GENERAL WILDLIFE ASSESSMENT

THORNCREEK ROAD TO MOSCOW

Prepared By:

STATE OF IDAHO
IDAHO DEPARTMENT OF FISH & GAME

FOR

IDAHO TRANSPORTATION DEPARTMENT

Project Number: DHP-NH-4110 (156)
Key Number: 9294

Location
Hwy 95 South of Moscow
Latah County, Idaho

T39N R05W Sections 19, 20, 29, 30, 31, and 32
T39N R06W Sections, 24, 25, and 36
T38N R05W Sections 5, 6, 7, 8, 9, 17, 18, and 20
T38N R06W Sections 1, 12, and 13

USGS Quadrangles: Moscow West, Idaho and Moscow East, Idaho

December 2006

This wildlife assessment was prepared by Idaho Fish and Game, Clearwater Regional Office, at the request of the ITD District 2 Office, Lewiston, Idaho. The assessment satisfies the goals of a Cooperative Agreement between IDFG and ITD that enables ITD to utilize the biological expertise of IDFG in the preparation of biological evaluations of highway projects. The Agreement benefits ITD by expediting the biological evaluation and review process for various projects. The Agreement benefits IDFG by helping direct collection and evaluation of necessary biological information, as well as helping guide the interagency consultation process, both of which are important to the protection and maintenance of plant, fish and wildlife populations.

Introduction

The long-term ecological effects of road construction have been well documented (Evink, *et.al.* 1999). Road construction has both direct and indirect impacts to wildlife and habitat in perpetuity. As long, linear features on the landscape, roads and highways have impacts on wildlife and wildlife habitat that are disproportionate to the area of land that they occupy (Jackson, in Evink *et.al.* 1999; Forman and Deblinger 2000). Road construction can result in significant loss of biodiversity at both local and regional scales due to restricted movement between populations, increased mortality, habitat fragmentation and edge effects, invasion by exotic species, or increased human access to wildlife habitats (Findlay and Bourdages 2000). Effects of highways on wildlife can extend well away from the edge of the roadway (Forman and Deblinger 2000).

The purpose of this report is to assist ITD to evaluate potential direct, indirect and cumulative impacts to wildlife that would be expected to occur with the proposed restructuring of US95 from Thorncreek Road to Moscow and to recommend mitigations for impacts that we have identified to wildlife.

The project area is entirely within Latah County, Idaho. It includes all or portions of T39N R05W Sections 19, 20, 29, 30, 31, and 32; T39N R06W Sections, 24, 25, and 36; T38N R05W Sections 5, 6, 7, 8, 9, 17, 18, and 20; and T38N R06W Sections 1, 12, and 13.

Methods

Although native habitat and wildlife have been severely altered in the project area, the Palouse remains home to many indigenous and introduced wildlife species – too many, in fact, for an inclusive impact analysis. IDFG's goal was to conduct a time and cost-efficient analysis of the potential impacts of the proposed US95 development, by alternative, on a number of representative wildlife species that would provide an indication not only of impact for all species, but would also suggest suitable protections and mitigations for unavoidable impacts. We decided to assess impacts to a limited number of species that could serve as surrogates for all other wildlife species expected to be present in the project area.

An initial list of wildlife species considered for this analysis was generated from several sources. A review of the Idaho state sensitive species list maintained by IDFG Conservation Data Center (CDC) identified one species in the Project area, Pygmy Nuthatch, *Sitta pymaea*. Adding a 5 mile buffer around the project area resulted in addition of one additional species, Yellow-billed Cuckoo, *Coccyzus americanus*. Pygmy Nuthatch was dropped from the SGNC list before this analysis was completed; however, ITD commissioned an analysis for that species prior to this change (Melquist 2005), the results of which we have incorporated by reference here.

Our primary resource was the recently published Idaho Wildlife Comprehensive Wildlife Conservation Strategy (WCS) (IDFG 2005). The WCS is the most complete and most current, peer reviewed summary of Idaho wildlife species at risk available. The WCS was developed from scientific literature as well as information from such national and international programs as Partners in Flight and NatureServe. The WCS strategy summarizes current knowledge about

Species of Greatest Conservation Need (SGN) population status, species' habitat affiliations and ecology, causes for listing and threats to the species, and recommends strategies to protect those species.

The WCS divides the state into Ecological Sections based on habitat. The US95 Thorncreek to Moscow project area lies entirely within the Palouse Prairie Ecological Section. The WCS also describes various habitat types (*e.g.*, arableland, dry conifer forest) found in the Palouse Ecological Section and lists wildlife species expected to reside in or migrate through the Palouse Prairie Ecological Section for each habitat type.

IDFG also reviewed the Washington State Wildlife Comprehensive Wildlife Conservation Strategy for those Washington counties proximate to the project, in case there were some species listed for Washington that might have been missed in the Idaho listings. There were none.

In addition to wildlife species of greatest conservation need listed in the WCS, potential impacts were considered for white-tail deer, elk and moose because of their high social and economic importance to the state and the region. A separate report on the potential impact of the proposed action was prepared for ITD describing potential impacts to big game (Melquist 2005a). We have not incorporated that report herein. IDFG did, however, provide comments to ITD on the draft Melquist report (Cal Groen, IDFG, letter 6/20/2005) and we have included some of our own recommendations regarding big game impacts in the mitigations portion of this report.

For various reasons, not all of the Palouse Ecoregion species listed in the WCS would be impacted by the proposed project. The initial list of wildlife species was further refined by identifying species occurring year-round or breeding within the Palouse Prairie Ecological Section (IDFG 2006, Sibley, D.A. 2000; Burt and Grossenheider 1980) and based on local knowledge of the occurrence of and timing of occurrence of animals in the area (Sauder, IDFG, personal comm.). In addition, species habitat associations described in the WCS were compared with available habitat in the project area using maps (IDFG 2006; Lichtart 2005; Lichtart and Mosely 1997), aerial photos provided by ITD and local knowledge to determine whether suitable habitat was present in or near the project area. Species were removed from consideration if suitable habitat was not present, even though the potential exists for some species to occasionally range far from suitable habitat.

Applying the series of filters described resulted in a refined list of 32 species, including13 vertebrate and 19 invertebrate species, that could reasonably expected to be present in the project area and, therefore, potentially be impacted by the project. These species were examined more closely in the final stage of the wildlife impact analysis. Of these, various species were expected to be present in the project area for all, some or none of the proposed alternatives. Some species (*e.g.*, Spur throated Grasshoppers, California Myotis) were retained for consideration because there was not sufficient information to remove them from the list and/or we determined they could serve as an appropriate surrogate for other species.

Finally, the Palouse Giant Earthworm was considered in the analysis due to high local and academic interest in the species. A petition for listing the earthworm under the federal Endangered Species Act was recently submitted to the US Fish and Wildlife Service.

For each of the species remaining on the refined list, a determination of the likelihood of effect or no effect was made based on occurrence of the species in the project area and/or the presence of suitable habitat in the area. For each species for which a determination of potential effect was made, direct and indirect effects of the Project were described and mitigation recommendations were developed.

Results: Species for which the Project will have No Effect:

Woodhouse's Toad, *Bufo woodhousii*: Woodhouse's Toad are common within their range. However, there have been no reported occurrences of the species in the project area. The closest reported occurrence is a single historical record from Lewiston, which is well outside the project area.

Determination of Effect and Rationale: No Effect

- WCS maps indicate potential occurrences of Woodhouse's Toad near Lewiston, but not within project area.
- Woodhouse's Toad has never been recorded and is not known to occur in the project area.

Mountain Quail, *Oreortyx pictus*: The mountain quail is a year-round resident in the mountain ranges of far western North America. In Idaho, mountain quail are currently restricted in their range to areas of west-central Idaho, with remnant population strongholds in the Riggins area.

Determination of Effect and Rationale: No Effect

- Mountain quail are not present within the project area.
- There is very limited suitable mountain quail habitat within the project area.

Peregrine Falcon, *Falco peregrinus*: Less than 28 historic peregrine nest sites were known from Idaho and peregrines were extirpated as a breeding species by 1974. In Idaho, peregrines aeries are now found at elevations between 696 ft near Lewiston to nearly 8468 ft near Stanley. Most are thought to migrate south of Idaho during winter. Idaho currently has 33 known peregrine nesting territories of which 26 were occupied in 2004. In Idaho, peregrines are associated with mountains, major river corridors, reservoirs and lake basins. The nest sites closest to the project area are located 3 miles east of Clarkston, WA and 2 miles south of Asotin, WA.

Determination of Effect and Rationale: No Effect

- No peregrine falcon nesting territories occur within the project area.
- The project area is outside the normal foraging range of the closest nesting sites.

Yellow-billed Cuckoo, *Coccyzus americanus*: In Idaho, the yellow-billed cuckoo is a rare visitor and local breeder that occurs in scattered drainages primarily in the southern portion of the state. They are reported to occur most frequently and consistently in cottonwood forests with a thick understory. In western United States, the species is a riparian obligate species, needing large blocks of riparian habitat for breeding.

Determination of Effect and Rationale: No Effect

- Yellow-billed cuckoo have not been reported in the project area.
- There is no suitable habitat for this species present within the project area.

Townsend's Big-eared Bat, *Corynorhinus townsendii*: Populations of Townsend's big-eared bat in Idaho occur predominately on the Snake River Plain, but scattered populations have been reported throughout the state. Only 2 maternity colonies have been confirmed in Idaho, both in the Craters of the Moon National Monument. Distribution and abundance of Townsend's big-eared bats is highly correlated with suitable cavity forming rock formations and historic mining.

Determination of Effect and Rationale: No Effect

- No suitable habitat for this species occurs with the project area.
- There are no known populations of the species within the project area.

Nimapuna Tigersnail, A*nguispira nimapuna:* This species is a terrestrial snail endemic to Idaho. Colonies have been found in the South Fork Clearwater, lower Selway and Lochsa River drainages only. Nimapuna Tigersnails are found in streamside habitats in moist coniferous forests. Occupied sites are typically undisturbed and have deciduous trees and diverse forb understories. They are also found in shaded and mossy basalt talus.

Determination of Effect and Rationale: No effect.

- Nimapuna Tigersnails have not been reported in the project area.
- There is no suitable habitat in the project area.

Pale Jumping-slug, *Hemphilla camelus:* Prior reports of presence of Pale Jumping-slug nearest the project were from the Selway and SF Clearwater River drainages and portions of the lower Salmon River valley. Habitat comprises intact closed to nearly closed canopy Ponderosa Pine/Douglas Fir forests adjacent to major streams. The species occurs in relatively moist areas with a diverse plant understory and a duff layer. The prevalent substrate at occupied sites is usually basalt, but limestone- and schist-derived soils occur at some sites.

Determination of Effect and Rationale: No effect.

- There have been no reported occurrences of Pale Jumping-slugs in the project area
- There is no suitable habitat in the project area. (Of three corridors, only the eastern alternative has Ponderosa Pine forest, and that is relatively dry -- there are no major streams in the project area.)

Fir Pinwheel, *Radiodiscus abietum:* Populations of Fir Pinwheel were historically found at scattered sites throughout much of the northern forests. Populations have not been relocated at most sites during recent years, and only one population in the Salmon River valley has been confirmed to be extant. Fir Pinwheel inhabits rocky sites in Douglas Fir forests with a rich understory of forbs, shrubs and bryophytes. Rock formations typically consist of basalt, schist or limestone.

Determination of Effect and Rationale: No effect.

- No populations of Fir Pinwheel have been reported in the project area in recent years.
- There is no suitable habitat in the project area.

Salmon Coil, *Helicodiscus salmonaceus:* Salmon Coil are widespread in the Salmon River drainage. The species appears to occur in relatively dry conditions, often associated with talus or rock outcrops in dry, open sage scrub at low to moderate elevations.

Determination of Effect and Rationale: No effect.
- There is no suitable habitat in the project area.
- There have been no reported occurrences of Salmon Coil in the project area.

Lyre Mantleslug, *Udosarx lyrata*: Lyre Mantleslug occurs only in western Montana and northern Idaho. This species has been found at scattered sites in the Clearwater River drainage; however, current population status is unknown. Lyre Mantleslug occurs in mesic environments in valleys, ravines, gorges or talus fields. One occurrence site was described as subalpine, somewhat open, mixed pine and fir forest with forbs and downed wood. Populations have not been found at disturbed areas.

Determination of Effect and Rationale: No effect.
- Lyre Mantleslug has not been reported in the project area.
- Suitable habitat is unlikely in the project area. There is no suitable habitat in the central or western alignments; marginal habitat may be available in the eastern alignment.

Dry Land Forestsnail, *Allgona ptychophora solida*: Within Idaho, historical distribution of Dry Land Forestsnail includes Hells Canyon, lower Salmon River canyon and lower Clearwater River drainage. Nearest the project area, the lower Clearwater populations are thought to be extirpated. Dry Land Forestsnail inhabits large basalt taluses, most often at the base of north-facing slopes.

Determination of Effect and Rationale: No effect.
- The historic population closest to the project area is thought to be extirpated, and was outside the project area.
- There is no suitable habitat within the project area.

An Oregonian, *Cryptomastix mullani tuckeri:* This species is known to have formerly occurred along the mainstem of the Clearwater River from Orofino to Kooskia; however, its current status is "uncertain" and populations are known to persist in only a limited portion of historic range. Populations are believed to be extirpated from the Orofino area. Typical habitat is intact Ponderosa Pine forests along the Clearwater River, in moist shaded sites at the base of steep slopes with exposed bedrock.

Determination of Effect and Rationale: No effect
- The project area is outside the historic range.
- There is no suitable habitat in the project area.

An Oregonian (Hells Canyon), *Cryptomastix populi:* Idaho populations of this species occur in Snake River, lower Salmon River and lower Clearwater River canyons. They typically occur in basalt talus along lower slopes of the river canyons. Occupied sites are xeric and sparsely vegetated with hackberry, sagebrush and a variety of forbs and grasses.

Determination of Effect and Rationale: No effect

- The project area is outside the known range of the species.
- There is no suitable habitat in the project area.

Humped Coin, *Polygyrella polygyrella:* Current distribution of Humped Coin in Idaho includes several sites in White Bird Canyon, one near Mission Creek and one near Mt. Idaho. Humped Coin were historically present in the Clearwater River drainage. This species inhabits undisturbed open spruce and Douglas fir forests, commonly near basalt, schist or limestone outcroppings and permanent or persistent water. The largest populations are likely to occur in forested talus.

Determination of Effect and Rationale: No effect

- The project area is outside the historic range of Humped Coin.
- There is no suitable habitat available in the project area.

Palouse earthworm, *Drioleirus amercanus:* The Palouse earthworm is endemic to the Palouse bioregion. The species was first reported in 1897, and was described as being common in the area around Pullman, Washington; however, reported occurrences are very rare and there have been no recent confirmed occurrences reported in Idaho. Palouse earthworms inhabit relatively loose, rich soils in undisturbed bunchgrass prairie. Threats include loss of native Palouse habitat to agriculture, development and other disturbances, as well as introduction of European earthworm species.

Determination of Effect and Rationale: No Effect

- There have been no reported occurrences of Palouse earthworm in the project area.
- No remnant Palouse plant communities (suitable habitat) will be effected by the project.

Results: Species for which the Project will have a Potential Effect

The following species are likely to be effected by the project. To be conservative, we retained some species from the WCS listings for which we have limited knowledge of ecology or habitat associations, if we determined suitable habitat might be available in the project area, regardless of known occurrence. For each species, we attempted to identify potential direct, indirect and cumulative impacts and to recommend mitigations for those impacts. A more detailed discussion and a list of mitigations follows the species synopses.

All of the species listed below will be directly effected by loss of habitat. The amount of habitat lost varies between alternatives but, in all cases, is additive to the acreage already taken up by portions of the existing highway, portions of which will be retained as county road. All new construction is an additive impact to that portion of the existing highway that will remain as

county road after build-out. We have assumed that all the habitat taken by construction of the new highway is suitable for those species affected.

There are numerous indirect impacts of highways on habitat and wildlife. Some indirect effects may influence wildlife to 1 kilometer or more from the highway (Forman and Deblinger 2000; Forman, 1999; Rudolph, *et.al.* 1999; Carr and Fahrig, 2001). Some known indirect effects, like the spread of exotic plants/invasive weeds along highways and increased vehicle-wildlife collisions are relatively straightforward. Other indirect impacts are not as well understood; for instance, the effects of highway noise on wildlife. Noise can have a number effects on wildlife, including causing avoidance of suitable habitat, interfering with breeding bird songs and communication, etc.; however, direct causal relationships between highway noise and declines in wildlife have been difficult to establish. For instance, highways adversely effect amphibian populations, but no clear links have been established to noise alone as a cause (Kaseloo and Tyson 2004). The effect of noise on birds has been more extensively studied and effects on both populations and breeding success have been established at varying distances from roads (Kaseloo and Tyson 2004; Forman and Deblinger 2000).

Specific indirect cause-effect relationships have not been well established; however, there is clearly a relationship between traffic volume and both the degree of impact and the distance of indirect impacts from highways on wildlife. The greater the traffic volume, the more pronounced the impact on wildlife (Kaseloo and Tyson 2004; Forman and Deblinger 2000; Forman, et.al. 2003; Alexander, *et.al.* 2005). Based on available literature (primarily Forman and Deblinger 2000) and based on projected traffic volumes for US95, we have adopted a "wildlife impact zone" or "zone of effect" of 300 meters from the edge of the highway for this analysis.

The most notable indirect effect of this project for many species will be fragmentation of habitat by the four-lane highway. The new road will be a 4-lane divided highway; the existing road is an undivided 2-lane. Speed limits on the new road will be increased by 5 miles per hour, from 60 mph to 65 mph. The number of vehicles using the new highway is projected to increase from 6130 vehicles per day to 9440 vehicles per day in about 20 years. Increased width of crossing, increased speeds and increasing numbers of vehicles will all impact the permeability of the highway for wildlife. Even if all the recommended mitigations are implemented, we anticipate there will be at least partial fragmentation of existing habitat as a result of this project, some from avoidance, resulting in isolation of individuals or populations. We also anticipate that the project will result in an increase in loss of individuals of most species due to the increased likelihood of wildlife-vehicular collisions; some of this loss may be significant.

We believe that selection of the eastern alternative would result in the most direct and indirect impacts to the greatest number of wildlife species in the project area. The proposed eastern alternative is closest to the largest tracts of the best remaining habitat in the project area; therefore, this habitat should support the greatest diversity of species and largest populations of species in the project area. Proximity of the highway to good habitat may increase avoidance of that valuable habitat by large ungulates (Melquist, 2005a), as well as other species. We also anticipate that there would be more vehicle/wildlife collisions on an eastern alignment because that alignment would be closest to preferred habitat; thus, more animals are likely to be present

and attempting to enter/cross the road than would be encountered on central and western alignments. Effects of a new highway would be most pronounced for the eastern alignment.

Determination of cumulative impacts was somewhat problematic. Since habitat condition and land use will be the primary impacts on wildlife in the area, changes in land use as a result of the project would largely determine cumulative impact. Commercial and residential development in the project area is currently on the rise; however, the highway project itself is not anticipated to cause significant acceleration of growth along the new alignment (HDR Engineering 2005). Except for the area immediately south of Moscow, all of the Alternatives would have a moderate to low potential to induce development (HDR Engineering 2005). We anticipate that land use is likely to remain very similar to current conditions. Therefore, with appropriate mitigations, we have concluded that the cumulative impact for all species should be negligible.

The following species are likely to be effected by the project:

Northern Alligator Lizard, *Elgaria coerulea*: Idaho populations of Northern Alligator Lizard occur in the Panhandle region from Boundary County south to northern Clearwater County; however, the species is rarely encountered and poorly documented. The species occurs in coniferous forests, often in clearings or along forest edges. Sites typically have a prominent understory that includes grass or brush and surface debris, such as leaf litter, exfoliated bark, rotting logs and talus.

Determination of Effect and Rationale: Potential Effect -- Eastern Alternative only.

- Suitable habitat occurs only in the easterneastern alternative.

Direct Effects:

- Loss of habitat.

Indirect Effects:

- Potential loss to vehicle collisions.
- The road is likely to be a partial to complete barrier to movement.

Cumulative Effects:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- Protection/restoration of suitable habitat at selected sites in or near the project area (purchase, easements, etc.). A detailed survey of the project area is needed to define actual acreage of potentially-suitable habitat for this species that is impacted.
- Installation of bridges, culverts in the project designed to allow movement of small terrestrial vertebrates, including potential retrofitting of existing structures.

Ring-necked Snake, *Diadophis punctatus*: The ring-necked snake is widespread throughout North America, but the distribution in the western part of the range is sparse and discontinuous. The species has been detected in two parts of Idaho. A cluster of populations occurring in west-

central Idaho comprises records from the Clearwater and Potlatch River drainages and the lower Salmon River drainage near Whitebird. These populations extend into eastern Washington and are disjunct from populations occurring in central Washington by about 130 km. Ring-necked snake habitat requirements are poorly understood. In west-central Idaho, localities are typically adjacent to perennial rivers or streams in grassland or forested habitats.

Determination of Effect and Rationale: Potential Effect, all alternatives.

- Species distribution and/or occurrence within the project area is unknown

Direct Effects:

- Loss of potential habitat. Most of the suitable habitat is likely to be in the forested or shrubby areas in the eastern corridor and in riparian areas in all corridors.

Indirect Effects:

- Potential loss to vehicle collisions.
- The road is likely to be a partial to complete barrier to movement.

Cumulative Effects:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- Bridges/culverts for streams and riparian areas wide enough to provide passage of terrestrial wildlife, including potential retrofitting of existing structures where appropriate.
- Wildlife passage culverts should be installed to retain connectivity between existing suitable habitats that would be fragmented by the highway. Culverts should be sized to accommodate use by multiple species.
- Avoidance, restoration of suitable forest habitat, streams and riparian areas to provide habitat.

Swainson's Hawk, *Buteo swainsoni*: In Idaho, this species breeds throughout the southern half of the state, as well as in the Palouse region of the Northwest. There are an estimated 16,800 breeding individuals in Idaho. The species is considered abundant and stable in Idaho and they fare well in agricultural areas. Swainson's breed in the Palouse and generally nest in trees and shrubs near riparian areas adjacent to agricultural lands.

Determination of Effect and Rational: Potential Effect

- Swainson's Hawk occurs across the project area and would be impacted by all three alternatives. Breeding and foraging habitats are present in all three alternatives.

Direct Effects:

- Loss of breeding and foraging habitat. Breeding habitat is limited in the project area, likely restricted to riparian areas with suitably large trees.
- Foraging occurs over the entire project area. The project will eliminate foraging habitat, the acreage of which varies by alternative; however, adequate foraging habitat will remain to support existing populations.

Indirect Effects:

- Increased numbers of collisions with vehicles.
- Potential impacts on prey species.

Cumulative Effects:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- Avoidance, protection/restoration of riparian areas, especially larger trees or shrubs suitable for breeding.
- Protection/restoration of native vegetative communities and other suitable habitat.

Long-billed Curlew, *Numenius americanus*: The current population size of this species is unknown in Idaho. Long-billed curlews nest in open short-grass or mixed-prairie habitat with level to slightly rolling topography. They generally avoid areas with trees, high-density shrubs and tall, dense grasses. In Idaho, this species forages predominately in grassland, but may switch to plowed fields and wet pastures if grasslands become too tall or dense after high spring rainfall.

Determination of Effect and Rational: Potential Effect

- There are no known resident populations within the project area; however, long-billed curlews migrate through the area and occasionally stop to rest and feed within project boundaries.

Direct Effects:

- Loss of foraging habitat.

Indirect Effects:

- Vehicle collisions.
- Based on observations of curlew foraging activity in proximity to US95 near Grangeville, we do not anticipate avoidance of foraging habitat within 300 meters of the highway.

Cumulative Effects:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- Protection/restoration of native vegetative communities and other habitat suitable habitat.

Short-eared Owl, *Asio flammeus*: The short-eared owl is one of the world's most widely distributed owls, occurring throughout much of North America. Based on North American Breeding Bird Survey (BBS) data from 1994-2004, the species is most common in the intermountain west and upper Midwestern states, including Idaho, and the western and central provinces of Canada. The short-eared owl is a confirmed or suspected breeder across nearly all of Idaho and there are winter records in the northern and southern portions of the state. The

estimate of the population size in Idaho is about 32,000 individuals. Short-eared owls are typically associated with open landscapes such as marshes, grasslands, tundra and agricultural lands (e.g., pastures, stubble fields, and hay fields).

Although they will utilize wooded environments during winter, they rarely breed in forests, except in areas that have been cleared of trees. Breeding habitats typically support sufficient vegetation (primarily grasses and forbs) to provide ground nesting and roosting cover and are in close proximity to productive and open hunting areas with abundant supplies of small mammals. In areas with sparse snowfall, short-eared owls will winter in the same areas as they breed, as long as these areas continue to provide shelter from the weather, support ample populations of small mammals and have low human disturbance. Where snows are deep enough that birds become conspicuous when on the ground, short-eared owls often will roost in forest and woodland environments.

Determination of Effect and Rational: Potential Effect

- Short-eared Owl occurs in all project corridors. They are present in the project area year-round. Foraging occurs in all corridors; nesting is known to occur within the project area.

Direct Effects:

- Foraging occurs over the entire project area. The project will eliminate foraging habitat, the acreage of which varies by alternative; however, adequate foraging habitat will remain to support existing populations.
- Short-eared owls overwinter in the Palouse. When snow remains on the ground, the owls may rely on forest/woodland habitat in the eastern portion of the project area for roosting. Removal of forest/woodland habitat on the eastern alternative may result in a reduction of winter roosting habitat.

Indirect Effects:

- Increased loss due to vehicle collisions. Short-eared owls forage close to the ground.
- Habitat fragmentation and avoidance.
- Disturbance from noise and activity may affect foraging, roosting, breeding.
- Potential impacts on prey species.

Cumulative Effects:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- Avoidance, protection/restoration of suitable nesting and foraging habitat. This species benefits from any actions or projects that protect, enhance, or restore potentially suitable foraging and breeding habitats (IDFG 2006).
- Installation of fencing or reflective “posts” or installation of reflectors on other highway structures in key flight and/or foraging areas to be identified by wildlife biologists (Jacobson 2005). Short-eared owls are prone to vehicle collisions because they forage close to the ground. Fencing or reflective posts may cause short-eared owls to fly higher over highways, reducing collisions with vehicles.

- Avoid known nesting sites during construction. Monitor suitable nesting habitat prior to ground disturbing activities and schedule to avoid disturbance.
- Support a study of effect of highway disturbance on short-eared owl population distribution and breeding success, other impacts.

Grasshopper Sparrow, *Ammodramus savannarum***:** In Idaho, this species is locally abundant wherever suitable habitat occurs throughout the Snake River plain in the south and the Palouse in the north. This species is found in prairies, old fields, open grasslands, cultivated fields and savannas where it eats insects, other small invertebrates, grain and seeds. Grasshopper sparrow appears to prefer moderately open grasslands and prairies with patchy bare ground, occupying lusher areas with shrub cover in arid grasslands of the west (Vickery 1996). Tends to be extremely shy and secretive; even its song, which is weak and insect-like, makes this species difficult to detect during the breeding season.

Determination of Effect and Rationale: Potential Effect

- Species has potential to occur throughout the project area.

Direct Effects:

- Loss of foraging, perhaps breeding habitat.
- Increased fragmentation of suitable Palouse habitat. Habitat loss, fragmentation and degradation are reported to be the primary reasons for population declines of the grasshopper sparrow in North America.

Indirect Effects:

- Potential for increased number of collisions with vehicles.
- Potential highway disturbance impacts. Potential impact on breeding success. This species tends to be extremely shy and secretive; even its song, which is weak and insect-like, makes this species difficult to detect during the breeding season.

Cumulative Effects:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- Can be partially mitigated by avoiding native Palouse remnant vegetation.
- Purchase, easements to protect/restore Palouse prairie habitat. Conversion of native grasslands to agricultural land (*e.g.*, on the Palouse) has likely contributed to local and regional population declines.
- Survey Grasshopper Sparrow population in project area prior to, during and after construction to assess impacts of highway disturbance on the species.

Pygmy Nuthatch, *Sitta pygmaea* **:** (From Melquist 2005) At least 6 subspecies of pygmy nuthatches have been described; *S. p. melanotis* is the subspecies present in Idaho. The pygmy nuthatch is a year-round resident in ponderosa and similar pines from south-central British Columbia and mountains of the western U.S. to central Mexico. Throughout its range, the patchy distribution of the nuthatch is dictated by the patchy distribution of pines. In northern Idaho, it is locally common, less common in the west-central mountains, and rare in the southern

and eastern parts of the state. In Idaho, the pygmy nuthatch is generally limited in its distribution to the southern slope of mountains at elevations up to approximately 3,500 feet, where it occupies suitable habitat year-round. Nuthatches nest in natural or excavated cavities in dead pines, live trees with dead sections, standing snags, and they may even use posts. The birds may use the same cavity trees for nesting and year-round roosting. Nuthatches prefer old-growth, mature, undisturbed forests for nesting.

Determination of Effect and Rationale: Potential Effect – eastern alternative only=

- Suitable habitat exists in or near the proposed eastern alternative.

Direct Effects:

- Plans for the eastern corridor include removal of suitable habitat (Ponderosa Pines) at the lower end of the forested draw and the timber stand on the Dumroese property, a loss of nesting, foraging, and roosting habitat.

Indirect Effects:

- Potential disturbance impacts.

Cumulative Effects:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- Avoid construction along the eastern edge of the eastern corridor where the removal of habitat trees would be necessary.
- Time removal of trees to avoid/minimize impacts to nesting birds. Consult with IDFG regarding timing.
- Ponderosa Pine snags do not last many years before they rot and the trees topple. Nuthatches would benefit from the installation of nest boxes at selected sites to augment the limited number of natural nesting sites currently available and to replace any nesting sites lost.
- Protection or restoration of suitable mature Ponderosa Pine forest at a minimum 1:1 ratio.

California Myotis, *Myotis californicus*: (From Melquist 2005) The Idaho distribution of this bat species is poorly understood. Most authorities consider this species to occur in the northern and extreme western parts of the state, but scattered records suggest that the species may occur statewide. Little information is available to describe habitat affiliations or ecology of this species in Idaho. Dry conifer forest, sagebrush steppe, riparian, and juniper habitats have been reported. Roost types in Idaho are also poorly known. Characteristics of roosts used for maternity sites and hibernacula in the state are not known. Elsewhere, buildings and bridges are major roost types, and individuals are also found under loose tree bark. Characteristics of roosts used for maternity sites and hibernacula in the state are not known; elsewhere a maternity colony of 52 individuals was reported in a large diameter snag.

Determination of Effect and Rationale: Potential Effect

- California Myotis have not been identified in the project area; however, differentiating between this and similar bat species requires close examination that has not been attempted in the project area. Bats are present in the project area; and suitable habitat exists for this species. Therefore, California Myotis are assumed to be present. Even if California Myotis are not present, protections/mitigations identified for this species will provide benefits for other species of bats common in the project area.

Direct Effects:

- Bats tend to forage primarily over water where insects are plentiful, often near and over water. The project will impact stream, riparian and wetland habitat in varying amounts, depending on alternative selected. There will be both short-term (during construction, prior to wetland restoration) and permanent loss of foraging habitat in all alternativess.
- Myotis species are known to use crevices in the bark of large Ponderosa Pine for roosting habitat. Removal of mature Ponderosa Pine may eliminate some roosting habitat if the eastern alternative is selected.

Indirect Effects:

- Bats are prone to collisions with vehicles. The four lane, higher speed highway is anticipated to increase the number of bats lost to collisions.
- Overpasses, bridges and culverts are often used by bats as roosting habitat. Such structures built in the new construction may attract bats to, thus increasing chances for bat losses to vehicles.
- New highway may fragment bat habitat – separate roosting/nesting sites from foraging areas, normally around ponds, streams and wetlands, thus forcing migration across highways, increasing chances for bat losses to vehicles.

Cumulative Effects:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- For all alternatives, replace/restore all stream habitat effected on a 1:1 basis to maintain foraging habitat.
- Installation of suitable day and night roosting "facilities" in culverts and bridges, including retrofitting those on the "old" portion of US95 or at other roads in or near the project area (*i.e.*, away from heavy traffic). It may be appropriate to construct bridges on the new highway to discourage roosting (*e.g.*, do not seal joints).
- Construction of ponds, wetlands at suitable sites away from the highway to attract bats away from the highway to reduce collisions with vehicles.

A Stonefly, *Capnia zukeli*: This stonefly species is an Idaho endemic and is known from localities in Latah County. The habitat requirements of this species have not been described. In general, however, stonefly populations are affected by changes to aquatic habitat such as

alteration of stream flow patterns, streambed substrate, thermal characteristics and water quality. Specific threats to Idaho populations of *Capnia zukeli* have not been identified; however, alteration and degradation of aquatic habitat is the primary concern for Idaho stonefly populations.

Determination of Effect and Rationale: Potential Effect

- The Thorncreek Road to Moscow project will impact several streams and drainages and wetlands that may provide habitat for *Capnia zukel.*

Direct Effects:

- There will be short-term disruption of potential habitat during construction.
- Depending on design of stream and ditch passage through the highway ROW, there may be some permanent loss of suitable habitat in all alternativess.

Indirect Effects:

- Loss to vehicles.

Cumulative Effects:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- For all alternativess, replace/restore all stream habitat effected on a 1:1 basis. There will be short term impacts, but no long-term adverse impacts on flow patterns, streambed substrate, thermal characteristics or water quality and stream connectivity will be maintained throughout the project area.
- Potential wetland habitat area will be maintained (alternative W and C) or increased slightly (alternative E).

A Stonefly, *Soyedina potteri*: This species occurs in Idaho and Montana. In Idaho, the species is known to occur in Clearwater and Idaho counties. The species occurs in creeks, small streams and small springs. Specific threats to Idaho populations of *Soyedina potteri* have not been identified. In general, however, stonefly populations are affected by changes to aquatic habitat such as alteration of stream flow patterns, streambed substrate, thermal characteristics and water quality. Alteration and degradation of aquatic habitat is the primary concern for Idaho stonefly populations.

Determination of Effect and Rationale: Potential Effect

- The Thorncreek Road to Moscow project will impact several streams and drainages and wetland that may provide habitat for *Soyedina potteri.*

Direct Effects:

- There will be short-term disruption of potential habitat during construction.
- Depending on design of stream and ditch passage through the highway ROW, there may be some permanent loss of suitable habitat in all alternatives.

Indirect Effects:

- Loss to vehicles.

Cumulative Effects:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- For all alternatives, replace/restore all stream habitat effected on a 1:1 basis. There will be short term impacts, but no long-term adverse impacts on flow patterns, streambed substrate, thermal characteristics or water quality and stream connectivity will be maintained throughout the project area.
- Potential wetland habitat area will be maintained (alternative W and C) or increased slightly (alternative E).

A Stonefly, *Capnia lineate*: The distribution of this species includes localities in Idaho and California. In Idaho, the species is known to occur only in Latah County. No information has been documented that describes the habitat requirements of this species beyond the fact that nymphs occur in creeks. Specific threats to Idaho populations have not been identified. In general, stonefly populations are affected by changes to aquatic habitat such as alteration of flow patterns, streambed substrate, thermal characteristics and water quality. Alteration and degradation of aquatic habitat is the primary concern for Idaho populations.

Determination of Effect and Rationale: Potential Effect

- The Thorncreek Road to Moscow project will impact several streams and drainages and, depending on the Alternative selected, up to 7.06 acres of wetland that might provide habitat for *Capnia lineate.*

Direct Effects:

- There will be short-term disruption of potential habitat during construction.
- Depending on design of stream and ditch passage through the highway ROW, there may be some permanent loss of suitable habitat in all alternatives.

Indirect Effects:

- Loss to vehicles.

Cumulative Impacts:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- For all alternatives, replace/restore all stream habitat effected on a 1:1 basis. There will be short term impacts, but no long-term adverse impacts on flow patterns, streambed substrate, thermal characteristics or water quality and stream connectivity will be maintained throughout the project area.
- Potential wetland habitat area will be maintained (alternative W and C) or increased slightly (alternative E).

A Stonefly, *Perlomyia collaris*: This species occurs in California, Idaho, Oregon, British Columbia and the Yukon Territory. In Idaho, the species is known only in Nez Perce County. Habitats includes creeks and rivers of the Pacific Northwest, particularly in spring-fed areas. Specific threats to Idaho populations have not been identified. In general, stonefly populations are affected by changes to aquatic habitat such as alteration of flow patterns, streambed substrate, thermal characteristics and water quality. Because this species is associated with sites having particularly high water quality, populations may be especially vulnerable at alteration and degradation of aquatic habitat.

Determination of Effect and Rational: Potential Effect

- The Thorncreek Road to Moscow project will impact several streams and drainages and, depending on the alternative selected, up to 7.06 acres of wetland that might provide habitat for *Perlomyia collaris.*

Direct Effects:

- There will be short-term disruption of potential habitat during construction.
- Depending on design of stream and ditch passage through the highway ROW, there may be some permanent loss of suitable habitat in all alternatives.

Indirect Effects:

- Loss to vehicles.

Cumulative Impacts:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- For all alternatives, replace/restore all stream habitat effected on a 1:1 basis. There will be short term impacts, but no long-term adverse impacts on flow patterns, streambed substrate, thermal characteristics or water quality and stream connectivity will be maintained throughout the project area.
- Potential wetland habitat area will be maintained (alternative W and C) or increased slightly (alternative E).

A Stonefly, *Taenionema umatilla*: This species occurs in west central Idaho and eastern Oregon. In Idaho, the species is known from locations in Latah County. Specific threats to Idaho populations have not been identified. In general, however, stonefly populations are affected by changes to aquatic habitat such as alteration of stream flow patterns, streambed substrate, thermal characteristics and water quality. Alteration and degradation of aquatic habitat is the primary concern for Idaho populations.

Determination of Effect and Rationale: Potential Effect

- The Thorncreek Road to Moscow project will impact several streams and drainages and, depending on the alternative selected, up to 7.06 acres of wetland that might provide habitat for *Taenionema umatilla.*

Direct Effects:

- There will be short-term disruption of potential habitat during construction.
- Depending on design of stream and ditch passage through the highway ROW, there may be some permanent loss of suitable habitat in all alternatives.

Indirect Effects:
- Loss to vehicles.

Cumulative Impacts:
- Negligible, with appropriate mitigations.

Potential Mitigations:
- For all alternatives, replace/restore all stream habitat effected on a 1:1 basis. There will be short term impacts, but no long-term adverse impacts on flow patterns, streambed substrate, thermal characteristics or water quality and stream connectivity will be maintained throughout the project area.
- Potential wetland habitat area will be maintained (alternative W and C) or increased slightly (alternative E).

A Mayfly, *Paraleptophlebia traverae*: This species in known to occur only in Idaho and may be endemic to a single locality in Idaho County. Current status of the species in not known. The habitat occupied by this species has not been described. In general, mayfly populations are affected by changes to aquatic habitat, such as alteration of flow patterns, streambed substrate, thermal characteristics and water quality. Alteration and degradation of aquatic habitat is the primary concern for Idaho populations. Specific threats to Idaho populations have not been identified.

Determination of Effect and Rationale: Potential Effect
- The Thorncreek Road to Moscow project will impact several streams and drainages and, depending on the alternative selected, up to 7.06 acres of wetland that might provide habitat for *Paraleptophlebia traverae.*

Direct Effects:
- There will be short-term disruption of potential habitat during construction.
- Depending on design of stream and ditch passage through the highway ROW, there may be some permanent loss of suitable habitat in all alternatives.

Indirect Effects:
- Loss to vehicles.

Cumulative Impacts:
- Negligible, with appropriate mitigations.

Potential Mitigations:
- For all alternatives, replace/restore all stream habitat effected on a 1:1 basis. There may be short term impacts, but no long-term adverse impacts on flow patterns,

streambed substrate, thermal characteristics or water quality and stream connectivity will be maintained throughout the project area.
- Potential wetland habitat area will be maintained (alternative W and C) or increased slightly (alternative E).

A Mayfly, *Parameletus columbiae*: Idaho distribution includes four occasions in Latah, Blaine and Teton counties. Specific threats to Idaho populations have not been identified. In general, mayfly populations are affected by changes to aquatic habitat, such as alteration of flow patterns, streambed substrate, thermal characteristics, and water quality. Alteration and degradation of aquatic habitat is the primary concern for Idaho populations. Specific threats to Idaho populations have not been identified.

Determination of Effect and Rationale: Potential Effect

- The Thorncreek Road to Moscow project will impact several streams and drainages and, depending on the alternative selected, up to 7.06 acres of wetland that might provide habitat for *Parameletus columbiae.*

Direct Effects:

- There will be short-term disruption of potential habitat during construction.
- Depending on design of stream and ditch passage through the highway ROW, there will be some permanent loss of suitable habitat in all alternatives.

Indirect Effects:

- Loss of individuals to vehicle collisions.

Cumulative Impacts:

- Negligible, with appropriate mitigations.

Potential Mitigations:

- For all alternatives, replace/restore all stream habitat effected on a 1:1 basis. There may be short term impacts, but no long-term adverse impacts on flow patterns, streambed substrate, thermal characteristics or water quality and stream connectivity will be maintained throughout the project area.
- Potential wetland habitat area will be maintained (alternative W and C) or increased slightly (alternative E).

A Spur-throat Grasshopper, *Melanoplus digitifer*: This grasshopper has been reported to occur at localities in Oregon and Idaho. In Idaho, this species has been found in Adams, Butte Caribou, Clearwater, Custer, Idaho and Valley counties. Specimens have been collected between 1160-1830 m. Habitat affiliations are not documented for this species. Threats to grasshoppers include pesticides and habitat modification. Although conversion of native habitat to agricultural uses has benefited some grasshopper species, there are not data to suggest that agriculture has benefited this species. Close similarities within the species and an abundance of races makes identification difficult.

Determination of Effect and Rationale: Potential Effect

- Although this species has not been reported in the project area, and although habitat affiliations have not been described for this species, this species has been reported in the Palouse and is included to represent similar species that may be affected by the project.

Direct Effects:
- Loss of suitable habitat. ROW as habitat loss.

Indirect Effects:
- Vehicle of individuals to collisions.

Cumulative effects:
- Negligible, with appropriate mitigations.

Potential Mitigations:
- Purchase, easement other protections/restoration for remnant native plant communities.
- Replace lost habitat.

A Spur-throat Grasshopper, *Melanoplus payettei*: This species occurs in Washington, Oregon and Idaho. In Idaho, specimens have been reported from Latah, Washington, Idaho and Valley counties. Threats to grasshoppers include pesticides and habitat modification. Although conversion of native habitat to agricultural uses has benefited some grasshopper species there are not data to suggest that agriculture has benefited this species. Specific threats to this taxon were unknown. Close similarities within the species and an abundance of races makes identification difficult.

Determination of Effect and Rationale: Potential Effect
- Although this species has not been reported in the project area, and although habitat affiliations have not been described for this species, this species has been reported in the Palouse and is included to represent similar species that may be effected by the project.

Direct Effects:
- Loss of suitable habitat. ROW as habitat loss.

Indirect Effects:
- Loss of individuals to vehicle collisions.

Cumulative Effects:
- Negligible, with appropriate mitigations.

Potential Mitigations:
- Purchase, easement other protections/restoration for remnant native plant communities.
- Replace lost habitat.

Recommended Mitigations Discussion:

The most pervading limiting factor and threat for wildlife in the Palouse ecosystem, including the project area, is the loss of habitat to agriculture and other development. Palouse Grasslands have been converted nearly 100 percent to cultivated agriculture, making it an imperiled ecosystem (Lichtardt and Mosely 1997), perhaps the most endangered prairie ecosystem in North America (Noss, *et.al.* 1995). Nearly 90 percent of Ponderosa Pine plant communities have been lost in Latah County as well. Remnants of native Palouse plant communities may provide habitat for some species of wildlife dependent on those plant communities, including some of the species included in this assessment. Although the project will avoid direct impacts to remnant native plant communities, the effects of highways extend well beyond the edge of pavement (Forman and Deblinger 2000). We anticipate the new road will have indirect effects on some of those plant communities and their associated wildlife.

Also at risk in the project area are habitat types that provide relatively undisturbed cover and forage for many species; for instance, mixed grassland, shrub and forest that provide year-round habitat for deer, elk, moose and a variety of other game and non-game bird species. Agricultural fields provide habitat for species like pheasants, quail and gray partridge, but only if adequate grassland and woody cover is available nearby. The highway project will unavoidably reduce some of these valuable habitat components in the project area.

Habitat and wildlife would be most severely impacted by the proposed eastern corridor. The proposed eastern corridor lies along the toe of the Paradise Ridge slope. Paradise Ridge supports a rich diversity of native Palouse Prairie and important stands of Douglas hawthorne and Ponderosa Pine. It is home year-round to elk, white tail deer, moose and a variety of other wildlife. In addition to direct effects, the highway project is likely to have the greatest indirect impacts on wildlife if the eastern corridor is selected (Melquist 2005a; Melquist 2005b; Forman and Deblinger 2000). For instance, elk are likely to be displaced from suitable habitat along the base of the ridge as a result of increased activity (Melquist 2005a); other species may be displaced from suitable habitat as well.

As always, the first priority of mitigation should be avoidance. Because the eastern corridor would have the greatest impact on wildlife and habitat, due to both direct and indirect impacts to Paradise Ridge, we recommend the central and western alternatives over the eastern alternative to avoid those additional impacts.

Regardless of alternative selected, habitat will be lost in perpetuity. Because wildlife habitat is in such short supply and already imperiled in the project area, replacement of the habitat lost as a result of the project should be the primary focus of mitigation for the Thorncreek to Moscow project.

We recommend identification, protection and restoration of suitable wildlife habitat in or near the project area *at a minimum* ratio of 1:1 (acres replaced, protected and/or restored to acres impacted) for the western or central alternatives. If the eastern alternative is chosen, in consideration for the potentially greater direct and indirect impacts in the eastern corridor, we

recommend replacement, protection or restoration of habitat at a ratio of 2 acres replaced for each acre impacted. Emphasis should be on replacement of habitat lost with like habitat (*e.g.*, mixed grassland for mixed grassland) or improvement of habitat to benefit affected species (*e.g,* replacement of cultivated land with shrub/grassland). Long-term or, preferably, permanent protection of replacement wildlife habitat should be insured. Acreage impacted should be calculated so that it includes a minimum 300 meter "zone of effect" from the edge of the pavement.

Maintaining connectivity across the landscape is also very important to wildlife in the project area. We have recommended the installation of wildlife passage structures (terrestrial culverts, culverts and bridges to accommodate terrestrial passage, etc.) as potential mitigation for many of the species in our assessment. Melquist (2005a) recommended wildlife passage structures for large ungulates; IDFG supports Melquist's recommendations, consistent with our past recommendations for structures to pass large wildlife.

Many structures can be designed to provide passage for numerous wildlife species, including both the species we assessed and other species they represent in the surrogate analysis. Design, location and spacing of various wildlife passage structures will be critical for effective mitigation for multi-species impacts. It is important to note that wildlife passage structures rely on careful selection, planting and maintenance of vegetation leading to and through wildlife structures, and that fencing may also be a critical functional component for some or all wildlife passage structures. We have not identified those components separately in our mitigation recommendations, but assume they will be incorporated as necessary to make any installed passage structures functional. As part of the mitigation, for all the crossing structures, we recommend consultation with IDFG when designing the crossing structures, planning their installation and monitoring their effectiveness.

The indirect effect of highways is poorly understood. Funding studies to evaluate the indirect effects of this highway project on a number of species, including the effectiveness of wildlife crossing structures, should be considered as possible mitigations. Surveys of Grasshopper Sparrow and Short-eared Owls and an assessment of the highway impacts on these species might be particularly appropriate for this project and will provide information useful for future projects. Similarly, post-construction monitoring of wildlife use of passage structures installed as part of the project should be integral to the project. Consult IDFG regarding the design and implementation of these studies.

Finally, we would like to note that the list of mitigations we have suggested is not exhaustive; many other mitigation options are available that alone or in combination may provide similar protections for wildlife.

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