6 INDIRECT AND CUMULATIVE EFFECTS

6.1 Indirect Effects

This section evaluates the potential indirect effects of the alternatives.

6.1.1 Regulatory Framework and Policies

Relevant laws, regulations and guidance that pertain to indirect effects include:

- 40 CFR 1500-1508-CEQ Regulations
- 40 CFR 1508.8- Effects
- 23 CFR 771-FHWA Environmental Impact and Related Procedures
- Technical Advisory (TA) 6640.8A Guidance for Preparing and Processing Environmental and Section 4(f) Documents
- FHWA Interim Guidance: Indirect and Cumulative Impacts in NEPA
- FHWA Position Paper on Secondary and Cumulative Impact Assessment

6.1.2 Methodology

This chapter evaluates the indirect (secondary) effects of the alternatives which might occur in the reasonably foreseeable future. Indirect effects may include highway-related growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems [40 USC 1508.8].

In this analysis, indirect effects are primarily resulting from land development which could occur due to improved accessibility and mobility in the area as a result of the project. Indirect effects can have either beneficial or adverse effects on communities and natural resources.

The Delphi process was used to evaluate the project's indirect effects resulting from induced development. The process relies on the opinions of a panel of experts to provide their assessment of likely future outcomes by responding to several rounds of questions. This process included:

1. Collecting information about factors that are the most likely to influence future land development patterns

2. Making an estimate of the probable magnitude and direction of change in development patterns (i.e., indirect land use effects)

Several types of data were used to identify factors that would affect development patterns:

- Socio-economic conditions (population, employment by sub-area, and household characteristics)
- Land use patterns (location, type and extent of land development in the study area vacant land, building permits by type and location, development capacity)
- Transportation system characteristics
- Public services (primarily the availability of water and sewer connections) and
- Public policy (land use plan designation and zoning, economic development)

The induced growth analyses and findings are presented in the *Community Profile and Induced Development Technical Report* (December 2005). Additional interviews were conducted in November 2011 and the findings were summarized in a supplemental report (HDR 2011).

6.1.3 Existing Conditions

Growth Trends and Land Use

The majority of the study area is agricultural with accompanying farmhouses and accessory buildings. There are clusters of residential development along portions of the corridor (Zeitler Road, Cameron Road, Eid Road, and Clyde Road) and two areas that have a concentration of mobile homes (Woodland Heights Mobile Home Court and Hidden Village/ Benson Mobile Home parks). The northern portion of the corridor is more highly developed with a mix of uses emphasized on auto-oriented businesses.

The northern project limit extends into the City of Moscow Area Of Impact which is zoned commercial and industrial. South of Moscow, the area was recently rezoned for auto-related commercial. The rural, southern portion of the project area is zoned to support continued agricultural and forestry use in the county. The only type of residential development allowed in unincorporated Latah County is rural residential (one unit per acre). Along the alignment development is concentrated at the main county and private roads.

Indirect Effects

South of Moscow all the Action Alternatives would have a moderate to low potential to induce development in the corridor. Land use in the study area is expected to remain very similar to current conditions. Eighty-three percent of the Delphi panelists acknowledged that development is already occurring at a slow rate in the project area. They acknowledge that once the final alternative is selected, pace and intensity would increase due to the alleviation of uncertainty as to the location of the alignment.

The Delphi panelists felt that the growth would occur in the area approximately one mile south of the Moscow city limits, regardless of the alternative selected. Due to the proximity to Moscow this growth would be consistent with planning documents and existing land uses. Panelists also felt that additional development is likely to occur along the US-95 alignments that are transferred to the North Latah Highway District.

The No Action Alternative would only include safety improvements on the existing alignment and would not induce development or result in substantial indirect effects.

Any of the Action Alternatives would benefit regional trade and could facilitate new commercial and industrial uses locating to the south of Moscow in areas which are already zoned for these purposes. They would all have increased development along their alignments, however, they would be limited by the City and County land use and zoning designations. All alternatives would tie into existing county and private roads and therefore, the trend of development at these intersections and roadways would continue.

A majority of the Delphi panelists felt that the type and pace of development along the county roads of Eid, Zeitler, Snow, and Sand roads would remain constant due to the lack of direct access to the proposed alignments. Property values in the general corridor area for all of the Action Alternatives would be expected to increase immediately south of Moscow and would remain unchanged in the rest of the corridor.

To promote an efficient and safe transportation system and to maintain the agricultural and rural character of the area, the Latah County Comprehensive Plan requires that limits be placed on the number of access points to state and federal highways; and encourages bike and pedestrian routes and mass-transit as transportation options. See Chapter 9, Environmental Commitments.

Highway-induced development and other indirect effects are expected to be moderate due to the following:

- Access control along the highway is required by Latah County. The alternatives would have Type IV access control that would limit the number and spacing of approaches and access points.
- Latah County would continue to enforce the zoning regulations which only allow low-density residential development.
- The agricultural and rural character of the corridor will be maintained and will ensure consistency with the existing land use plans.

Indirect Effects by Resource

Social. The indirect effects of development may include increased noise, light and visual effects on surrounding areas. Visual quality could be degraded due to exposed soils, erosion, unnatural slopes, the addition of new roadways and structures, and changes in vegetation. There could be increased use of recreational facilities, public resources, schools, and emergency services, utility distribution, buildings and traffic along the highway and south of Moscow.

Areas south of Moscow and adjacent to the existing highway that are currently identified for development may experience higher noise levels over time. ADT volumes on this section of US-95 are expected to increase and noise levels would increase proportionately. However, they would not result in noise levels that would approach or exceed FHWA noise impact levels.

W-4 would have increased noise and visual effects to the University of Idaho Arboretum, located on a hill approximately three-quarters of a mile north of W-4. It would have potential effects to the planned ball fields and nearby senior center on the southwest side of Moscow approximately one-half mile north of W-4. W-4 would also have potential noise and visual effects to a master-planned community approximately one-quarter mile north of W-4. A new development planned near the C-3 Alignment could potentially increase traffic and traffic related conflicts and access issues in the area. C-3 would have indirect effects to businesses and approaches along the existing US-95 alignment.

The primary indirect effect of E-2 would be a visual effect to residents on Paradise Ridge due to the roadway alignment and acceleration of development. See Community Impact Technical Reports for more details.

Economic. Indirect effects to economic conditions could involve changes to visibility and access or result from declining sales or client bases that may cause existing businesses to move to new locations or cause new businesses to locate in other areas. Vehicular access is important for customers to access the business establishments and for suppliers and shipment ingress and egress. Temporary disruptions to access could adversely affect businesses. Visibility could affect retail businesses requiring drive-by traffic but could also affect non-retail businesses.

C-3 is believed by business owners to have the least indirect effects because the access would be similar, although it would be changed to a limited access facility. Traffic would continue to pass by the existing businesses which would encourage businesses to stay or locate in the area. W-4 and E-2 would have greater effects to visibility and access to existing businesses; however; they could also potentially encourage growth in the area. While safety and direct routes to and from Moscow and Lewiston are also believed to be an important consideration for area businesses and goods movement, the travel times and safety between Action Alternatives does not differ substantially.

Farmland. There could be more conversion of farmland up to one mile south of Moscow where growth is predicted with any of the alternatives. W-4 could result in greater indirect effects compared to the other alternatives because there are larger tracts of farmed land on the western corridor compared to the farmland near the E-2 corridor. The rate of farmland conversion for W-4 could also be expected to be higher because it would be closer to the universities, more accessible to the cities and closer to planned developments.

Increased development could result in farmland fragmentation for any of the alternatives. Farming smaller fields and having to transport equipment across roadways or between separated fields could decrease efficiency and affect the viability of farming. Additional expenses to the producer caused by smaller operational units and the increased demand for development property could result in the land being used for purposes other than agricultural production. The loss of agricultural land would also be felt by farm services

within the area. For additional information regarding indirect effects to farmlands see the Farmland Technical Report.

Wetlands and Tributaries. Wetlands and tributaries are present throughout the corridor including at the north end of the project within the City of Moscow area of impact. Development is already expected to occur within the City of Moscow area of impact regardless of the project. Sections 401, 402 and 404 and of the Clean Water Act regulate activities in waters of the US and would require the replacement of lost functions and values of waters of the US including wetlands.

Development could increase the amount of impervious surfaces, thus increasing the potential for high peak flows, increased sediment, incised banks, pollutants, and increased water temperatures. Since development is likely to be concentrated south of Moscow, developers would also be required to comply with City stormwater ordinances to minimize those effects. See the Wetland Technical Report for more detail.

Floodplains. Indirect effects to floodplains may result from induced residential and commercial growth. These may involve placing fill in the floodplains/floodway, vegetation removal, soil tilling, grading, and channel modification. These actions would degrade floodplain function including flood storage.

The floodplains (and a regulatory floodway) in the project area are concentrated at the north end of the project within the Moscow Area of Impact where growth is expected and along the W-4 alternative. There is no floodplain along the southern parts of the C-3 and E-2 alternatives. Development is required to comply with local floodplain regulations which would not allow a more than a one-foot rise in base flood elevations; therefore, none of the alternatives would likely result in indirect effects to floodplains.

Groundwater. The groundwater in the project area could be indirectly affected by the increase in impervious surface, increased development primarily south of Moscow where induced growth is anticipated. Development impacts to groundwater will be minimized through the compliance with the NPDES Construction General Permit and BMPs which will require quantity and quality treatment for most new developments. Limited access to US-95 would also minimize the potential induced growth and would minimize potential impacts to groundwater.

Vegetation. Thirty-two areas were identified as Palouse remnants during the 2005 inventory (Litchardt 2006). The primary threat to the persistence of Palouse remnants in their present state is colonization by weeds; expansion of those present as well as invasion by new arrivals. All remnants identified in the project area are bordered completely or partially by weedy vegetation. See the Vegetation Technical Reports and the Biological Assessment Technical Report.

New roadway alignments, induced development and weed distribution through vehicles can contribute to the establishment and spread of weeds and could contribute to the degradation of nearby Palouse remnants. Remnants within 0.6 miles of the highway are at greatest risk to weed invasion; however there are existing infestations of weeds surrounding all of the remnants (Lass and Prather 2007). Intensively managed cropland is believed to provide a more efficient buffer to new weed invasion compared to native vegetation or CRP plantings.

There are no known Palouse remnants within one mile south of Moscow; however, two remnants are within 1.25 miles south of Moscow and could potentially be affected by induced development. The numbers of Palouse remnants near the alignments are presented in Table 62. Palouse Remnants near Alternatives.

Table 62. Palouse Remnants near Alternatives

Alternative	Palouse Remnants near Alignment
No Action	0
W-4	12
C-3	14
E-2	24

W-4 and C-3 would be within 1000 feet of the nearest remnant. This could introduce new weeds contributing to the degradation of the remnant. Six Palouse remnants occur within 1000 feet of alternative E-2 and the closest is within 300 feet (Lass and Prather 2007). This includes the South End Paradise Ridge Conservation Site documented by the Idaho Conservation Data Center (CDC) in 1996 and a smaller remnant documented by CDC in 2005 as a conservation site. The Paradise Ridge is already being affected by new residential development independent of the proposed project. The CRP land could be affected by weed invasion.

There are sites in the project vicinity for which restoration activities (ecological weed control, native plant establishment and establishment of Spalding's catchfly) are occurring or planned. The E-2 Alternative would not directly affect these areas but it would bring the roadway closer compared to the other alternatives. While invasive weeds are already present to differing extents on the sites, the closer alignment could contribute to weed establishment in sites near the road. Measures that will minimize impacts due to potential weed infestations include, limiting access through the corridor which will limit future development, constructing farmable slopes, implementation of the SWPPP, and development of a weed control plan and seed mixes that will minimize weed establishment during and after construction. See Chapter 9. Environmental Commitments.

While none of the alternatives would directly affect federally listed threatened or endangered plants, they would bring the road closer to the Spalding's catchfly population and Palouse remnants. This could introduce weeds or have other indirect effects that could affect Spalding's catchfly plants found near the project area. The distance of each alternative from the Spalding's catchfly plants are shown in Table 63. Alternative Distances to Spalding's Catchfly. The project May Affect but is Not Likely to Adversely Affect (NLAA) Spalding's catchfly due to these potential indirect effects. See Biological Assessment Technical Report. Measures that will be taken to minimize harm are described in Chapter 9, Environmental Commitments.

Table 63. Alternative Distances to Spalding's Catchfly

Alignment	Approximate Distance to Spalding's Catchfly Population (feet)
No Action	1,640
W-4	1,573
C-3	2,102
E-2	4,757

Fish and Wildlife. Growth would occur with or without the project. There would likely be more dense development at the north end of the project which is already developed and lacks suitable wildlife habitat.

Development in suitable wildlife habitat and movement corridors or increased development density could further restrict migration across the US-95 corridor. The types of developments that could affect wildlife movements are commercial, industrial, and higher density residential that would occur in or near Palouse remnants, pine stands, ungulate habitat,

wetlands or water resources. This development could reduce habitat connectivity, increase habitat fragmentation, and create isolated blocks of habitat. In the long term this lack of genetic diversity could result in weaker subpopulations. See the Wildlife Technical Reports for more information.

Roads constructed due to indirect development can introduce weeds and transportation related pollutants like salt and automobile emissions. Historically, concentrations of lead in vegetation tended to be higher near roadways and could be ingested by deer. Today, lead is no longer an issue due to use of unleaded gasoline.

Deer move throughout the entire project area feeding on agricultural crops and other vegetation and are not confined to the timbered areas of Paradise Ridge. While development and associated road improvements may temporarily displace deer, they are extremely adaptable to humans. The development in areas that might serve as suitable habitat would have minimal effects and no measurable indirect effects are anticipated.

Elk tend to stay closer to security and seek cover more than deer. Therefore, induced growth along the E-2 corridor would have the greatest effect on elk because the route passes through existing cover and foraging areas in agricultural fields or CRP land adjacent to cover.W-4 passes to the east of an area of suitable habitat near the Idaho-Washington border; therefore, any development in that area could also result in indirect effects to elk. However, no long-term indirect effects on elk populations are expected to occur as a result of corridor construction within the project area (Melquist 2005a). While elk are not nearly as tolerant of humans as whitetail deer, elk have become more plentiful and expanded their range into more populated areas in recent years, and in doing so, they have become more tolerant of humans and human activity (Melquist 2005a). Elk will continue to move between Paradise Ridge and the patches of habitat along the Washington border (Rand per. com. 2005).

Movements of moose west of US-95 are less common, as habitat is limited and separated by three to four miles of agricultural fields. Nonetheless, exploratory movements by moose are likely to occur throughout the project area. The greatest indirect effect of development in this corridor might be the restriction of western movement by moose. However, their movement is random and occasional and there is ample suitable habitat outside of the area. See Wildlife Technical Reports for more detail.

6.2 Cumulative Effects

This section evaluates the potential cumulative effects of the Action Alternatives.

6.2.1 Regulatory Framework and Policies

Relevant laws, regulations and guidance that pertain to indirect effects include:

- 40 CFR 1508.7 Cumulative Effects
- FHWA Interim Guidance: Indirect and Cumulative Impacts in NEPA
- FHWA Position Paper on Secondary and Cumulative Impact Assessment
- Technical Advisory (TA) 6640.8A Guidance for Preparing and Processing Environmental and Section 4(f) Documents
- CEQ Guidance on the Consideration of Past Actions in Cumulative Effects Analysis
- CEQ Considering Cumulative Effects under the National Environmental Policy Act

6.2.2 Methodology

The methodology for determining the cumulative effects of the proposed project is based on *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997).

Cumulative effects (impacts) are defined by the CEQ regulations as "the impact on the environment which results from the incremental impact of the [proposed] action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time" [40 CFR 1508.7]. Cumulative impacts include the direct and indirect impacts of a project together with the reasonably foreseeable future actions of other projects. According to CEQ's cumulative impacts guidance, the cumulative impact analysis should be narrowed to focus on important issues at a national, regional, or local level. The analysis should look at other actions that could have similar effects and whether a particular resource has historically been affected by cumulative actions.

During the scoping period, letters were sent to the resource agencies asking them to identify issues to be studied in the EIS. Ongoing coordination with the resource agencies has continued to evaluate the potential resource effects and to address agency concerns. Based on the concerns identified during the scoping process and the potential for direct and indirect effects from the project, the cumulative effect analysis focuses on four key resources.

- Farmland-This includes conversion of farmland to other uses.
- Wildlife and Vegetation –This includes barriers to wildlife movement, fragmentation of habitat and loss of habitat for wildlife, fish and vegetation.
- Wetlands and Tributaries-This includes degradation of water quality, loss of wetlands, effects to tributaries and effects to floodplains.
- Visual effects-This includes effects to the aesthetics of the area.

6.2.3 Cumulative Effects to Resources

Development

All of the Action Alternatives would have a moderate to low potential to induce development. Land use is likely to remain very similar to current conditions in the project area. The area immediately south of Moscow within the area of impact is zoned for more dense land uses and is being developed accordingly. The southern part of the project is designated for agricultural and rural residential land uses; therefore, the existing farmland is expected to be retained. US-95 will be designated as a Type IV limited-access highway through the majority of its length which will restrict future access to US-95 and limit induced development along the highway corridor.

The key past, present and reasonably foreseeable future development projects that were considered are discussed in the Community Impact Technical Reports. Potential developments that are considered in the City of Moscow Comprehensive Plan and considered in the evaluation of cumulative effects include: the Ring Road concept, a proposed rezoning and annex for a ball park, auto-urban commercial land use along US-95 south of Moscow, auto-urban residential growth south of Moscow and an industrial park north of the South Fork of the Palouse River. See Section 3.2.3 for additional information.

Wildlife and Vegetation

Past Effects. The project is within the Palouse Bioregion. Historically, the area had scattered Ponderosa pine stands with shrubs and native bunchgrasses. Beginning in the early 1800s, with the settling of the area, the native vegetation was cleared and converted to agricultural use, grazing, and urban development. Currently up to 99 percent of the Palouse has been converted and only remnants of the Palouse Prairie vegetation remain. The remaining Palouse remnants continue to be eliminated through conversion to cropland, and to a lesser extent, urban and rural residential development. The remnants are primarily located in isolated, rocky, unproductive farmland soils and have been degraded to varying extent by

weeds. Because of their isolation, gene flow is restricted, which may contribute to reduced genetic diversity and fitness of the populations.

Big game were relatively scarce in the early 1900s, but agricultural crops and construction of stock ponds created desirable browsing areas which attracted elk and deer. This newly created habitat, in combination with a reduction in predators allowed continued growth of deer and elk populations through the mid-1950s, when populations peaked. The number of homes in the wooded areas and areas on and near Paradise Ridge continues to increase. The continual elimination of trees and shrubs that provide suitable cover for browsing ungulates and general wildlife has degraded the availability of quality habitat in the project area. Abundant suitable habitat is available outside of the project area.

Project Effects. The southern section of the project is considered to have the highest occurrences of ungulates in the project area. It is within the Thorncreek (ID2-04) linkage area, an area identified in an IDFG and ITD wildlife corridor study as a highway segment that intersects a movement corridor for deer, elk, moose and small mammals. However, the linkage area is determined to be low priority compared to other linkage areas. See Wildlife Technical Reports for more detail.

The increased projected traffic volumes through the area could deter wildlife movement and increase wild animal crashes in the area; however, the effects would be mitigated by the wider typical section that would allow for improved sight distance and recovery. While there are still expected to be wildlife collisions over time, the conditions would not cause habitat fragmentation or restrict gene flow that could result in genetically differing subpopulations. See Section 4.8 Vegetation, Fish and Wildlife Effects.

Future Effects. Delphi panelists predicted growth would primarily occur just south of Moscow, west of existing US-95 and along the highway alignments near county road intersections. Habitat loss and fragmentation resulting from the increased development on Paradise Ridge will continue, irrespective of the construction of the highway. Because deer commonly feed on lawns, ornamental plants, and fruit trees, the effects on deer would be minimal as deer thrive near humans. However, moose would likely be negatively affected as complaints by homeowners that moose are eating ornamental shrubs in their yards or tearing down fences often lead to the removal of animals. In the Paradise Ridge area, if removal

exceeds replenishment from immigration, moose would become temporary and intermittent residents.

Habitat fragmentation and habitat loss as a result of continued rural residential development on Paradise Ridge would have the greatest effect to elk. The cumulative effects of primarily current and future residential development and fragmentation and loss of habitat could be sufficient to eventually discourage elk use of the Paradise Ridge area. However, more important to the presence of elk in the Paradise Ridge area is maintaining connectivity to larger tracts of suitable habitat to the north and east, and ensuring the suitability of eastern corridor habitat patches. Unlike deer, elk are more sensitive to both temporary and permanent human intrusion into their habitats.

Current agricultural practices are expected to continue through the study area. Cumulative effects may include pesticide drift from adjoining cropland, tracking by farm equipment and RVs which can lead to sedimentation and weed dispersal.

A private loop road for development was recently constructed near Clyde Hill. Increased development on or near Spalding's catchfly plants in this area may adversely affect this federally protected plant. Weed dispersal and infestation may also adversely affect the population.

Cumulative Effects. Changes in land use as a result of the project would largely determine cumulative effects to wildlife.

Many of the wildlife species that would occur in the project area are non-native species and habitat generalist species like raccoon, white-tail deer and a variety of other common species. These species, while important locally, are mainly species already adaptable to habitat modifications, fragmentation and high levels of human use.

Elk and moose are somewhat more specific as to habitat and human use patterns. Regardless, the habitat for elk and moose is limited in quantity and quality and confined to the Paradise Ridge vicinity. Since nearly all of the elk and moose habitat is on Paradise Ridge and eastward, the cumulative effects to their habitat and to their movement is expected to be minimal.

The effects of this project when combined with effects of past, present and future private and public developments in the area could result in cumulative adverse effects to wildlife habitat and movement. It could also result in cumulative effects to Spalding's catchfly. These cumulative effects would include habitat loss, increased mortality, increased habitat fragmentation, and decreased habitat connectivity. However, IDFG expects that overall healthy populations would continue (USFWS 2007). Finally, thousands of acres of public lands with more suitable wildlife habitat are available north and east of Paradise Ridge and just over the Washington State Line. Because of the abundance of suitable habitat and the abundance of species, there is not expected to be substantial cumulative effects to wildlife and the effects would not reduce population viability.

Farmland

Past Effects. The project is located in the rolling Palouse hills of southwestern Latah County. It lies on the eastern margin of the Columbia Plateau where lava flowed into low lying areas leaving higher hills exposed. Over succeeding millennia, streams cut into the bedrock, wind-blown loess was thickly deposited over the surface, and seasonal flooding added alluvial sediments to valley floors (Bush, Provant, and Gill 1998; Othberg 1982; Rember and Bennett 1979). Highly fertile silt loam soils developed in the wind-deposited loess (Barker 1981). These geologic conditions created the basis for the highly productive Palouse soils which are farmed today.

Prior to Euro-American agricultural encroachment, the area was native grasslands and ponderosa pine, Douglas-fir, and other tree species occurring in riparian zones and on some north-facing slopes (Franklin and Dyrness 1988). Today most of the region is farmed, with wheat and legumes being the primary crops. See Section 3.3 Farmlands for a characterization of the farmland in Latah County and the project area.

Project Effects. Direct and indirect effects of the alternatives to farmland are discussed in Section 4.3 Farmland Effects and 6.1 Indirect Effects. The effects include conversion of farmland to other uses, farm fragmentation and creation of smaller less efficiently farmed areas.

Future Effects. Future development south of Moscow and near planned developments in the western corridor could increase property values and encourage conversion of farmland to other uses. However, the Latah County Comprehensive Plan designates much of the area as

agricultural. Those areas that are not zoned agricultural are closer to Moscow where growth has already been planned.

Cumulative Effects. The majority of the study area has already been converted to farmland with scattered urban and rural residential areas. Any effects from the project in combination with the projects in the foreseeable future are not expected to result in a cumulative effect to farmland and farming practices. There is abundant farmland available and the comprehensive plan is consistent with maintaining agricultural land uses.

Wetlands and Tributaries

Past Effects. Wetlands and tributaries in the South Fork Palouse River Subbasin have been extensively altered as a result of urban and agricultural development. Approximately 97 percent of the wetlands in the Palouse have been converted to crops, hay, or pasture since 1870 (Black et al. 2003). Less than one percent of the historic grassland wetlands exist today. Most of the remaining small patches of grassland and riparian vegetation disappeared between 1940 and 1989 due to the increase in agricultural activities in the Palouse.

Euro-American missionaries and settlers arrived in the Palouse region converting the land to a privately-owned commodity. Faming removed much of the native vegetation, which led to increased soil erosion and down cutting of tributaries. As a result of the down cut channels, the water table receded, permitting bottom lands and small meadows formerly considered too wet to farm, to be farmed. The introduction of reed canarygrass, which was reportedly planted to reduce stream channel erosion, resulted in an aggressive colonization of reed canarygrass dominated lowlands. The grass invaded wet meadows and provided aggressive competition to native plants. Wetland drainage further reduced the extent of the native camas meadows; during the 1950s, many of the wet depressional areas of the Palouse were drained (Weddell 2001).

Agricultural and urban development resulted in the channelizing of streams, removal of riparian vegetation, increased erosion and sedimentation and other water quality impacts (including high nutrient loading and high water temperatures). This adversely affects fish and wildlife habitat.

Project Effects. The majority of the wetlands affected by the alternatives are rated as Category III, palustrine emergent wetlands. Most are small, disturbed and less diverse than

the surrounding environment. Loss and degradation of additional wetlands and streams resulting from the alternatives would negatively affect the wetland system by further degrading water quality, vegetation removal and fill. However, temporary and permanent stormwater best management practices will also be implemented which will help mitigate for water quality effects. 23 CFR 777 and Section 404 of the Clean Water Act require mitigation for affected wetland functions and values which will compensate for wetland and surface water effects. See Chapter 9. Environmental Commitments for how effects to wetlands and tributaries will be mitigated.

Future Trends. Reasonably foreseeable urban and rural residential developments and farming activities could affect wetland and tributary functions and value through wetland fill, sediment deposit, pesticide use, vegetation removal and degradation of wildlife habitat.

Many of the wetlands and tributaries located in the sub basins are in floodplains and subject to strict development restrictions. Overall, there will continue to be conversion of wetlands to increasingly dense levels of urban development or farming in some areas. Wetland functions will be lost in some portions of the area since all mitigation will likely not be accomplished at the site of the impacts. Tributaries that are impacted will likely be relocated or replaced which could result in degradation. Wetlands and tributaries that are determined to be jurisdictional by the Corps of Engineers are subject to the requirements of the CWA, Section 404(b)(1) guidelines and mitigation outlined in the Compensatory Mitigation for Losses of Aquatic Resources; Final Rule, April 10, 2008, [33 CFR 325] and [33 CFR 332, 40 CFR 230].

Cumulative Effects. The loss of wetlands and effects to tributaries resulting from this project, along with the loss of wetlands and degradation of tributaries due to past and future urban and agricultural development, could contribute to cumulative effects. Ongoing agricultural activities, urban and rural residential growth, regardless of the construction of roads would likely cause the greatest effect to wetlands.

Floodplains

Past Effects. Floodplains in Latah County have been degraded primarily as a result of past and ongoing farmland conversion. Road construction, scattered residential and industrial development has also contributed to the degradation. As a result, there has been vegetation

removal, sedimentation and erosion and to a lesser extent bank shaping, channeling and other historical riparian modifications.

Project Effects. The W-4 and C-3 alternatives would encroach on the 100-year floodplain. Prior to construction, a detailed floodplain study, floodplain development permit and hydraulic analysis will be completed. The project will be designed to not result in a rise in base flood elevations and all structures in the floodplain will be designed to sufficiently pass hydraulic flow. Therefore the alternatives are not expected to result in a substantial effect. The E-2 Alternative would not encroach on the 100-year floodplain.

Future Effects. Predicted growth in the study area is concentrated south of Moscow and west of existing US-95 so the potential effects to floodplains are primarily associated with the South Fork Palouse River. However, that area has a designated floodway where no development is allowed. Any proposed development within the mapped 100 year floodplain is required to complete a hydraulic analysis and to apply for a floodplain development permit. Therefore it can be expected that any future developments would not substantially adversely affect the floodplains.

Cumulative Effects. Effects to floodplains in Latah County have occurred primarily as a result of past and current agricultural activities, urban and residential development. The proposed effects from the W-4 and C-3 alternatives in combination with the past, present and reasonably foreseeable future effects could contribute to cumulative effects to floodplains. However with strict floodplain development regulations these are not expected to be significant. Since the E-2 Alternative would not encroach on floodplains, there would be no cumulative effects to floodplains as a result of the E-2 Alternative.

Visual Effects

Past Effects. The Palouse was dominated by native grasslands with scattered tree stands before euro American settlement. Beginning in the early 1800s the area has continuously been converted to agricultural land with scattered urban and rural residential development. Currently the agricultural views characterize the area. Palouse remnants, the largest being Paradise Ridge, are also visible. Most of the urban development is concentrated just south of Moscow and is continuing on Paradise Ridge. Existing roadways and the power lines are now the most visible linear features in the area.

Project Effects. The project would cause a high effect to residential viewpoints. The project would result in moderate to low visual effects where the alternatives approach the City of Moscow and the setting is more developed. Effects would be the result of grading, exposed soils, erosion, and unnatural slopes. The addition of a new highway, structures, development and vegetation removal would also potentially affect the visual quality.

Future Effects. The projects in the reasonably foreseeable future would be primarily located south of Moscow and in the western corridor near the universities. The area south of Moscow is already developed and therefore there would not be a substantial effect to visual quality. Continued development on Paradise Ridge would further degrade visual quality for residential viewpoints.

Future transmission lines may potentially follow the alternatives' alignment to facilitate access and to consolidate impacts into a single corridor. This may further contribute to the additional contrast in the existing natural landscape. Direct effects to visual quality resulting from the alternatives are discussed in Section 4.11 Visual Quality Effects.

Cumulative Effects. The project would cause an overall high increase in cumulative impacts to sensitive viewers (residential viewpoints) due to the general lack of current viewshed impacts and the relatively natural setting for the majority of the alternatives, with a moderate to low increase in cumulative impacts where the alternatives approach the City of Moscow and the setting is more developed.

Potential Mitigation Measures for Cumulative Effects

While cumulative effects would result primarily from actions outside of the control of FHWA and ITD, CEQ regulations require that mitigation measures for cumulative effects be identified and discussed in this DEIS. Potential mitigation measures could include the following:

- Development projects will be required to implement mitigation for unavoidable adverse effects to wetlands and waters of the US according to the mitigation rule issued on March 31, 2008, by the EPA and the USACE under Section 404 of the CWA. These regulations are designed to improve the effectiveness of compensatory mitigation to replace lost aquatic resource functions and area, expand public

participation in compensatory mitigation decision making, and increase the efficiency and predictability of the mitigation project review process [33 CFR 332] [40 CFR 230].

- Many of the wetlands and streams are within a regulatory floodplain. The implementation of the National Floodplain Insurance Program (NFIP), a program managed by FEMA, should reduce negative effects to floodplains in the future. Through the NFIP, FEMA has established minimum federal standards for floodplain regulation that are administered locally by cities and counties with state oversight by IDWR. Projects constructed within the floodplain must be in compliance with the NFIP.
- ITD will limit access on US-95.
- ITD may plant native plant species near the roadways that would be unappealing to wildlife to minimize wildlife collisions.
- ITD may encourage farming to the edge of the roadway to control weed establishment and dispersal.
- Latah County and the City of Moscow could pass protective ordinances for development on Palouse remnants including Paradise Ridge. They could encourage planting of native plant species throughout the county.
- Latah County and the City of Moscow could pass additional protective ordinances for development on wetlands, streams associated riparian areas, and wildlife habitat areas.
- Latah County and the City of Moscow could encourage installation of watering areas further from the roadway and east of Paradise Ridge.
- Latah County, the City of Moscow or other agencies or conservation organizations could purchase properties, place development restrictions or implement other protective measures to protect Paradise Ridge and identified wildlife movement corridors from development. This could benefit wildlife and have aesthetic benefit.