Wyoming Department of Transportation and Federal Highway staff (Gaylen Hesterberg, Tom Hart, Kevin Powell and others), discussions and meetings with Dave Young of Western Ecosystems Technology (WEST), Inc. and other sources of information. Additional information was received on June 13, 2005 from Mr. Young which further clarified the extent of potential impacts to the bald eagle, Preble's meadow jumping mouse, Ute ladies'-tresses and Colorado butterfly plant. A draft of this BO was provided to the FHWA and WYDOT on July 11, 1005. A complete administrative record of this consultation is on file in the Cheyenne Field Office.

Consultation History

In early 2003, the Service met with representatives of the FHWA to discuss opportunities for a programmatic process to address upcoming FHWA and WYDOT Projects. At that meeting it

was determined that depletion issues with the Colorado and Platte River Recovery Programs were a priority to address and so efforts began to complete a programmatic consultation for these two programs. That consultation has since been completed (October 3, 2003; WY7662) and as a result depletions in the Colorado and Platte River Basins during the period of October 2003 to October 2008 have been covered and will not be discussed further in this PBO.

The biological assessment for terrestrial species required additional time as it covers 15 species and 3 designated critical habitats. Early draft documents regarding the process were reviewed by the Service in the fall of 2003. A draft biological assessment dated March 2004 was reviewed in July 2004 by the Service. At that time the Service provided comments for FHWA/WYDOT's use in the revision process. A second draft biological assessment dated November 19, 2004 was provided to the Service on November 24. After a meeting, several phone calls and the exchange of memorandums addressing comments on the November 19, 2004 draft, a final biological assessment was received on March 21, 2005. At that time the Service initiated the Formal Consultation process. A Draft PBO was provided to the FHWA/WYDOT on July 11, 2005. The Service met with FHWA/WYDOT representatives on August 3, 2005 and again in September to discuss the DRAFT PBO. Comments were received from FHWA/WYDOT in August and September 2005 and have been incorporated into this document.

Other Listed Species. The BA also addressed affects of the proposed action on all other listed, proposed, candidate and experimental non-essential species under the Act (see Table I), whose range overlaps Wyoming and may be affected by FHWA/WYDOT STIP projects, including mineral source operations. Based on the information provided in the BA, including project locations and adjacency to habitats, the Service concurs with your "not likely to adversely affect "determinations for these species due to the lack of suitable habitat and/or absence of the species in the area, and lack of affects. Although you have made "no effect" determinations for many of these species based on implementation of the STIP, Service concurrence under the Act for these determinations is not required. These determinations are listed by project in Appendix A-WYDOT Projects 2005-2009. A summary of the PBA analysis and determinations follows.

Table I. Listed, candidate and experimental species and critical habitats addressed in the PBA.

Species	Scientific Name	Status
black-footed ferret	*Mustela nigripes*	endangered
Wyoming toad	*Bufo baxteri*	endangered
Kendall Warm Springs dace	*Rhinichthys osculus thermalis*	endangered
blowout penstemon	*Penstemon haydenii*	endangered
grizzly bear	*Ursus arctos horribilis*	threatened
Canada lynx	*Lynx canadensis*	threatened
gray wolf	*Canis lupis*	threatened in YNP and GTNP
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	threatened
bald eagle	*Haliaeetus leucocephalus*	threatened
Colorado butterfly plant	*Gaura neomexicana spp. coloradensis*	threatened
Ute ladies'-tresses orchid	*Spiranthes diluvialis*	threatened
desert yellowhead	*Yermo xanthocephalus*	threatened
black-footed ferret	*Mustela nigripes*	experimental non-essential
gray wolf	*Canis lupus*	experimental non-essential
yellow-billed cuckoo	*Coccyzus americanus*	candidate
arctic grayling	*Thymallus arcticus*	candidate

Table I. (Continued)

Species	Scientific Name	Status
Slender moonwort	*Botrychium lineare*	candidate
Preble's meadow jumping mouse		critical habitat
desert yellowhead		critical habitat
Colorado butterfly plant		critical habitat

Bald Eagle. The distribution of bald eagles in Wyoming is scattered and varies by season (e.g., breeding versus winter). In general, the highest density of breeding bald eagles occur in the northwest portion of the state, but they also occur along all major river drainages. During the breeding season bald eagles nest in large trees primarily along the major river drainages and near large lakes. In the winter, the bald eagle distribution in the state is scattered and they occur in areas with nearby abundant food resources such as fish, waterfowl, or carrion.

Potential impacts to bald eagles from highway construction projects potentially include loss of habitat (breeding and/or wintering), both temporary and permanent, and disturbance effects to nesting or wintering eagles from construction. Indirect effects from projects may include effects from water quality degradation and loss of foraging opportunities.

Based on the STIP for the next five year period, there are approximately 56 WYDOT projects which may affect bald eagles (see Appendix A). Most of these occur in Districts 3 and 5 which cover the northwest portion of the state (See Attachment 1 for a map of WYDOT Field Operation Districts). In most cases, the may affect determination is based on the project crossing or occurring in (e.g., bridge replacement) a large riparian area. The majority of potential effects from the construction for the next five years are potential disturbance type effects or indirect effects because most of the projects are either reconstruction without added capacity, restoration or resurfacing, or environmental only projects which will result in minimal habitat loss. Five of the fifty-six projects potentially have adverse affects resulting primarily from disturbance, are the subject of this PBO, and will be discussed later. The remaining projects will not result in the loss of a bald eagle nest or roost tree or trees within 800 meters (m) of a nest or roost. Prior to highway activities, FHWA/WYDOT will determine the location of bald eagle nests in relation to highway projects and evaluate the potential for designing the project to minimize encroachment on riparian habitat and eliminate removal of trees within 800 meters of nests or roosts.

Habitat loss from highway projects is not likely to adversely affect bald eagles unless a nest site or winter roost site is taken (e.g., nest tree cut down) by a project. No projects of that type are considered in the STIP for the next five years. For the most part, the highway infrastructure in Wyoming is in place and highway projects for the next five years involve surface restoration or reconstruction without added capacity. Because the highway system is existing and in place, and bald eagle nests and winter roosts are used annually, it is unlikely that a nest or winter roost would occur in an area which would be lost to a highway project. Highway projects are *not likely to adversely affect* bald eagles through habitat loss.

Disturbance effects, while hard to quantify, are more likely to occur. Little construction occurs during the winter other than material processing and stockpiling so there is less potential for highway projects to disturb wintering eagles and they are unlikely to result in a disturbance of the magnitude where adverse affects would occur. If material sources were being mined during the bald eagle nesting or wintering season, the material sources could result in the loss of juvenile eagles or abandonment of winter roosts where they overlapped with bald eagle habitat.

Adult eagles are mobile enough that they are unlikely to be affected by an operating material source. Highway projects are *not likely to adversely affect* wintering bald eagles; However material sources operations could potentially *adversely affect* wintering bald eagles if their operation occurs during the winter months. In addition, material sources operations could *adversely affect* bald eagle reproductive success if operations occurred during the nesting season and were disturbing enough to alter adult bald eagle behavior regarding their nest or young. As indicated above, these potential adverse affects are the subject of this PBO and will be discussed later in this document.

Black-footed ferret. Currently, there are no known populations of ferrets in Wyoming that are classified as endangered (i.e., not experimental non-essential), however, black-footed ferrets are designated "non-essential, experimental" as part of the reintroduction efforts in Shirley Basin. Highway construction projects have the potential to affect black-footed ferrets through loss of habitat, creation of barriers to movement, disturbance or displacement of individuals or groups from important habitats or fatalities.

Potential effects may occur if a highway project (including mineral source operations) occurred in a prairie dog complex occupied by wild black-footed ferrets. Impacts to ferrets from highway construction projects could include loss of habitat (prairie dog colonies), mortality, and possibly disturbance/displacement effects if a ferret were to occur near construction. Highway construction projects that encroach on prairie dog colonies can result in loss of habitat and potential mortality of a ferret if one occurred under ground in an area of excavation. Disturbance and displacement effects may also occur as ferrets have strong ties to their prey and are not able to alter feeding or other behaviors in order to avoid construction activities.

Based on the STIP for the next 5 years (Appendix A) there are approximately 21 projects and a potentially unknown number of mineral source sites that are located within (or a portion of) areas in Wyoming not cleared for black-footed ferrets (U. S. Fish and Wildlife Service <USFWS> 2004a) and are located outside of the reintroduction site in Shirley Basin. The may affect determination for these projects is based on the potential for a project to fall within a non-cleared white-tailed prairie dog complex. If a project may potentially impact (result in ground disturbing activities) an un-cleared white-tailed prairie dog complex that meets the definition of black-footed ferret habitat [Greater than 200 acres; 8 burrows/acre], a survey will be conducted according to the USFWS guidelines. If a wild black-footed ferret were found, the project would cease until an additional Biological Assessment and formal consultation with the Service could be initiated.

Sixteen of these projects for the next five years are reconstruction projects without added capacity and three are restoration or resurfacing projects (Appendix A). The restoration or resurfacing projects are not expected to impact prairie dog colonies because they are not expected to encroach on adjacent areas, regardless of right-of-ways. The reconstruction without added capacity projects may impact an adjacent prairie dog colony if they include highway widening. Given the small number of projects that may potentially affect un-cleared white-tailed prairie dog complexes and the rarity of wild ferrets, and that consultation under the Act will be re-initiated and project activities halted if a wild black-footed ferret is found, the STIP for the next five years is *not likely to adversely affect* free ranging wild endangered black-footed ferrets.

Based on the STIP for the next five year period there are two WYDOT projects that may affect experimental black-footed ferrets (Appendix A). The may affect determination is based on the project occurring within the designated experimental non-essential population limits. These

projects are reconstruction without added capacity projects located on U.S. Highway 287 south of Shirley Basin. These projects are not expected to result in substantial loss of prairie dogs (habitat) or create a barrier to movement greater than the existing situation, neither are they expected to result in disturbance to ferrets through affects to their prey base or habitat. It is assumed that ferrets would not commonly occur in an area of highway construction. Highway projects for the next five years will *not jeopardize the continued existence* of experimental non-essential black-footed ferrets through habitat loss, disturbance or mortality.

Grizzly Bears. The distribution of grizzly bear in Wyoming is currently confined to the Greater Yellowstone Ecosystem (GYE); however, the population is increasing and expanding it's range. There is special concern with grizzly bears due to potential agonistic encounters between humans and bears. In general, grizzly habitats are located in wilderness areas away from human disturbance, however, they are known to come into camp sites, picnic areas, and garbage dumps in search of food. Land management agencies in and around the GYE have adopted a set of guidelines around site management in grizzly bear country designed to reduce the level of attractants and potential impacts to grizzlies.

Highway project construction, including mineral source operations, have the potential to affect grizzly bears through altering habitat, creating barriers to movement, and causing disturbance or displacement. Highway projects throughout most of Wyoming would have no effect on grizzly bears. Those projects on highways that occur in the GYE may affect grizzly bears and all types of projects (Table 1 of the PBO) have the potential to affect grizzly bears if they occur within occupied habitat. *Please note that highway projects within Yellowstone or Grand Teton National Parks are under the Regional Federal Highway Administration jurisdiction and are not considered under this PBA.* Highway improvements themselves generally have minimal impacts on grizzly bears; however, increased human use of the area during construction may have greater effects to the extent that the human presence displaces or attracts grizzly bears.

Based on the STIP for the next five year period, there are six WYDOT projects and an unknown number of mineral source sites which may affect grizzly bear (Appendix A). This determination is based on the project occurring in the GYE (WYDOT Districts 3 and 5). Three of the projects are reconstruction without added capacity and would likely result primarily in disturbance type effects or indirect effects with little potential for loss of habitat, mortality, or creating a barrier to movement. Mineral source sites would have the same type of effects as reconstruction. Two projects are new construction or reconstruction with added capacity. While these projects are increasing the size of the facility or creating a new road they are not expected to have substantial effects on grizzly bear due to location (Afton and Teton Village; two areas with existing development and high human activity). The final project that may affect grizzly bear is re-vegetation along the North Fork highway from Cody to YNP. While reclamation activity is not expected to result in direct effects (habitat loss, disturbance, mortality, movement barrier) it could result in indirect effects if it creates attractants to grizzly bears.

Habitat loss from highway projects for the next five years is not considered a significant effect to grizzly bears. Two of the six projects are new construction or reconstruction with added capacity; however, while these projects are located in the GYE, they are not in areas with good grizzly bear habitat. One is near Afton and one at Teton Village, two areas with existing development and high human activity. Three projects are reconstruction without added capacity and will not encroach on adjacent areas outside the existing zone of influence from the highway. The final project is an environmental only project that is re-vegetation of areas along the Cody-

YNP highway. Highway projects for the next five years are *not likely to adversely affect* grizzly bears through habitat loss.

Construction activity on a highway could conceivably harass or harm grizzly bears through disturbance however STIP projects for the next five years are not located in prime grizzly bear habitat and are unlikely to disturb grizzly bears. The re-vegetation project is not expected to create disturbances which would harass or harm grizzly bears. In addition, FHWA/WYDOT has agreed that all construction contractors for projects within grizzly bear range will be required to be in compliance with the U.S. Forest Service special order regarding minimization of grizzly/human conflicts. The WYDOT projects for the next five years are *not likely to adversely affect* grizzly bears through disturbance or displacement.

The grizzly bear population in the GYE is also growing and expanding to the south and east in Wyoming. Currently, there are no known highways in grizzly bear range in Wyoming that create a physical barrier to movement. The two new construction or added capacity projects are not likely to create a barrier to grizzly bears due to location. The "reconstruction without added capacity or environmental only projects" are not expected to create barriers to movement because these projects will not increase the size of the highway. The WYDOT projects over the next five years are *not likely to adversely affect* grizzly bears through creating a barrier to movement and through design features could facilitate grizzly bear movement.

Canada Lynx. Lynx are generally associated with boreal forests in northern latitudes and in the lower 48 states unbroken, uneven-aged stands of spruce/fir/lodgepole pine forest in higher elevations (USFWS 2000a, Squires and Laurion 2000, McKelvey et al. 2000). The uneven-aged stands are important because they provide mature stands with plenty of dead fall for denning, early successional forests with abundant snowshoe hare prey, and areas of open understory for travel. Lynx use large woody debris such as downed logs or windfalls for denning sites (Mowat et al. 2000, USFWS 2000a). In Wyoming the range of lynx is relatively unknown. Currently, there are scattered reports of tracks and sightings as lynx are not abundant within their former range, but have been located in Yellowstone National Park, Medicine Bow National Forest and have historic sitings in the Wyoming Range.

Highway construction projects (including mineral source operations) have the potential to affect Canada lynx through altering habitat, creating barriers to movement, and causing disturbance or displacement. Some highway projects such as restoration or resurfacing and reconstruction with no added capacity would have no or minimal impacts on Canada lynx habitat. Restoration or resurfacing projects do not change the highway template and do not result in additional land surface being converted to highway. Reconstruction with no added capacity usually results in a larger roadway (e.g., wider lanes, added shoulders), however, in most cases this construction occurs within the existing right-of-way which is considered marginal habitat for Canada lynx.

New construction, roadway relocation, or reconstruction with added capacity projects would result in greater losses of lynx habitat. New highway construction rarely occurs and in particular is unlikely to occur in the areas of lynx habitat. Reconstruction with added capacity is a more likely scenario given the popular use of lynx habitat areas for recreation. This type of project would result in a larger highway (e.g., added lanes, added shoulders) and would likely encroach on adjacent areas through improved clear zones and wider right-of-way. This encroachment may result in the loss of lynx habitat outside the existing right-of-ways.

Based on the STIP for the next 5 year period, there are 21 WYDOT projects and an unknown number of mineral source sites which may affect Canada lynx (Appendix A). This may affect determination is based on the project occurring in the GYE (WYDOT Districts 3 and 5) or for projects in the Big Horn National Forest. Sixteen of the projects are reconstruction without added capacity and would likely result primarily in disturbance type effects or indirect effects with little potential for loss of habitat, mortality, or creating a barrier to movement. Mineral source sites would have the same type of effects as reconstruction. Two projects are new construction or reconstruction with added capacity. While these projects are increasing the size of the facility or creating a new road they are not expected to have substantial effects on lynx due to location (Afton and Teton Village), existence of motorized traffic and high levels of human habitation. The final three projects that may affect Canada lynx are environment only projects which include re-vegetation along the North Fork highway from Cody to YNP, and landscape enhancements near Hoback Junction in District 3.

Construction activity on a highway could conceivably harass or harm Canada lynx through disturbance, but the STIP for the next five years that may affect lynx are not located in prime lynx habitat and are unlikely to create disturbances that lead to harassing or harming lynx. Radio collared lynx in Wyoming have been documented making seasonal long range movements which take them well out of their typical home range. One lynx in particular crossed several highways in the GYE during his seasonal movements. Lynx may avoid areas around highways but the two new construction or added capacity projects are not likely to create a barrier to lynx due to location. The reconstruction without added capacity or environmental only projects are not expected to create barriers to movement because these projects will not increase the size of the highway. Highway projects for the next five years are *not likely to adversely affect* Canada lynx through habitat loss, disturbance or barriers to movement.

Gray Wolf. In Wyoming, the gray wolf has a dual listing. Within the boundaries of Yellowstone and Grand-Teton National Parks and any National Wildlife Refuge, the gray wolf is listed as a threatened species. Outside the boundaries of the national parks or refuges it is listed as experimental non-essential. As with other large carnivores, highway construction projects have the potential to affect wolves through loss of habitat, creation of a barrier to movement, disturbance or displacement, or fatalities.

Based on the STIP for the next five year period, there are no WYDOT projects which may affect threatened gray wolves. During that same period, there are seven WYDOT projects and an unknown number of mineral source sites which may affect experimental non-essential gray wolves (Appendix A). The may affect determination is based on the project occurring where gray wolves exist (Currently WYDOT Districts 3 and 5). Four of the projects are reconstruction without added capacity and would likely result primarily in disturbance type effects, effects to the wolf's prey or indirect effects with little potential for loss of habitat, mortality, or creation of a barrier to movement. Mineral source sites would have the same type of effects as reconstruction. Two projects are new construction or reconstruction with added capacity. While these projects are increasing the size of the facility or creating a new road they are not expected to have substantial effects on gray wolves due to location (Afton and Teton Village), existence of motorized traffic and high levels of human habitation. The final project that may affect gray wolves is re-vegetation along the North Fork highway from Cody to YNP. While reclamation activity is not expected to result in direct effects (habitat loss, disturbance, mortality, movement barrier) it could result in indirect effects if it creates attractants for the prey (ungulates) of wolves. Highway projects for the next five years will not jeopardize the continued existence of gray wolf through habitat loss, disturbance, mortality, movement barrier.

Preble's Meadow Jumping Mouse. Preble's meadow jumping mouse potentially occurs in Laramie, Platte, Goshen, eastern Albany, southern Converse, and southeastern Natrona counties. Projects elsewhere in the state would not affect Preble's. Preble's occur along perennial streams in areas with dense undergrowth consisting of grasses and forbs and where shrubs or trees provide overstory cover. Projects within these counties which potentially impact riparian habitat along perennial streams may affect Preble's. Highway projects may affect Preble's through loss of habitat, disruption of connectivity of habitat, mortality of individuals, and temporary construction related effects such as disturbance due to heavy machinery working in the area.

Based on the STIP for the next five year period, there are approximately 32 WYDOT projects (including material source operations) which may affect Preble's meadow jumping mouse (Appendix A). The may affect determination is based on the project occurring in Preble's range (WYDOT Districts 1 and 2) and potentially affecting a riparian area. Two of the projects are restoration or resurfacing projects but may involve bridge repairs or culvert extension which could affect Preble's. Twenty-one of the projects are reconstruction without added capacity and may result in some habitat loss, mortality, disturbance type effects or indirect effects depending on the extent of Preble's habitat in the project area. Four projects are new construction or reconstruction with added capacity. Up to four may be mineral source operations. Depending on the presence of Preble's habitat in the project area these projects may have direct and indirect impacts on Preble's. To facilitate habitat connectivity, culverts within Preble's habitat will be installed in a manner that allows stream bed material to collect in the culvert and form a natural stream bed. Disturbed areas within the riparian zones will be reclaimed with riparian vegetation similar to the existing plant community to facilitate re-establishment of Preble's habitat. Compliance with the NPDES permit will be maintained to minimize impacts from siltation and erosion to the aquatic ecosystem and Preble's habitat. Storage, staging, and fueling of construction equipment and materials will be greater than 100 meters (>300 feet) from any riparian zones; location specific erosion control measures will be installed to minimize sediment laden runoff from construction zones affecting streams and riparian areas.

Highways that cross riparian areas likely create a swath of unsuitable habitat (i.e., the road, right-of-way) for Preble's and conceivably could create a barrier or blockage to Preble's movement. It is, however, presumed that Preble's may periodically move through areas of marginal or unsuitable habitat during dispersal and in some cases highways do not appear to be a barrier to movement. Of the specific WYDOT projects for the next five years that may affect Preble's, twenty-one are linear sections of highway that likely cross riparian areas with Preble's habitat, six are bridge or structure replacement, and two are resurfacing or restoration projects. To implement these projects up to 4 mineral sources operation sites may be needed. It is assumed that these projects may change the current situation by either replacing a bridge or extending the length of culverts and may therefore affect Preble's habitat connectivity. However, provided project design criteria are employed to facilitate reestablishment of riparian vegetation, over-sizing structures and minimizing road slope encroachment on Preble's habitat, the WYDOT projects are *not likely to adversely affect* Preble's through disruption of habitat connectivity or movement. Projects which remove or affect habitat or have the potential to incidentally take or otherwise harm the Preble's meadow jumping mouse are the subject of this PBO, and will be discussed later.

Preble's Meadow Jumping Mouse Critical Habitat. In Wyoming, critical habitat was designated along three streams: Cottonwood Creek in extreme northeast Albany County and western Platte County; Chugwater Creek in extreme eastern Albany County, northwestern Laramie County and extending into southern Platte County; and Lodgepole Creek in eastern

Albany County and western Laramie County. Critical habitat in these areas was defined as the area within 120 meters on either side of the stream (USFWS 2003).

The potential for a WYDOT project to impact Preble's critical habitat is based on the occurrence of a project on a highway that crosses or parallels the stream segments designated as critical habitat. The highways that could potentially affect Preble's critical habitat include Interstate 25 where it crosses and then runs parallel to Chugwater Creek in southern Platte County and Wyoming Highway 211 where it crosses Lodgepole Creek and from approximately Iron Mountain to its end where it parallels and then crosses Chugwater Creek. Iron Mountain Road (a county road) parallels Chugwater Creek from approximately the end of Wyoming Highway 211 to the town of Chugwater. Construction on these highways could affect Preble's critical habitat through habitat losses (permanent or temporary) or degradation from run off or stochastic events such as accidents or fuel spills.

Based on the STIP for the next five year period, there are no WYDOT projects that occur in or near Preble's meadow jumping mouse critical habitat (Appendix A), therefore WYDOT projects over the next five years will have no effect on Preble's meadow jumping mouse critical habitat. In addition, any material source operations will be located outside of Preble's meadow jumping mouse critical habitat and therefore will have no effect on Preble's meadow jumping mouse critical habitat as well.

Wyoming Toad. The Wyoming toad is **c**urrently found in the wild only at Mortenson Lake and possibly Lake Hutton National Wildlife Refuges in the Laramie Basin in Albany County and at a small research project site in the Laramie Plains, and on private land adjacent to Wyoming Highway 130 as of June 16, 2005. There are also captive populations at several captive breeding facilities in the State including the Wyoming Game and Fish Department's Sybille Research Unit and Saratoga National Fish Hatchery in Wyoming.

WYDOT projects throughout most of the state will have no effect on Wyoming toad as the toad is limited in its distribution. The potential for a WYDOT project to impact this species would be based on the occurrence of a project near Mortenson Lake National Wildlife Refuge or the captive breeding or reintroduced populations. As the reintroduction program expands and if new populations are established, other highways may become of concern. Currently however, and based on the STIP for the next five year period, there are no WYDOT projects that may affect Wyoming toads based on the current range of the species (Appendix A). Based on the current known range of naturally occurring Wyoming toads, WYDOT projects for the next five years will not affect Wyoming toads.

There are two captive breeding populations of Wyoming toads in Wyoming: at the WGFD Sybille Research Unit and the Saratoga Fish Hatchery. Access to the Saratoga Fish Hatchery is via a Carbon County road; WYDOT projects will *not affect* captive Wyoming toads at the Saratoga Fish Hatchery. Potential impacts from the reconstruction of the North Sybille Creek Section of Wyoming Highway 34 will be evaluated on an individual basis through formal consultation with the USFWS and potential effects to this population of Wyoming toads are not included in the scope of this PBA.

Kendall Warm Springs Dace. Kendall Warm Springs dace is a subspecies of speckled dace (a small minnow), that only occurs in one small stream located in the Green River drainage in northern Sublette County on the Bridger-Teton National Forest.

The potential for a WYDOT project to impact this species would be based on the occurrence of a project near or crossing Kendall Warm Springs Creek. This is highly unlikely because Kendall Warm Springs Creek occurs on the Bridger-Teton National Forest and the only nearby road is a Forest Service road not under the administration of WYDOT. The primary concern for WYDOT would be the construction of a new road or upgrading the U.S. Forest Service road in the immediate watershed of Kendall Warm Springs. These events are considered unlikely to occur in the foreseeable future. Based on the STIP for the next five year period, there are no WYDOT projects that may affect Kendal Warm Springs dace (Appendix A). Based on the limited range of Kendall Warm Springs Dace on U.S. Forest Service land (Bridger-Teton National Forest), there are no roads on the WYDOT system which are in close proximity to the population. WYDOT projects will *not affect* Kendall Warm Springs dace.

Ute Ladies'-tresses Orchid. In Wyoming, Ute ladies'-tresses orchid is known from four populations in Laramie, Goshen, Niobrara and Converse counties (Fertig 2000a). Based on the current known distribution of Ute ladies'-tresses orchid in Wyoming, WYDOT projects throughout the state will not affect the species at the known species locations. U.S. Highway 20 runs parallel to the Niobrara River in southeastern Niobrara County. This is the closest location of a WYDOT system highway to a known Ute ladies'-tresses population. However, because of the uncertainty of the species range, highway projects throughout Wyoming may affect Ute ladies'-tresses orchid by impacting previously unknown populations. Potential impacts may include mortality of individual plants, loss of suitable habitat, fragmentation of populations, and sedimentation or runoff affecting habitat for these plants. In order to address the unknown location of this plant and to minimize potential affects the following conservation measures will be implemented: (1) all projects which impact wetlands will be evaluated for suitability for Ute ladies'-tresses orchid - i.e., below 6,800 feet elevation; non-saline soils; open palustrine wetlands with no overstory; perennial water source, (2) wetlands with characteristics suitable for Ute ladies'-tresses will be surveyed prior to disturbance according to USFWS guidelines to determine presence/absence of the species, and (3) wetlands with Ute ladies'-tresses present which are disturbed as a result of highway activities will be reclaimed in a manner which preserves topsoil from the affected areas and utilizes it for reclamation thus preserving the seed bank, propagules, and other biological material.

Based on the STIP for the next five year period, and due to the uncertain distribution of the species in Wyoming, numerous WYDOT projects may affect Ute ladies'-tresses orchid (Appendix A). Because it is believed that Ute ladies'-tresses could occur anywhere in the state below 6,800 feet elevation, the may affect determination is based on projects throughout the state that cross riparian areas of perennial streams and potentially affect riparian wetlands.

Because of the uncertain distribution of Ute ladies'-tresses in Wyoming, it is difficult to predict how many WYDOT projects over the next five years will actually affect occupied habitat. It is likely that no projects will actually occur in or cross occupied habitat and the appropriate determination would be that WYDOT projects are *not likely to adversely affect* Ute ladies'-tresses orchid. However, there is still the potential for new populations of Ute ladies'-tresses to be located in Wyoming which could be affected by a highway project. Highway projects that do not require additional conversion of land area to highway or that impact suitable but unoccupied habitat are *not likely to adversely affect* Ute ladies'-tresses through habitat loss. Highway projects are *not likely to adversely affect* Ute ladies'-tresses through fragmentation of a population. Projects which remove, destroy or otherwise degrade or affect occupied habitat for Ute ladies'-tresses are the subject of this PBO, and will be discussed later in this document.

Colorado Butterfly Plant. In Wyoming the Colorado butterfly plant is found in Laramie and Platte Counties in moist soil areas of floodplain mesic meadows which are fairly open and not overly dense. According to a recent status review, the current Wyoming range of Colorado butterfly plant is limited to about 6,100 acres along Bear, Little Bear, Horse, Lodgepole, Diamond, Crow, Spring, Lone Tree Creeks in Laramie County and Tepee Ring Creek in Platte County (USFWS 2004b, Fertig 2000b).

Highway projects have the potential to affect the Colorado butterfly plant through destruction of individuals, loss of suitable habitat, fragmentation of populations, and sedimentation or runoff affecting habitat for this plant. Based on the STIP for the next five year period there are fourteen WYDOT projects which may affect Colorado butterfly plant (Appendix A). The may affect determination is based on the project occurring in butterfly plant range and potentially affecting a riparian area. Two of the projects are restoration or resurfacing projects that may involve culvert extensions. Nine of the projects are reconstruction without added capacity and two of the projects are reconstruction with added capacity. In addition, up to four mineral source operations may occur within butterfly plant habitat. Depending on the presence of butterfly plant habitat in the project area these projects may have direct and indirect impacts on Colorado butterfly plant.

As with other plants, habitat loss and mortality for Colorado butterfly plant are closely associated because of the limited mobility/dispersal ability of plants. Suitable habitat may be present in an area but simply unoccupied because of the lack of nearby populations for dispersing seeds. Field surveys according to USFWS methods will easily verify whether a project has the potential to adversely affect Colorado butterfly plant through habitat loss or mortality. In addition, to minimize potential affects to this listed species the following conservation measures will be implemented with the proposed action: (1) all projects within Platte and Laramie Counties which impact wetlands will be evaluated for suitability for Colorado butterfly plant - i.e., floodplain of a stream; open palustrine wetlands with no overstory; (2) riparian areas with characteristics suitable for Colorado butterfly plant will be surveyed prior to disturbance according to USFWS guidelines to determine presence/absence of the species, and (3) wetlands with Colorado butterfly plant present which are disturbed as a result of highway activities will be reclaimed in a manner which preserves topsoil from the affected areas and utilizes it for reclamation, thus preserving the seed bank, propagules, and other biological material.

Highway projects that do not require additional conversion of land area to highway or that impact suitable but unoccupied habitat are *not likely to adversely affect* Colorado butterfly plant through habitat loss. Highway projects have the potential to adversely affect Colorado butterfly plant through fragmentation of populations if they were to bisect a population or stop dispersal of individuals between two populations near each other along a stream. Given the current known distribution and status of Colorado butterfly plant and number of projects over the next five years, this scenario is considered unlikely. Highway projects are *not likely to adversely affect* Colorado butterfly plant through fragmentation of a population. Projects which remove, destroy or otherwise degrade or affect occupied habitat for Colorado butterfly plant are the subject of this PBO, and will be discussed later in this document.

Colorado Butterfly Critical Habitat. In Wyoming, critical habitat is designated along the Bear, Little Bear, Horse, Lodgepole, Diamond, and Lone Tree Creek drainages in Laramie County; and Tepee Ring Creek in Platte County (USFWS 2005). Critical habitat in these areas includes variable reaches of the streams and the area within 300 feet of the centerline of the streams (USFWS 2005).

Currently, the potential for a WYDOT project to impact Colorado butterfly plant critical habitat is limited to the Little Bear Creek, Horse Creek, and Lodgepole Creek drainages where they cross Interstate 25 north of Cheyenne. Of the stream reaches proposed as critical habitat these are the only areas which cross a road under the WYDOT system. Construction on I-25 could affect Colorado butterfly plant critical habitat through habitat losses (permanent or temporary) or habitat degradation from run off or stochastic events such as accidents or fuel spills.

Based on the STIP for the next five year period there are no WYDOT projects which may affect Colorado butterfly plant critical habitat (Appendix A). In any locations where a WYDOT project may affect critical habitat, impacts can be avoided through project design. WYDOT projects (including material source operations) over the next five years will have no effect on Colorado butterfly plant critical habitat.

Blowout Penestom. In 1996, a small population of the species was found on public lands in the northwest part of Carbon County, Wyoming in the western Seminoe Mountains. Habitat targeted surveys in 2000 found a few nearby populations in the eastern Ferris Mountains but the species distribution in Wyoming is still confined to a 5 square mile area between the Ferris and Seminoe mountains (Fertig 2001).

Blowout penstemon occurs in a remote location on land administered by the Bureau of Land Management (BLM). The potential for a WYDOT project to impact this species would be based on the occurrence of a project near or crossing the area occupied by the species. The nearest highway under the WYDOT system is U.S. Highway 287/Wyoming Highway 789 approximately 18 miles west of the known species range in Wyoming. The primary concern for WYDOT would be upgrading a BLM road in the area, which is considered highly unlikely to occur in the foreseeable future.

Based on the limited range of blowout penstemon on BLM lands in the northwest part of Carbon County between the Ferris and Seminoe Mountains, there are no roads on the WYDOT system which are in close proximity to the known populations. Based on the STIP for the next five year period there are no WYDOT projects which may affect blowout penstemon (Appendix A). WYDOT projects will *not affect* blowout penstemon.

Desert Yellowhead. Desert Yellowhead was discovered in 1990 and is a Wyoming endemic known only from one location in southern Fremont County. The plant was listed under the Act as threatened in 2002 (USFWS 2002a). To date it is only known from the original location and two small nearby sub-populations.

Desert yellowhead occurs on land administered by the BLM along the summit of Beaver Rim in southern Fremont County. The potential for a WYDOT project to impact this species would be based on the occurrence of a project near or crossing the area occupied by the species. The primary concern for WYDOT would be an improvement project on Highway 135 near the species location or upgrading a BLM road in the area, which is considered unlikely to occur in the foreseeable future.

Based on the limited range of desert yellowhead on BLM lands in southeast Fremont County, there are no roads on the WYDOT system which are in close proximity to the known populations. In addition, based on the STIP for the next five year period there are no WYDOT projects which may affect desert yellowhead (Appendix A). WYDOT projects will *not affect* desert yellowhead.

Desert Yellowhead Critical Habitat. The area designated critical habitat encompasses the only known locations of the species and a buffer around these populations. The critical habitat occurs on land administered by the BLM along the summit of Beaver Rim in southern Fremont County. The total area is approximately 360 acres in portions of two sections (USFWS 2004d). The western boundary of the area designated critical habitat is approximately 0.5 mile east of Wyoming Highway 135.

The potential for a WYDOT project to impact this species would be based on the occurrence of a project bordering or crossing the area that has been designated (360 acre plot). This is unlikely because of the location of the critical habitat. The primary concern for WYDOT would be an improvement project on Highway 135 near the critical habitat or upgrading a BLM road in the area, which is considered unlikely to occur in the foreseeable future.

Based on the STIP for the next five year period there are no WYDOT projects which may affect Desert yellowhead (Appendix A). The area designated critical habitat for desert yellowhead and the only known populations of the species are located on BLM lands which have been set aside and protected from future development or land management changes. WYDOT projects will *not affect* desert yellowhead critical habitat.

Conclusion of Informal Consultation. This concludes *informal consultation* pursuant to the regulations implementing the Endangered Species Act, 50 C.F.R. § 402.13. This project should be re-analyzed if new information reveals effects of the action that may affect listed or proposed species or designated or proposed critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to a listed or proposed species or designated or proposed critical habitat that was not considered in this consultation; and/or, if a new species is listed or critical habitat is designated that may be affected by this project.

Candidate Species –yellow-billed cuckoo, artic grayling, and slender moonwart. Although the Service does not provide concurrence to species which are candidates for listing, we have reviewed your BA for potential affects to these species and appreciate your efforts in providing a proactive analysis and subsequent determinations. The Service recommends that FHWA/WYDOT also give consideration to candidate species in environmental planning to avoid possible delays should the species be listed prior to the completion of the project. Protection provided to these species now may preclude possible listing in the future. In addition, many Federal agencies have policies to protect candidate species from further population declines. Conservation measures for these candidate species are voluntary but recommended and should be incorporated into project planning.

Boreal Toad. In September of 2005, the Service determined that the boreal toad (*Bufo boreas boreas*) was unwarranted for listing at this time. We do, however, encourage the FHWA/WYDOT and their applicants to continue providing protection for this species as we remained concerned regarding its status. Although the Service does not provide concurrence to species which are not listed under the Act, we have reviewed your PBA for potential affects to this species and appreciate your efforts in providing a proactive analysis of your agencies potential affects and subsequent determinations.

PROGRAMMATIC BIOLOGICAL OPINION
FOR THE
WYOMING STATEWIDE
TRANSPORTATION IMPROVEMENT PROGRAM (STIP)

FHWA/WYDOT

NOVEMBER 7, 2005

Prepared by
U.S. FISH AND WILDLIFE SERVICE
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PROGRAMMATIC BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Programmatic Biological Assessment (PBA) evaluated the effects of typical Federal Highway Administration (FHWA)/Wyoming Department of Transportation (WYDOT) highway improvement projects over a five year period (program) on endangered, threatened, proposed, experimental non-essential, and candidate species. This evaluation is based on Appendix A which lists proposed annual projects for the next five years by WYDOT District boundaries. The PBA will be re-evaluated every five years and consultation re-initiated with the Service as necessary. In addition, annual monitoring of incidental take authorized through the Programmatic Biological Opinion (PBO) will occur for reporting and monitoring purposes with a summary of incidental take provided for each project (See Appendix B, Project Specific Reporting Form).

The PBA did not consider actions associated with the continued operation, use, and maintenance of highways. These actions are interrelated in that they would not occur without the road being there, but they are existing and are not considered part of this federal action of authorizing the expenditure of federal funds for the highway project activities considered in the PBA. Irregardless of whether these actions were analyzed in the PBA, the Service is obligated, under 50 CFR 402.14, to evaluate the effects of the action (including the direct, indirect and cumulative effects), on listed species or designated critical habitat. This evaluation will occur during the Service's analysis of effects in the biological opinion, however as these interrelated and interdependent actions and their resultant affects are not considered part of the proposed action as identified in the PBA, no incidental take coverage will be provided to FHWA or WYDOT for these ongoing actions through this PBO.

WYDOT highway construction projects are managed under the State Transportation Improvement Program (STIP) and typically fall within one of six general project categories. The STIP for the next five years and each general project type are described below. Although not necessarily a project category, mineral source operations are needed to implement these projects. Therefore mineral source operations have been included as a project type, described below. The need for a highway construction project is based on a number of factors including deficiencies of the road in meeting current design and safety standards, level of service, funding, and the functional classification of the road.

The PBA addressed potential impacts from WYDOT projects on species and critical habitat currently listed under the ESA. In the event of future listings or changes in status of species, the consultation will be re-initiated and an effects analysis conducted for the new species. In addition, consultation will be re-initiated if: (1) the scope of work changes so as to create potential effects to listed species or critical habitat not previously considered; or (2) new information or study reveals effects of highway projects may impact listed species in a manner not considered in this PBO.

State Transportation Improvement Program

The STIP is a staged, multi-year, statewide, intermodal program of transportation projects which is consistent with the Statewide transportation plan and planning processes. The STIP is a

comprehensive list of highway projects in the state and is used to track and manage the progress of projects and determine needs and priorities. The STIP programs and schedules highway projects throughout five districts in the state. All known WYDOT projects that fall within the National Highway System and scheduled for the next five years are listed in Appendix A by district. A total of approximately 328 projects are addressed in this list. The STIP and the projects identified therein are subject to revision based upon workload, funding and contractor availability. However, it is the expectation of this PBO that although projects may be substituted and/or revised the total affects attributed to a particular project and/or species will remain the same or be reduced.

Highway Project Types. WYDOT highway construction projects fall into the following general categories (Table 1). These project types include: (1) new construction and highway relocation; (2) reconstruction with added capacity; (3) reconstruction with no added capacity; (4) restoration or resurfacing; (5) environmental projects; (6) safety projects, and (7) material sources. Each of these project types is described in more detail below. Each project type can apply to different highways in the state. Wyoming highways under the Department of Transportation system include two-lane primary roads, two-lane secondary roads, four-lane primary roads, four-lane primary roads with a median; and four-lane interstate highways (Table 2). Generally speaking, each one of these highway classifications has standard specifications that apply to that road class. The purpose of most highway construction projects is to reconstruct a given section of highway to meet the specifications for that road classification. All highway projects include land clearing and stockpiling soils for use in restoration and rehabilitation of the site after project work is completed.

Table 1. **Project Type Descriptions**

Project Type	Description
01/07 - New Construction and roadway relocation	Construction of new roadway on new alignment as a new facility, as replacement for an existing roadway, or as an extension of an existing roadway. These improvements would typically include new bridge/drainage structures and require substantial additional ROWs. This project type applies to the following highway classifications: (1) 2 Lane Primary, (2) 2 Lane Secondary, (3) 4 Lane Primary, (4) 4 Lane Primary with Median, and (5) 4 Lane Interstate.
03/08/10/13 - Reconstruction, Added Capacity (Major Widening)	Construction on approximate alignment of an existing route where the old pavement structure is removed and replaced. Reconstruction includes widening to provide continuous additional through lane(s), or adding, or revising interchanges, total or partial replacement of bridge structures/drainage structures, replacing other highway elements including grade separation structures and improvements to existing intersections. Also included, where necessary, are other incidental improvements such as utility, drainage, and shoulder improvements. These improvements may require substantial additional rights-of-way. This project type applies to the following highway classifications: (1) 4 Lane Primary, (2) 4 Lane Primary with Median, and (3) 4 Lane Interstate.
04/11/14 - Reconstruction, No Added Capacity (Minor Widening)	Construction to widen travel lanes and/or shoulders of an existing roadway without adding through lanes. Project includes reconstructing the existing pavement, total or partial reconstruction of bridge structures/drainage structures, and other incidental improvements such as utility, drainage, and shoulder improvements. These improvements may require minor additional rights-of-way. This project type applies to the following highway classifications: (1) 2 Lane Primary, (2) 2 Lane Secondary, (3) 4 Lane Primary, (4) 4 Lane Primary with Median, and (5) 4 Lane Interstate.

Project Type	Description
05/06 - Restoration or Resurfacing	Construction for placement of additional surface material over the existing roadway to improve serviceability or to provide additional strength. There may be some upgrading of unsafe features and/or bridge deck surfacing, and other incidental work in conjunction with resurfacing. These improvements are typically within existing rights-of-way, but may require minor additional rights-of-way. This project type applies to the following highway classifications: (1) 2 Lane Primary, (2) 2 Lane Secondary, (3) 4 Lane Primary, (4) 4 Lane Primary with Median, (5) 4 Lane Interstate.
20 - Environmental Only	Improvements that do not provide any increase in the level of service, in the condition of the facility, or in safety features. Typical improvements, which would fall in this category, would be transportation enhancements, rest area construction or modification, bicycle and pedestrian facilities, noise barriers, roadside landscaping and other environmentally related features not built as a part of any other improvement type. These improvements are typically within existing ROWs, except for new rest area construction and are independent of all the highway classifications.
21 - Safety	Improvements that provide features or services to enhance safety. For example, expenditures on projects designed to improve the safety of at-grade railroad crossings, weather monitoring systems, construction of port-of-entries for the enforcement of vehicle weight regulations. These improvements are typically within existing rights-of-way, except for new port-of-entry construction. This project type is independent of all the highway classifications.
Material Sources	Sources of raw materials used in highway construction projects. Typically, material sources provide rock or gravel for use in the asphalt or concert highway surface, but may also be a source of material for use in the road base or in fill slopes. Material sources as distinguished from borrow sources are typically independent of highways and may be used for multiple projects. The raw material mined from material sources is typically processed at the mine site and then either hauled to a project area for stockpiling or stockpiled at the source site. The haul road to the site is included as part of the material source. This project type is independent of all the highway classifications.

New Construction and Roadway Relocation. Projects under this type are construction of new roads on new alignments as a new facility. Generally, projects that fall under this type are for replacement or extension of an existing road and include new bridges and acquisition of the highway right-of-way property. This project type applies to all highway classifications and each project would be constructed to the corresponding specifications (Table 2). Very few new road construction projects occur in Wyoming. Roadway relocation projects sometime occur where past or current mining activity warrants rerouting a highway. According to Appendix A, there are 7 of these types of projects proposed in the next five years (2005 to 2009).

Reconstruction with Added Capacity. Reconstruction projects involve those projects where the old or existing pavement is removed and replaced. Often the whole roadbed is removed or recycled and the road is rebuilt from the base up. Reconstruction projects with added capacity involve widening the road by adding continuous additional through lanes (e.g., two-lane highway to four-lane highway) or adding interchanges and usually include changes in the highway alignment to improve safety and accommodate the additional travel lanes. When necessary, reconstruction projects also include components such as replacement of bridge or drainage structures, improvement of interchanges, utility changes, drainage improvements, shoulder and clear zone improvements.

Reconstruction projects with added capacity often require additional right-of-way acquisition. This project type applies to two lane highways being upgraded to four lane highways: four lane primary, four lane primary with a median, and four lane interstate highways (Table 2). On an average annual basis very few added capacity projects occur. This project type usually occurs

near urban areas where traffic volumes are heaviest. According to Appendix A, there are 13 of these types of projects proposed in the next five years (2005 to 2009).

Reconstruction without Added Capacity. Reconstruction without added capacity include projects that widen travel lanes and add or widen shoulders of an existing roadway without adding through lanes or interchanges. Reconstruction projects involve removing the existing roadway and replacing it with new pavement and may include some alignment changes to improve highway safety. Projects in this type also include, when necessary, reconstructing bridge or drainage structures, utilities improvements, drainage improvements, and shoulder and clear zone improvements. Reconstruction projects without added capacity often require some additional right-of-way acquisition where alignment shifts or widening warrant. This project type applies to all highway classifications and each project would be constructed to the corresponding specifications (Table 2). Reconstruction projects without added capacity are one of the most common highway construction project types in Wyoming. According to Appendix A, there are 161 of these types of projects proposed in the next five years (2005 to 2009).

Restoration or Resurfacing. Restoration or resurfacing projects involve placement of additional or new surface material over the existing roadway or highway base. These projects include simply overlays where new surface material is added to the existing road or mill and overlays where the existing surface is ground off and a new surface put down. These projects are intended to improve serviceability and/or provide additional highway strength. In some cases, these projects include upgrading of unsafe features, resurfacing bridge decks, and other incidental work in conjunction with resurfacing (e.g., minor widening of shoulders, resurface of approaches, replacing cattle guards, striping, etc.). Resurfacing projects usually fall within the existing right-of-ways but may require some minor right-of-way acquisition. This project type applies to all highway classifications (Table 2). Restoration or resurfacing projects are one of the most common highway construction project types. According to Appendix A, there are 62 of these types of projects proposed in the next five years (2005 to 2009).

Environmental Only Projects. Environmental only projects are those that do not provide any increased level of service, improvement to the condition of facility, or safety features. Typical projects which would fall in this category would be transportation enhancements; rest area construction or modification; facilities for pedestrians and bicycles; scenic easements and/or scenic or historic sites; scenic or historic highway programs; roadside landscaping and/or scenic beautification; historic preservation; preservation of abandoned railway corridors; archaeological planning and research; mitigation of water pollution due to highway runoff; noise barriers; recreational trails; or other environmentally related feature not constructed as part of any other project type. Environmental only projects typically occur within existing right-of-ways except for some of the larger projects such as new rest area construction. This project type is independent of all highway classifications. According to Appendix A, there are 35 of these types of projects proposed in next five years (2005 to 2009).

Safety Projects. Safety projects are those that provide features or services designed to enhance safety. Typical projects which fall in this category include reconstructing railroad crossings; weather monitoring systems; traffic alert signs; port-of-entry facilities for enforcement of vehicle weight restrictions; and pedestrian crossing improvements. Safety projects typically occur within existing right-of-ways except for construction of port-of-entry facilities. This project type

is independent of all highway classifications. According to Appendix A, there are 49 of these types of projects proposed in the next five years (2005 to 2009).

Material Sources. Materials sources or pits supply the raw materials used in highway construction. Typically a material source is distinguished from a borrow source by being located off-highway or outside the right-of-way for a given highway project. Borrow sources are often located within the highway right-of-way and are typically used for fill slopes or re-contouring clear zones. Material sources may be existing or new. Existing sources are typically operating pits with on-going or seasonal mining operations. Approximately 1-2 new material sources are established in each District annually, for a total of 5 to 10 new sources over the next five years. For new sources, typical disturbance area per project is between 5-10 acres. This disturbance area includes the haul road to and from the site which is usually dirt or gravel road to the nearest public road. New material sources undergo environmental impact review which includes habitat surveys and listed species surveys, if necessary.

Material source operations typically include the following activities: clearing brush and vegetation from the site; stripping and stockpiling topsoil; stripping and stockpiling overburden material; material (gravel) extraction to variable depth. Once the material mining is complete the overburden is replaced and the site is re-contoured. Reclamation of the site includes replacing and spreading the topsoil and re-vegetation. If the contractor processes the material on site, there will be temporary power lines brought to the site to operate the processing equipment and some stockpiling of processed material may occur.

Table 2. Highway Classification Specifications

TYPE OF HIGHWAY	SPECIFICATIONS ON THE GROUND
2 Lane Primary	• 150 ft. (+/-) Right of Way • (2) 12 ft. Travel Lanes • (2) 6-8 ft. Shoulders on outside travel lanes • (2) 30 ft. Clear Zones • Variable Slope Distances
2 Lane Secondary	• 150 ft. (+/-) Right of Way • (2) 12 ft. Travel Lanes • (2) 4-8 ft. Shoulders on outside travel lanes • (2) 30 ft. Clear Zones • Variable Slope Distances
4 Lane Primary	• 150 ft. (+/-) Right of Way • (4) 12 ft. Travel Lanes • (2) 6-8 ft. Shoulders on outside travel lanes • (2) 30 ft. Clear Zones • Variable Slope Distances
4 Lane Primary with Median	• 200 ft. Right of Way • (4) 12 ft. Travel Lanes • (2) 4 ft. Shoulders on inside travel lanes • (2) 8 ft. Shoulders on outside travel lanes • (2) 30 ft. Clear Zones • Variable Slope Distances • Variable Width Median

4 Lane Interstate	• 300 ft. Right of Way • (4) 12 ft. Travel Lanes • (2) 4 ft. Shoulders on inside travel lanes • (2) 10ft. Shoulders on outside travel lanes • (4) 35 ft. Clear Zones at edges of each shoulder • Variable Slope Distances • Variable Width Median
Environmental Only projects	• Rest Areas variable; footprint approximately 10-20 acres • Bike paths (10 ft wide) approximately 1 acre per mile of length
Material Sources	• Typically a quarter of a quarter section (40 acres) is designated in the permitted area. • Haul roads variable (20 -24 ft wide) approximately 1 acre per mile of length included in the permitted 40 acre site. • Disturbed (mine) areas for individual projects variable but typically 5-10 acres per highway project which includes the haul road, processing (crusher) site, and stockpiles.

General Highway Reconstruction/Construction and Associated Activities. Generally, highway reconstruction/construction and associated activities (relocations, bridge replacements and safety and environmental only projects) may result in the following actions on the ground. For example a bridge reconstruction project might include removal of the existing bridge and replacement with culverts at the same location.

Bridge replacements are intended to improve highway safety by alleviating problems associated with the existing bridges and guardrails, address traffic concerns, upgrade stream crossings, and to meet current design and safety standards of the WYDOT. Traffic may be routed through the area by the construction and use of temporary detours around each bridge crossing. Temporary detours may consist of placing culverts in the stream adjacent to each existing bridge crossing. The detour area and construction permit area are located within the right of way and in some locations may encroach upon the riparian corridor.

Clearing and grubbing involves removing vegetation within the right-of-way. Typically this occurs during new construction or reconstruction with added capacity. Under normal highway construction projects clearing and grubbing occurs at the stake slope limits. All standards for construction follow the Standard Specifications for Road and Bridge Construction (WYDOT 2003).

In reconstruction, restoration, or resurfacing, the existing pavement is typically milled and stockpiled for use within the new pavement structure. Repairs are made in areas where the soils underlying the road are poor quality. In these areas, the unsuitable material will be excavated and replaced with suitable materials. The roadway may be widened by excavation of cut slopes and or addition of embankment fill. Roadway widening may be confined to one side, with the centerline shifted accordingly to avoid important natural or cultural features and to minimize cut-and-fill slopes along the roadside, or widening to both sides to maintain the existing roadway centerline.

For highway construction or reconstruction, dependent on road speeds and classification, standard fill slope ratios will vary from of 1:4 to 1:8. These ratio will be the design standard for the slope from the edge of the pavement to the bottom of the ditch or where the slope catches or

meets the natural terrain. This slope design is the minimum traversable and recoverable slope recommended by the American Association of State Highway and Transportation Officials and has the dual effect of reducing the need for guardrails and aiding reclamation/revegetation of the roadway shoulder. (The larger the slope ratio (1:8) the lower the fill slope, allowing for safer recovery on faster highways.)

For highway construction or reconstruction, where wildlife habitat linkages have been identified, transitions between cuts and fills will allow for wildlife crossings and will be included in the construction contract. Geogrid© reinforced earth walls may be constructed at fill side locations where steeper fill slopes minimize impacts. These walls are then vegetated. The exact location of these embankments are coordinated with biologists or other environmental disciplines.
For all highway construction or reconstruction, cut and fill slopes are developed with varying heights. Rock cuts are designed and sculpted to minimize visual impacts by producing a form and texture compatible with natural rock outcrops and cliffs. Drill holes from blasting are tested to minimize visual impacts. Excavation into stable cliffs will be made at steep angles to reduce disturbance. Some slope tops might need to be rounded back and overburden removed to reduce rockfall potential. Additionally, ditches will be deepened and widened at selected locations to catch rockfall where it is a problem. Soil slopes will be flattened (slope angle reduced) from existing cut and fill slopes, where required to reduce erosion and promote revegetation. After completion, the majority of the impacted area will be re-vegetated on the new cut and fill slopes.

For all highway construction or reconstruction, where trees must be cleared along the road edge, designs will create an irregular forest edge and preserve as many large trees on the edge of the disturbance as possible. At wildlife habitat linkage zones, aggressive revegetation efforts will be employed to re-establish suitable native (or indigenous) plant materials along newly constructed embankments to provide cover and reduce the possibility of creating a large open area that may inhibit wildlife species from crossing the roadway. The vegetation will be established at expected travel ways leading in to deeper cover or natural crossing points.

Assumptions. Because the PBA has been completed with the understanding that projects are grouped into similar types, site-specificity for each project is lost. As a result, in order to further understand what the potential affects from these highway projects are, the following assumptions have been made.

1. Where total length and width of disturbance area is described by Highway Classification specifications in Table 2, it is assumed that these descriptions are an average of the total disturbance by mile and may be narrower or wider at any given time during construction. These widened areas may include borrow sites and staging areas, bypass zones and fuel storage sites while narrowed areas may include areas where riparian functions are a concern or the full extent of the right-of-way is not needed for construction activities. In nearly every case the full right-of-way will not be impacted but for actual disturbance associated with road activities.

2. Existing borrow sources are included under discussion of highway construction in this PBO unless they are considered material source sites. Material source sites are addressed as a separate project type in this PBO. Material source sites will not be constructed within any riparian zones.

3. Where the term “minor” is used no additional habitat or affects to listed species will occur.

4. Where the cooperating federal agency requires additional analysis for listed species, their requirement will be added to the information. This new information may alter the determination made by the FHWA/WYDOT in this PBA and resultant PBO, resulting in re-initiation of section 7 consultation for a particular project.

5. Habitat requirements for the Preble's Meadow Jumping Mouse, Colorado butterfly plant and Ute's ladies-tresses overlap where the species ranges overlap.

6. No winter highway construction activities will occur where it may adversely affect the bald eagle.

7. Disturbance or habitat removal within 800 meters (0.5miles) of a bald eagle nesting or winter roost site could potentially result in an adverse affect to the bald eagle,

8. In evaluating Preble's Meadow Jumping mouse affects from habitat loss, the PBA assumed that riparian habitat occurred typically no more than 30 feet of either side of a perennial or intermittent stream. However, for the analysis in this PBO, the Service considered potential affects to PMJM hibernacula, foraging and nesting habitat all of which could potentially occur outside of this 30 foot PBA analysis zone, and based on information from Ryon (1999) and USFWS (2003) and specific site measurements, used an estimate of approximately 140 meters (400 feet) for this evaluation.

9. As discussed in the Service's memo to Mr. Galen Hesterberg, Federal Highways Administration (USFWS March 3, 2005), the PBA covers only WYDOT Projects. Federal Administration Projects that occur on other public (federal) lands are not part of this analysis under the PBA or the resultant PBO.

10. The proposed Project list identified in Appendix A is the FHWA/WYDOT's best estimate of what projects will be implemented in the next five years. The Service agrees that if timing or priority for these projects is changed that another project with the ***same effects or less*** could replace the reviewed project(s) identified in Appendix A.

11. Certain projects identified within Appendix A: (1) have already completed consultation, (2) have, or are in the process of initiating consultation with the Service (CMP-SR-W211-00(011); Hoback Junction Projects), or (3) are noted as consulting with the Service separately outside of the PBA (SCPS-0109-00(021)). These projects are not considered in the PBO.

12. Major new construction or reconstruction projects that require an EIS ***AND*** have the potential to adversely affect listed species will likely require separate analysis under section 7 of the Act unless the effects are consistent with those already described in the PBO. In addition, new construction will need to address maintenance and operation activities neither of which are addressed in the PBA. This is consistent with the statement in the Proposed action above which describes the following:

> *In addition, consultation will be re-initiated if: (1) the scope of work changes significantly so as to create potential effects to listed species or critical habitat not previously considered; or (2) new information or study reveals effects of highway projects may impact listed species in a manner not considered in this PBA.*

13. This PBO does not address the Service's responsibilities for other trust resources including wetlands, migratory birds and other trust resources. As necessary these issues will be addressed under separate correspondence.

CONSERVATION MEASURES (From the PBA, clarified for PBO)

Bald Eagle

1. Determine the location of bald eagle nests in relation to highway projects and evaluate the potential for designing the project to minimize encroachment on riparian habitat and eliminate removal of trees within 800 meters (m) of nests or roosts.

2. Projects that occur within 800 m of a bald eagle nest will be monitored consistent with the Incidental Take Permit.

Prebles' Meadow Jumping Mouse

1. To facilitate habitat connectivity, culverts within Preble's habitat will be installed in a manner that allows stream bed material to collect in the culvert and form a natural stream bed.

2. Riparian zones that may be disturbed areas within Preble's habitat will be reclaimed with riparian vegetation similar to the existing plant community to facilitate re-establishment of Preble's habitat.

3. Compliance with the NPDES permit will be maintained to minimize impacts from siltation and erosion to the aquatic ecosystem and Preble's habitat.

4. Storage, staging, and fueling of construction equipment and materials will be greater than 100 meters (>300 feet) from any riparian zones; (and) location specific erosion control measures will be installed to minimize sediment laden runoff from construction zones affecting streams and riparian areas.

Ute Ladies'-tresses Orchid

1. All projects which impact wetlands will be evaluated for suitability for Ute ladies'-tresses orchid (i.e., below 6,800 feet elevation; non-saline soils; open palustrine wetlands with no overstory; perennial water source).

2. Wetlands that may be disturbed with characteristics suitable for Ute ladies'-tresses will be surveyed prior to disturbance according to USFWS guidelines to determine presence/absence of the species.

3. Wetlands that may be disturbed that have Ute ladies'-tresses present will be reclaimed in a manner which preserves topsoil from the affected areas and utilizes it for reclamation thus preserving the seed bank, propagules, and other biological material.

Colorado Butterfly Plant

1. All projects within Platte and Laramie Counties which impact wetlands will be evaluated for suitability for Colorado butterfly plant (i.e., floodplain of a stream; open palustrine wetlands with no overstory; located in Platte or Laramie counties).

2. Riparian areas that may be disturbed with characteristics suitable for Colorado butterfly plant, will be surveyed prior to disturbance according to USFWS guidelines to determine presence/absence of the species.

3. Wetlands that may be disturbed that have Colorado butterfly plant present will be reclaimed in a manner which preserves topsoil from the affected areas and utilizes it for reclamation, thus preserving the seed bank, propagules, and other biological material.

STATUS OF THE BALD EAGLE

On February 14, 1978, the bald eagle was listed as endangered in all of the conterminous United States except Minnesota, Wisconsin, Michigan, Oregon, and Washington, where it was classified as threatened (43 F.R. 6233; USFWS 1978). The Service reclassified the bald eagle from endangered to threatened throughout its range in the lower 48 states on July, 12, 1995 (60 F.R. 36000; USFWS 1995a). The bald eagle was proposed for delisting on July 6, 1999 (64 F.R. 36454; USFWS 1999b), but at this point the proposal has not been finalized or withdrawn.

Species Description. The bald eagle is a large diurnal raptor. Adult bald eagles have a white head and tail plumage and very dark brown to black wing and body plumage. The bill and cere are bright yellow as are the lower legs and talons. This adult plumage is not usually acquired until age four. Juveniles go through a series of plumages prior to achieving the adult coloration and in some plumages the young bear a superficial resemblance to golden eagles (*Aquila chrysaetos*) with primarily brown plumage (including head and tail), bill, and eyes. The bald eagle has a wing span up to 7 and a half feet wide and weighs between 8 and 14 pounds. Females are larger than males.

Life History/Habitat Use. Present-day breeding occurs primarily in northern California, Alaska, Oregon, Washington, Minnesota, Wisconsin, Michigan, Maine, the Chesapeake Bay area, Florida, south-central Wyoming, the tri-state corner of Idaho, Montana, and Wyoming, and in parts of Canada. The Service estimated the breeding population exceeded 5,748 occupied breeding areas in 1998 (USFWS 1999).

Bald eagles are migratory and may live more than 30 years in the wild. Bald eagles are monogamous and build nests that may be reused and built upon year after year, sometimes producing nests 10 feet in diameter. Bald eagles have no more than one brood per year, laying one to three eggs. Their incubation period lasts about 35 days. The eggs are incubated by both male and female birds (Stalmaster 1987). Nestlings may out-compete siblings for food and push them out of the nest. Usually one or two eaglets are produced per pair annually. Fledglings leave the nest approximately 75 days after hatching. After the breeding season, bald eagles congregate where food is plentiful, and they may continue to roost near the nest tree.

In the western United States, bald eagles inhabit primarily riparian habitats in cottonwood groves

along streams and rivers, and in coniferous forests. Bald eagles primarily feed on fish, but also eat small mammals and carrion. In Wyoming, where water is scarce, bald eagles can be found nesting away from water sources and will often feed on carrion, including road-killed wildlife, gut piles from hunter-killed ungulates, and winter kill. They are also known to be kleptoparasitic, stealing prey from other raptors and corvids (Ehrlich et al 1988).

Nesting Habitat. Bald eagles typically nest in forested areas adjacent to large bodies of water. Nests are most often constructed in the tops of large trees (Howell 1937, Murphy 1965), but can occur on cliffs or on the ground in treeless areas (Troyer and Hensel 1965). Nest sites are usually in large trees along shorelines in relatively remote areas that are free of disturbance (USFWS 1999b). In addition to the distance to the nearest body of water, diversity, abundance, and vulnerability of prey base and the absence of human development or disturbance can influence the location of nests (Buehler 2000). In Wyoming, mature cottonwood groves found along streams and rivers are often used as bald eagle nesting habitat. Nest locations are usually located within close proximity to a food source, in areas with high visibility, and where a clear flight path to the nest is available (Herrick 1924).

Bald eagles in the Greater Yellowstone Ecosystem were flexible in their selection of nest sites, as long as a dependable food source was available in early spring (Swenson et al. 1986). If adequate prey resources were present, eagles selected the most desirable trees available (Swenson et al. 1986). Open forest structure is an important characteristic of bald eagle nesting habitat and their use of dominant forest stands with openings and edges is widely reported (Anthony et al. 1982). Bald eagle pairs will often build and maintain several alternate nests within their breeding territory, and in any given year, a new nest may be built or an old nest may be reoccupied [Greater Yellowstone Bald Eagle Working Group (GYBEWG) 1996].

For the purposes of this PBO, bald eagle nesting habitat is defined as any mature stand of conifer or cottonwood trees in association with rivers, streams, reservoirs, lakes or any significant body of water with a concentrated food source. Furthermore, the Service defines a recently active bald eagle nest as a nest which has been active within the past 5 years.

Human Disturbance. Freedom from human disturbance can be necessary to successful nesting of bald eagles. Breeding eagles are considered to be more sensitive to disturbance than non-breeding or wintering birds, and the early stages of the breeding cycle (nest repair, egg laying, and incubation) are considered the most sensitive times [Mathisen 1968, Weekes 1974, Montana Bald Eagle Working Group (MBEWG 1994), GYBEWG 1996]. Eagles are more likely to abandon a nest early in the nesting season before a bond is established or prior to hatching of young. If adults are flushed from a nest, eggs and young are most vulnerable to adverse weather conditions during the early stages of nesting. Human disturbances, however, may still be problematic later in the season and result in premature fledging (Grier 1969). Research indicates that bald eagles are sensitive to a variety of human activities. Eagle responses to human disturbance vary, and range from short term changes in behavior including temporal or spatial avoidance of the disturbance, to total reproductive failure and abandonment of breeding areas (Stalmaster and Newman 1978, MBEWG 1994, Anthony et al. 1995, GYBEWG 1996). Responses of bald eagles to human disturbance depend on the individual eagle or pair, and the type, intensity, duration, time of year, predictability, and location of human activity (Knight and Cole 1995).

Survival of individual eagles, particularly those in their first year of life, probably depends on conditions during their first wintering period. The physiological condition of adults at the beginning of each breeding season, an important factor influencing reproductive success, also is affected by how well their energy demands are met in wintering areas. Thus, the survival and recovery of nesting populations depends on the eagles having suitable locations to use throughout annual wintering period (USFWS 1983). Changes in the numbers of eagles using traditional wintering areas may be influenced by human disturbance (Fitzner and Hanson 1979). Eagles along the North Platte River in Wyoming were never observed by Reclamation biologists within the city limits of Casper, Glenrock, Douglas, or Torrington despite the presence of adequate perches along the river in these areas and the relatively dense populations of eagles four miles on either side of these towns [United States Bureau of Reclamation (USBR) 1981]. The stretches of river passing through these towns correspond to "high human activity" as described by Stalmaster and Newman (1978), and low eagle activity in such areas is in accordance with their observations. Eagles were also less likely to be observed in areas where fishermen congregated (USBR 1981). This pattern was particularly evident along the Miracle Mile section of the North Platte River between Kortes and Pathfinder Reservoirs where eagles often perched along the river when roads were snow covered and fishermen were absent, but rarely perched in the area when fishermen could access to the river. On Pathfinder Reservoir, eagles congregated on the western shore or on the Sweetwater Arm when fishermen were present along the more accessible eastern shore. However, bald eagles reportedly habituate to human disturbance, and highway traffic is among the least disturbing activities (GYBEWG 1996).

Winter Habitat. Within their winter range, bald eagles may roost singly or in small groups, but larger communal roosts are important and may predominate in many areas (Platt 1976). Communal roosting may have developed in response to distribution of foods (Ward and Zehavi 1973, Steenhof 1976, Fitzner and Hanson 1978). By congregating with other birds, an individual eagle may enhance its chances of finding unevenly distributed food resources. Communal roosts usually are located in stands of mature, old growth conifers or cottonwoods, and roosts may be several miles from feeding areas. Communal roosting also may facilitate pair bonding (Steenhof 1976). Bald eagles winter throughout the United States, but are most abundant along major river systems and large bodies of water in the mid-western states, Chesapeake Bay region, Pacific Northwestern states, and states of the intermountain west, including Wyoming, Utah, Colorado, New Mexico, and Arizona (USFWS 1983). Anderson and Patterson (1988) characterized bald eagle winter roosts in Wyoming. Twenty-three roosts were located, which contained from 1 to 24 eagles. Roosts were located on slopes with northeasterly aspects and typically in forest stands with high densities of conifers and snags. These forest stands had larger and more open trees than the surrounding forest.

Occupied bald eagle winter habitat typically contains both an abundant, readily-available food supply and one or more suitable night roost sites. The majority of wintering bald eagles are observed near open water where they feed on fish and waterfowl, often taking those that are dead, crippled, or otherwise vulnerable (Stalmaster and Associates 1990, Lingle and Krapu 1986, USFWS 1983). Freedom from human disturbance is an important component of wintering habitat (Detrich 1978, Fitzner and Hanson 1979). When suitable habitat conditions exist for winter roosts that also have limited human disturbance, wintering bald eagles will forage in terrestrial habitats for small and medium sized mammals (e.g., prairie dogs and rabbits) or will scavenge carrion, roadkill, or winter mortalities of big game and livestock (USFWS 1983). Bald eagles have generalist food preferences during winter. For example, Lingle and Krapu (1986)

reported that eagles consumed at least 50 species of fish, birds, and mammals along the North Platte and Platte Rivers during the winters of 1978-1979 and 1979-1980.

Inclement weather also is considered a major impetus for communal roosting. Roosts usually are located on the leeward sides of mountains, woodlots, or in protected canyons. Communal night roosts are used more frequently when winds are greater than 17 km/hr (Steenhof et al. 1980) or during periods of otherwise inclement weather (Anderson and Patterson 1988). Platt (1976) observed that the most protected stand on the wintering site was consistently used as a roost during severe weather. Large, live trees in sheltered areas provide a more favorable thermal environment and help minimize the energy stress encountered by wintering eagles. Freedom from human disturbance may influences site selection for communal roosts (Steenhof et al. 1980, USBR 1981, USFWS 1986, Buehler et al. 1991). Continued human disturbance of a night roost may cause eagles to abandon the area (USFWS 1983).

The number of eagles using a roost and times of arrival to and departure from the roost are influenced by temperature, precipitation, and wind conditions. During moderate weather, eagles usually leave the roost at dawn, and may ride thermal currents in the vicinity of the roost for up to a half hour before departing for feeding areas (USBR 1981). Eagles have been observed to fly over 15 miles from their feeding areas to roosting sites (Swisher 1964).

Foraging Behavior. Bald eagles typically hunt from perches or while soaring over suitable prey habitat. Prey is often taken off the wing, and includes snatching fish from surface waters, snaring waterfowl in the air, and pouncing on small mammals. When it is available, carrion is also eaten. General foraging habitats include nearly all upland and aquatic habitats that support sufficient prey species. In Wyoming, suitable general foraging habitats can include grasslands, shrublands, streams, rivers, lakes, and reservoirs. Concentrated foraging habitats are typically habitats that support high densities of prey species and that can provide a reliable source of prey for wintering bald eagles. In Wyoming, concentrated foraging habitats can include big game crucial winter ranges, ice-free water bodies that support fish and waterfowl during the winter, cattle and sheep stockyard operations, and big game roadkill.

Diurnal Perches. Diurnal perch sites serve a number of functions for bald eagles, such as vantage points for hunting, observation posts to increase vigilance against predators, locations for loafing and sunning, and night roosts. Selection of a day perch by bald eagles is determined primarily by the location of the food resource and secondarily by the visibility provided by the perch site. When available in appropriate locations and of sufficient size, trees are preferred as perches (Stalmaster and Newman 1978, Steenhof et al. 1980). Trees must be strong enough to support an eagle's weight, offer unobstructed views of potential food sources and the surrounding area, and provide for easy landing and takeoff. Preferred species possess the physical characteristics (size and growth form) and location (near open areas, proximity to a food source) required by eagles. Cottonwoods (*Populus* spp.), for example, are preferred along the Platte River in Nebraska (Vian and Bliese 1974) because of their large size and proximity to water. Approximately 90 to 95 percent of the eagles along the Nooksack River in Washington perched close to the river (Stalmaster et al. 1979). Bald eagles tend to select trees that are bordered by an open area, such as riverbanks, rangeland, cropland, creeks, or roads (Steenhof et al. 1980).

Limited disturbance from human activities may influence the distribution of perched eagles in an

area. Stalmaster and Newman (1978) reported that eagles avoided areas of "high human activity." During severe weather, continued disturbances may sufficiently stress eagles to cause them to leave the area. Continued human disturbance of a night roost may cause eagles to abandon an area (Hansen et al. 1981, Keister 1981). Diurnal perches located close to the nest are important for hunting, loafing, and monitoring the nest. Favored perches are used consistently year-after-year, are generally 100 to 200 meters (328 to 656 feet) from the nest tree, and provide an unobstructed view of the nest (Herrick 1924).

Foods. Food availability may have the greatest influence on local distribution and population sizes of bald eagles. Bald eagles congregate at locally abundant, easily exploitable food sources, and population densities fluctuate with food availability. Fish comprise a large component of the diet of eagles throughout much of its winter range, especially for those individuals that winter near watercourses and lakes (Wright 1953, Southern 1964, Ingram 1965, Fitzner and Hanson 1979). Fish comprised the bulk of the diet of eagles along the Platte and North Platte Rivers in Nebraska even though waterfowl were abundant (Vian and Bleise 1974). Further, USBR biologists documented that fish was an important winter staple of eagles along the Platte River (USBR 1981).

Waterfowl are a major component of the diet of eagles where fish are not plentiful or readily available because of ice conditions (USBR 1981). Wintering eagles in Missouri fed primarily on dead and crippled geese (*Branta canadensis*). In Nebraska, pellet analyses and observations indicated that waterfowl were a major food source, particularly on reservoirs.

Bureau of Reclamation's bald eagle studies conducted between 1978 and 1981 indicated that most wintering eagles using North Platte and Platte Rivers aquatic areas were associated with open water and waterfowl concentrations (USBR 1981). Greater than 50 percent of the feeding observations during three winters of observations were on waterfowl. Eagles observed on the ice were within 100 ft (30.5 meters) of waterfowl in 55 percent of 1109 observations. Bald eagles were observed flying over, chasing, and eating ducks, geese, and coots (*Fulica americana*). Most of the feeding observations were of ducks, and all of the roosts contained some pellets with waterfowl remains. In many instances where suitable perch trees were present nearby, eagles rested on the ice near waterfowl. Ducks and geese maintained ice-free areas in reservoirs and eagles sometimes perched on uplifting and irregularities on the ice near waterfowl.

In addition to capturing fish, ducks or geese, bald eagles will readily feed on fish and waterfowl carrion (USBR 1981). Nearly all eagles associated with carrion and 75 percent of those associated with waterfowl were immature indicating that young eagles rely heavily on easily accessible prey during winter. As less adept hunters, subadults apparently are more dependent on concentrated food resources and carrion throughout their wintering range and will congregate around abundant food sources (Sherrod et al. 1976, Schwilling 1980).

The extent of the southern migration in winter probably depends on the severity of the weather. As water sources freeze, and fish, waterfowl and carrion are no longer available to eagles, they tend to move further south in order to find more easily exploitable food sources. In Nevada, Utah, Wyoming, and portions of western Colorado, however, some bald eagle winter concentrations were not related to the existence of water but were associated with dead big game and domestic sheep (*Ovis* spp.) (Swisher 1964, Platt 1976, Anderson and Patterson 1988). Carrion supplements diets of eagles in some areas but is the primary food source in others. Deer

(*Odocoileu*s spp.) carcasses are commonly eaten (Ingram 1965, Stalmaster et al. 1979) as are those of cattle (*Bos taurus*) and sheep (Hancock 1964, Anderson and Patterson 1988). Food habits of wintering eagles within the GYE reflect the seasonal availability and abundance of food on ungulate winter ranges throughout the GYE due to winter mortality, predation, and hunting.

Studies conducted at Jackson Canyon, Wyoming between 1975 and 1977 included an analysis of prey remains and cast pellets (Lund 1978). Antelope, coyote, and waterfowl, in that order, were the most common components of pellets with some sheep, beaver (*Castor canadensis*), and raccoon (*Procyon lotor*) also identified. Although antelope and waterfowl were frequently identified from Wyoming roost castings collected in 1979 and 1980 (USBR 1981), greater then 50 percent of most pellet remains were comprised of rabbit hair and sheep wool. However, studies of raptor diets based solely on pellet contents can be highly biased. Pellet analyses for bald eagles underestimate the importance of fish in the eagle diet, because the bones and scales of fish may be completely digested and may not form pellets (Brown 1974). Thus, it is difficult to quantitatively describe food habitats of piscivorous species, such as bald eagles via pellet analyses (Jenkins 1980).

Wintering bald eagles in Wyoming generally occur in areas associated with large, ice-free water bodies and near winter concentrations of ungulates, livestock, waterfowl, and/or fish (USFWS 1986, MBEWG 1994, GYBEWG 1996). The distribution of bald eagle nesting and winter roosting areas is associated with habitat availability and amount of human disturbance. Most open habitats with sufficient prey base in Wyoming can be utilized for foraging by bald eagles. Foraging bald eagles are less sensitive to human disturbance and will tolerate more human activities in foraging habitats than they will near nesting and winter roosting areas. As a result, human activities have less of an impact to foraging bald eagles than to nesting or roosting eagles.

Nesting eagles are also dependent on reliable sources of food, especially fish and waterfowl. Primary feeding areas are large bodies of open water, and more rarely, smaller streams or ponds (Leighton et al. 1979). In the Greater Yellowstone Ecosystem (GYE), a stable food source available from early spring, appeared to be the most important factor in breeding area selection by eagles (Swenson et al. 1986). Differences in movements, breeding success, nest site selection, and nesting chronology among bald eagles in the GYE were primarily due to differences in the amount and timing of food availability (Swenson et al. 1986). During the breeding season, mammalian prey becomes less important as fish and aquatic birds become available.

Outside of the GYE, nesting eagles appear to rely on a greater variety of foods. Bald eagles in Maine preyed upon or ate carrion of at least 64 species of vertebrates and 2 species of invertebrates (Todd et al. 1982). Use of carrion, rabbits, small mammals, game birds, songbirds and invertebrates also has been reported for nesting eagles elsewhere (Smith 1963, Retfalvi 1970, Lish 1975, Sherrod et al. 1976, Jenkins 1981, USBR 1981, Lingle and Krapu 1986).

Although a variety of species are eaten by eagles, fish composed 77 percent of the food item remains collected at bald eagle nests in interior Maine (Todd et al. 1982). Bald eagles nesting on offshore coastal islands fed primarily on seabirds and waterfowl. Further, fish comprised 90 percent of the diet of breeding eagles in Minnesota (Dunstan and Harper 1975), 51 percent of the breeding season diet in Washington (Retfalvi 1970), and nesting bald eagles in Ohio also fed primarily on fish (Herrick 1924).

Bald eagle prey selection is determined largely by availability. In Maine, eagles focused on the chain pickerel (*Esox niger*) spawning run in April, then on the sucker (*Catostomus* spp.) spawning run in May (Todd et al. 1982). Birds accounted for 68 and 47 percent of the diet of bald eagles in some areas of the GYE while fish made up 67 percent of the diet in other areas of the GYE in response to habitat differences and prey availability (Swenson et al. 1986). In one area of the GYE, aquatic birds comprised the majority of food taken by bald eagles later in the breeding season. However, early in the breeding season these same eagles heavily utilize cutthroat trout (*Salmo clarki*), corresponding with peak spawning activity in shallow streams. When waterfowl became more available during the postnuptial molt period, they were readily taken by eagles at that time.

Jenkins (1980) studied the home range movements and feeding activities of a pair of nesting eagles near Basin, Wyoming. Data regarding food habits were gathered through direct observation at the nest, periodic collection of pellets and food remains from and under the nest and favorite perch sites. Food items noted included carp and other fish, sheep, pheasant, and three species of waterfowl. During the early nesting season, the adult male was absent for hours before returning with food. After the increase in water flows in the Big Horn River in June, the male was absent for a few minutes before returning to the nest with food, usually a fish of unknown species. High water coincided with or was related to the apparent increase in fish availability.

Population Dynamics. It is estimated that the bald eagle population numbered 250,000 to 500,000 bald eagles in North American continent prior to the arrival of the first Europeans. Loss of prey species, hunting, pesticide use, and loss of habitat are considered among the major causes of population declines.

A bald eagle recovery plan was developed during the mid-1970's, and the Service divided the lower 48 states into 5 recovery regions. Recovery plans for each region were developed with goals and tasks for recovery. Since 1974, the number of occupied breeding areas in the lower 48 states has increased by 462 percent, and since 1990, there has been an additional 47 percent increase in bald eagle numbers (USFWS 1995a). In 1995, the bald eagle was reclassified as threatened, and has been proposed for delisting (USFWS 1999b).

In Wyoming, the bald eagle is managed in the Pacific Bald Eagle Recovery Zone (USFWS 1986). The primary objective for this area is to provide secure habitat for bald eagles within the 7-state Pacific recovery area, and to increase population levels in specific geographic areas for delisting. Management goals are to have: (1) a minimum of 800 nesting pairs in the Pacific Recovery Area, (2) an average reproductive rate of 1.0 fledged young per pair, with an average success rate per occupied site of not less than 65 percent, (3) the attainment of breeding population goals in at least 80 percent of the management zones with nesting potential, and (4) stable or increasing wintering populations.

Although eagle population investigations have revealed that both reproduction and survival are important, changes in survival rates seem to have a greater effect on populations than similar changes in reproductive rates (Grier 1980). Population models indicate that eagle populations with lower reproduction but adequate survival will perform better than populations with higher reproduction but poor survival. Winter is thought to be the critical limiting season for eagles, because adults prepare themselves for the breeding season, and all age-classes must survive

stressful environmental conditions. Therefore, maintaining and/or improving winter survival is crucial to eagle recovery (USFWS 1978, USFWS 1983).

Jenkins (1980) summarized sightings of bald eagles in Wyoming obtained from annual Audubon Christmas Bird counts from 1963-1979. Observers recorded between 5 and 176 eagles, on surveys totaling 195 to 2,805 miles in length. Bald eagles are routinely counted during mid-winter waterfowl/eagle surveys conducted by the Wyoming Game and Fish Department (WGFD). Between 1974 and 1979, biologists recorded an average of 55 bald eagles (range of 22 to 132) in the Central Flyway (that portion of Wyoming east of the Continental Divide) (Jenkins 1980). Low-level fixed-wing aircraft censuses of wintering golden eagles in east-central Wyoming (between Casper, Lusk, Mule Creek Junction and Midwest) conducted annually from 1965 until 1979 by the Service revealed between 13 and 49 bald eagles annually (average of 24) (Jenkins 1980).

According to surveys conducted by Wyoming Game and Fish (WGFD 2004), of 60 territories in Western Wyoming 50 were occupied and 46 were active as of June 2004. As of July 2005 (WGFD 2005b), an additional 4 territories had been tentatively identified although status of most of these sites is currently unknown. As of January 2004 (WGFD 2005a) in the Platte River Basin in Wyoming, there were 73 known bald eagle territories, although 4 additional sites were identified as possible or probably.

Status and Distribution. Laws protecting the bald eagle were implemented as early as 1918 with the Migratory Bird Treaty Act, the domestic law that affirms the United States' commitment to four international conventions with Canada, Japan, Mexico and Russia for the protection of shared migratory bird resources. In 1940, the Bald Eagle and Golden Eagle Protection Act was passed, which prohibits the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. Take includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. The Endangered Species Act of 1973 also offers protection to the bald eagle. On February 14, 1978, the bald eagle was listed under the Act as an endangered species throughout the lower 48 States except in Michigan, Minnesota, Wisconsin, Washington, and Oregon, where it was designated as threatened. On July 12, 1995, the Service reclassified the bald eagle from endangered to threatened throughout its range in the lower 48 states (USFWS 1995a). Most recently (July 6, 1999), the bald eagle was proposed for delisting (USFWS 1999b). The proposal has not been finalized or withdrawn to date.

The bald eagle historically ranged throughout North America except for extreme northern Alaska and Canada and central and southern Mexico. They nest from Florida to Baja California, and Labrador to the western Aleutian Islands of Alaska. Bald eagles occur year-round in Wyoming. Statewide surveys for nesting bald eagles were initiated in Wyoming in 1978 (WGFD 1996). The Wyoming population has been increasing, and in 1999, 97 bald eagle pairs produced 85 young in Wyoming (WGFD 2000). The greatest nesting concentration occurs in the Greater Yellowstone area. However, numerous other breeding pairs also occur along major drainages throughout the State (WGFD 1996).

In Wyoming, bald eagles are often not dependant on habitat attributes provided by public lands, but rather are opportunistic inhabitants that will move from area to area where conditions and food sources are most favorable. Bald eagles can be found throughout the winter in both prairie

and forested areas. Typically winter migrant bald eagles in Wyoming arrive in late winter, depending on the severity of weather conditions in their northern range.

Threats. The decline in nesting populations during the twentieth century has been attributed to habitat loss (identified as the most significant long-term threat to all bald eagle populations in the recovery area), environmental contamination, electrocution, shooting, poisoning, and trapping (USFWS 1986). These problems still exist today and continue to be of concern (N. Hartman 2002). Numerous cases of bald eagle and golden eagle poisoning have been caused by landowners unlawfully misusing pesticides and other chemicals for predator control.

By the late 1960's, the pesticide dichloro-diphenyl-trichloreothane (DDT) and its metabolites had caused widespread reproductive failures and resulted in drastic decreases in eagle numbers continent-wide (Sprunt et al. 1973, Wieneuyer et al. 1972). Other contaminants such as polychlorinated biphenyls and heavy metals including mercury and lead may contribute to increased eagle mortality in some areas. The exact impact of DDT and other contaminants on bald eagles in Wyoming is not known.

Secondary poisoning in eagles from eating lead-poisoned prey, particularly ducks and geese, was a concern identified in the early 1980's by Pattee and Hennes (1983). They reported that of 650 dead eagles, 7.2 percent probably died from lead poisoning. Their field evaluations in Missouri and Minnesota found 9-11 percent of digested eagle pellets contained lead shot. However, Lingle and Krapu (1988) found in a wintering eagle study (1978-1980) that cast pellets contained a small percentage (0.3 percent) of lead shot. Due to the use of nontoxic shot being phased in during the 1980's and now required in many areas across the nation, the potential for eagles to suffer ill-effects or death from lead shot ingestion has likely decreased.

Loss of eagle habitat continues to be the most significant long-term threat to bald eagle populations within the 7-state Pacific recovery area. Development, both urban and recreational, logging, mineral exploration and extraction, as well as others forms of human activity are adversely affecting suitable breeding, foraging and wintering habitats (USFWS 1986). The Pacific Bald Eagle Recovery Plan (USFWS 1986) identifies the cumulative long-term effects of small scale actions and individual projects, while not jeopardizing the continued existence of the species, as the single most important threat to bald eagle recovery. Increased human activity and various land developments can adversely affect the suitability of breeding and wintering habitats (Juenemann and Frenzel 1972, Lish 1975, Grubb and King 1991).

As early as 1922, researchers noted the electrocution of raptors. However, not until the 1970's did researchers become aware of the magnitude of the problem. Franson et al. [*as cited in* Avian Power Line Interaction Committee (APLIC) 1996] summarized that 12 percent of the known bald eagle mortalities resulted from electrocution. Electrocution deaths of bald eagles have been documented across the country, including Wyoming (APLIC 1996). Between 1986 and 1996, electric utility company records from across the western United States and Canada reported that 118 bald eagles and an additional 358 unidentified eagles were electrocuted (Harness 2002). Bald eagles frequently congregate in large numbers during the winter (Stalmaster 1987). In predominately treeless areas, such as the Powder River Basin of northeast Wyoming, power poles may be the only perches available to bald eagles.

STATUS OF THE PREBLE'S MEADOW JUMPING MOUSE

Preble's was listed as a threatened species on May 13, 1998 (63 F.R. 26517; USFWS 1998). This species currently has critical habitat designated under the Act. Preble's is a small rodent in the family Zapodidae and is 1 of 12 recognized subspecies of the species the meadow jumping mouse (*Zapus hudsonius*). Preble's is native only to the Rocky Mountains-Great Plains interface of eastern Colorado and southeastern Wyoming. The holotype for Preble's was first collected by E. A. Preble in 1895 and taxonomically labeled as *Z. h. campestris* in 1899. Upon review by Krutzch (1954), the Colorado and southeastern Wyoming meadow jumping mice were separated into their own distinct subspecies, *preblei*.

Species Description. Preble's is 8 to 9 inches long (its tail accounts for 60 percent of its length) with hind feet adapted for jumping. *Z. hudsonius* was described by Quimby (1951) in the following manner: "A mouse-like rodent with greatly enlarged hind feet and an exceptionally long tail. The forelegs are relatively short. The ears are somewhat conspicuous. The body is clothed in moderately long, somewhat dense hair of a rather coarse texture and several colors. The dorsal portions are marked by a broad stripe of brownish hairs many of which are tipped with black giving the region a grayish-black appearance. The sides are bright yellowish-orange, whereas the underparts and feet are white. The tail is bicolor, dark above and light below and sparsely covered with hair which is longer on the terminal part. Preble's have eight mammae which are quite prominent in lactating females. The male genitalia are inconspicuous except during the breeding season when the scrotal sac becomes enlarged. The testes enlarge and may be either abdominal, inguinal, or scrotal during this period."

The coloration of Preble's was described in more detail by Krutzsch (1954) as "color dull, back from near Clay Color to near Tawny-Olive with a mixture of black hair forming poorly defined dorsal band; sides lighter than back from near Clay Color to near Cinnamon-Buff; lateral line distinct and clear Ochraceous-Buff; belly white, sometimes faint wash of clear Ochraceous-Buff; tail bicolored, brownish to light brownish-black above, grayish-white to yellowish-white below" (capitalized color terms refer to a scientific standard, while lower case terms reflect common usage). Krutzch (1954) differentiated Preble's from *Z. h. campestris* by the following taxonomic features: "a less distinct dorsal band with fewer black tipped hairs; smaller cranial measurements; a narrower interorbital constriction; smaller, less inflated auditory bullae; narrower incisive foramina; and a more inflated frontal region than *Z. h. campestris*." Fitzgerald *et al.* (1994) describes *Z. hudsonius* as having a narrower braincase, smaller molars, a less pronounced mid-dorsal band, and smaller average total length than *Z. princeps*.

Meadow jumping mice (*Z. hudsonius*) sampled in Colorado and Wyoming range in total length from 187 to 255 millimeter (mm); tail length from 108 to 155 mm; and hindfoot length from 20 to 35 mm (Fitzgerald *et al.* 1994). Quimby (1951) noted variability in body weights for different individuals and for the same individual during different levels of activity and seasons. Body weights for 65 individuals sampled in Wyoming ranged from 14 to 40 grams.

Life History/Habitat Use. *Z. hudsonius* hibernates approximately 7 months of the year in an underground burrow that it excavates itself (Quimby 1951, Whitaker Jr. 1963). *Z. hudsonius* hibernate in dry upland sites adjacent to the riparian habitats they occupy during the summer (Clark and Stromberg 1987, Whitaker, Jr. 1972). Data on the timing of the initial breeding period and time of hibernation of Preble's have been gathered by researchers at Rocky Flats in

Colorado (PTI Environmental Services 1996). The month of May marks the beginning of the active period for Preble's; with May 5 the earliest capture date at Rocky Flats. Breeding probably occurs soon after emergence. During the breeding season (June to mid-August), females typically have 2 to 3 litters of 5 to 6 young per litter (Quimby 1951, Fitzgerald *et al.* 1994). Adults begin hibernation in early September, while juveniles enter hibernation from mid-September to late October. The latest recorded date of capture of Preble's at Rocky Flats is October 27. Adults reach approximately 20 percent body fat before going into hibernation (USFWS 1998). Preble's has been shown to move a significant distance along drainages. For example, a male Preble's was recaptured 1.6 kilometers (km) (1 mile) upstream from a previous capture site and a female Preble's was captured 1.2 km (.75 mile) downstream from a previous capture site (USFWS 1998). Shenk and Sivert (1999a) found maximum movements of Preble's to be more than a mile.

Preble's constructs day nests composed of grasses, forbs, sedges, rushes, and other available plant material. Nests may be globular in shape or simply raised mats of litter, and are most commonly found above ground but can also be located below ground. Nests are typically found under debris at the base of shrubs and trees, or in open grasslands (Ryon 2001). An individual mouse can have multiple day nests in both riparian and grassland communities (Shenk and Sivert 1999a), and may abandon a nest after approximately one week of use (Ryon 2001).

Little is known about the life history of Preble's. Preble's is thought to be similar to other *Z. hudsonius* in patterns of diet, behavior, breeding and habitat utilization. In general, *Z. hudsonius* subsists on seeds, small fruits, fungi and insects (Whitaker Jr. 1972, Fitzgerald *et al.* 1994). Grass seeds are the most important part of Preble's diet, but more invertebrates are eaten in the spring as mice emerge from hibernation (Young 2001). It has been speculated that Preble's may need an open water source to fulfill dietary requirements. Shenk and Sivert (1999b) noted the use of both perennial and intermittent tributaries adjacent to capture sites. Preble's is adapted for digging; creates nests of grasses, leaves, and woody material several centimeters below the ground; and is primarily nocturnal or crepuscular, but can be observed during daylight.

Population Dynamics. Actual population size and abundance for this species is not known. Preble's may never have been widespread in the period since western settlement. Armstrong (1972) described Preble's as poorly known in Colorado and apparently nowhere abundant. Preble's distribution is confined to eastern Colorado and southeastern Wyoming (Krutzsch 1954, Long 1965, Armstrong 1972). Once common in the tallgrass prairie of eastern Colorado, this relict of the Ice Age is now limited in its ecological and geographic distribution to scattered locations on the Colorado Piedmont (Fitzgerald *et al.* 1994). The known historical range of Preble's may represent a relict of a more southern range of *Z. hudsonius*, occupied when the climate was cooler and more damp (Fitzgerald *et al.* 1994). Preble's home range is approximately 0.2-0.9 acre (0.08 - 0.35 hectare) and may vary in response to habitat changes. Densities of Preble's are considerably variable but have been estimated at between 3 and 6 mice per acre (7-15 per hectare) (Fitzgerald *et al.* 1994). Patterns of capture suggest that populations may fluctuate over time at occupied sites (Shenk 1998, unpublished report).

Distribution. Records for Preble's define a range including Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Elbert, Jefferson, Larimer, and Weld Counties in Colorado; and Albany, Laramie, Platte, Goshen, and Converse Counties in Wyoming (Krutzsch 1954, Compton and Hugie 1993). In Wyoming, Preble's has been trapped from approximately 50 sites in 4 counties:

Albany, Laramie, Platte and Converse. Due to extremely limited sampling in Goshen County, the full extent of Preble's historic and present distribution is currently not known. The Service indicates potential habitat for Preble's exists in Wyoming along the 100-year floodplains of the North Platte River, Lodgepole Creek and their tributaries, as well as the tributaries of the South Platte River east of the Laramie Mountains and south of the North Platte River in Albany, Converse, Goshen, Laramie, and Platte Counties (USFWS 1999a). Recent surveys have documented numerous sites with *Zapus* spp. throughout the suspected range of Preble's in Wyoming.

While historical status in Wyoming is less clear (Garber 1995), Preble's is not currently known from its former range in Goshen and Natrona counties. Garber documented Preble's persisting at only two Wyoming sites, commented on the difficulty of capturing Preble's at these sites, and concluded that substantial additional work was needed to fully determine the status of Preble's in Wyoming.

Typical Preble's habitat is comprised of well-developed plains riparian vegetation with adjacent, undisturbed grassland communities and a nearby water source. Well-developed plains riparian vegetation typically includes a dense combination of grasses, forbs, and shrubs; a taller shrub and tree canopy may also be present (Bakeman 1997). When present, the shrub canopy is often willow (*Salix* spp.), although other shrub species, including snowberry (*Symphoricarpus* spp.), chokecherry (*Prunus virginiana*), hawthorn (*Crataegus* spp.), Gambel's oak (*Quercus gambelli*), alder (*Alnus incana*), river birch (*Betula fontinalis*), skunkbrush (*Rhus trilobata*), wild plum (*Prunus americana*), lead plant (*Amorpha fruticosa*), dogwood (*Cornus sericea*), and others may also occur (Bakeman 1997, Shenk and Eussen 1998).

Krutzsch (1954), Quimby (1951), and Armstrong (1972) agree that across its range, *Z. hudsonius* occurs mostly in low undergrowth consisting of grasses, forbs (herbaceous plants other than grasses), or both, in open wet meadows and riparian corridors, or where tall shrubs and low trees provide adequate cover. In addition, *Z. hudsonius* prefers lowlands with medium to high moisture over drier uplands. Whitaker Jr. (1972) concluded that *Z. hudsonius* avoids the sparse vegetation that is generally associated with low moisture habitats. Fitzgerald *et al.* (1994) described *Z. hudsonius* as most common in wooded areas. Tester *et al.* (1993) suggested that proximity to water may be the most important factor influencing habitat selection and utilization by *Z. hudsonius*.

Meaney *et al.* (1997) suggested that Preble's has a broader ecological tolerance than previously thought and while they require diverse vegetation and well developed cover, this can be met in a variety of circumstances. Recent captures that were exceptions to the typical habitat described include individuals found along irrigation ditches and in mesic grassy fields. Ensight Technical Services (1997) reported instances of Preble's trapped at or near sites of human alteration including ditches along roads and driveways, and wetlands adjacent to highways. Meaney *et al.* (1997) emphasized that vegetated ditches may be a significant habitat for Preble's and may also provide adequate dispersal routes.

Garber (1995) characterized capture sites along Lodgepole Creek, Albany County, Wyoming as moist areas near beaver ponds with dense sedges and *Salix* spp. Ryon (1996) suggested that where Preble's occupies habitat along intermittent streams, adjacent wet meadows and seeps may be important habitats in dry periods. Armstrong *et al.* (1997) described typical Preble's habitat as

"well-developed plains riparian vegetation with relatively undisturbed grassland and a water source in close proximity." Also noted was a preference for "dense herbaceous vegetation consisting of a variety of grasses, forbs and thick shrubs."

Preble's have rarely been trapped in uplands adjacent to riparian areas (Dharman 2001). However, in detailed studies of Preble's movement patterns using radio telemetry, Preble's has been found foraging and resting in adjacent uplands (Shenk and Sivert 1999b, Ryon 1999, Schorr 2001). These studies reveal that Preble's regularly utilizes uplands at least as far out as 100 meters (328 feet) beyond the 100-year floodplain (Ryon 1999).

Fifteen likely Preble's hibernacula (hibernation nests) have been located. Of these, one was confirmed through excavation. Nests were found between 1 and 78 meters (3 and 260 feet) from a perennial stream bed or intermittent tributary (Bakeman and Deans 1997, Shenk and Sivert 1999a, Schorr 2001). Likely hibernacula have been located under willow, chokecherry, snowberry, skunkbrush, sumac (*Rhus* spp.), clematis (*Clematis* spp.), cottonwoods (*Populus* spp.), Gambels' oak, thistle (*Cirsium* spp.), and alyssum (*Alyssum* spp.) (Shenk and Sivert 1999a). At the U.S. Air Force Academy in El Paso County, Colorado, 4 of 6 likely hibernacula found by radio telemetry were located in close proximity to coyote willow (*Salix exigua*) (Schorr 2001). One confirmed hibernaculum at the Department of Energy's Rocky Flats Environmental Technology Site in Jefferson County, Colorado, was found 9 meters (30 feet) above the stream bed, in a dense patch of chokecherry and snowberry (Bakeman and Deans 1997). This nest was constructed of leaf litter 30 centimeters (12 inches) below the surface in coarse textured soil.

Threats. Habitat loss and fragmentation resulting from human land uses have adversely impacted Preble's populations, and continue to do so. Preble's populations in Colorado and Wyoming are imperiled by ongoing and increasing urban, industrial, agricultural, ranching, and recreational development; ongoing and increasing wetland/riparian habitat destruction and/or modification; small size of known populations; and inadequacy or lack of government protection for the species and its habitats (USFWS 1998). Compton and Hugie (1993, 1994) cited human activities that have adversely impacted Preble's including conversion of grasslands to farms; livestock grazing; water development and management practices; and, residential and commercial development. Shenk (1998) linked potential threats to ecological requirements of Preble's and suggested that factors which impacted vegetation composition and structure, riparian hydrology, habitat structure, distribution, geomorphology, and animal community composition must be addressed in any conservation strategy.

Residential and commercial development, accompanied by highway and bridge construction, and instream alterations to implement flood control, directly remove Preble's habitat, or reduce, alter, fragment, and isolate habitat to the point where Preble's can no longer persist. Corn *et al.* (1995) proposed that a 100 meters (328 feet) buffer of unaltered habitat be established to protect the floodplain of Monument Creek (Colorado) from a range of human activities that might adversely affect Preble's or its habitat. Shenk and Sivert (1999b) believed the 300-foot buffer did not adequately protect much of the population. Roads, trails, or other linear developments through Preble's habitat may act as barriers to movement. Shenk (1998) suggested that on a landscape scale, maintenance of acceptable dispersal corridors linking patches of Preble's habitat may be critical to its conservation.

Predation on Preble's has always existed as a naturally occurring association between predator and prey. While evidence is scant, human development may have altered this relationship. Development may affect Preble's populations through the introduction of the house mouse and the domestic cat. Both of these species may significantly affect populations of Preble's by predation and competition (Shenk 1998). Armstrong *et al.* (1996) recommended studies be conducted on influences of the suburban environment and associated densities of species such as the striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), great horned owl (*Bubo virginianus*), and the domestic cat (*Felis catus*) on Preble's. Free-ranging domestic cats may present a problem to Preble's. Corn *et al.* (1995) recommended a 1.5 km (.9 mi) setback of housing development from Preble's habitat to exclude predation by "house cats."

Preble's, as well as other native rodents, carry parasites and diseases that may reduce vigor, curtail reproductive success, and cause death. There is no evidence whether or not any epizootic disease has caused significant impact to Preble's. While plague is regularly found in other rodent species within Preble's range, its impact to Preble's populations is not known. In addition, the tolerance of Preble's for exotic plant species is not well understood. Whether or not exotic plant species reduce Preble's persistence at a site may be due in large part to whether plants create a monoculture and replace native species. There is particular concern about the establishment of non-native species such as leafy spurge (*Euphorbia esula*) and Canada thistle (*Cirsium arvense*). Such species can form monoculture stands of vegetation, thus displacing native vegetation and reducing available Preble's habitat.

Armstrong *et al*. (1997) concluded that Preble's in this region, as elsewhere, is a habitat specialist, and that its specialized habitat is declining. Trapping surveys have provided evidence that Preble's has declined throughout portions of its range. This decline and future threats to existing Preble's populations are linked to widespread habitat alteration. The Colorado Piedmont east of the Front Range and adjacent areas of southeastern Wyoming have changed from predominantly prairie habitat intermixed with perennial and intermittent streams and associated riparian habitats, to a more agricultural and urban setting with grazing, residential, commercial, industrial, and recreational development. The Colorado Front Range urban corridor represents only about 4 percent of the State's land area but supports 80 percent of Preble's population (Wright 1993).

The apparent local extirpation of Preble's from historically occupied sites in Colorado and Wyoming, and the difficulty in finding Preble's in patches of apparently adequate but fragmented habitat isolated by human land uses, suggests a decline in populations of Preble's in recent decades. Recent trapping efforts have located Preble's populations in some areas (Douglas, El Paso, and Elbert counties, Colorado) where few or no historical records exist. However, recent trapping has also failed to produce captures at historical sites and sites with apparently suitable habitat within Preble's historic range. The Service believes that Preble's has undergone a decline in range and that populations within its remaining range have been lost.

STATUS OF THE UTE LADIES'-TRESSES

On January 17, 1992, the Service listed Ute ladies'-tresses (*Spiranthes diluvialis*) as threatened in its entire range under the Act (57 FR 2053; USFWS 1992). The Ute ladies'-tresses was first described as a species in 1984 by Dr. Charles J. Sheviak from a population discovered near

Golden, Colorado (Sheviak 1984). At the time of its listing, Ute ladies'-tresses was known from 11 populations occurring in Colorado, Utah, and Nevada. Critical habitat has not been designated at this time. To date, no recovery plan has been approved for this species. However, a draft recovery plan has been written (USFWS 1995b).

Species Description. Ute ladies'-tresses is a perennial, terrestrial orchid with stems 20 to 50 centimeters (cm) tall arising from tuberously thickened roots measuring up to 1 cm in diameter. It has narrow leaves about 28 cm long and 1.5 cm wide at the base of the stem and becomes reduced in size going up the stem. The flowers, in an inflorescence (flowering spike) of 3 to 30 or more flowers, are small white to ivory arranged in a spiral. The species is characterized by stout flowers that are gaping at the mouth. The sepals and petals, except for the lip, are straight, although the lateral sepals are variably oriented. These lateral sepals spread abruptly from the base of the flower and are free to the base. The rachis is densely pubescent with the longest trichomes, or hairs, 0.2 millimeters long or longer (Sipes and Tepedino 1994, USFWS 1992, 1995b).

Life History. Very little is known about the life history of Ute ladies'-tresses (USFWS 1995b). Much of what is presumed about the species' life history is drawn from knowledge of other orchids. Orchids generally have very small seeds that require symbiotic associations with mycorrhizal fungi for germination. Many species of orchids are saprophytic, underground plants that may persist for many years underground before emerging above ground. The mycorrhizal stage is reported to last 8 years in *S. spiralis* and green leaves are first produced up to 11 years after germination in that species (Wells 1967). Studies of *S. magnicamporum* in western Kansas and Nebraska report that that species may bloom as rarely as once in 20 years. The mean life expectancy of *S. spiralis* plants studied over a nine year period was calculated to be more than 50 years (USFWS 1995b).

Throughout its range, reproduction of the Ute ladies'-tresses orchid appears to be strictly sexual, with bumblebees (*Bombus* spp.) as the primary pollinators (Arditti 1992, Sheviak 1984). Flowers are protandrus (functionally male first and then female). As with other orchid species, it is thought that Ute ladies'-tresses does not reach sexual maturity for 5 to 10 years (USFWS 1995b). Each orchid fruit can have several hundred to 10,000 seeds with an average of around 2,000 (Sipes and Tepedino 1994). These seeds may be dispersed by water (Carroll 2004) or wind (Wells 1967). The flowers, seed heads, and vegetative parts of the Ute ladies'-tresses orchid are palatable and can be incidentally eaten by grazing livestock. The possibility that grazers could disperse the seeds of this species has not been evaluated. The blooming period is from early August to early September, with fruits produced in mid-August to September (Fertig 2000a). Not all individual mature Ute ladies'-tresses orchids bloom every year and some may remain dormant beneath the ground surface and not show any above ground parts for at least one growing season (Arft 1995).

Populations of Ute ladies' tresses may do well under a regime of somewhat heavy use, i.e., livestock grazing and hay mowing. Grazing may have beneficial effects to the plants, especially in early summer prior to flowering or fruit production (Arft 1995, Moseley 1998). Grazing may mimic the effects of flooding, fire, or other disturbances in maintaining low vegetative cover or reducing weed cover (Moseley 1998). Mowing may be beneficial by reducing competing vegetation cover, but can be detrimental if done before fruit ripen or if hay is cut too low (Arft

1995; Hazlett 1996, 1997 and 1999). Ute ladies'-tresses does not tolerate dense competition of vegetation, although a few populations are found in riparian woodlands.

The Ute ladies'-tresses orchid inhabits early successional riparian habitats such as moist stream beds, wet meadows, point bars, sand bars, abandoned stream channels, and low lying gravelly, sandy, or cobbley edges (Fertig et al. 1994, USFWS 1995b, Fertig 2000a). Ute ladies'-tresses appears to have a close affinity with floodplain areas where the water table is near the surface throughout the growing season and into early autumn. The species is found in open riparian, floodplain areas where the competing vegetation has been removed by livestock grazing, mowing or by flooding events approximately one month prior to flowering. Ute ladies'-tresses is known to grow in agricultural lands managed for grazing in the winter and hay production in spring and summer, where mowing occurs in mid-July (USFWS 1995b). The elevational range of known Ute ladies'-tresses occurrences is 1800-6800 feet (Arft and Ranker 1998), while the known Wyoming populations range from 4650-5420 feet (Fertig 2000a).

Population Dynamics. Ute ladies'-tresses population levels and viability are, at least in part, determined by habitat conditions created and maintained by natural water processes. Therefore, the significance of population size and distribution within a watershed can, at least partially, be assessed in terms of the ability of the watershed factors to perpetuate it. However, the linkages between watershed processes, habitat conditions, and Ute ladies'-tresses population response are complex and not completely understood.

The locations of populations within a watershed vary with the availability of suitable habitat. Sizes of populations fluctuate naturally. Some years not a single Ute ladies'-tresses individual appears above ground. The number of flowering adults does not give an accurate picture of population size nor tell us anything about population structure. More information is necessary regarding population viability (USFWS 1995b).

If estimated population size is based on the number of Ute ladies'-tresses flowering spikes, then populations appear to fluctuate dramatically in size from year to year (USFWS 1992). For example, the primary site for the Boulder, Colorado population contained 5,435 plants in 1986, 200 plants in 1987, 131 plants in 1988, 1,137 plants in 1989, 1,894 plants in 1990, and at least 80 plants in 1991 (USFWS 1992). This variability in apparent population size is consistent with other observations made of other orchid species.

However, Wells (1967) questioned whether apparent fluctuations in orchid numbers were (and are) accurate descriptions of the actual dynamics of the orchid populations. According to Wells (1967), the criterion adopted for judging whether the number of orchids at a site has changed or not has been the number of flowering spikes displayed at the time of visit. This may be an unsatisfactory criterion for measuring a quantitative change in population because, as has been demonstrated, plants may spend several years as vegetative rosettes or as underground tubers (as many as 11 years) with no above-ground parts. Furthermore, according to Wells (1967), the autumn ladies'-tresses orchid (*S. spiralis)* grows mainly in short grassland which is typically maintained in that condition by some kind of grazing which can damage some of the flowering spikes making a visual estimate of number based on count of flowering spikes unreliable. Arft's (1995) work on Ute ladies'-tresses supports this theory as well.

At the time of listing of Ute ladies'-tresses, most of the species' historic western populations on the Wasatch Front and in the Great Basin were believed to have been extirpated by urbanization. Most known populations contained fewer than 1,000 plants when counted in 1990 and 1991. Eastern Utah populations were also typically small in size. Local extirpations may have taken place in currently unoccupied potential habitat similar to extirpations which occurred along the Wasatch Front, the Great Basin, and certain historic populations in Colorado (USFWS 1992).

When the species was listed, the total known population size of Ute ladies'-tresses was fewer than 6,000 individuals from 11 known populations in Colorado, Utah, and Nevada (USFWS 1992). With the listing of the Ute ladies'-tresses in January 17, 1992, an increased interest in the species resulted in a subsequent increase in surveys. Since that time, additional populations have been located in Utah, Montana, Idaho, Nevada, Colorado, Nebraska, Washington, and Wyoming. In 1995, the total known population size of Ute ladies'-tresses was approximately 20,500 individuals (USFWS 1995b). Additional Ute ladies'-tresses populations have been discovered since that 1995 population estimate.

Status and Distribution. Ute ladies'-tresses was first discovered in Wyoming by the University of Wyoming, Rocky Mountain Herbarium in 1993. Formal surveys for Ute ladies'-tresses then began in Wyoming in 1994, one year after B. Ernie Nelson, manager of the Rocky Mountain Herbarium, discovered the state's first population in Goshen County. Nelson, staff from the Rocky Mountain Herbarium, and graduate students conducted general floristic surveys in southeast Wyoming, the Green River Basin, and Laramie Basin from 1994-1999, finding an additional new colony along Antelope Creek in Converse County in 1994 (Hartman and Nelson 1994). The population on Antelope Creek occurs on BLM-administered land in the Casper RMP area upstream of the Newcastle RMP area. This population has been censused several times and has remained small (11-35 plants seen during various years). The habitat there is considered marginal and the Antelope Creek population is considered the least viable of the populations within Wyoming (Fertig 2000a).

Hartman and Nelson (1994) found that populations discovered in Wyoming occurred on terraces, low slopes, and oxbows adjacent to small streams on sandy to coarse gravelly alluvium or alkaline clays in wet meadow communities (Nelson and Hartman 1995). Based on short-term observation data, the populations that they found were thought to be stable or increasing. The sites were on lands managed for livestock grazing or hay production. Current land uses at the time appeared compatible with the habitat needs of Ute ladies'-tresses orchid populations. The timing of grazing and mowing was thought to be critical for successful seed production (Fertig 2000a).

Through coordination with and cooperation from a private landowner, Don Hazlett was granted permission in 1996 to search an area along the Niobrara River in Sioux County, Nebraska. Hazlett (1996) counted several thousand Ute ladies'-tresses (Hazlett 1996). The area was previously mown in July of that year for hay and thousands of Ute ladies'-tresses were flowering in the pasture apparently flourishing from the reduced competition following the mowing and baling. The discovery was the first reported case of *S. diluvialis* in the state of Nebraska. Future plans for that area are to maintain it as a working ranch or as a youth camp/nature preserve for young people (Hazlett 1996).

Walter Fertig and George Jones of the Wyoming Natural Diversity Database (WYNDD) surveyed public lands in Jackson Hole and the lower Green River Basin in 1999, but did not find any new *S. diluvialis* sites. Staff of the WYNDD also conducted unsuccessful searches in the Powder River Basin, National Elk Refuge, and F.E. Warren Air Force Base from 1995-1997.

Various environmental consulting firms (e.g. ERO Resources 1994) have searched for *S. diluvialis* across the state since 1994. These efforts have not documented any new colonies (Fertig 2000a). Because of the plant's irregular flowering pattern, sites which have been surveyed in the past could still harbor populations (Fertig 2000a).

In the Newcastle Resource Management area, a survey in August 1996 for Ute ladies'-tresses discovered a population on private land along the Niobrara River in Niobrara County near the Wyoming/Nebraska border (Hazlett 1996). No populations have been discovered to date on land administered by the BLM in the Newcastle Resource Management area (BLM 2004).

Since their discovery in Wyoming, Ute ladies'-tresses populations have been located in Goshen, Converse, Laramie, and Niobrara counties of southeastern Wyoming. The Ute ladies'-tresses orchid is currently known from a small population along a tributary to Antelope Creek (a tributary to the Cheyenne River) in northwest Converse County; a population along Bear Creek in southwestern Goshen County; a population along the Niobrara River near McMaster's Reservoir in southeastern Niobrara County; and, a population along Sprager Creek in Laramie County. These populations are monitored on a limited basis and appear to be stable (USFWS 2002b).

However, surveys have yet to be conducted on all potential existing orchid habitat. The variability of Ute ladies'-tresses emerging and flowering every year, makes it difficult to effectively locate populations and inventory them. Future surveys may find populations of Ute ladies'-tresses on potential habitat that is within 50 feet of streams, rivers, and riparian areas with sandy or loamy clay soils (BLM 2004).

Threats. Urban, residential, agricultural, or recreational development within riparian or lacustrine floodplain areas could threaten Ute ladies'-tresses populations. These activities historically have likely been a primary cause of the fragmentation of populations now currently observed. There is increasing pressure for urban, residential, and recreational development in these wetland and riparian areas, especially along the Front Range of Colorado and the Wasatch Front in Utah. As these areas are typically in private ownership, and the projects are often privately funded, there is very little regulatory protection for the orchid, even though it is a Federally-listed species.

Incompatible agricultural or other land management practices could also threaten the Ute ladies'-tresses orchid. The orchid is quite tolerant of grazing and other forms of land and vegetation disturbance. However, continuous grazing during the flowering season, severe trampling and soil compaction, untimely herbicide applications, proliferation of aggressive native and exotic plant species indicative of site degradation, and practices that result in habitat alteration from grass/forb/sedge to shrub/tree dominance, can result in loss of vigor and eventual demise of the orchid and/or orchid pollinators. Many riparian and other wetland and wetland/upland habitats suffer from these impacts.

Alterations of stream hydrology could also threaten Ute ladies'-tresses. The orchid is supported by moist soil throughout the growing season, and by wet habitats that are dominated by grass/forb/sedge communities. During the past 150 years, and continuing today, water development, diversions, stream channel alterations for flood control or other purposes (including oil and gas development and mining), and changes in hydrograph have altered hydrology, floodplain geomorphology, and vegetation composition and trends. While in some streams and reaches this may have provided improved conditions for the orchid, in many cases it has resulted in the loss of suitable habitat and likely fragmentation or loss of the orchid within watersheds (USFWS 2004c). Although some BLM-authorized activities may affect stream hydrology, the BLM in the Newcastle RMP area is committed to not authorizing activities that might affect the hydrology of occupied Ute ladies'-tresses habitat.

STATUS OF COLORADO BUTTERFLY PLANT

On October 18, 2000, the Colorado butterfly plant (*Gaura neomexicana spp. coloradensis*) was designated as threatened throughout its entire range under the Act (65 FR 62302; USFWS 2000b), and on January 11, 2005, critical habitat was designated along 51 stream miles within Platte and Laramie Counties in Wyoming (70 FR 1940; USFWS 2005). It is a short-lived, perennial herb endemic to moist soils in mesic or wet meadows of floodplain areas in southeastern Wyoming, northcentral Colorado, and extreme western Nebraska. This early to mid-seral stage species occurs primarily in habitats created and maintained by streams active within their floodplains with vegetation that is relatively open and not overly dense or overgrown.

Species Description. The Colorado butterfly plant lives vegetatively for several years before bearing fruit once and then dying. It has one or a few reddish, hairy stems that are 50 to 80 centimeters (2 to 3 feet) tall. The lower leaves are lance-shaped with smooth or wavy-toothed margins and average 5 to 15 centimeters (2 to 6 inches) long, while those on the stem are smaller and reduced in number. Flowers are arranged in a branched, elongate inflorescence above the leaves. Only a few flowers are open at any one time and these are located below the rounded buds and above the mature fruits. Individual flowers are 5 to 14 millimeters (0.25 to 0.5 inch) long with four reddish sepals and four white petals that turn pink or red with age. The hard, nutlike fruits are 4-angled and have no stalk. Non-flowering plants consist of a stemless, basal rosette of oblong, hairless leaves 3 to18 centimeters (1 to 7 inches) long (Marriott 1987; Fertig 1994; Fertig et al. 1994).

Life History/Ecology. The Colorado butterfly plant occurs on subirrigated, alluvial soils on level or slightly sloping floodplains and drainage bottoms at elevations of 1,524-1,951 meters (5,000-6,400 feet). Colonies are often found in low depressions or along bends in wide, active, meandering stream channels a short distance upslope of the actual channel. The plant requires early- to mid-succession riparian habitat. It commonly occurs in communities dominated by redtop (*Agrostis stolonifera*) and Kentucky bluegrass (*Poa pratensis*) on wetter sites, and wild licorice (*Glycyrrhiza lepidota*), Flodman's thistle (*Cirsium flodmanii*), curlytop gumweed (*Grindelia squarrosa*), and smooth scouring rush (*Equisetum laevigatum*) on drier sites. Both these habitat types are usually intermediate in moisture between wet, streamside communities dominated by sedges, rushes, and cattails, and dry, upland shortgrass prairie. Typical Colorado butterfly plant habitat is open, without dense or overgrown vegetation. Coyote willow (*Salix*

exigua) and Canada thistle (*Cirsium arvense*) may become dominant in areas of Colorado butterfly plant habitat that are not periodically flooded or otherwise disturbed. The plant occurs on soils derived from conglomerates, sandstones, and tuffaceous mudstones and siltstones of the Tertiary White River, Arikaree, and Oglalla Formations (Love and Christiansen 1985). These soils are common in eastern Colorado and Wyoming.

The Colorado butterfly plant is an early successional species (although probably not a pioneer), adapted to use stream channel sites that are periodically disturbed. Historically, flooding was probably the main cause of disturbances in the plant's habitat, although wildfire and grazing by native herbivores also may have been important. Although flowering and fruiting stems may exhibit increased mortality because of these events, vegetative rosettes appear to be little affected (Mountain West Environmental Services 1985). The establishment and survival of seedlings appears to be enhanced at sites where tall and dense vegetation has been removed by some form of disturbance. In the absence of occasional disturbance, the plant's habitat can become choked out by dense growth of willows, grasses, and exotic plants, preventing new seedlings from becoming established to replace plants that have died (Floyd 1995a; Fertig 1996).

Individual populations of Colorado butterfly plant typically consist of numerous subpopulations, each with dozens to hundreds of flowering stems and rosettes. These subpopulations are often widely scattered and may be isolated by gaps of seemingly suitable habitat. It is not uncommon for subpopulations to be scattered along stream channels, with gaps of up to 4 miles between neighboring subpopulations. These gaps are probably too small to prevent the dispersal of pollinators or fruits between subpopulations, so colonies along the same stream reach should be considered part of the same population.

Population growth rates in the Colorado butterfly plant appear to be influenced by rates of seedling establishment and survival of vegetative rosettes to reproductive maturity, which may be influenced by summer precipitation (Floyd 1995a, Floyd and Ranker 1998 and various observations by Fertig 1996, 1997, 1998a, 1998b). During the drought of 1994, Floyd measured 47 percent less seedling recruitment at sample plots on F.E. Warren Air Force Base than in the preceding year (Floyd and Ranker 1998). Differences in soil moisture and vegetative cover also may influence recruitment success. Munk (1999) found that Crow Creek had soils significantly moister than Diamond Creek or the unnamed drainage, but had lower densities of Colorado butterfly plant rosettes, probably due to greater competition from forbs and shrubs. Vegetative rosette populations may be relatively stable and capable of surviving adverse climatic years when new seedling establishment is low. Therefore, episodic establishment of large seedling recruitment classes may be important for the long-term growth, replenishment, and survival of populations of this species (Floyd and Ranker 1998).

Distribution. Little is known about the historical distribution of the Colorado butterfly plant. Prior to 1984, no extensive documentation of the plants' range had been conducted. The plant was known from several historical (and presumably extirpated) locations in southeastern Wyoming and in northern Colorado, as well as from three extant populations in Laramie County in Wyoming and Weld County in Colorado. The total known population size was estimated in the low hundreds (Dorn 1979). Intensive range-wide surveys from 1984 to 1986 resulted in the discovery or relocation of more than 20 populations in Wyoming, Colorado, and Nebraska, containing approximately 20,000 flowering individuals (Marriott 1987). Additional surveys since 1992 have resulted in the discovery of additional populations in Wyoming and Colorado

(Fertig 1994; Floyd 1995b). However, other historically known populations in Wyoming and Colorado have not been relocated in recent years and may no longer be extant (Fertig 1994).

Extensive surveys were conducted during 1998 to document the status of previously known populations at 14 sites in Wyoming and Colorado (Fertig 1998b). All 14 sites supported populations of the Colorado butterfly plant. Repeated survey information led Fertig (1998b) to conclude that 10 of these populations were either relatively stable or increasing over the long-term. Fertig (1998b) estimated the entire population of this taxon to contain between 47,000 and 50,000 reproductive plants. Twelve previously known populations were not surveyed. Three of these populations were surveyed from 1989 until 1992 and were found to contain a limited number of plants. However, four populations in Colorado and five in Wyoming have not been relocated since 1986 and may be extirpated.

Surveys were conducted by the Service in 2004 during which approximately 80 percent of all habitat occupied by the Colorado butterfly plant was surveyed. Of 77 known locations at least 0.2 miles apart previously identified by Wyoming Natural Diversity Database (WYNDD), 59 locations along 94 stream miles were surveyed. A total of 17,891 reproductively mature plants were counted throughout the survey area. While 23 of the previously known 59 locations contained no plants, 23 new locations 0.2 miles apart with adult plants were identified. All plants located during the survey were within Laramie County in Wyoming and Weld County in Colorado: neither plants, nor suitable habitat, were found in Nebraska likely because of habitat deterioration associated with 5 years of continuous drought.

These 2004 survey results on both private and State land suggest that the Colorado butterfly plant occurs only in southeast Wyoming and northern Colorado, and is likely extirpated from Nebraska. Three additional populations, comprised of a total of 7,322 reproductively mature plants according to recent surveys, occur on F.E. Warren Air Force Base (Heidel 2005). Survey results suggest that two of these populations appear relatively stable or increasing, while one appears to be declining (Heidel 2005). Annual monitoring of these three populations by Wyoming Natural Diversity Database has continued for the past 18 years and is ongoing.

Threats. Of the known populations of Colorado butterfly plant, the vast majority occur on private lands managed primarily for agriculture and livestock. Haying and mowing at certain times of the year, water development, land conversion for cultivation, competition with exotic plants, non-selective use of herbicides, and loss of habitat to urban development are the main threats to these populations (Mountain West Environmental Services 1985, Marriott 1987, Fertig 1994). Because of the small, isolated nature of populations and few numbers present in many of them, the subspecies is much more susceptible to random events such as fires, insect or disease outbreaks, or other unpredictable events that could easily eliminate local populations. In nonagricultural, undeveloped areas, a significant threat to Colorado butterfly plant populations may result from natural succession of the plant community.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed State or Federal projects in the action area

that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process.

The action area is defined at 50 CFR 402 as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action". For the purposes of this consultation, the Service defines the action area to include all lands in Wyoming that state or federal highways or their right-of-ways exist on and the range of the species that may be affected by these actions. That is the action area for each species varies depending on it's range in Wyoming and the overlap of PBA actions. Table 3 is a compilation of 26 actions that resulted in adverse affects to bald eagle, Preble's Meadow Jumping Mouse , Ute ladies'-tresses and Colorado butterfly plant since listing within the action area. In total in Wyoming, 25 actions were provided incidental take permits for bald eagles and Preble's. In all 11 Preble's meadow jumping mouse individuals may have been taken through harm/harass. In addition, 6.52 acres of Preble's meadow jumping mouse habitat were permanently lost, 37.8 acres temporarily lost and 8.2 acres created. For the bald eagle 35 individuals (adults and juveniles) may have been taken through harm/harass, 3 to 10 territories affected, and 4 roosts.

TABLE 3. Previous Adverse Affect Consultation in the State of Wyoming for Ute ladies'-tresses, Prebles' Meadow Jumping Mouse, Bald Eagle, and Colorado Butterfly Plant.

NAME	AGENCY	DATE OF BO	SPECIES	AMT TAKE	TERM
Horse Creek RD Bridge Replacement (Hwy 211) ES-6-WY-04-F011, WY8141	FHWA/WYDOT	June 2004	PMJM	0.37 aces –perm loss 0.03 acres –temp loss 215 ft riparian hbtt 3 indiv. PMJM	1 yr
Wheatland-Glendo Rd Reconstruction Project ES-6-WY-04-F019, WY8250	FHWA/WYDOT	October 2004	PMJM	0.09 aces –perm loss 6.07 acres –temp loss 6 indiv. PMJM	2 yr
Powder River BO ES_6-WY-02-F006, WY6633	BLM-Buffalo FO	December 2002	BE, ULT	4 indiv BE 1 BE roost	10 yrs
Sybille Canyon SR 34 ES-6-WY-02-F010, WY5820	FHWA/WYDOT	August 2002	PMJM	4.72 acres –perm loss 5.85 acres -creation	5yrs
Antelope Gap Rd, Wheatland ES-6-WY-02-F003,WY5341	FHWA/WYDOT	May 2002	PMJM	1 acre –temp loss 0.33 acre- perm loss 215 ft riparian hbtt temp	3yrs ?
Canyon Club Develop Project ES-6-WY-02-F005,WY5301	COE/Wyoming	April 2002	BE	3 BE territories (6 Adults, 12 juvs)	2 yrs
Medicine Bow NF LRMP ES-6-WY-04-F-003, WY7696	US Forest Service	December 2003	PMJM	None- Id at Project Level	10 to 15 yrs
Pinedale FO, Snake River RMP ES-6-WY-03-F0017, WY3704	BLM	December 2003	BE	None- Id at Project Level	10 to 15 yrs
Burger Draw CBNG ES-6-WY-05-F04, WY8942	BLM	December 2004	BE	indiv BE	5 to 15 yrs
Newcastle FO, RMP ES-6-WY-04-F025, WY8796	BLM	October 2004	UTL	None- Id at Project Level	10 to 15 yrs
Big Porcupine CBNG Project ES-6-WY-04-F013, WY8085	US Forest Service	July 2004	BE	2 indiv BE	5 to 15 Yrs
Statewide BLM RMP BE Programmatic ES-6-WY-04-F002, WY7682	BLM	June 2004	BE	None –Id at Project Level	10 to 15 yrs
Cabin Creek Hwy Reconstruction Project ES-6-WY-5-F010, WY9119	FHWA/WYDOT	May 2005	BE	2 Juv BE -nest	1 year
Douglas Esterbrook RD (WY FH 29) Bridge Replacement ES-6-WY-5-F005, WY8944	FHWA/WYDOT	March 2005	PMJM	1.12 acres –perm loss 0.58 acres-temp loss 2 Indiv PMJMs	1 year

NAME	AGENCY	DATE OF BO	SPECIES	AMT TAKE	TERM
FE Warren AFB Burning Proj. ES-6-WY-01-F010, WY4648	DOD/Air Force	July 2001	PMJM, CBP	.01 acres of temp dist.	2 ½ yrs
Medicine Bow Lateral Loop ES-6-WY-01-F003, WY4352	FERC	May 25, 2001	PMJM, CBP	2.63 acres-temp loss	2 yr ?
DM&E, Railroad Powder River Expansion Proj. ES-6-WY-01-F008, WY4669	Surface Transportation Board	October 26, 2001	BE, UTL	4 indiv BE 2 BE roosting sites	Lfetime
Wyodak CB Methane Drainage Project ES-6-WY-01-F002, WY4287	BLM	March 2001	BE, UTL	No Additional take. See Wyodak Project	3 to 10 yrs
Wyodak CB Methane Project ES-6-WY-00-F017, WY3667	BLM	November 2000	BE, UTL	1 indiv BE 1 BE roosting site	3 to 10 yrs
Morton Pass Hwy SH 34 Road Reconstruction Project ES-6-WY-00-F010, WY3222	FHWA/WYDOT	June 2000	PMJM	0.34 acres –perm loss 2.35 acres -creation	3 yrs
Landfill Remedial Actions at FE Warren AFB ES-6-WY-00-F006, WY3093	DOD/Air Force	March 2000	PMJM, CBP	28 acres temp disturbed	2 years
4D for PMJM ES-6-WY-01-F001, WY3287	USFWS	November 2000	PMJM, UTL, CBP	Take elimated, none authorized	Init 5yrs -ext
Clearmont N. Reconstruction Project, SH 14/16 ES-6-WY-00-F07, WY3103	FHWA/WYDOT	February 2000	BE	2 juv BE	1 year
Douglas Pipeline Project ES-6-WY-99-F011, WYXXXX	COE	September 1999	PMJM	11,745 sq.ft. disturbed	1 year
Kennetech Windpower Project ES-6-WyY-95-F006	BLM	October 1995	BE	1 Indiv BE	30 yr ROW

Status of the Bald Eagle Within the Action Area

Because this action affects the Bald Eagle throughout its range in Wyoming, the environmental baseline (both the status of the species within the action area and the factors affecting the species environment within the action area) is much the same as the information presented above in the status of the species section.

Factors Affecting the Bald Eagle Environment Within the Action Area

The decline of nesting bald eagle populations in the lower 48 states during the last century has been attributed to several factors including habitat loss or alteration, environmental contamination, poisoning, shooting, collisions, and electrocutions. However, with the banning of DDT and the signing and enforcing of numerous protection laws, the bald eagle population is currently recovering.

Habitat loss. Habitat loss includes the physical disturbance of habitats associated with development and with human activities that can deter eagles from otherwise suitable habitats. Bald eagles are particularly sensitive to human activities near active nests and winter roosting areas. Unfamiliar or new activities near active nests can be detrimental during egg incubation and brooding periods. Disturbance can flush adults from nests and expose eggs or young to adverse weather conditions or deprivation of food, and thus decrease hatch rates and young survivability (USFWS 1995a). Human activities near active winter roosting areas may cause eagles to abandon these habitats and expend energy finding other suitable roost areas (BLM 2003). Additional energy use and added stresses can lead to general deterioration in health condition and possibly affect survivability and reproductive success. Human activities near

active nests may disrupt nesting activities or may cause nest abandonment which can comprise the reproductive potential for that breeding season (Grubb et al. 1992).

Habitat loss due to development of riparian areas for agricultural, urban, and recreational uses is another major concern for the bald eagle. Human disturbances in and around eagle habitat can also result in nest failure or abandonment of nesting, foraging, or roosting areas. Loss of habitat also occurs due to a lack of regeneration of the cottonwood trees – a preferred roost and nest tree species. Lack of cottonwood regeneration may result from livestock grazing and to a lesser extent the altering of streams and rivers for the construction of reservoirs and dams. Overbank flooding is necessary for growth of new cottonwood stands.

Disturbance. As previously stated, bald eagles prefer areas with little human disturbance for nesting and other activities (Greater Yellowstone Bald Eagle Working Group 1996), Montana Bald Eagle Working Group 1994, Anthony et al. 1982, Stalmaster and Newman 1978). Responses of bald eagles to human disturbance vary depending on the eagle individual/pair, and the type, intensity, duration, time of year, predictability, and the location of human activity (GYBEWG 1996). In one study, the distance of eagles from a water body increased as the recreational use of the water body increased (Swenson et al. 1986). All the bald eagle nests on Yellowstone Lake, Wyoming, were on the roadless south shore (Murphy 1965). The north shore is paralleled by a heavily traveled highway that permits access for a wide range of human recreational activities.

Documented causes of nest failure or abandonment include climbing to an active nest, or nearby snowmobiling, aircraft activity, logging, deer poaching, land clearing, or construction (Cunningham 1960, Weekes 1974, Dunstan and Harper 1975). Bald eagle nesting patterns also changed in response to increased human developments on the San Juan Islands in Washington (Newman et al. 1977). As shoreline development or human activity increase, nests are distributed further inland (Whitfield et al. 1974).

Contaminants. Before the use of organochlorine-based pesticides including dichloro-diphenyl-trichloroethane (DDT) was banned in the U.S. in 1972, bald eagle populations declined significantly. The use of dichloro-diphenyl-trichloroethane (DDT) and other organochlorine compounds became widespread after World War II. DDT was used as an insecticide to control mosquitoes in riparian and coastal areas. It was determined that dichlorophenyl-dichloroethylene (DDE), a breakdown product of DDT, accumulated in the fatty tissues of adult females birds, including bald eagles, impairing the release of calcium in formation of egg shells. In 1972, DDT use was banned from use in the United States after bald eagle populations plummeted due to reproductive failure caused by thin egg shells. Today, contaminants may still affect the survival and reproductive success of the bald eagle as the use of regulated pesticides and poisons still accounts for bald eagle deaths in many of the western states, where these chemicals are used to control rodent pests and coyotes (USFWS 1995a). Intentional poisoning of coyotes with carcasses baited with poison may also attract bald eagles. Residues from DDT and other compounds from both historical and present uses can still contaminate prey species and be accumulated in bald eagle tissues. In addition, lead and mercury contribute to bald eagle poisoning and mortality as well.

Long-term exposure to environmental contaminants is also a concern in the recovery of this species. Lead can poison bald eagles when they ingest prey that contains lead shot or fragments,

or where the prey has assimilated lead into its own tissues. Mercury exposure is also a concern in some parts of the country. Exposure to high levels of mercury can result in neurological problems that affect flight and other motor skills and can alter and reduce hatching success in bald eagle eggs (USFWS 1995a).

Electrocutions and collisions. Electrocutions and collisions due to power lines are another cause of eagle mortality. Collisions with vehicles pose a threat to eagles foraging on roadkills. Current research is helping to establish guidelines to create safer utility lines utilizing anti-perch devices. Approximately ten years ago, the Wyoming Department of Transportation initiated a program to remove big game carcasses from the highway in an effort to reduce the number of vehicle collisions with bald eagles that feed on carrion.

As early as 1922, researchers noted the electrocution of raptors. However, not until the 1970's did researchers become aware of the magnitude of the problem. Franson et al. (as cited in Avian Power Line Interaction Committee (APLIC) 1996) summarized that 12 percent of the known bald eagle mortalities were the result of electrocution. Electrocution deaths of bald eagles have been documented across the country including in Wyoming (APLIC 1996). Between 1986 and 1996, electric utility company records from across the western United States and Canada showed that 118 bald eagles and an additional 358 unidentified eagles were electrocuted (Harness 2002). In predominantly treeless areas, which characterizes much of Wyoming, power poles may be the only perches available to bald eagles.

Bald eagle mortality from electrocution by small distribution power poles and collision with small distribution power lines common to all oil and gas development and to a lesser extent to residential and commercial development was documented in 2000 and 2001 in Montana's Powder River and Billings Resource Management Plan project area (Schomburg 2001, USFWS 2002b). Data were collected from 303 carcasses from 1996-2001, and from 273 carcasses in 2000 and 2001, respectively. Causes of death of 23 raptor carcasses were attributed to mid-span collisions, with 21 identified golden eagles (*Aquila chrysaetos*) and 1 bald eagle (Schomburg 2001). Causes of death of 280 raptors were attributed to electrocution, with 219 identified as golden eagles, as 4 bald eagles, and 11 as either golden or bald eagles (Schomburg 2002).

Shooting. Illegal shooting still poses threats to individual bald eagles. Increased law enforcement and public awareness have reduced shooting deaths to a small fraction of the number of shooting mortalities that once occurred in the early 1900s (USFWS 1995a).

Status of the Prebles' Jumping Mouse in the Action Area

Because this action affects Preble's throughout its range in Wyoming, the environmental baseline (both the status of the species within the action area and the factors affecting the species environment within the action area) is much the same as the information presented above in the status of the species section.

In Wyoming, the Preble's meadow jumping mouse has been recently documented at approximately 40 sites in Albany, Laramie, Platte and Converse counties. Due to extremely limited sampling in Goshen County, the full extent of Preble's historic and present distribution is currently not known. Survey information from these counties found Preble's in (1) Albany

County in drainages of the Laramie Range in the eastern half of the county, including Crow Creek, Lodgepole Creek, North Laramie River, Cottonwood Creek and their tributaries, (2) Converse County in southern drainages of the North Platte River including Bed Tick Creek and La Prele Creek. Very few surveys have been conducted in this county, (3) Laramie Countyin nearly every drainage in the western half of the county where suitable habitat exists including Lone Tree Creek, Crow Creek, Horse Creek, Lodgepole Creek and Chugwater Creek. There have been no surveys conducted in the eastern half of the county, (4) Platte County in drainages of the Laramie Range in the western half of the County including Richeau Creek, South Hunton Creek and Sybille Creek. Very few surveys have been conducted in this county. Although few surveys have been conducted in Goshen County, potential habitat exists along the North Platte River, Horse Creek and Bear Creek.

Little is known regarding the size of most Preble's populations. The population size of any Preble's population is probably the result of many factors (current and historical), some of which are not apparent. Current factors influencing Preble's populations size include stream reach length, width of riparian vegetation, habitat condition, and landscape context (Pague and Grunau 2000). White and Shenk (2000) found the majority of variation in Preble's density explained by variation in shrub and tree cover.

Accurate estimation of population size requires extensive study, usually involving some sort of mark/recapture technique employed over several years. This approach has been attempted at a limited number of sites with varying densities detected between sites and between years at some sites. Throughout the range of Preble's, riparian vegetation is quite variable (quantity and quality of vegetation available to Preble's) making it difficult to extrapolate density estimates to sites other than those at which they were calculated. A rough estimate of 38 mice per stream mile is cautiously being used for recovery planning purposes by the Preble's Recovery Team.

Factors Affecting the Prebles' Jumping Mouse in the Action Area

Development and Habitat Alteration. Urban and suburban development in and adjacent to riparian areas are the primary factors affecting Preble's throughout most of its range (Pague and Grunau 2000). While development directly eliminates habitat, it can also reduce the quality of remaining habitat by increasing disturbance, reducing water quality, channelizing streams, and increasing densities of exotic predators such as Norway rats, domestic dogs, and domestic cat, as well as human-commensal predators (e.g., skunk, raccoon, red fox)(Beauvais 2000, Pague and Grunau 2000). Pague and Grunau (2000) identify habitat conversion (through housing, commercial, and industrial construction) and fragmentation of habitat and corridors (resulting from continued development) as currently problematic throughout the range of Preble's in Colorado. Development pressure in Wyoming is not as extreme as in Colorado, but portions of Laramie County (particularly along Crow, Lodgepole and Horse creeks) are being developed primarily for residential use, particularly for small ranchettes. Grunau et al. (1999) cite isolation of populations (resulting from human development, roads and other infrastructure, and hydrologic alteration that leads to drying of streams), habitat destruction (from residential development, parking lots, recreational facilities, flood control structures, roads, utility lines, and trails), and habitat degradation (resulting largely from alteration of hydrological function related to development) as a major problems for Preble's in the Monument Creek drainage of Colorado (southernmost portion of Preble's range).

Changes to Hydrology. Hydrological changes (including changes in water quantity, flow regime, groundwater level, and stream alterations such as channelization) continue to occur throughout the range of Preble's. Hydrological impairment is identified as a major concern for management of Preble's habitat in Larimer, Weld (including bank stabilization), Boulder, Jefferson, and Douglas (including a particular example of streambank hardening upstream of Castle Rock on East Plum Creek) counties in Colorado by Pague and Grunau (2000). In Wyoming, flood control projects continue to change the nature of several creeks, including Crow Creek upstream of and through Cheyenne. Diversions of water for agricultural use continue to impact Preble's habitat in areas receiving less natural flow. Sybille Creek, in Platte County, Wyoming, moves large amounts of additional water for irrigation during the growing season.

Material Extraction. Rock, sand and gravel extraction supports development and occurs throughout the range of Preble's. Pague and Grunau (2000) found such extraction a high priority concern for Preble's in Weld, Boulder, Douglas counties in Colorado.

Forage Production. Overgrazing of riparian areas reduces habitat quality for Preble's (Brown 1967, Clark and Stromberg 1987, Compton and Hugie 1993). Grazing problems may be associated with large livestock producing operations or with "pet" livestock containment on small acreages. Areas where the riparian habitat is less functional for Preble's in Colorado as a result of overgrazing include Larimer, Weld, Elbert, El Paso counties (Pague and Grunau 2000). In Wyoming, overgrazing occurs sporadically across the landscape, most often in limited areas where cattle congregate in riparian areas during winter and spring or in very small areas where livestock gain access to water year-round.

Unprotected Habitat. Most Preble's meadow jumping mouse range is privately owned with no specific conservation measures in place. Some habitat occurs on lands administered by the Air Force, Forest Service and BLM, and small parcels occur on other lands with some conservation focus (e.g., City of Boulder Open Space, private conservation easements).

Status of the Ute ladies'-tresses in the Action Area.

Because this action affects Ute ladies'-tresses throughout its range in Wyoming, the environmental baseline (both the status of the species within the action area and the factors affecting the species environment within the action area) is much the same as the information presented above in the status of the species section.

Ute ladies'-tresses is currently known from four sites in eastern Wyoming, including: a small population along a tributary to Antelope Creek (a tributary to the Cheyenne River) in northwest Converse County; a population along Bear Creek in southwestern Goshen County; a population along the Niobrara River near McMaster's Reservoir in southeastern Niobrara County; and, a population along Sprager Creek in Laramie County. These populations are monitored on a limited basis and appear to be stable. Mowing and grazing occur at two of the sites and appear to have only minor impacts on the populations.

It is likely that if large areas of suitable habitat or populations occurred near STIP projects in Wyoming, these would have been surveyed or identified already. However, that does not

preclude the possibility of smaller patches of suitable habitat or smaller populations having gone undetected to date.

Factors Affecting the Ute Ladies'-tresses Within the Action Area

Changes in Hydrology. The past and present impacts to Ute ladies'-tresses in the action area may have included increases or decreases in habitat suitability due to irrigation developments and other human-caused changes to stream hydrology. Human-caused changes to stream hydrology have taken the form of channelization of streams, construction and use of irrigation canals, water impoundment (pond) construction, increased water discharges to surface waters, and water depletions from surface waters. These activities are widespread across the Wyoming range of ULT and many historical projects exist that have changed stream hydrology.

Invasive Plants. Invasive plant species do occupy much of the Wyoming range of ULT area and herbicide use to control these invasive species has been undertaken by private citizens or performed by County Weed and Pest Districts. It has not been observed at present that any invasive plants may be adversely impacting any Ute ladies'-tresses plants within the action area, h owever it is likely that invasive plants could impede the ability of ULT to spread and reproduce.

Forage Production. Livestock grazing, haying, or mowing occur within the Wyoming range of ULT. Grazing activities on BLM-administered lands are authorized by the BLM through a permitting process. Grazing, haying and mowing activities are normally undertaken by private land owners as part of their agricultural operations. These activities may be beneficial to Ute ladies'-tresses plants through the maintenance of habitat or they may be detrimental in that these activities if not timed properly may reduce the reproductive success of individual Ute ladies'-tresses plants.

Herbivory. Another impact to Ute ladies'-tresses plants in the action area may be herbivory by wildlife. Herbivory of the flowering spikes of *S. diluvialis* by voles (Arft 1994), deer (Fertig 2000a), and moose (Moseley 1998) is frequent at some locations. Wells (1967) documented significant flowering stalk herbivory of the autumn ladies'-tresses orchid by rabbits. Arft (1994) speculated that vole herbivory could be the greatest single threat to the long-term survival of Ute ladies'-tresses at one study site. It is plausible that similar damage to Ute ladies'-tresses plants in the action area could be attributed to wildlife as well.

Status of the Colorado Butterfly Plant in the Action Are.

This action affects the Colorado butterfly plant throughout nearly all of its range (except for one population occurring in Colorado). Therefore, the environmental baseline (both the status of the species within the action area and the factors affecting the species environment within the action area) is much the same as the information presented above in the status of the species section. Within the action area , Colorado butterfly plant has recently been known from 18 sites in Wyoming (Laramie County). Several of those populations have not been surveyed for several years, were quite small when last surveyed and may, therefore, be extirpated. Extensive surveys were conducted during 1998 to document the status of previously known populations at 14 sites in Wyoming and Colorado (Fertig 1998a, 1998b). These sites were all within the area considered part of this project area. All 14 sites still supported populations of Colorado butterfly

plant. Repeated survey information led Fertig (1998a, 1998b) to conclude that 10 of these populations were either relatively stable or increasing over the long-term. Extant populations known to co-occur (or occur within fairly close proximity in the same drainage) with Preble's are found within Lone Tree Creek, Crow Creek, Horse Creek, South Fork of Bear Creek, and Little Bear Creek in Laramie County, Wyoming. Additionally, suitable habitat for both species occurs in many drainages throughout much of the range of the plant.

Two populations of Colorado butterfly plant occur on F.E. Warren Air Force Base (WAFB) near Cheyenne, Wyoming. One of the populations is large and both appear to be increasing. The Service has approved an Integrated Natural Resources Management Plan (INRMP) for WAFB. Additionally, the Air Force Base has implemented a 5-year "Conservation and Management Plan for the Colorado Butterfly Plan and Preble's Meadow Jumping ouse on F.E.Warren Air Force base as well as entered into a cooperative agreement with the Service to monitor the populations, minimize adverse effects from Air Force operations, and conduct research as appropriate.

Factors Affecting the Colorado Butterfly Plant in the Action Area

Unless otherwise noted, the following information has been taken from U.S. Fish and Wildlife Service (2000b).

Haying and mowing at certain times of the year, overgrazing, water development and flood control, urban development, indiscriminately used herbicides, and habitat degradation resulting from plant succession and noxious weed competition have adversely affected the Colorado butterfly plant and its habitat. Although many populations of Colorado butterfly plant co-occur with haying and grazing, some of the populations are adversely affected by those activities. Heavy grazing and grazing during the summer flowering period adversely affect the plant. Likewise, mowing prior to hardening of the fruit wall causes adverse effects.

Changes in Hydrology. Several flood control projects are affecting suitable habitat. Diamond, Crow, and Dry creeks in and upstream of Cheyenne are currently part of a plan to channelize and harden the streams and construct holding ponds for flood control purposes. Similar projects have occurred near Fort Collins, Colorado. Additionally, the management of water resources for domestic and commercial uses, coupled with encroaching agricultural land use, has had a tendency to channelize and isolate water resources and fragment, realign, and reduce riparian and moist lowland habitat that could otherwise serve as potential Colorado butterfly plant habitat (Compton and Hugie 1993). This has been particularly evident in areas of eastern Laramie County, Wyoming, where reaches of some streams have been completely eliminated.

Development and Habitat Alteration. Residential and urban development around the city of Cheyenne has converted areas of suitable habitat. Populations of the plant west of Cheyenne may be particularly threatened by recently approved housing developments.

Lack of Natural Disturbance. In nonagricultural, undeveloped areas, a significant problem for Colorado butterfly plant populations is habitat degradation resulting from succession of the plant community. Without periodic disturbance events, the semi-open habitats preferred by this subspecies become choked by tall and dense growth of willows, grasses, and exotic weeds (Fertig 1994). Natural disturbances, such as flooding, fire, and native ungulate grazing, were sufficient in the past to create favorable habitat conditions for the plant. However, the natural

flooding regime within the subspecies' floodplain habitat has been altered by construction of flood control structures and by irrigation and channelization practices. In the absence of such natural disturbances today, managed disturbance may be necessary to maintain and create areas of suitable habitat (Fertig 1994, 1996). However, many Federal programs, such as those administered by the USDA Natural Resources Conservation Service and the Service, focus on enhancing or protecting riparian areas by removing the types of disturbance the plant needs, increasing vegetative cover, and pushing the habitat into later successional stages. Additionally, noxious weed infestations, such as currently occurring at F.E. Warren Air Force Base, also threaten to choke out populations of Colorado butterfly plant. However, the indiscriminate use of broadleaf herbicides can severely harm Colorado butterfly plant, as was evidenced on F.E. Warren Air Force Base in 1983 when nearly half of the population was destroyed by herbicide use. Control of competing noxious weeds in areas of Colorado butterfly plant is therefore problematic.

Other impacts to the environmental baseline. Irregardless of whether the actions associated with the continued operation, use, and maintenance of highways were analyzed in the PBA, the Service is obligated, under 50 CFR 402.14, to evaluate the effects of the action (including the direct, indirect and cumulative effects), on listed species or designated critical habitat. For this reason as part of the PBO, the Service considers below the effects of continued operation, use and maintenance of existing highways on listed, proposed and experimental species.

At the level of this analysis, two major trends impact wildlife habitat and distribution. The sources of potential cumulative effect include: (1) road construction and reconstruction trends, and (2) future area growth. Many roads within the action area are being paved or reconstructed. Yellowstone National Park and Grand Teton National Park are in the process of implementing a 20-year parkwide road reconstruction plan to improve both Park's road systems. Segment 1 of U.S. 212, from the northeast entrance to YNP east to the Montana/Wyoming state line near Colter Pass, is proposed for reconstruction from 2004 to 2007. Reconstruction recently was completed on the North Fork Road from the East Entrance to YNP east to Cody, Wyoming and is currently in process on Highway 287 from Dubois to Towgotee, Snake River Canyon, Hoback junction to Daniels and many other places around the state. Reconstruction activities generally lead to a wider roadway and clear zone width and improved road surface, which may increase vehicle speeds. These changes make roads less permeable to wildlife, thereby impacting habitat connectivity. In addition, increased vehicle speeds increase the risk of vehicle collisions.

The population of communities and counties within the action area has grown about 1 percent annually over the past 10 years (Census Bureau 2001). Population growth impacts wildlife populations in several ways, most importantly by directly impacting and fragmenting habitat with new development, and by increasing traffic volumes on area roads. Increased traffic volumes are a primary impetus for reconstructing and improving roadways and are the reasons for many wildlife/user conflicts.

Studies show that 2,000 to 3,000 vehicles per day are problematic to forest carnivores, and 4,000 or more vehicles per day may have serious effects due to mortality risks and habitat fragmentation (Ruediger et al. 2000). Current and projected traffic levels for the action area are variable with numbers during "design" year exceeding 4,000 vehicles per day.

Higher traffic speeds may contribute to wildlife mortality and fragmentation (Ruediger et al. 2000). Highways with speeds ranging from 80 to 115 km/h (50 to 70 mph) were studied by Gibeau et al. (2001) as high-speed roadways with potential effects on grizzly bear movement. In a study in YNP, vehicle speed was found to be the primary factor contributing to vehicle/wildlife collisions (Gunther et al. 1998). Road design was found to be more important than posted speed limits in controlling vehicle speeds. Vehicle speeds on winding roads typically were near posted speed limits in YNP. The study also determined that about 85 percent of road kills occurred where the speed limit was greater than 75 km/h (45 mph).

There are 27,292 miles of on-system roads (state jurisdiction) in Wyoming. Twenty-five percent (6,823 miles) of those miles are state highways, including the 913 miles of Interstate. The Interstates are not federally-owned in Wyoming; they are part of the state highway system.

EFFECTS OF THE ACTION

Generally, effects from highway construction projects on wildlife and plants include those associated with the facilities (e.g., highway, trailhead) that cause land use changes or habitat loss and those associated with construction such as disturbances, disruption of behavior or movement/dispersal, and possible mortality effects. Effects may be direct effects, resulting from the action itself, or indirect effects, those caused by the proposed action and occurring later in time after the proposed action is completed. Direct impacts of the proposed action include (1) impacts to individuals as a result of loss or impacts to habitat, (2) habitat displacement or disruption of connectivity of habitat(s), as a result of human activities associated with project activities, and (3) temporary movement by individuals in response to activity associated with project activities, including noise. Indirect effects associated with the proposed action may include: (1) the loss of reproductive potential for individuals removed/lost from the population, and (2) potential disturbance to individual behavior patterns, social systems, and activity patterns and declines in foraging efficiency, reproductive potential, and/or survival. Effects may also be cumulative, which under the Act includes the overall effect of the project combined with effects from future non-federal activities that are reasonably certain to occur in the foreseeable future. Effects may also be temporary (e.g., life of the construction) or permanent (e.g., permanent losses to habitat or a permanent disturbance from a new or larger highway).

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Cumulative impacts are the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions. Past, present and foreseeable future actions might include: increasing recreational use (non-roaded and roaded, authorized and unauthorized) and development, including increased infrastructure like powerlines and increased roading and human use of these roads.

Effects to Bald Eagle from Highway Projects

Because bald eagles are highly mobile and will travel long distances to forage, they can easily occur in areas which are not necessarily considered essential habitat or critical to their survival. Important breeding habitat includes nests sites, which are used annually, and important winter habitat includes communal roost sites. The effects analysis focuses on impacts to important breeding and wintering habitat. For example, while riparian corridors may be considered breeding or wintering habitat, impacts to this habitat type will generally not affect bald eagles unless a nest or winter roost is present which may be lost, impaired in some way or subject to disturbance.

Potential Effects

Impacts to bald eagles from highway construction projects include loss of habitat (breeding and/or wintering), both temporary and permanent, and disturbance effects to nesting or wintering eagles from construction. Highway construction projects generally would not have direct impacts to bald eagles such as mortality, unless disturbance effects were severe enough to cause abandonment of a nest with young eaglets. Indirect effects from projects may include effects from water quality degradation and loss of foraging opportunities.

Habitat Loss. New construction projects; reconstruction projects, both added and no added capacity; environmental only; and safety projects, may affect bald eagles if they occur in and encroach on occupied areas. General riparian habitat loss due to a highway project is not considered an adverse effect unless it results in the loss of nesting or roosting trees or trees within an 800 meter (~0.5 mile) buffer of these.

Disturbance/Displacement

Potential disturbance effects to bald eagles could arise from all project types (Table 1) but are generally limited to breeding bald eagles. Potential disturbance effects to wintering bald eagles may also occur but because little construction occurs during the winter months, this affect is limited. For example, new construction or reconstruction projects occur primarily in the late spring, summer, and early fall periods and restoration or resurfacing projects occur almost exclusively in the summer when day time temperatures are adequate for asphalt applications. Mineral source operations however, do have the potential to adversely affect winter roost sites through disturbance as these operations may occur during the winter months. These operations clear brush and vegetation, strip and stockpile topsoil, overburden and extract material (typically gravel) from variable depths.

Bald eagle nests or roost sites within 800 meters (~0.5 mile) of a project would likely be subjected to some disturbance from heavy machinery and associated human activity. Disturbance effects may extend further than a half mile in some areas that are more open or topographically flat. For nests and roosts within 800 meters of a project, bald eagles would likely alter their normal behavior patterns due to the disturbance from the construction. As distance to a nest or roost from the construction increases, or if there are visual obstructions, disturbance effects diminish. For the basis of the PBA, nests or roosts greater than 800 meters from the construction zone are unlikely to be adversely affected. Conversely construction activities (including material source operations) *within* this distance are likely to adversely affect bald eagles.

Highway construction activities could lead to mortality of juvenile bald eagles if disturbance/displacement effects were severe enough to cause the abandonment of a nest with eggs or young eaglets. Mortality of adult bald eagles due to project construction is considered highly unlikely to occur as adult eagles are very mobile and can avoid areas with high disturbance. It is also considered unlikely that a bald eagle would be at risk of highway collision due to their mobility and the slow speeds in affect in these construction areas. Highway activities (including material source operations) that occur within 800 meters of winter roost sites may adversely affect these sites by impairing the ability of the adult birds to forage, by increasing energy expenditures due to excessive flushing and otherwise disturbing normal winter foraging behavior.

Indirect Effects

Construction of highway projects near rivers and lakes have the potential of affecting water quality through sediment runoff or fuel/oil spills. Summer resident and wintering bald eagles forage on fish and waterfowl associated with river and lake habitats. Should a project result in water quality impacts that affects fish or waterfowl availability it could affect forage for bald eagles. Due to standard measures in place designed to reduce impacts to aquatic and riparian areas (e.g., reclamation of disturbed areas; erosion control methods to prevent sediment and fuels/oil from entering water bodies, maintenance of best management practices, and compliance with the NPDES permits), these type of associated affects have been addressed and minimized.

Resident and wintering bald eagles may also forage on winter-killed or road-killed big game. Generally, road killed wildlife is not considered an important resource for bald eagles and road kills are mostly associated with vehicular use of a highway, not the project construction. Big game wintering areas often correspond with bald eagle wintering areas where they scavenge winter-killed big game. Bald eagle winter roosts and forage ability could be affected by highway construction where it occurs in the winter. However, highway project construction does not occur in the winter when it could displace wintering big game from winter range. Highway construction projects are not expected to affect the availability of winter-killed big game or the use of winter roosts.

Highway projects could occur near a bald eagle nest as the nesting season overlaps with the highway construction season. Construction projects could result in disturbance that meets the definition of harass or harm by disrupting the normal breeding, feeding, sheltering behavior to the extent that injury or death (of a nestling) occurs. Highway construction activities within 800 meters (0.5 miles) of a nest could result in mortalities to juveniles or eggs present through impaired feeding and brooding behaviors by the adults. Impaired parental attention to juveniles who are unable to thermoregulate could also result in mortalities through hypo- or hyperthermia depending upon weather conditions. Disturbance types of effects likely diminish with distance from the disturbance and if there are visual obstructions between the disturbance and the nest. They are also thought to vary depending on the nesting stage and tolerance of the individual eagles in question, specifically the youngs ability to thermoregulate, fly and self-feed. Bald eagles that nest near highways have some degree of tolerance to disturbance. However, construction activities create a different level and magnitude of disturbance over typical highway use. In cases where an active bald eagle nest occurs in line of sight and within 800 meters (~0.5 mile) of a highway project and construction takes place during the nesting season, the project is *likely to adversely affect* bald eagles.

Program Specific Effects

Based on the STIP for the next five year period, there are 3 WYDOT projects which may adversely affect bald eagles (see Appendix A). These three projects include two safety projects (one near Saratoga and Encampment in District 1, and the other in District 5 near Worland) and a reconstruction without added capacity in District 3. In addition, although the location of these sites are unknown, up to 2 new material source sites could be located within 800 meters of occupied bald eagle nests or winter roosts. The potential effects from these projects are specifically related to potential disturbance type effects or indirect effects because of highway construction activities. No removal of a bald eagle nest, trees, or roost trees will occur within 800 meters of a nest or roost. However, Project construction activities may occur within 800 meters of a nest or roost site. Prior to highway activities, FHWA/WYDOT will determine the location of bald eagle nests in relation to highway projects and design the project to minimize encroachment on riparian habitat and eliminate removal of trees used by bald eagles within 800 meters of nests or roosts. Five potential nests (along with up to two juvenile eaglets per nest) and two winter roosts may be affected by these actions. To evaluate the extent of these affects, any projects that occur within 800 m of a bald eagle nest will be monitored consistent with direction by the Service under any Incidental Take Permit.

TABLE 4. Adversely Affected Bald Eagles

PROJECT	TYPE OF PROJECT	MILES OF CONSTRUCTION	ROW SIZE	BE NEST OR TERR	DISTANCE TO NEST
STP-H-OP22-01(044)	Safety Project	16.77	150 feet	Nest	200 meters
SCP-0N10-04(067)	Reconstruction w/o Added Cap	3.59	150 feet	Nest	200 meters
NH-0N34-05(080)	Safety Project	5.1	150 feet	Nest	525 meters
Unidentified	Mineral Source	Unk. Up to 10 ac	unk	Either/Both	w/in 800 m
Unidentified	Mineral Source	Unk. Up to 10 ac	unk	Either/Both	w/in 800 m
TOTALS	5			5 nests/2 WR	

Cumulative Effects

Other private, state, or local (i.e., non-federal actions) development or land management activities may cumulatively affect bald eagles. In Wyoming, the primary concern for occupied bald eagle habitat is disturbance related effects to nesting or winter areas. For example, in Teton County where there is a high concentration of bald eagle nests, private development actions may disturb nesting pairs. Other land management actions such as grazing may indirectly affect bald eagles by reducing suitability or displacing big game from winter range which can be important food sources for winter eagles. Private development in riparian areas or actions which degrade water quality may also indirectly affect bald eagles.

In Wyoming, the primary concern for occupied bald eagle habitat is disturbance related effects to nesting or winter areas. For example, in Teton County where there is a high concentration of bald eagle nests, private development actions may disturb nesting pairs. Other land management actions such as grazing may indirectly affect bald eagles by reducing suitability or displacing big game from winter range which can be important food sources for winter eagles. In addition, bald eagles can lose roosting habitat due to the decline of riparian habitat regeneration from high grazing concentrations in these areas. Private development in riparian areas or actions which degrade water quality may also indirectly affect bald eagles. In most cases, potential cumulative

effects are considered independent of highway projects and are not expected to be significant for the life of any highway project. Highway projects do contribute to the overall effects occurring on bald eagles although generally not in a significant manner.

Additional activities that will likely occur in the action area include actions on private inholdings and private lands adjacent to the Forest. These activities include constructions of homes and development of residential subdivisions. This can reduce or fragment available bald eagle habitat and reduce its effectiveness due to human disturbance. Loss of, displacement from, or decrease in value of available habitat can occur from increased development on private lands related to both private and recreational development. With these increases in developments, there is a concurrent increase in recreational activities on both private and public lands, which can lead to increases in bald eagle/human conflicts and cumulative effects.

In addition, more and more land management actions are occurring within the State of Wyoming. These include major road reconstruction projects which may affect habitat effectiveness and foraging opportunities; campground and resort community reconstruction projects, which change the pattern of human use in areas, and potentially also decrease habitat effectiveness; and finally, continued press for development in areas of Wyoming that until fairly recently had relatively low levels of human use and occupancy. This high level of human activities in an area with increasing bald eagle populations will continue to result, on occasion direct human caused mortality typically during egg laying or later to young of the year.

Effects to Preble's Meadow Jumping Mouse. Highway projects may affect Preble's through loss of wetland and adjacent upland habitat(s), disruption of connectivity of habitat, mortality of individuals, and temporary construction related effects such as disturbance due to heavy machinery working in the area.

Habitat Loss

Reconstruction projects, with or without added capacity, may affect Preble's habitat. These projects can affect riparian habitat through temporary losses of habitat from construction and detours, and permanent losses to the new larger road or bridge. In bridge replacement projects, temporary detours are often established to allow continued traffic flow. Bridge construction itself may also require temporary habitat disturbances from construction equipment in the riparian zone. In cases where reconstruction creates a wider or larger highway or bridge, permanent habitat loss may result from the wider facility. Through the design phases, efforts can be made to minimize habitat losses by reducing clear zone slopes, using guardrail, or locating detours outside suitable habitat if possible. Material Source Operations can result in the loss of habitat if they are located in PMJM habitat. These operations clear brush and vegetation, strip and stockpile topsoil, overburden and extract material (typically gravel) from variable depths. Up to four new material sources could be located in PMJM habitat over the next five years, affecting up to forty acres of PMJM habitat over that same period. Temporary habitat losses are restored post construction and after mining is complete through the reclamation phases or through natural vegetation recovery.

Disruption of Habitat Connectivity

Highway projects may disrupt habitat connectivity if they result in a barrier to Preble's movement along the riparian corridor. It is unknown whether Preble's will move through culverts or under bridges, but it is likely that they do regularly move under bridges or cross roads

in areas where suitable habitat occurs upstream and downstream. In many cases stream side vegetation will grow under bridges creating habitat suitable as a travel corridor. New bridge or culvert construction has the potential to disrupt connectivity of habitat if it creates a patch of unsuitable habitat through which Preble's will not move. It is unknown if continuity of riparian vegetation is critical for Preble's movement or if they will venture across open areas devoid of vegetation. In cases where the existing clear zone will be extended, the potential exists for a highway project to hinder movement of Preble's along the riparian zone. Assuming the right-of-way and detour construction areas are cleared of vegetation during construction, there could also be a temporary break in habitat during the construction period. Assuming the right-of-way and detour are successfully reclaimed this impact should be temporary but will still result in an adverse affect to Preble's habitat.

In most cases, existing habitat inside the highway right-of-way is likely less suitable than areas outside the right-of-way due to previous impacts and right-of-way maintenance activities. Also, in most cases new bridge or culverts are designed to accommodate 100 year flood events and will span similar distances to the existing situations. In most cases rip rap is placed to protect bridge abutments, but there are often areas of stream bank under bridges where riparian vegetation can grow. Over time connectivity of habitat is expected to reestablish. Reclamation of disturbed areas under bridges with riparian vegetation may minimize the period during which habitat is disrupted.

Mortality

In areas where Preble's are confirmed residents, bridge and highway construction may cause direct mortality of individuals if they occur in an area of construction or excavation. This effect, while possible, is considered minimal and virtually immeasurable. Individual mice occurring above ground are believed to be mobile enough to escape construction equipment, however, they may hide in burrows where they are then at risk of being crushed. Preble's hibernate from approximately October to May. Should construction/excavation occur during this time frame, hibernating Preble's may be subject to disturbance and likely death. Additionally the extent of disturbance outside the right-of-way, where Preble's are most likely to occur and presumably be at risk, is usually limited to construction permit areas for detours, which is a small portion of the total existing suitable habitat along occupied riparian zones.

Temporary Construction Effects

Temporary construction effects from highway construction include noise, dust, and ground disturbance. Ground disturbance usually occurs within the right-of-way but may fall outside the right-of-way at construction permit areas (e.g., detour). Preble's may be affected by noise and dust near the construction areas but are believed to be mobile enough to avoid disturbances. The detour habitat disturbance is considered temporary for the life of the construction and reclamation period but may also result in potential adverse affect to Preble's and are incorporated into the analysis of habitat affected in Table 5, below.

Indirect Effects

Runoff from the highway and construction areas may affect Preble's if it affects the riparian corridor. Highway reconstruction projects with and without added capacity usually increase the area impervious to water over current conditions (i.e., a wider highway with shoulders). The amount of runoff from the highway reaching the stream is subject to topographic features but it can be expected to increase as a result of highway projects. The overall net result would be

increased flows in an affected stream, although it is expected that this would be periodic, nearly immeasurable, negligible over the long term, and have virtually no effect on the amount of Preble's habitat.

In cases where the highway crosses or parallels segments of occupied habitat, it is possible that some petroleum products from vehicular and construction traffic could enter the stream via runoff. Also, during construction, there is the potential for a fuel/oil spill or accident from construction equipment entering habitat. Project construction is not expected to directly affect the level of contaminants in the streams provided standard precautions are employed which limit the location of staging and refueling equipment and elimination of instream construction.

Program Specific Effects

Based on the STIP for the first five year period, there are 19 WYDOT projects and up to 4 mineral source sites which may adversely affect Preble's meadow jumping mouse (Appendix A; Reiterated in Table 5). This determination is based on the project occurring in Preble's range (WYDOT Districts 1 and 2) and potentially adversely affecting a riparian area or PMJM habitat. Most of the WYDOT projects are reconstruction with or without added capacity. However one is a restoration/resurfacing project and one is a safety project. These projects may result in some habitat loss, mortality, disturbance type effects or indirect effects depending on the extent of Preble's habitat in the project area. Depending on the presence of Preble's habitat in the project area these projects may have direct and indirect impacts on Preble's. To facilitate habitat connectivity, culverts within Preble's habitat will be installed in a manner that allows stream bed material to collect in the culvert and form a natural stream bed. Riparian zones that may be disturbed within Preble's habitat will be reclaimed with riparian vegetation similar to the existing plant community to facilitate re-establishment of Preble's habitat. Compliance with the NPDES permit will be maintained to minimize impacts from siltation and erosion to the aquatic ecosystem and Preble's habitat. Storage, staging, and fueling of construction equipment and materials will be greater than 100 meters (>300 feet) from any riparian zones; location specific erosion control measures will be installed to minimize sediment laden runoff from construction zones affecting streams and riparian areas.

Adverse effects from habitat loss are assumed if habitat for Preble's meadow jumping mouse is affected by highway construction activities. These activities may lead to harm or harassment as defined under the Act. According to the summary presented by the USFWS (1998), Preble's home ranges may vary from approximately 0.81 to 1.23 acres. The loss of approximately 1 acre would constitute the loss of approximately 1 Preble's home range, on average, but depending on the number of overlapping home ranges and location and amount of habitat loss by each project, it is likely that more than one Preble's home range will be affected by each action in the STIP (Appendix A). Most of the projects that will occur in Preble's habitat for the next five years are still in the planning stages and detailed plan sets showing the extent of encroachment on Preble's habitat have not been completed. However, based on the number of projects potentially affecting Preble's and information regarding riparian habitats adjacent to these highway construction projects, these types of projects are likely to adversely affect the Preble's meadow jumping mouse.

In evaluating Preble's Meadow Jumping mouse affects from habitat loss, the PBA assumed that riparian habitat occurred typically no more than 30 feet of either side of a perennial or intermittent stream. However, for the analysis in this PBO, the Service considered potential affects to Preble's hibernacula, foraging and nesting habitat all of which could potentially occur

outside of this 30 foot PBA analysis zone and based on information from Ryon (1999) and USFWS (2003) and specific site measurements used an estimate of approximately 120 meters (400 feet) for this evaluation. That is, the ROW distance (area of disturbance) was multiplied by number of riparian crossings and by the distance Preble's would be expected to be affected by the action. For this analysis, we have used 120 meters (400 feet) outward from the stream edge on both sides of the stream (total of 800 feet). According to USFWS (2003), this distance captures foraging and resting habitat adjacent to uplands and includes the alluvial floodplain, transition slopes and pertinent uplands as described by Shenk and Sivert 1999b, Ryon 1999, and Schorr 2001. These studies reveal that Preble's regularly utilizes uplands at least as far out as 100 meters (328 feet) beyond the 100-year floodplain (Ryon 1999). In order to capture the distance of the 100-year floodplain, we assumed that streams to be affected would be no greater than 4th order and thus have added 20 meters to this distance for a total of 120 meters (400 feet) of habitat affected. Under this analysis, habitat loss for the actions identified in Table 5 would be up to 100 acres of Prebles's habitat and up to 67 Preble's home ranges. Based on this, WYDOT projects identified in Table 5 are *likely to adversely affect* Preble's through habitat loss and direct take. This level of take and habitat loss are inflated because areas where projects are identified have existing paved roads with disturbed rights-of-ways and are already impacted and in most cases, are currently only marginally suitable for the Preble's. For this analysis we have determined that ROWs of 150 feet have approximately 50 feet which due to paving and existing management practices are not considered Preble's habitat for the purposes for this evaluation. Therefore ROWs of 150 feet have been reduced to 100 feet, and for the same reasons, ROWs of 300 feet have been reduced by 100 feet to 200 feet. For mineral source operations, activities will not occur directly within wetlands or riparian habitats, but may occur in Preble's habitat upland. Therefore affects for these activities have not been directly related to individual Preble's home ranges affected but to overall habitat affected. In this PBO, an analysis of the greatest potential affect to Preble's has been analyzed.

TABLE 5. Adversely Affected Preble's Meadow Jumping Mouse and Habitat

PROJECT	ADJUSTED ROW SIZE	NO. OF RIP. CROSSINGS	AFFECTED HBTT	TOTAL HBTT AFFECTED	ACREAGE AFFECTED	PMJM HR AFFECTED
ACIM-I025-03(094)	200 ft	2	800 feet	320,000 sq.ft	7.3 acres	Up to 7
STPS-0803-00(007)	100 ft	1	800 feet	80,000 sq ft	1.8 acres	Up to 2
BROS-0C07-00(081)	100 ft	1	800 feet	80,000 sq ft	1.8 acres	Up to 2
ACIM-I025-04(138)	200 ft	2	800 feet	320,000 sq.ft	7.3 acres	Up to 7
STP-0P58-01(013)	100 ft	1	800 feet	80,000 sq ft	1.8 acres	Up to 2
BROS-0C13-00(058)	100 ft	1	800 feet	80,000 sq ft	1.8 acres	Up to 2
NH-I025-03(085)	200 ft	3	800 feet	480,000 sq. ft	11 acres	Up to 11
STPS-0805-00(006)	100 ft	1	800 feet	80,000 sq ft	1.8 acres	Up to 2
BROS-I025-02(143)	200 ft	1	800 feet	160,000 sq. ft	3.7 acres	Up to 4
ACIM-I025-02(140)	200 ft	1	800 feet	160,000 sq. ft	3.7 acres	Up to 4
ACIM-I080-05(130)	200 ft	1	800 feet	160,000 sq. ft	3.7 acres	Up to 4
STP-U212CR-00(009)	100 ft	1	800 feet	80,000 sq ft	1.8 acres	Up to 2
ACSTP-CR-0C02-00(072)	100 ft	1	800 feet	80,000 sq ft	1.8 acres	Up to 2
IM-1080-05(135)	200 ft	1	800 feet	160,000 sq. ft	3.7 acres	Up to 4
IM-I025-01(153)	100 ft	1	800 feet	80,000 sq ft	1.8 acres	Up to 2
STPS-0107-00(024)	100 ft	2	800 feet	160,000 sq. ft	3.7 acres	Up to 4
STPS-0107-00(025)	100 ft	1	800 feet	80,000 sq ft	1.8 acres	Up to 2
BROS-0C02-00(078)	100 ft	1	800 feet	80,000 sq ft	1.8 acres	Up to 2
SIB-ACIM-I080-06(185)	100 ft	1	800 feet	80,000 sq ft	1.8 acres	Up to 2
Unidentified Mineral Source Sites (Up to 4)		0	Up to 40 ac		40 acres	Unknown
TOTALS		24		2,800,000 sq ft	64 acres +	Up to 67 HRs

Cumulative Effects
Other private, state, or local (i.e., non-federal actions) development or land management activities may cumulatively affect Preble's. In Wyoming, the primary concern for occupied Preble's habitat are effects of land management programs such as grazing or other agriculture practices. Little development is occurring within occupied Preble's habitat in Wyoming. Over grazing of riparian areas can degrade Preble's habitat by reducing the density of the riparian vegetation. Cultivated or native pasture agriculture can limit the width of riparian corridors due to plowing/mowing in the floodplain. In most cases, however, potential cumulative effects are considered minor in Wyoming and independent of highway projects and are not expected to be significant for the life of the project. Although highway projects do contribute to cumulative effects to Preble's in Wyoming, through these projects no known populations will be affected and through surveys new populations are likely to be located.

Effects to Ute Ladies'-tresses Orchid. Potential effects from impacting activities due to the highway STIP could result in the loss of habitat or direct damage to individual and flowering parts of Ute Ladies'-tresses plants. Damage to Ute ladies'-tresses flowering spikes may occur as equipment and personnel move along the highway construction area. Alterations or changes to stream, wetland or riparian habitats could affect the ability of the plant to reproduce, disperse through seeds, and remain functioning.

Based on the current known distribution of Ute ladies'-tresses orchid in Wyoming, WYDOT projects throughout the state will not affect the species at the ***known*** species locations. U.S. Highway 20 runs parallel to the Niobrara River in southeastern Niobrara County. This is the closest location of a WYDOT system highway to a known Ute ladies'-tresses population. However, because of the uncertainty of the species range, highway projects throughout Wyoming may adversely affect Ute ladies'-tresses orchid by impacting previously unknown populations. Potential impacts may include mortality of individual plants, loss of suitable habitat, fragmenting populations, and sedimentation or runoff. In order to address the potential unknown locations of this plant and to minimize potential affects the following conservation measures will be implemented: (1) All projects which impact wetlands will be evaluated for suitability for Ute ladies'-tresses orchid - i.e., below 6,800 feet elevation; non-saline soils; open palustrine wetlands with no overstory; perennial water source, (2) Wetlands with characteristics suitable for Ute ladies'-tresses that may be disturbed will be surveyed prior to disturbance according to USFWS guidelines to determine presence/absence of the species, and (3) Wetlands that may be disturbed that have Ute ladies'-tresses present will be reclaimed in a manner which preserves topsoil from the affected areas and utilizes it for reclamation thus preserving the seed bank, propagules, and other biological material.

<u>Mortality and Impaired Reproduction</u>
Bridge and highway construction may cause direct mortality of individuals if they occur in an area of construction or excavation. Ute ladies'-tresses is a perennial that reproduces by seed and potentially asexual reproduction though tuberous root segments. Each individual plant has the capability of producing thousands of seeds per fruit. It is unknown how long seeds may persist in the soil but it is believed that seedlings may lie dormant for up to 8 years as subterranean saprophytes living on mycorrhizal fungi or persist above ground for a few years as small leaf rosettes (Fertig 2000a). Individual plants may not flower under adverse environmental conditions or even in consecutive years. To the extent that construction limits encroach on occupied areas, all life stages - seeds, saprophytes, rosettes, flowering adults - of the plant may

be affected. Due to the clumped nature of Ute ladies'-tresses distribution, construction could affect a large percentage of an individual population. But due to the distribution of suitable habitat (floodplains bordering perennial streams below 6800 feet), it is unlikely that highway projects will substantially impact Ute ladies'-tresses. Standard construction practices that minimize impacts to riparian and wetland habitats would minimize the direct mortality (loss) of Ute ladies'-tresses plants.

Seed dispersal mechanisms of Ute ladies'-tresses are poorly known but is probably through transport by flowing water or wind. The species grows in clumped patterns suggesting that seed dispersal distances are relatively short but the scattered distribution of populations suggest seed dispersal could occur over great distances. It is unlikely that highway construction projects would fragment populations of Ute ladies'-tresses orchid above the current situation. Highway reconstruction projects and bridges themselves may create unsuitable areas for Ute ladies'-tresses to grow (e.g., due to stream channelization or shading), however, it is unlikely that they would create a barrier to seed dispersal by eliminating the dispersal mechanisms. In cases where the existing clear zone will be extended, the potential exists for a highway project to hinder natural movement of Ute ladies'-tresses along a floodplain zone by increasing the size of area which is unsuitable for plant growth.

In most cases, existing habitat inside highway right-of-ways is likely less suitable than areas outside the right-of-way due to previous impacts and right-of-way maintenance activities. Additionally, in most cases new bridge or culverts are designed to accommodate 100 year flood events (potential seed dispersal mechanism) and will span similar distances to the existing situations. Standard construction measures to minimize disturbance and impacts to riparian and wetland areas would minimize the change from existing conditions.

<u>Habitat Loss</u>
Highway projects can affect riparian wetland habitat through temporary losses of habitat from construction and detours, and permanent losses to the new larger road or bridge (e.g., toes of slopes encroaching on wetlands). In bridge replacement projects, temporary detours are often established to allow continued traffic flow. Bridge construction itself may also require temporary habitat disturbances from construction equipment in the riparian zone. In cases where reconstruction creates a wider or larger highway or bridge, permanent habitat loss can result from the wider facility requiring more space in the riparian zone. For each individual project, acreage of habitat losses can be calculated during the design phases and efforts made to minimize habitat losses by reducing clear zone slopes, installing guardrail, or locating detours outside suitable habitat if possible. Material Source Operations can result in the loss of habitat if they are located in Ute ladies'-tresses s' habitat. These operations clear brush and vegetation, strip and stockpile topsoil, overburden and extract material (typically gravel) from variable depths. Up to 10 new material sources could be located in Ute ladies'-tresses habitat over the next 5 years, affecting up to 100 acres of Ute ladies'-tresses habitat over that same period. Temporary habitat losses are restored post construction through the reclamation phases or through natural vegetation recovery. Stockpiling topsoil from riparian areas for use in reclamation conserves vegetative resources such as native seed stock and propagules. Projects such as new construction or reconstruction with added capacity or some environmental only projects which require more than minimal amounts of additional right-of-way areas and mineral source sites *are likely to adversely affect* Ute ladies'-tresses orchid through habitat loss and mortality if occupied suitable habitat is converted to highway or a mineral source site.

Indirect Effects

Runoff from the highway and construction areas may affect Ute ladies'-tresses if it affects the suitability of the wetland conditions for the plant. Highway reconstruction projects with and without added capacity usually increase the area impervious to water over current conditions (i.e., a wider highway with shoulders). The amount of runoff from the highway reaching the riparian area and associated wetlands is subject to topographic features but it can be expected to increase as a result of highway projects. The overall net result would be increased flows in an affected stream, although it is expected that this would be periodic, nearly immeasurable, negligible over the long term, and have virtually no effect on the amount of Ute ladies'-tresses habitat.

Storm runoff from highways generally contains sediments, hydrocarbons (oil, grease, fuel), litter, deicing salts and minerals, and heavy metals. In cases where the highway crosses or parallels segments of occupied habitat, it is possible that some petroleum products from vehicular and construction traffic on the highway could enter the riparian area via runoff. In the event of a construction accident occurring in or near occupied habitat, fuel/oil contamination may occur. Project construction is not expected to directly affect the level of contaminants in the riparian corridors provided standard measures are employed which limit the location of staging and refueling equipment and elimination of instream construction.

Program Specific Effects

Based on the STIP for the next five year period, and due to the uncertain distribution of the species in Wyoming, five WYDOT projects and up to ten mineral source operation sites may adversely affect Ute ladies'-tresses orchid (Appendix A: Reiterated in Table 6). Because it is believed that Ute ladies'-tresses could occur anywhere in the state below 6,800 feet elevation, this determination is based on projects throughout the state that cross riparian areas of perennial streams and potentially affect riparian wetlands. Please see the discussion under effects to Preble's for clarification on how affects to Ute ladies'-tresses were determined. As described below in Table 6, this level of potential affect and habitat loss are likely inflated because areas where projects are identified have existing paved roads with disturbed rights-of-ways and are already impacted and in most cases, are currently only marginally suitable for the Ute ladies'-tresses. For this analysis we have determined that ROWs of 150 feet have approximately 50 feet which due to paving and existing management practices are not considered Ute ladies'-tresses orchid habitat for the purposes for this evaluation. Therefore ROWs of 150 feet have been reduced to 100 feet, and for the same reasons, ROWs of 300 feet have been reduced by 100 feet to 200 feet. For projects with ROWs of 200 feet, the ROW has been reduced to 100 feet. For mineral source operations, activities will not occur directly within wetlands or riparian habitats, but may occur in Ute ladies'-tresses habitat upland. In this PBO, an analysis of the greatest potential affect to Ute ladies'-tresses orchid and it's habitat has been analyzed.

TABLE 6. Affected Ute Ladies'-tresses Habitat

PROJECT	ADJUSTED ROW SIZE	NO. OF RIP. CROSSINGS	AFFECTED HBTT	TOTAL HBTT AFFECTED	ACREAGE AFFECTED
STP-U212-00(009)	100 ft	1	800 feet	80,000 sq ft	1.8 acres
IM-I025-01(153)	100 ft	1	800 feet	80,000 sq ft	1.8 acres
NH-0N23-02(045)	100 ft	1	800 feet	80,000 sq ft	1.8 acres
STP-CR-0C22-00(033)	100 ft	1 (0.25 mile)	800 feet	80,000 sq ft	1.8 acres
NH-0N29-01(036)	200 ft	2	800 feet	320,000 sq ft	7.3 acres
Mineral Source site – unk location (10)			100 Acres	100 acres	100 acres
TOTALS		6		640,000 sq ft	14.5 acres +

Cumulative Effects

Other private, state, or local (i.e., non-federal actions) development or land management activities may cumulatively affect Ute ladies'-tresses orchid. Habitat loss and small population size were cited as the two primary threats to Ute ladies'-tresses (USFWS 1992). Ute ladies'-tresses orchid was once believed confined to a few populations in Colorado and Utah with a historical population from central Nevada. Because of the limited nature of populations, encroachment on occupied habitat from urbanization was a direct threat and believed to have caused the extirpation of several populations along the Colorado Front Range and the Utah Wasatch Front. In Wyoming, the primary concern for occupied Ute ladies'-tresses habitat is effects from land management such as grazing, pesticide/herbicide applications, and other agriculture practices. Little development is occurring within areas occupied by Ute ladies'-tresses in Wyoming. Over grazing of riparian areas may increase the suitability of areas by reducing the density of competing vegetation but may also destabilize streams creating channelization effects and reducing the amount of suitable sub-irrigated floodplain. Late season grazing may also reduce seed production within a population by eliminating flowers and fruits. Cultivated or native pasture agriculture may limit the size of suitable riparian wetlands due to plowing/mowing or pesticide applications to control grasshoppers may impact native insect pollinators all of which could affect Ute ladies'-tresses populations. In most cases, however, potential cumulative effects are considered minor in Wyoming (Fertig 2000a) and independent of highway projects and are not expected to be significant for the life of the project. Although highway projects do contribute to cumulative effects to Ute ladies'-tresses in Wyoming, through these projects no known populations will be affected and through surveys new populations are likely to be located.

Effects to Colorado Butterfly Plant. Highway projects have the potential to affect Colorado butterfly plant through mortality of individuals, loss of suitable habitat, fragmentation of populations, and sedimentation or runoff effects.

As with other plants, habitat loss and mortality for Colorado butterfly plant are closely associated because of the limited mobility/dispersal ability of plants. Suitable habitat may be present in an area but simply unoccupied because of the lack of nearby populations for dispersing seeds. Field surveys according to USFWS methods will easily verify whether a project has the potential to adversely affect Colorado butterfly plant through habitat loss or mortality. In addition, in order to minimize potential effects to this listed species the following conservation measures will be implemented with the proposed action: (1) All projects within Platte and Laramie Counties which impact wetlands will be evaluated for suitability for Colorado butterfly plant - i.e., floodplain of a stream; open palustrine wetlands with no overstory, (2) Riparian zones with

characteristics suitable for Colorado butterfly plant will be surveyed prior to disturbance according to USFWS guidelines to determine presence/absence of the species, and (3) Wetlands with Colorado butterfly plant present that are disturbed will be reclaimed in a manner which preserves topsoil from the affected areas and utilizes it for reclamation, thus preserving the seed bank, propagules, and other biological material.

Mortality and Impaired Reproduction

Bridge and highway construction may potentially cause direct mortality of Colorado butterfly plant individuals if they occur in an area of construction or excavation. To the extent that construction limits encroach on occupied areas, all life stages - seeds, rosettes, flowering adults - of the plant may be affected including reproduction. Due to the clumped nature of butterfly plant colonies, construction could affect a large percentage of a population. Standard construction practices that minimize impacts to riparian and wetland habitats would minimize the direct mortality (loss) of Colorado butterfly plants especially due to the limited distribution of suitable habitat (floodplain areas along perennial streams.

Habitat Loss

Highway projects can affect riparian habitat through temporary losses from construction and detours, and permanent losses to the new larger road or bridge (e.g., toe of slopes encroaching on floodplains). In bridge replacement projects, temporary detours are often established to allow continued traffic flow. Bridge construction itself may also require temporary habitat disturbances from construction equipment in the riparian zone. In cases where reconstruction creates a wider or larger highway or bridge, permanent habitat loss can result from the new road requiring more space in the riparian zone. More refined acreage of habitat losses can be calculated during the design phases and efforts made to minimize habitat losses by reducing clear zone slopes, installing guardrail, or locating detours outside suitable habitat if possible. . Material source operations can result in the loss of habitat if they are located in Colorado butterfly plant habitat. These operations clear brush and vegetation, strip and stockpile topsoil, overburden and extract material (typically gravel) from variable depths. Up to four new material sources could be located in Colorado butterfly plant habitat over the next five years, affecting up to forty acres of Colorado butterfly plant habitat over that same period. Temporary habitat losses are restored post construction through the reclamation phases or through natural vegetation recovery. Stockpiling topsoil from riparian areas for use in reclamation conserves vegetative resources such as native seed stock.

Population Fragmentation

It is unlikely that highway construction projects would fragment populations of Colorado butterfly plant beyond the current situation. New highway construction projects are rare and unlikely to impact Colorado butterfly plant due to the limited distribution of the species. Highway reconstruction projects and bridges themselves may create unsuitable areas for butterfly plants to grow (e.g., due to shading), however, it is unlikely that they would create a barrier to seed dispersal by eliminating the dispersal mechanisms. In cases where the existing clear zone will be extended, the potential exists for a highway project to hinder natural movement of butterfly plant along a riparian zone by increasing the size of area which is unsuitable for butterfly plant growth.

In most cases, existing habitat inside the highway right-of-way is likely less suitable than areas outside the right-of-way due to previous impacts and right-of-way maintenance activities.

Additionally, in most cases new bridge or culverts are designed to accommodate 100 year flood events (potential seed dispersal mechanism) and will span similar distances to the existing situations. Standard construction measures to minimize disturbance and impacts to riparian and wetland areas would minimize the change from existing conditions.

Indirect Effects

Runoff from the highway and construction areas may affect Colorado butterfly plant if it affects the suitability of the riparian conditions for the plant. Highway reconstruction projects with and without added capacity usually increase the area impervious to water over current conditions (i.e., a wider highway with shoulders). The amount of runoff from the highway reaching the riparian area is subject to topographic features but it can be expected to increase as a result of highway projects. The overall net result would be increased flows in an affected stream, although it is expected that this would be periodic, nearly immeasurable, negligible over the long term, and have virtually no effect on the amount of Colorado butterfly plant habitat.

In cases where the highway crosses or parallels segments of occupied habitat, it is possible that some petroleum products from vehicular and construction traffic could enter the riparian area via runoff. Storm runoff from highways generally contains sediment, oil, grease, fuel, litter, deicing salts/minerals, and heavy metals. In the event of a construction accident occurring in or near occupied habitat, fuel/oil contamination may occur. Project construction is not expected to directly affect the level of contaminants in the riparian corridor provided standard measures are employed which limit the location of staging and refueling equipment and elimination of instream construction.

Program Specific Effects

Based on the STIP for the next five year period there are two WYDOT projects and up to four material source sites which potentially may adversely affect Colorado butterfly plant (Appendix A: Reiterated in Table 7). This determination is based on the project occurring in butterfly plant range and/or potentially affecting a riparian area. Depending on the presence of butterfly plant habitat in the project area these projects may have direct and indirect adverse effects to Colorado butterfly plant. Please see the discussion under effects to Preble's for clarification on how affects to Colorado butterfly plant were determined. This level of potential affect and habitat loss are likely inflated because areas where projects are identified have existing paved roads with disturbed rights-of-ways and are already impacted and in most cases, are currently only marginally suitable for the Colorado butterfly plant. For this analysis we have determined that ROWs of 150 feet have approximately 50 feet which due to paving and existing management practices are not considered Colorado butterfly plant habitat for the purposes for this evaluation. Therefore ROWs of 150 feet have been reduced to 100 feet, and for the same reasons, ROWs of 300 feet have been reduced by 100 feet to 200 feet. For mineral source operations, activities will not occur directly within wetlands or riparian habitats, but may occur in Colorado butterfly plant habitat upland. In this PBO, an analysis of the greatest potential affect to Colorado butterfly plant and it's habitat has been analyzed. Projects that require more than minimal amounts of additional right-of-way areas *are likely to adversely affect* Colorado butterfly plant through habitat loss and mortality if occupied suitable habitat is converted to highway.

TABLE 7. Affected Colorado Butterfly Plant Habitat

PROJECT	ROW SIZE	NO. OF RIP. CROSSINGS	AFFECTED HBTT	TOTAL HBTT AFFECTED	ACREAGE AFFECTED
STP-U212-00(009)	100 ft	1	800 feet	80,000 sq ft	1.8 acres
IM-I025-01(153)	100 ft	1	800 feet	80,000 sq ft	1.8 acres
Material Source Sites-Unknown Locations (4)			40 acres		40 acres
TOTALS		2		240,000 sq ft	3.6 acres +

Cumulative Effects

Other private, state, or local (i.e., non-federal actions) development or land management activities may cumulatively affect Colorado butterfly plant. Urban development was cited as one of the primary threats to the species (USFWS 2000b). The distribution of Colorado butterfly plant once extended south along the front range to Douglas County. Populations in these areas which have experienced substantial urban growth are believed to be extirpated (Fertig 2000b). In Wyoming, the primary concerns for occupied butterfly plant habitat are effects of land management programs such as grazing, herbicide applications, and conversion of native grass floodplain to other agriculture (e.g., irrigated crops or hay meadows). Little development is occurring within occupied butterfly plant habitat in Wyoming, except potentially in areas around Cheyenne. Grazing of riparian areas may increase the suitability of areas by reducing the density of vegetation but may also destabilize streams creating channelization effects and reducing the amount of suitable sub-irrigated floodplain. Cultivated or native pasture agriculture can limit the width of riparian corridors due to plowing/mowing in the floodplain. In most cases, however, potential cumulative effects are considered minor in Wyoming (Fertig 2000b) and independent of highway projects and are not expected to be significant for the life of the project. Although highway projects do contribute to cumulative effects to Colorado butterfly plant in Wyoming, through these projects no known populations will be affected and through surveys new populations are likely to be located.

CONCLUSION

After reviewing the current status of the bald eagle, the Preble's Meadow jumping mouse, Ute ladies'-tresses and the Colorado butterfly plant, the environmental baseline for the action area, the effects of FHWA/WYDOT STIP for the next five years, and the cumulative effects, it is the Service's biological opinion that, as proposed, is not likely to jeopardize the continued existence of the bald eagle, Prebles' meadow jumping mouse, Ute ladies'-tresses, or the Colorado butterfly plant. No critical habitat for these species will be affected by the action.

The Service has reached this conclusion for bald eagles by considering the following.

1. The bald eagle has experienced significant recovery across its range since the banning of DDT. The bald eagle has been proposed for delisting as a result of its recovery.

2. Bald eagles are widely distributed throughout their breeding range, with the population estimated at 5,748 breeding pairs in 1999 (USFWS 1999b). The loss of bald eagle

juveniles would be a relatively minor impact on the population in the contiguous United States as a whole.

3. The loss of up to ten bald eaglets, as a result of STIP highway construction projects, will not result in a range-wide population decline of this species. Results of annual surveys indicate bald eagle populations within the state are increasing and have exceeded management goals since 1987. In 1999, 97 bald eagle pairs produced 85 young in Wyoming. Thus, the loss of up to ten eaglets from this program of work (STIP) as described in the PBA will have negligible effects to the recovery of bald eagles in the Pacific Recovery Zone.

The Service has reached this conclusion for Preble's by considering the following:

1. Many populations of Preble's are known throughout its range;

2. Due to the nature of riparian habitat available in the project area, Preble's likely occur within the program of work (STIP) as described in the PBA only in scattered, disjunct and potentially isolated areas; and,

3. Affects to Preble's from the actions occur in an area within existing paved roads with disturbed rights-of-ways, already impacted and in most cases, are currently only marginally suitable for the Preble's.

The Service has reached this conclusion for Ute ladies'-tresses by considering the following.

1. It appears that this species is more widespread and numerous than was previously known. At the time of listing, the total known Ute ladies'-tresses population numbered approximately 6,000 individuals. Extensive census efforts between 1991-1995 revealed that known population size was approximately 20,500 individuals. Since 1995, several new populations have been located adjacent to the action area, one of which contained several thousand individuals. Between 1992-1999, the total known population of the Ute ladies'-tresses orchid observed across its range reached over 60,000 individuals (USFWS 2004c). It is expected that new populations will continue to be discovered as not all potential habitat has been surveyed.

2. The FHWA/WYDOT is committed to implementing conservation measures to minimize potential impacts to Ute ladies'-tresses.

3. While the area for the program of work (STIP) as described in the PBA is relatively large, Projects identified under the STIP for the next five years do not include any of the three major areas of known Ute ladies'-tresses concentrations.

The Service has reached this conclusion for Colorado Butterfly plant by considering the following.

1. While not more widespread and numerous than was previously known, for the most part surveys conducted since its listing continue to locate populations in the same or adjacent areas indicating that the population is relatively stable. Surveys were conducted by the Service in 2004 during which approximately 80 percent of all habitat occupied by the Colorado butterfly plant was surveyed. Of 77 known locations at least 0.2 miles apart previously identified by Wyoming Natural Diversity Database (WYNDD), 59 locations along 94 stream miles were surveyed. A total of 17,891 reproductively mature plants were counted throughout the survey area. While 23 of the previously known 59 locations contained no plants, 23 new locations 0.2 miles apart with adult plants were identified.

2. The FHWA/WYDOT is committed to implementing conservation measures to minimize potential impacts to Colorado Butterfly plant.

3. While the project area is relatively large, Projects identified under the STIP for the next five years do not include any of the known Colorado butterfly plant concentrations.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation when it actually kills or injures listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent act or omission which creates the likelihood of injury to listed species by annoying it such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by the FHWA/WYDOT so that they become binding conditions of any grant, permit, or Allotment Management Plan (AMP) issued by the FHWA/WYDOT, as appropriate, in order for the exemption in section 7(o)(2) to apply. The FHWA/WYDOT has continuing duty to regulate the activity covered by this incidental take statement. If the FHWA/WYDOT (1) fails to assume and implement the terms and conditions or (2) fails to require permittees to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, grant, or AMP or other documents related to grazing, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA/WYDOT must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement. [50 CFR §402.14(i)(3)].

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants is provided to the extent that the Act prohibits the removal and

reduction to possession of Federally listed plants, the malicious damage of endangered plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law.

AMOUNT OR EXTENT OF TAKE

The Service anticipates the loss (incidental take) of up to ten bald eagle chicks or eggs from the nests associated with the three highway projects and potential two mineral source operation sites identified to adversely affect eagles (See Appendix A: Reiterated in Table 4). Eagles utilizing the nests adjacent to major highways are likely to have some degree of tolerance for disturbances, and nests may be screened from the vegetation, but the behavior of the adult birds may be negatively impacted enough to influence the survival of their chicks. These negative behaviors include alteration of foraging behavior, attentiveness to young and disruption of the normal breeding, feeding, sheltering behavior to the extent that injury or death (of a nestling) occurs. In addition, impaired parental attention, as juveniles are unable to thermoregulate, could result in mortalities through hypo- or hyperthermia depending upon weather conditions. The average clutch size for bald eagles is two eggs (Buehler 2000). Without knowing which nests may actually be adversely affected, the Service assumes that no more than 2 eggs or young per nest will be affected through harm or harassment by proposed highway construction activities at 5 locations.

The Service anticipates incidental take of Preble's through direct killing, harming, or harassing will be difficult to detect due to their small size and often secretive nature. The actual population size and abundance for Preble's is not currently known. Preble's home range sizes have been estimated at 0.2 to 0.9 acre per mouse. Densities of Preble's are considerably variable but have been estimated at between 3 and 6 mice per acre (Fitzgerald *et al.* 1994).

However, take of this species can be anticipated by the temporary loss of habitat elements utilized by Preble's for foraging, shelter, reproduction, and movement. These habitat elements are limiting factors for Preble's populations and will be unavailable to Preble's within the project area due to the proposed project. The Service anticipates that the proposed action (19 projects as identified in Appendix A: Reiterated in Table 5), will result in the loss of approximately 64 acres of Preble's habitat related to highway activities and up to an additional 40 acres in mineral source operations. The proposed actions will also result in both short-term (temporary) and long term disturbance and loss of Preble's habitat due to construction disturbance and mineral source operations. According to Fitzgerald *et al.*'s (1994) estimations, the Service anticipates that the proposed action will result in the incidental take of no more than up to 67 home ranges of Preble's through the loss and disturbance of a total of 64 acres of Preble's habitat. An undetermined amount of incidental take is associated with the 40 acres of mineral source operations as this activity is not likely to occur in prime Preble's habitat, but in upland habitats.

Additionally, the Service anticipates non-lethal take, such as harm or harassment resulting from displacement of Preble's meadow jumping mouse from important habitats, will continue to occur as a result of highway construction activities. However, the best scientific and commercial data available are not sufficient to enable the Service to quantify a specific amount of non-lethal incidental take for the proposed action. The affects of the proposed action are largely unquantifiable in the short term and may be measurable only as long-term effects on the species'

habitat and population levels. Without additional information and analyses that are currently unavailable, we must designate the anticipated level of non-lethal incidental take for the proposed highway construction activities as unquantifiable.

The Service acknowledges that after highway construction activities all areas of temporary disturbance will be reclaimed using vegetation similar to the existing plant community by the project proponent. Successful reclamation of these areas will facilitate re-establishment of Preble's habitat over time.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures (RPM) are necessary and appropriate to minimize take of the bald eagle and Preble's meadow jumping mouse.

RPM 1 FHWA/WYDOT shall minimize direct and indirect habitat disturbance to the bald eagle and Preble's during implementation, and ensure that the level of this disturbance does not exceed that discussed and evaluated in this Programmatic Biological Opinion,

RPM 2 FHWA/WYDOT shall insure monitoring of direct and indirect habitat disturbance to the bald eagle and Preble's during implementation, and ensure that the level of this disturbance does not exceed that discussed and evaluated in this Programmatic Biological Opinion,

RPM 3. FHWA/WYDOT shall reduce the likelihood of disruption of bald eagle nesting and roosting activities.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the FHWA/WYDOT must comply with the following terms and conditions (T&C), which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

T&C 1. The FHWA/WYDOT will implement and enforce all conservation measures as outlined in the Biological Assessment, dated March 2005.

T&C 2. In the unlikely event that a Bald eagle or Preble's (dead, injured, or hibernating) is located during construction, the Service's Wyoming Field Office (307-772-2374) and the Service's Law Enforcement Office (307-261-6365) shall be notified within 24 hours.

Because of difficulty in identification, all Zapus or similar species found dead shall be stored in a freezer for the Service to identify.

T&C 3. FHWA/WYDOT shall monitor all loss/disturbed Preble's habitat associated with the proposed project and insure that it does not exceed the anticipated area. The actual measurement of loss/disturbed habitat can be the responsibility of the FHWA's agent (consultant, contractor, etc.) and included with the written summary report referred to in T&C 5.

T&C 4. The FHWA/WYDOT shall insure that all areas of temporary disturbance will be successfully reclaimed utilizing riparian vegetation native to Wyoming or similar to the existing plant community unless it includes invasive, non-native species. The area of disturbance shall be considered successfully reclaimed after the re-establishment of native riparian vegetation.

T&C 5. To monitor the impacts of the Project, the FHWA/WYDOT will, in coordination with the Service, annually meet to review the effectiveness of the conservation measures outlined in the Programmatic Biological Assessment and the PBO's terms and conditions as they apply to STIP projects and describe the progress of the proposed action, including impacts to listed species (50 CFR § 402.14(1)(3)). These annual meetings shall continue until projects associated with the STIP are completed on the ground and all required terms and conditions have been implemented and carried out. This annual review process shall consider (1) to what extent terms and conditions have been implemented, (2) adverse effects resulting from Project activities, (3) when and if the level of anticipated incidental take is approached; and, (4) when and if the level of anticipated take is exceeded. FHWA/WYDOT will then prepare a report using the Project Specific Reporting Form (Appendix B) to quantify the level of affects, incidental take and actions (including applicable terms and conditions and conservation measures) that have taken place during the calendar year preceding.

T&C 6. Deep-rooted woody vegetation, including below ground root wads, shall be retained, where possible, within the construction limits at road crossings (including any temporary detours). Project plans shall include a notification to contractors that requires avoidance of disturbance outside of the minimum need for project construction.

T&C 7. All fill, construction materials, and construction equipment (i.e., temporary culvert installations) associated with the temporary detours shall be removed from the construction area after construction areas are completed.

T&C 8. Construction debris, liquid concrete, old riprap, old bridge support materials, or other litter shall not be placed directly instream or in areas where migration into the stream could reasonably be expected.

T&C 9. Activities that may disturb bald eagles will be restricted within 1 mile of known communal winter roosts during the period of November 1 – April 1, annually. No removal of bald eagle habitat will be permitted within 0.5 mile of active roost sites year round.

T&C 10. Highway Construction activities which are likely to adversely affect active bald eagle nests will not occur until any bald eagle chicks present within 0.5 mile radius of the project area are at least three weeks old and able to thermoregulate. Typically, eaglets at known nest sites reach three weeks of age between the middle of May and June, depending upon hatch dates.

T&C 11. Where highway construction activities are likely to occur within 800 meters (0.5 mile) of an active bald eagle nest, the associated noise will be introduced gradually by beginning operations at the furthest point from the nest and progressively decreasing the distance from eagle nests.

T&C 12. Where highway construction activities are likely to occur within 800 meters (0.5 mile) of an active bald eagle nest, flaggers and concentrations of stopped vehicles will be screened from bald eagle nests that are active during the year of operations.

T&C 13. Where highway construction activities are likely to occur within 800 meters (0.5 mile) of an active bald eagle nest, construction activity will be prohibited during early morning (5:30 to 7:30 a.m.) and evening periods (5:00 to 7:00 p.m.) to avoid disturbing foraging activities and during cold and wet weather conditions to avoid negative effects to young bald eagles. Construction activity will not occur during nighttime.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations (CR) are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

CR1. FHWA/WYDOT should continue to implement standard operating procedures and contract specifications to insure non-native and noxious weeds do not become re-established within suitable habitat for Preble's and Gaura in the project area; and,

CR2 FHWA/WYDOT should continue to develop threatened and endangered species information and share it with all levels of personnel within WYDOT and the FHWA. The Service recommends the goal of this information be aimed at

providing education and public outreach regarding threatened and endangered species in Wyoming.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects of benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION CLOSING STATEMENT

This concludes formal consultation on the Wyoming Statewide Transportation Improvement Program of highway projects as outlined in your March 21, 2005 request for formal consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your assistance in the conservation of endangered, threatened, and proposed species. If you have any questions or comments on this programmatic biological opinion or your responsibilities under the Act, please contact Jodi Bush by phone at (307) 772-2374, extension 31.

Sincerely,

Brian T. Kelly
Field Supervisor
Wyoming Field Office

cc: DOI, Solicitor's Office, Lakewood, Colorado (M.Zallen)
FWS, Region 6, Regional Office, Section 7 Coordinator, Lakewood, CO (B.Fahey)
WGFD, Nongame Coordinator, Lander, WY (B.Oakleaf)
WGFD, Statewide Habitat Coordinator, Lander, WY (V.Stelter)
WYDOT, Wildlife Specialist, Cheyenne, WY (T.Hart)

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