

3.7 Transportation

This section describes the expected impacts of the project alternatives to transportation. The study area for transportation is the project area. More detail on transportation impacts is available in Chapter 3.7 of the Draft EIS.

What new information has been developed since the Draft EIS?

Since publishing the Draft EIS, WSDOT revised the *Transportation Discipline Report* (Appendix P), including updating traffic projections and accident data.

Comments from the public and reviewing agencies have been incorporated into this section.

What are the major characteristics of the affected environment?

What makes up the transportation system and network?

Exhibit 3-28 shows the principal roads in the project area.

State Roads. I-90 is part of the Interstate Highway System and is designated as a Rural-Principle Arterial in Kittitas County. I-90 has a posted speed limit of 70 mph at MP 70.0 in the eastern portion of the project corridor. The speed limit from Hyak to MP 70.0 varies, and is typically 65 mph along Keechelus Lake.

The project area contains three interchanges: the Stampede Pass Interchange, Cabin Creek Interchange, and West Easton Interchange. The Hyak Interchange is just west of the western project limit.

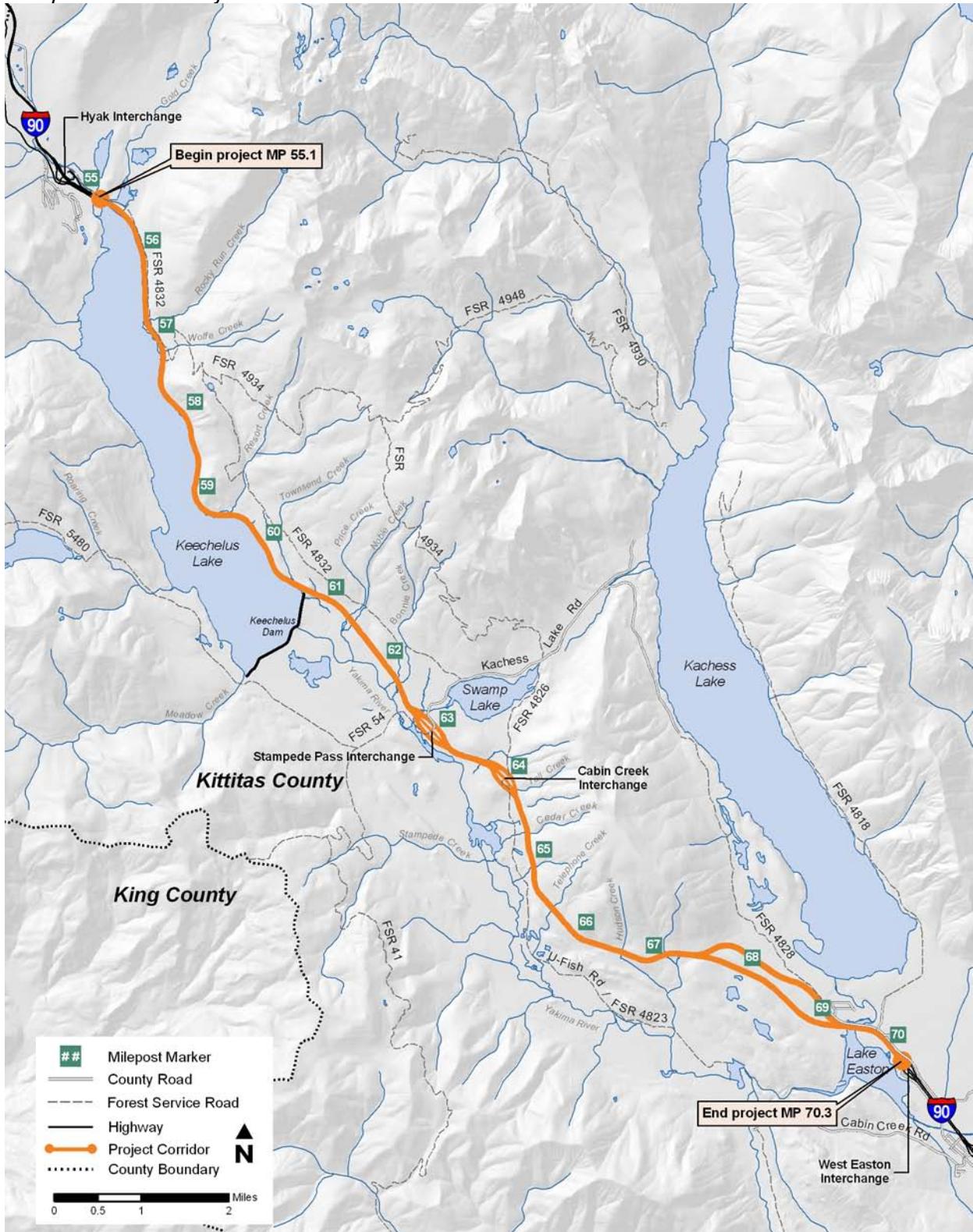


The project area near the summit of Snoqualmie Pass.



The project area ends near Easton.

Exhibit 3-28
Principal Roads in the Project Area



County Roads. There are several Kittitas County roads within the project area. Most access Kachess Lake and the private land and recreation sites in the area of the lake. Just outside the western limit of the project area, several County roads serve the developed areas at the Snoqualmie Summit.

USFS Roads. The USFS manages a number of roads in the project area that cross I-90. Most are historic logging roads, and some access private roads serving private land within the National Forest.



The USFS and Kittitas County also manage roads in the project area.

Bicycle and Pedestrian Facilities. Pedestrian access is prohibited on I-90 itself. Currently, cyclists use the 10-foot wide outside shoulders along I-90. As many as 600 cyclists use the I-90 shoulders during two bicycle rallies that occur during the summer. Use by cyclists during the remainder of the year has not been measured but is observed to be low, on the order of several cyclists per week in the summer.

The project area also is served by a large network of trails maintained by State Parks and USFS. These trails are accessed from the project corridor. Although the number of recreational users has not been measured, use is observed to be heavy. Recreational use is discussed in more detail in Section 3.10, *Recreation Resources*.

What is the current level of traffic and how is it expected to grow?

WSDOT estimates the current annual average daily traffic (AADT) for the highway at 28,100 vehicles. Traffic growth rates were estimated for the Draft EIS, using a base year of 2008 and a design year of 2028. At that time, WSDOT calculated the estimated annual traffic growth rate to be 3.5 percent, and the AADT for the design year of 2028 to be 55,500 vehicles.

WSDOT revised this calculation in February 2007, using a base year of 2010 and a design year of 2030. This calculation used additional years of monitoring data. Based on this new data, WSDOT estimated the annual growth rate to be 2.1 percent. This decrease in the projected traffic growth rate was based on several factors, including additional years of monitoring data and correction for what

appeared to be unusually high growth rates for a short period prior to the previous estimate. Using this growth rate, WSDOT estimated the AADT for the 20-year design period (Exhibit 3-29).

*Exhibit 3-29
Predicted Annual Average Daily Traffic – 2005*

Year	Predicted Annual Average Daily Traffic
2007	28,139
2010	28,849
2015	33,697
2020	35,546
2025	38,394
2030	41,243

As traffic levels go up and congestion becomes more frequent and lasts longer, the level of service (LOS) for the highway will go down. Based on the revised traffic growth figures and the physical characteristics of the highway, WSDOT estimated the decline in LOS for the project (Exhibit 3-30).

*Exhibit 3-30
Estimated Level of Service Deterioration*

Year	Annual Average Daily Traffic	Level of Service
2013	31,500	D
2025	38,400	E
2033	43,000	F

How do traffic volumes vary?

Traffic volumes in the project area are higher during the daylight hours and on weekends (including Friday, Saturday and Sunday) (Exhibit 3-31). Traffic volumes also are higher during the summer than during the winter (Exhibit 3-32).

Level of Service (LOS) Standards

LOS A – Free-flow speed prevails. Vehicles can maneuver easily; incidents such as accidents do not affect traffic flow.

LOS B – Free-flow speeds are maintained. Vehicles can maneuver easily with only slight restriction; minor incidents are still easily absorbed.

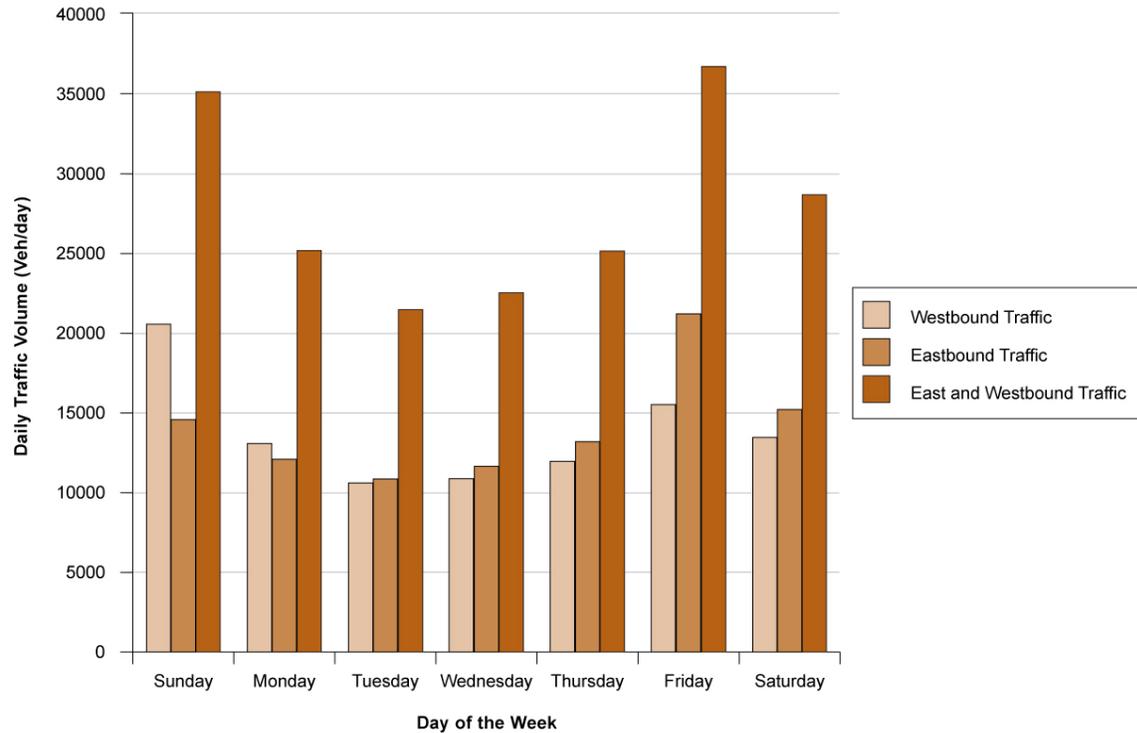
LOS C – Speed remains near free-flow, but freedom to maneuver is noticeably restricted. Minor incidents may still be absorbed, but with substantial local deterioration in service.

LOS D – Speed begins to decline slightly with increasing flows, and density increases more quickly. Freedom to maneuver is noticeably limited, and driver comfort level is significantly reduced; even minor incidents can create queuing.

LOS E – Flow is unstable, with volume at capacity. Maneuverability is extremely limited, and driver comfort level is poor; the traffic stream has no ability to absorb even the most minor disruption, and any incident will produce extensive queuing.

LOS F – Breakdown in traffic flow. Queuing forms behind breakdowns.

*Exhibit 3-31
Hourly Traffic Volumes – 2007 Yearly Average*



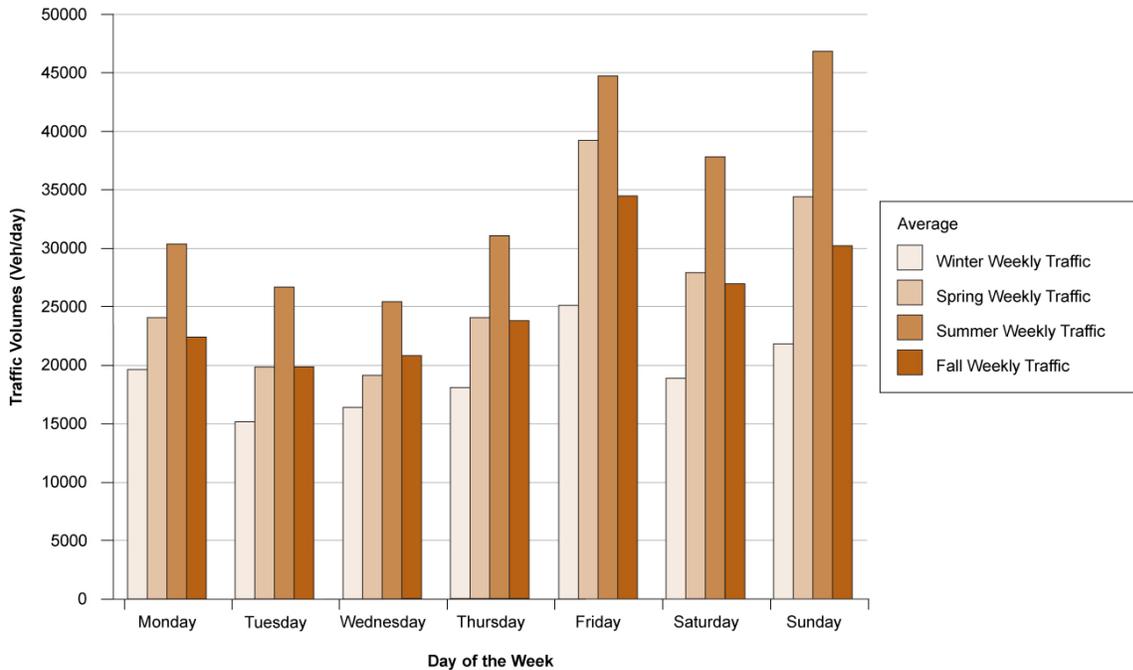
What are the primary transportation-related needs?

Avalanche Control. There are two avalanche-prone areas within the project corridor. One is in the vicinity of the existing snowshed, and the other is at Slide Curve in the vicinity of MP 59.0. The area in the vicinity of the existing snowshed contains six avalanche paths. Each winter, WSDOT's avalanche control teams actively monitor and manage these areas using explosives to stimulate controlled snow avalanches. These avalanches, though controlled, require WSDOT to close the highway in order to remove the resulting debris. Avalanche control within the project area closes I-90 an average of 42 hours each year, with 30 hours due to avalanche control activities, and 12 hours due to natural slides or extreme avalanche risk (Exhibit 3-33).



WSDOT avalanche control teams work to keep I-90 safe.

Exhibit 3-32
Seasonal Traffic Variation – 2005



Stabilizing Unstable Slopes. The project area, especially the area around Slide Curve, has a history of rock slides. Rock slides close I-90 approximately 12 hours each year, and can cause serious accidents. Since 1957, rock slides have caused nine fatalities in the project area. Unstable slope history is described in more detail in Section 3.1, *Geology and Soils*.

Repaving Deteriorating Pavement. The existing pavement is deteriorated and failing. The highway pavement has cracked both along and across the highway, and the cracked sections are tilting. The deteriorated state of the pavement forces WSDOT to devote more time and effort to normal maintenance activities such as fixing pot holes, repaving shoulders, and fixing damaged panels. These activities take time away from other needed maintenance such as ditching, vegetation management, and repairing winter damage.



Unstable slopes cause damage to the highway, put motorists at risk, and can cause delays.

*Exhibit 3-33
Historic I-90 Highway Closure Data between 1992 and 2008*

Type of Closure	Total Closure Duration (Average Hours:Minutes per Year)
Entire Snoqualmie Pass Closure	101:58
Full Closures EB and WB	43:54
Partial Closures EB	39:16
Partial Closures WB	18:48
Inside Project Corridor	61:31
Full Closures EB and WB	39:22
Partial Closures EB	15:34
Partial Closures WB	6:35
Outside Project Corridor	40:27
Full Closures EB and WB	4:32
Partial Closures EB	23:42
Partial Closures WB	12:13
Avalanche Closure Inside Project Corridor¹	41:56
Avalanche Control	29:54
Full Closures EB and WB	19:45
Partial Closures EB	6:52
Partial Closures WB	3:17
Naturally Occurring Snow Avalanches²	12:02
Full Closures EB and WB	8:35
Partial Closures EB	2:59
Partial Closures WB	0:28
Accidents Over Snoqualmie Pass	20:15
Inside Project Corridor	3:56
Outside Project Corridor	16:19
Oversize Load Detours	0:22

¹ *Avalanche-related closures are calculated by using "Avalanche Control" closure time plus 50% of "Naturally Occurring Slides/Weather" closure time per conversation with Hyak Maintenance.*

² *Values in this exhibit for "Naturally Occurring Snow Avalanches" represent 50% of the "Naturally Occurring Slides / Weather" closure time.*

The deteriorated state of the pavement also forces WSDOT to perform major repaving more often to keep the highway drivable. Overlays with hot mix asphalt, which normally last for approximately seven years, are lasting for no more than three years on this part of I-90. Asphalt is less durable under the extreme winter weather conditions on the pass.

If this project were not built, WSDOT would expect to perform the following projects to keep the pavement in a satisfactory condition:

- In 2009, existing areas of hot mix asphalt would be rotomilled and overlain with new hot mix asphalt
- In 2014, the entire corridor would be overlain with hot mix asphalt
- In 2021, 2027, 2032, 2036, and 2041, all lanes would be rotomilled and repaved with hot mix asphalt

Each of these planned pavement overlays would cause major traffic congestion and delay, and the cost of these overlays would be in addition to the cost of normal maintenance and operations.

Improving Highway Capacity. Traffic volume on I-90 is often higher than the design capacity of the highway. Peak traffic is high, and peak traffic periods are becoming more frequent. Because of the increase in traffic volume, backups are getting longer and becoming more frequent.

There are two chain-up/chain-off areas in the project corridor, and one chain-up/chain-off area just outside the project area at the West Easton interchange. The amount of space provided by these three areas is insufficient for the existing traffic volume. These areas frequently fill up during snowy weather, sometimes backing traffic into the main lanes, which adds to congestion and backups.

Frequently, chains are required only in the area of the Snoqualmie Pass Summit, which overloads the Gold Creek area. Exhibit 3-34 shows the dimensions of the existing areas.



Pavement in the project area has outlived its intended lifespan and is deteriorating rapidly.



The deteriorated state of the highway requires WSDOT to overlay the pavement with asphalt frequently, causing traffic delay and adding to costs.

*Exhibit 3-34
Chain-Up and Chain-Off Areas (feet)*

Area	Approximate MP Location	Westbound		Eastbound	
		Width	Length	Width	Length
Gold Creek	55.8	20–30	6,000	35	1,150
Bonnie Creek	62.1	20	1,000	None	None
Lake Easton	70.5	20	6,900	20	1,200

During the winter, snowplows push snow into highway ditches and the median. These areas are narrow, and the highway has limited areas for storing snow. In two sections of the project corridor, maintenance crews can plow snow only to one side of the highway. These are a 2.25-mile stretch along Keechelus Lake and a 3.3-mile section along Easton Hill. During heavy snow years, WSDOT needs to close lanes several times each year in order to remove snow from the storage areas.

Increasing Safety. Safety concerns for the project corridor include weather, sharp curves, low bridge clearance, and risks to wildlife and the public from vehicle/wildlife encounters. Weather conditions in the project area also create safety hazards, especially during the winter months. Snoqualmie Pass averages nearly 450 inches of rain and snow each year, making the travel lanes slippery and limiting visibility. Other hazards created by heavy precipitation include ice, flooding, avalanches, and rock slides. WSDOT’s records show that approximately 59 percent more accidents occur during the winter months between November and March, even though traffic is substantially lower during this period than during the summer.



Severe winter weather and sharp curves increase the risk of accidents.

Redesigning Sharp Curves. Approximately 55 percent of the corridor is composed of curves and 45 percent is straight. The sharp curves along the highway reduce sight distances and the speed at which vehicles can negotiate the curve without sliding or losing control. WSDOT analyzed the curves within the project corridor, and concluded that these individual curves met current geometric and stopping sight distance criteria for design speeds between 35 mph and 70 mph, with an average design speed of 53 mph. Speed studies

within the project corridor in 2004 showed that drivers average 66 mph, or 13 mph faster than the average design speed.

Between 1991 and 2006, there were 1,640 reported accidents within the project area. Three segments in the project area had higher-than-expected accident rates. The first section runs from MP 57.5 to MP 60.0 between Wolfe Creek and Resort Creek, where the existing highway is highly curved and constricted with concrete barriers on both sides. The second section runs from MP 61.5 to MP 63.0 between Bonnie Creek and Swamp Creek, where the existing highway is curved with an open median. The third section runs from MP 66.0 east of Telephone Creek to MP 70.0 at the bottom of Easton Hill, where the existing highway is highly curved and constricted with concrete barriers on both sides. Poor pavement conditions and inclement weather also contribute to the accidents in these locations.

Replacing Low-Clearance Bridges. The overpass bridges at the Stampede Pass, Cabin Creek and West Easton Interchanges are lower than the state standard of 16 feet, 6 inches. These low-clearance bridges require oversized loads to detour around the interchanges, and can pose a safety hazard.

In October 2007, an oversized load struck the Easton overpass bridge at MP 71.0, one mile east of the project end point, causing severe damage to the overpass. The Easton overpass bridge design is the same as the overpass bridges in the project area. The bridge span over the eastbound lanes was damaged, and WSDOT repaired and repaved this part of the bridge as part of an emergency contract in December 2007.



Accidents occur more frequently in areas where the highway is sharply curved.



An oversized load hit the Easton Bridge outside the project limits, causing extensive damage. Similar low bridges occur at two interchanges in the project area.

What are the expected environmental consequences?

What beneficial effects would result?

No-Build Alternative

The No-Build Alternative would result in no beneficial effects to transportation. The current transportation problems would continue and worsen over time.

Build Alternatives

Solving the transportation problems is part of the project's purpose and need. Under all of the build alternatives, WSDOT would replace the existing deteriorated pavement, widen the existing four-lane highway to six lanes, add additional chain-up and chain-off areas, and straighten unsafe curves. These improvements would have the following beneficial effects:

Avalanche Control. Under all of the build alternatives, WSDOT would make improvements at all of the avalanche chutes. These would include scaling (forcing loose rocks to fall in a controlled setting), bolting, wire mesh, reducing the steepness of the slope, and improving catchment areas. WSDOT would revegetate cut slopes with soil. The existing snowshed would be replaced with a larger and longer structure under all of the Keechelus Lake Alignment Alternatives except Alternative 1. WSDOT designed these improvements to prevent all avalanches that have a 30-year return period or less from reaching the highway.

Highway Capacity Improvements. Constructing additional lanes would increase the highway's capacity substantially. Exhibit 3-35 shows that constructing the Preferred Alternative would delay the deterioration to LOS D by approximately 23 years compared to the No-Build Alternative. These beneficial effects would be similar for all of the build alternatives.



The new snowshed will cover the entire width of I-90, preventing avalanches from reaching the highway at this location. (Design Visualization)

Avalanche return period: the average expected time between events reaching or exceeding a given positions. Larger return periods imply that the avalanche is larger. A 30-year return period event is the largest avalanche expected every 30 years (Canadian Avalanche Association).

*Exhibit 3-35
Change to Level of Service – Preferred Alternative vs No-Build Alternative*

LOS	Preferred Alternative		No-Build Alternative	
	Year	AADT	Year	AADT
D	2041	47,500	2013	31,500
E	2058	57,200	2025	38,400
F	2070	64,000	2033	43,000

AADT – annual average daily traffic

Unstable Slope Stabilization. WSDOT would stabilize slopes using methods including scaling, bolting, installing wire mesh, or reducing the steepness of the slope (see Section 3.1, *Geology and Soils*). Sufficient catchment at the toe of the slopes would be provided so that rock fall would not reach the highway.

Low-Clearance Bridge Replacement. Replacing low-clearance bridges with new structures that meet or exceed the minimum 16-foot 6-inch clearance would reduce the need for oversized trucks to detour around them and reduce the risk of accidents. Replacing the snowshed would eliminate the need to close the eastbound lanes in order to move oversized loads around it because of its low clearance.

Additional Chain-up/Chain-off Areas. WSDOT would build additional chain-up/chain-off areas where conditions are favorable (Gold Creek to Wolfe Creek, Resort Creek to Townsend Creek, and Price Creek to Bonnie Creek) under all the build alternatives (Exhibit 3-36). Chain-up areas would be 30 feet wide, and chain-off areas would be 20 feet wide. This would reduce the potential for chain-up/chain-off activities to interfere with normal traffic flow, and would concentrate chain-up/chain-off areas closer to the Snoqualmie Pass summit, where they are needed most.



WSDOT installs rock bolts and netting to improve safety from rock fall within the project area.

*Exhibit 3-36
Proposed Chain-Up/Chain-Off Areas*

Direction	MP	Approximate Length
Westbound	Between MP 55.5 and 57.3	1.81 miles (10,000 feet)
Westbound	Between MP 59.8 and 60.7	0.92 miles (5,000 feet)
Eastbound	Between MP 55.8 and 56.8	0.99 miles (5,200 feet)

Increased Snow Storage. Under all of the build alternatives, snow storage capacity would improve substantially. Non-paved medians would be widened, except where narrower medians are needed to minimize impacts to wetlands, forests, and construction activities. Winter snow plowing operations would continue to direct snow to the outside of the highway in areas with paved medians. Paved medians would be widened where possible, but would continue to provide limited or no snow storage capacity. Paved medians would be a minimum of 24 feet wide, except in the vicinity of Gold Creek, where the minimum paved median width would be approximately 18 feet for roughly 1,000 feet.

Replacing Deteriorating Pavement. All of the build alternatives would replace the existing pavement with new Portland cement concrete pavement. This would eliminate the need for repeated asphalt overlays to keep the highway in a driveable condition. In addition to being more durable, the new road surface would be smoother and would result in less wear on vehicles using the highway. Long-term maintenance costs would be reduced, since Portland cement concrete pavement has a 50-year design life, and the design includes dowel bars that would help prevent faulting in the future.

Increased Safety. Under all of the build alternatives, FHWA and WSDOT would design the new highway to meet a 65 mph design speed between Hyak and Keechelus Dam, and a 70 mph design speed between Keechelus Dam and Easton. Safety would improve substantially through increased shoulder width and a straighter alignment with longer sight distances. New or longer bridges at critical wildlife crossing locations would reduce the number of vehicle/wildlife collisions. Improvements to unstable slopes and

avalanche chutes would further reduce the risk of accidents. WSDOT estimated that together these improvements would reduce accident risk over existing conditions by 20 percent to 30 percent along Keechelus Lake, and by 30 percent to 35 percent in the remaining project area.

Reduced Operation and Maintenance. The build alternatives would reduce many maintenance and operations activities, including pavement repair and snow hauling. Other maintenance activities would increase, such as plowing the additional lanes, maintaining the avalanche control structures, and additional de-icing and general maintenance for the longer bridges. These changes would require WSDOT to hire a small number of additional maintenance staff and purchase additional snow removal equipment. See Section 2.6, *What would the project cost?*

What adverse impacts are expected?

No-Build Alternative

The No-Build Alternative would not result in any temporary impacts due to construction. This alternative would not result in any direct adverse impacts. However, it would create indirect impacts as traffic volumes grow and safety and capacity problems worsen.

Build Alternatives

Temporary Impacts

Auto and Truck Traffic. The primary temporary impacts to transportation would take place during construction. These impacts would include detours, construction work zones, and reduced speed limits.

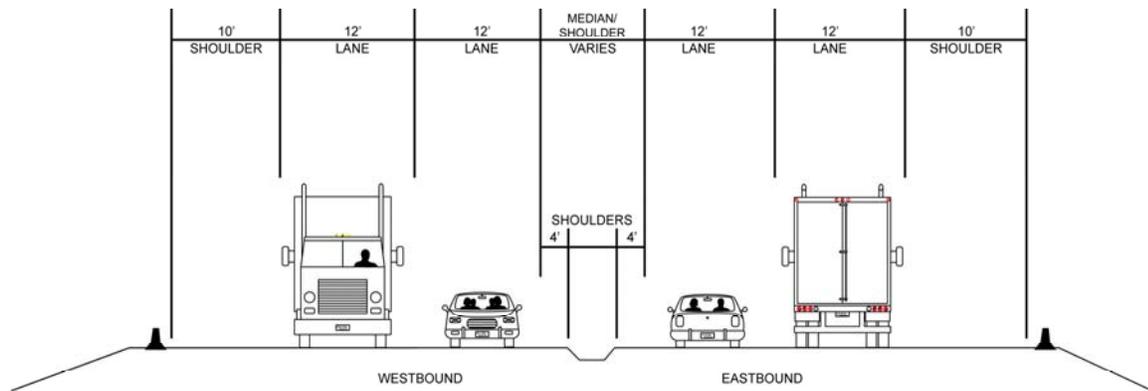
Construction would sometimes require WSDOT to reduce traffic to a single lane; however WSDOT would keep lane closures as short as possible and would typically limit them to Monday through Thursday during low traffic periods. During blasting operations, traffic traveling both directions would be required to stop as a safety measure.



Within the project area, ecological connectivity structures would reduce wildlife/vehicle collisions.

Currently, the existing typical highway cross section consists of four 12-foot lanes (two in each direction of travel), 10-foot outside shoulders, and four-foot inside shoulders (Exhibit 3-37).

*Exhibit 3-37
Existing Highway Cross Section*



During construction, WSDOT would use a similar alignment. Detour alignments would physically separate traffic from the work zone and would include four 12-foot lanes, two in each direction of travel. Both the inside and outside shoulders would be four feet wide. Each direction of travel would be separated by a temporary concrete barrier. The traffic capacity of the construction detour alignment would be reduced from 2,000 to 1,300 vehicles per hour per lane, as a result of the unfamiliar alignment and reducing the speed limit to 55 mph in the work zone. All detour alignments would be located within the project's disturbed area, and detours would not create additional environmental impacts.

Construction would usually stop for the winter months, and traffic would be separated from construction zones using a four-lane configuration similar to existing conditions where possible.

Bicycle Traffic. Bicycle traffic would be affected during construction, since the existing shoulder may become hazardous or temporarily unusable. Along the narrow area of the highway along

Keechelus Lake, it would be particularly difficult for bicycles and vehicles to coexist.

Conceptual Construction Phasing

Each of the build alternatives would result in different construction phases, and WSDOT will determine the exact sequence of construction steps during final design and permitting. For the Preferred Alternative, WSDOT would use the following general approach to Phase 1 of the project, the funded phase between Hyak and Keechelus Dam.

- **Phase 1A.** Build a detour bridge at Gold Creek, develop the materials site at Rocky Run Creek, and stockpile and process material from the Rocky Run Creek site at Crystal Springs Sno-Park. This sub-phase would begin in 2009 and last for one construction season.
- **Phase 1B.** Widen the highway between MP 55.1 (the project end point at Hyak) and MP 57.5, including the bridges at Gold Creek and the culverts at Rocky Run Creek, Wolfe Creek and Unnamed Creek (MP 57.3). This sub-phase would begin in 2010 and last for four construction seasons.
- **Phase 1C.** Widen the highway from MP 57.5 to the end of Phase 1 at MP 59.9, including the culverts and bridges at Resort Creek, Unnamed Creek (MP 59.7), and Townsend Creek, and construct the new snowshed. WSDOT will extend Phase 1C past MP 59.9 if funding allows. This sub-phase would begin in 2011 and last for five construction seasons.

More detailed information on potential construction phasing for the Preferred Alternative can be found in the revised *Transportation Discipline Report* (Appendix P).

Permanent Impacts

The build alternatives would not create either direct or indirect permanent adverse impacts to transportation.

How will FHWA and WSDOT mitigate for adverse environmental impacts?

Best Management Practices

BMPs for transportation will be designed to meet commitments and performance standards that apply to temporary traffic control during construction, as well as the *Standard Specifications for Road, Bridge, and Municipal Construction* (WSDOT 2008b) and all other applicable WSDOT design manuals and standards.

WSDOT will implement a comprehensive communications program during construction, which could include the following:

- Highway Advisory Radio messages during construction
- Newsletter with pertinent construction information for travelers
- Install the Intelligent Transportation System early enough to be used during construction

WSDOT has considered several options to manage bicycle traffic, and currently plans to use a combination of four options:

- Informing local bike clubs of planned closures so that they can alert their members
- Temporary bicycle detours through the construction zone
- Temporary closures with event shuttles and posted detour routes
- Equipping incident response team vehicles with bicycle racks that could accommodate three to four bicycles so that the incident response team vehicles could give bicyclists rides through the construction zone

Compensatory Mitigation

Since there will be no permanent adverse impacts to transportation, no compensatory mitigation will be required.



WSDOT has developed an environmental outreach program to educate people about the I-90 project.

3.8 Noise

This section discusses expected noise impacts to humans resulting from construction and operation of the project alternatives. Noise impacts to wildlife are discussed in Section 3.6, *Terrestrial Species*. The study area for noise includes residential dwellings and campgrounds classified as sensitive land uses or sensitive noise receptors within 500 feet of the I-90 pavement edge. For more detailed information on noise impacts see Section 3.8 of the Draft EIS, the *Noise Discipline Report* (WSDOT 2003d) and the *Noise Discipline Report Supplement* (Appendix R).

What new information has been developed since the Draft EIS?

Since publishing the Draft EIS, WSDOT produced the *Noise Discipline Report Supplement* (Appendix R). This report re-evaluated noise impacts from traffic growth and analyzed the feasibility and reasonableness of construction of a noise barrier wall at five sites in the project area. WSDOT added a revised method to evaluate potential noise impacts and re-analyzed the residential equivalency for campgrounds.

The WSDOT *Traffic Noise Analysis and Abatement Policy and Procedures* (WSDOT 2006d) were revised in 2006 to limit the study area for noise to 500 feet from the pavement edge. As discussed in Section 3.7, *Transportation*, WSDOT re-evaluated the traffic growth rate and changed the project design year to 2030. These items were incorporated into the analysis in the *Noise Discipline Report Supplement* (Appendix R).

Comments from the public and reviewing agencies have been incorporated into this section.



Construction operations will create increased noise levels within the project area.

What are the major characteristics of the affected environment?

The project area is mostly rural and lightly developed. Areas sensitive to noise are limited to a small number of cabins and several campgrounds.

Baseline Noise Levels

WSDOT performed baseline monitoring in 2002 for representative dwellings and campgrounds in the study area to determine the existing conditions. Sound levels were modeled in 2003, and the model was validated using the earlier, measured values. Peak-hour traffic sound levels for 2007 were modeled using the validated noise model. Modeling results showed that sound levels from peak-hour traffic at 24 existing homes, 16 campsites, and one picnic area currently exceed FHWA's Noise Abatement Criteria (Appendix R). Exhibit 3-38 shows monitoring and modeling locations and Exhibit 3-39 shows model results for 2007.

State and County Noise Regulations

The Kittitas County Noise Ordinance establishes noise standards for County roads, but it does not explicitly specify what sound levels are considered to be unacceptable within certain areas of the county.

The noise ordinance states that it is unlawful to create noise "*which unreasonably disturbs the peace, comfort, or repose of others.*" The noise ordinance further states that motors, engines, motorcycles, and snowmobiles may not generate noise within 200 feet of a dwelling, and limits noise between 10:30 pm and 7:00 am in residential areas. The Kittitas County Noise Ordinance applies only to private citizens. It is not directly applicable to noise generated by constructing or operating the I-90 project.

Exhibit 3-38
Modeled Noise Receptors

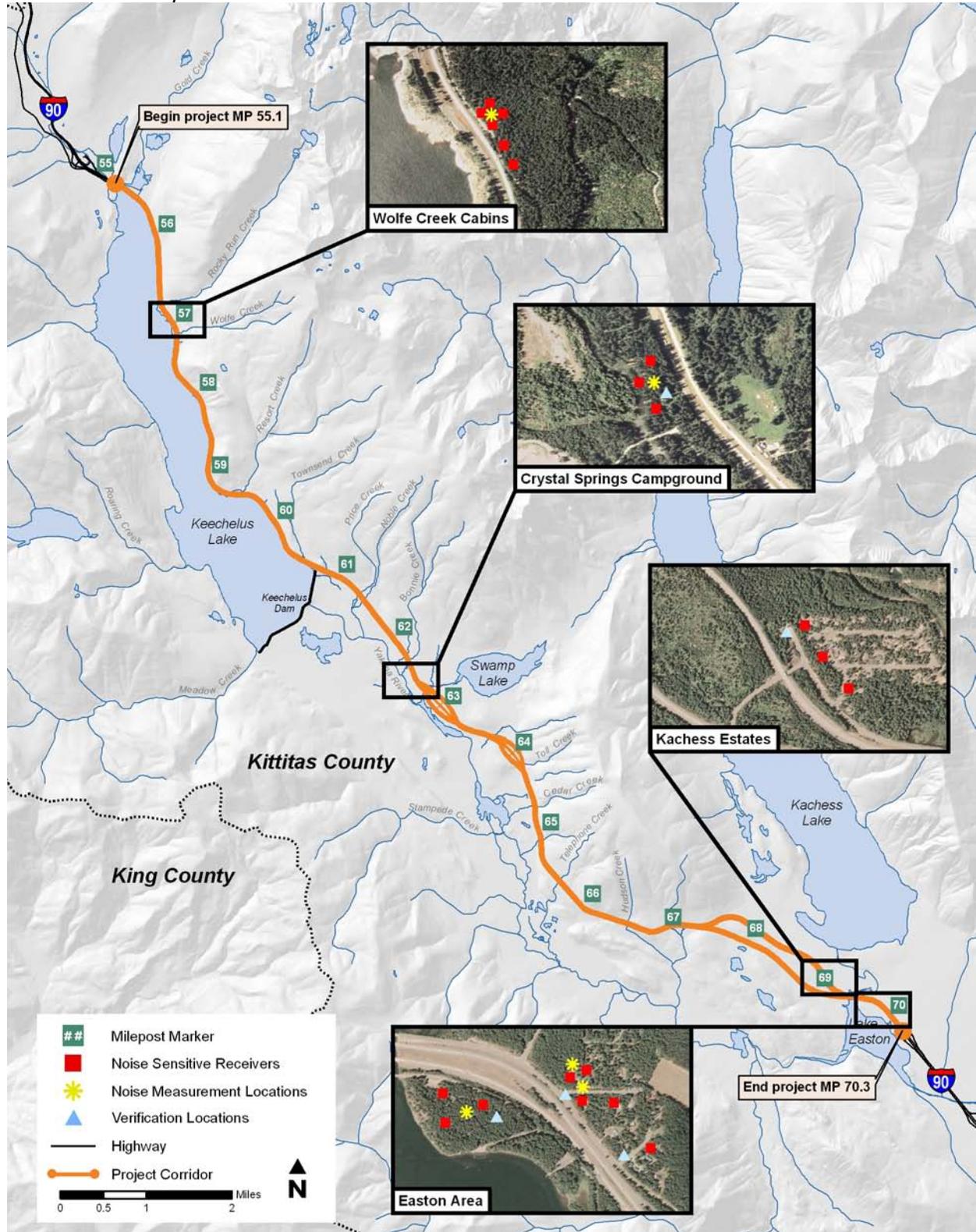


Exhibit 3-39
Noise Model and Validation Results for 2007

Location	Measured Value (dBA)	Modeled Value (dBA)	Difference (dBA)
Wolfe Creek - Validation	65.3	64.8	+/-0.5
Crystal Springs - Validation	61.8	60.9	+/-0.9
South - Lake Easton State Park - Validation	61.8	60.2	+/-1.6
North - Homes near the Easton Municipal Airport - Validation	73.6	71.6	+/-2.0
North - Homes in or near the Lake Easton Estates	63.0	62.3	+/-0.7

Source: Noise Discipline Report Supplement (Appendix R)
dBA – A-weighted decibel

Washington State regulations establish limits for noise exposure. Temporary daytime construction is exempt from these limits; however, the limits would apply to nighttime construction between 10:00 pm and 7:00 am. For purposes of noise impacts, WSDOT policy regards construction and operation of a freeway to be a commercial activity. The allowable noise levels from commercial activities are shown in Exhibit 3-40.

Exhibit 3-40
Construction Noise Limits

Averaging period	Daytime Limit (dBA)	Nighttime Limit (dBA)
L _{2.5} (1.5 minutes per hour)	72	62
L _{8.3} (5 minutes per hour)	67	57
L ₂₅ (15 minutes per hour)	62	52

Source: Washington Administrative Code 173-60
dBA – A-weighted decibel

What are the expected environmental consequences?

A noise impact occurs when a predicted traffic noise level at the design year approaches or exceeds the noise abatement criteria, or when the predicted traffic noise level substantially exceeds the existing noise level.

State and federal standards state that a noise level of 66 dBA is considered to approach the noise abatement criteria (67 dBA), while a noise level greater than or equal to 67 dBA is considered to exceed the noise abatement criteria. A 10 dBA increase over existing noise levels is considered to be a substantial increase.

What beneficial effects would result?

Neither the No-Build Alternative nor the build alternatives would result in any beneficial noise effects.

What adverse impacts are expected?

No-Build Alternative

The No-Build Alternative would not result in any direct or indirect adverse noise impacts.

Build Alternatives

Temporary Impacts

Construction equipment would be the primary source of temporary noise impacts for any of the build alternatives. The types of construction equipment WSDOT expects to use for highway construction include trucks, pavers, backhoes, bulldozers, scrapers, loaders, pneumatic tools, and blasting equipment. Based on the assumed types and number of equipment, and their estimated noise levels, the combined sound levels caused by simultaneous use of these pieces of equipment are estimated to be at a steady sound level of 88 dBA, exceeding 91 dBA for 10 percent of the time, measured at 50 feet from the source (WSDOT 2003d). WSDOT expects staging and stockpiling sites to generate noise levels consistent with other construction areas where construction vehicles and equipment would be in use.

Sound levels of 88 dBA to 91 dBA are the highest noise levels WSDOT expects from general construction, and noise would be lower during the majority of the construction period. Construction noise would not be heard in the entire project area at the same time. Construction of the project would take place in phases, with

temporary noise impacts expected to last for no more than one or two construction seasons at each location.

Blasting for the I-90 project could produce noise levels as high as 130 dBA (WSDOT 2006d). Impact hammering of pilings and casings could produce maximum noise levels of 110 dBA. Unattenuated blasting noise could extend for several miles. However, noise is limited by the mountain ridgelines surrounding the project area, which act as berms to reduce noise.

Because daytime construction activities are exempt from Kittitas County and Washington State noise regulations, the project is not subject to any regulatory requirements for daytime construction. WSDOT considers these noise levels to be unavoidable temporary impacts typical of major construction projects.

Temporary noise impacts would be felt by cabin owners and campers near the highway at the Crystal Springs Campground and Lake Easton State Park. It is unlikely that construction noise would affect hikers and bicyclists along the John Wayne Pioneer Trail, which is more than 500 feet from the highway at its nearest point.

In addition to daytime construction, some nighttime construction could be required because of the short construction season and high daytime traffic volumes. Nighttime construction activities would be subject to Washington State noise level regulations (Washington Administrative Code [WAC] 173-60). WSDOT would secure night work permits through Kittitas County and would conform to these regulations. WSDOT would specify noise mitigation measures for nighttime construction in the vicinity of sensitive noise receptors as part of its construction contracts. WSDOT has adopted the FHWA criteria for evaluating noise impacts associated with federally-funded highway projects (23 CFR 772).

WSDOT would construct tunnels under Keechelus Lake Alignment Alternatives 1, 2, and 3, which would require additional equipment and blasting. WSDOT estimates that tunnel construction would occur 24 hours a day for at least two years. Cabins located near Wolfe Creek would likely experience noise impacts from the tunnel

construction. Cabins at Resort Creek also could experience noise impacts from tunnel and bridge construction.

Permanent Impacts

Traffic noise was modeled for the study year of 2007 and the design year of 2030, using the projected traffic volumes for those years and the FHWA traffic noise model.

Traffic noise was modeled at the monitoring locations in the study area (Exhibit 3-38). Future increases in traffic volume would generate higher traffic sound levels along the project corridor and would cause sound levels to exceed the Noise Abatement Criteria at four of the five monitoring locations. The highest future sound level would be approximately 76 dBA at a home situated north of I-90 between Sparks Road and the highway.

At all sites, the modeled increase is between one and four dBA. The Preferred Alternative would result in a very slight increase over the No-Build Alternative, from zero to one dBA. This increase would be similar for any of the build alternatives. People generally cannot detect differences of one to two decibels (dB) between sound sources. Under ideal conditions, some people can detect differences of three dB. Most people would perceive a five dB change.

Residents in the project area would sometimes have a different experience of noise levels than that predicted by noise models. This is because temperature inversions and wind conditions can sometimes refract and focus sound waves toward a location at greater distance from the sound source. Consequently, the sound level environment can be highly variable, depending on local conditions.

Noise impacts approached or exceeded federal criteria of 67dB at five locations: Wolfe Creek cabins, Crystal Springs Campground, Lake Easton State Park, homes near Easton Municipal Airport, and homes south of Kachess Lake.

How will FHWA and WSDOT mitigate for adverse environmental impacts?

Best Management Practices

BMPs for noise will be designed to meet applicable commitments and noise standards, including Washington State and Kittitas County noise requirements. Some example BMPs that WSDOT could use to comply with these standards include requiring contractors to:

- Equip construction equipment engines with adequate mufflers, intake silencers, or engine enclosures
- Turn off construction equipment during prolonged periods of nonuse
- Locate stationary equipment away from sensitive properties where feasible
- Erect noise berms and barriers as early as possible
- Request that USFS close adjacent roads where noise impacts would combine with noise impacts from project construction
- Impose seasonal restrictions on construction near nest sites or other locations for species listed under the ESA

Compensatory Mitigation

WSDOT studied possible noise mitigation measures, including altering horizontal and vertical alignments, managing traffic, and constructing noise barrier walls. Construction of noise barriers was considered at five sites: the Wolfe Creek cabins, Crystal Springs Campground, Lake Easton State Park, homes near the Easton Municipal Airport, and homes south of Kachess Lake.

WSDOT guidance, which is based on federal noise abatement standards, stipulates that noise mitigation shall be implemented only if it is both feasible and reasonable. A number of factors go into

determining whether noise abatement measures are feasible and reasonable, including:

- Achievable noise reduction
- Cost of abatement per unit or dwelling benefited
- Highway safety (obstruction of sight distance along curves)
- Environmental effects of abatement construction

For a noise barrier to be considered feasible, it must be constructible without adversely affecting either the structural integrity of the highway or sight distances along curves. The barrier must provide a minimum five dBA reduction for the first row of receivers, with at least one receiver having a seven dBA reduction. Efforts also must be made to attain a 10 dBA or greater reduction in sound levels at the first row of receivers.

After determining that constructing a noise barrier is feasible, FHWA and WSDOT must determine whether constructing the barrier is reasonable, based primarily on the cost of the barrier wall relative to its expected benefits. WSDOT analyzed feasibility and reasonableness for noise barrier walls in 2003, and found that at all five sites, noise barrier walls would be too expensive to meet WSDOT's reasonableness criteria.

WSDOT re-analyzed all five sites in 2008 using FHWA's Noise Abatement Criteria. WSDOT found that a noise wall at Lake Easton State Park campground would be both feasible and reasonable, and State Parks has requested that a noise wall be built. However, WSDOT based this conclusion on current guidance and the worst-case scenario, since WSDOT did not conduct a survey to determine whether the sites were within 500 feet of edge of I-90 pavement. A noise wall at Lake Easton State Park would not impact views for any residents since there are no residences in the area of the wall.

Lake Easton State Park is not within the currently funded portion of the project. When funding becomes available for this portion of the

I-90 project, WSDOT will conduct a supplemental noise analysis that addresses potential noise impacts and the feasibility of a noise barrier wall. WSDOT will continue to consult with State Parks to determine whether a noise wall or other suitable noise mitigation measure is required at Lake Easton State Park.

3.9 Historic, Cultural, and Archaeological Resources

This section discusses the expected impacts from the project alternatives to historic, cultural, and archaeological resources. The study area for cultural resources is 400 feet on either side of the existing I-90 edge of pavement. For cultural resources studies, this area is referred to as the area of potential effect. Additional information on archaeological resources can be found in *Evaluative Testing of Eleven Sites for the WSDOT's I-90 Snoqualmie Pass East Project* (WSDOT 2004b). For a discussion of the cumulative impacts of the project within the context of past actions, present actions, and reasonably foreseeable future actions, see Section 3.16, *Cumulative Effects*.

What new information has been developed since the Draft EIS?

Since publishing the Draft EIS, WSDOT completed the *Materials and Staging Report* (Appendix E) and modified the project design to include replacing the snowshed at MP 58.1 with a longer structure spanning all six lanes. The snowshed is a historic bridge structure listed on the NRHP. FHWA and WSDOT analyzed the decision to remove the snowshed as required under Section 4(f) of the Department of Transportation Act. This analysis is presented in Chapter 5, *Programmatic Section 4(f) Evaluation*. FHWA, WSDOT, and the State Historic Preservation Officer (SHPO) at the Washington State DAHP completed a Memorandum of Agreement establishing mitigation for removal of the snowshed, which appears as an appendix to Chapter 5 in this document.

Comments from the public and reviewing agencies have been incorporated into this section.

What are the major characteristics of the affected environment?

WSDOT inventoried the project area for cultural, historic and archeological resources prior to publishing the Draft EIS. Within the project area, WSDOT found a total of 58 cultural resources, of which 37 are archaeological resources and 21 are historical architectural or engineering resources. One site, the snowshed, is listed on the NRHP, and 12 other sites were eligible for listing.



The snowshed is listed on the National Register of Historic Places, based on its method of construction.

Detailed results of the inventory are found in Section 3.9 of the Draft EIS and in the *Cultural Resources Discipline Report* (WSDOT 2003e), which also contains a description of the historical setting.

What are the expected environmental consequences?

What beneficial effects would result?

Neither the No-Build Alternative nor the build alternatives would result in any beneficial effects to cultural, historic, or archaeological resources.

What adverse impacts are expected?

No-Build Alternative

The No-Build Alternative would not result in any direct or indirect adverse impacts to cultural, historic, or archaeological resources.

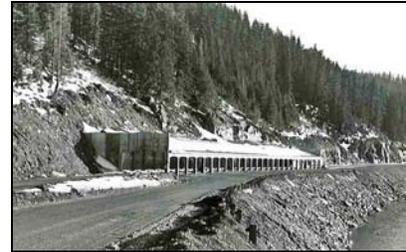
Keechelus Lake Alignment Alternatives

Temporary Impacts

The major potential temporary impact to historic, cultural, and archaeological resources would be inadvertent disturbance of previously unknown objects or sites. This potential impact would be similar for any of the build alternatives. WSDOT will develop a project-specific unanticipated discovery plan to cover pre-construction, construction activities, and cultural resource monitoring for each phase of the project.

Permanent Impacts

Keechelus Lake Alignment Alternatives 2, 3, and 4 (the Preferred Alternative) would require removing and replacing the snowshed, which is a historic structure listed on the NRHP. None of the build alternatives for the Keechelus Lake Alignments or for the remaining project area would result in either direct or indirect impacts to any other known historic, archaeological, or cultural resource in the area of potential effect.



The existing snowshed, built in 1950, only covers two of the four lanes on I-90 and does not adequately protect the highway from avalanches, or accommodate traffic volumes and oversized loads.

FHWA and WSDOT analyzed removal of the snowshed under Section 106 of the National Historic Preservation Act, and Section 4(f) of the Department of Transportation Act of 1966. Section 106 and Section 4(f) regulate the use of historic, cultural, and archaeological resources by transportation projects.

Section 106

Section 106 promotes historic preservation by ensuring that historic properties are considered as part of a federal agency's decision-making process. Section 106 establishes a consultation and agreement process that FHWA must follow before approving WSDOT actions that have the potential to adversely affect cultural resources. The process includes the following steps:

1. ***Consultation.*** Consultation is a major component of the archaeological and historical survey. For this project, WSDOT carried out Section 106 consultation with FHWA, affected tribes including their Tribal Historic Preservation Officer (THPO), the SHPO from the Washington State DAHP, and the federal Advisory Council on Historic Preservation, which oversees Section 106 compliance. WSDOT consulted with the Confederated Tribes of the Colville Reservation, Muckleshoot Tribe, Snoqualmie Tribe, Tulalip Tribe, Wanapum Tribe and Yakama Nation. During consultation, WSDOT agreed to coordinate revegetation and mitigation plant lists with interested tribes to include plants traditionally used by Native Americans.



Cabins along Old US Highway 10 in the 1930s.

2. ***Determining NRHP Eligibility.*** NRHP eligibility is determined in the archaeological and historical survey by licensed professionals. WSDOT confirmed NRHP eligibility determinations in consultation with the SHPO and the THPOs.

3. ***Determining Adverse Effects.*** FHWA and WSDOT must determine if the project would have an adverse effect on any historic, cultural, or archaeological resources, based on the Section 106 criteria defined in CFR 800.5(a)(1), on all eligible resources within the area of potential effect. FHWA and WSDOT, in consultation with the SHPO and THPOs, determined that no cultural or archaeological resources would be adversely affected, and only one historic resource (the snowshed) would be adversely affected by the project. Following the decision to remove the snowshed, the lead agencies made a separate determination of impact for that resource and concluded that there would be an adverse impact. The DAHP concurred with these determinations.

4. ***Memorandum of Agreement.*** FHWA, WSDOT, and DAHP signed a Memorandum of Agreement on October 10, 2007. (See Chapter 5, *Programmatic Section 4(f) Evaluation*). This agreement commits FHWA and WSDOT to carry out measures to mitigate for adverse impacts to the snowshed.

Section 4(f)

Section 4(f) of the Department of Transportation Act prohibits the use of NRHP-eligible or -listed cultural and recreational resources for transportation projects unless there is no prudent and feasible alternative. If a project causes an adverse effect to an NRHP-eligible or -listed resource, it is considered a “use” under Section 4(f), and a Section 4(f) evaluation must be prepared. FHWA concluded that removal of the snowshed is a use under Section 4(f) and prepared a Programmatic Section 4(f) Evaluation, which appears as Chapter 5 of this document.

How will FHWA and WSDOT mitigate for adverse environmental impacts?

Avoidance and Minimization

Both Section 106 and Section 4(f) require FHWA and WSDOT to avoid or minimize impacts to cultural, historical, and archaeological resources to the extent possible. The project has successfully avoided impacts to all such resources in the project area except for the existing snowshed.

WSDOT sought to avoid impacts to the snowshed throughout project planning. However, after evaluating various project alternatives, FHWA, WSDOT, and the SHPO concluded that because of safety, constructability, and operational concerns that reach an extraordinary magnitude, retaining the snowshed did not meet the project's purpose and need, and for these reasons, is not prudent and feasible.

FHWA and WSDOT took the following measures to avoid impacts to eligible resources, including the snowshed:

- The lead agencies considered a wide range of initial alternatives to meet the project's purpose and need. Alternatives were eliminated only if they were found not to meet the project's purpose and need, had unacceptably high environmental consequences, or if the construction and operations reached extraordinary magnitude.

- Once the Common Route was advanced for further study, the lead agencies developed four alternatives for the Keechelus Lake Alignment, all of which would have avoided impact to the snowshed. Alternative 1 included a tunnel that would avoid the snowshed completely. Alternatives 2, 3 and 4 would have avoided the snowshed by building a viaduct over Keechelus Lake in front of the snowshed. As discussed in Chapter 2, Alternative 1 was rejected because of its extremely high cost. FHWA and WSDOT modified Alternatives 2, 3 and 4 to use the existing alignment and replace the snowshed. This modification was made after studies revealed serious engineering problems with viaduct construction in the lake and serious safety concerns

with the viaduct during avalanches. At the same time, studies revealed stronger and more stable rock material that would allow for widening the existing alignment into the hillside near the snowshed.

- FHWA and WSDOT examined and rejected the alternatives that involved expanding or moving the snowshed. Construction methods used for the original structure make it essentially impossible to move or modify, since it consists of both pre-cast and cast in place concrete. The SHPO concurred with the determination that the snowshed can neither be moved nor modified without destroying its historic integrity.

Best Management Practices

The major temporary impact to historic, cultural, and archaeological resources would be inadvertent disturbance of previously unknown objects or sites. WSDOT will develop and implement a project-specific unanticipated discovery plan, which will establish procedures to deal with unanticipated discovery of cultural resources before and during construction, and cultural resource monitoring for each phase of the project.

Compensatory Mitigation

FHWA, WSDOT, and the SHPO agreed on mitigation measures for removing the snowshed. WSDOT agreed to perform the following measures, all located at Travelers' Rest, a potentially historic WSDOT-owned building located at the Snoqualmie Pass summit:

- Historic structures report for the Travelers' Rest building
- Site assessment of current and potential uses of Travelers' Rest, including mitigation options and needs
- Phase 1 environmental site assessment for hazardous materials
- Interpretive signs at Travelers' Rest depicting historic travel, including Native Americans, over Snoqualmie Pass, history of

the Travelers' Rest building and site, and history and engineering
facts of the snowshed

3.10 Recreation Resources

This section discusses the expected impacts of the project alternatives to recreation resources. The study area for recreation is approximately one mile on either side of the existing highway. Other recreation sites that are outside the study area have been included in instances where I-90 provides the primary access route to these areas. More information on recreation resources is available in the *Recreation Baseline Study* (WSDOT 2002h), the *Recreation and Section 4(f) Evaluation Discipline Report* (WSDOT 2002i), and the *Snoqualmie Pass Adaptive Management Area Plan FEIS* (USFS and USFWS 1997).



Trails and roads within the project area provide a variety of opportunities for recreation activities throughout the year.

What new information has been developed since the Draft EIS?

Since publishing the Draft EIS, WSDOT developed the *Recreation Impacts/Preliminary Mitigation Site Analysis* (Appendix S), which discusses mitigation for permanent impacts to the Price Creek Sno-Park (Westbound). This section is also based on statewide recreation planning described in the *I-90 Corridor Winter Recreation Strategy* (State Parks 2007).

Since the build alternatives have the potential to affect publicly owned parks and recreation lands, WSDOT has completed a *Section 6(f) Recreation Lands Technical Memorandum* (49 USC § 303) (Appendix T). The memorandum discusses the use of Land and Water Conservation Fund Act grant money to purchase or develop recreation property in the project corridor. It also discusses the potential impacts to those properties from the project. WSDOT also completed a *Programmatic Section 4(f) Evaluation* (see Chapter 5), which discusses potential temporary impacts to recreation resources, and analyzes the proposed removal of the existing snowshed.



Winter recreation opportunities include snowmobiling, skiing, snowshoeing, and dog sledding. (Shown: Price Creek Sno-Park)

Comments from the public and reviewing agencies have been incorporated into this section.

What are the major characteristics of the affected environment?

The project area is heavily used for recreation, and population growth in surrounding regions is increasing the demand for recreation opportunities. Recreation opportunities within or accessible from the project area include skiing, sledding, snowmobile riding, ice climbing, camping, hiking, horseback riding, alpine climbing and rock climbing, hunting, fishing, biking, berry picking, hang-gliding, boating, and running.

The importance of the project area for recreation is reflected in I-90's designation as a National Scenic Byway, the first interstate to be recognized as such, and the investments made by public and private agencies in recreation and conservation throughout the corridor.

Exhibit 3-41 lists the developed recreation destinations within or accessible from the study area that could be affected by the build alternatives. Exhibit 3-42 shows the locations of these sites.

The USFS manages most of the federal land adjacent to the project corridor, which is open to the public for recreation use. State Parks operates sno-parks located on federal land throughout the project area under the State Winter Recreation Program. Winter recreation within the study area is among the highest in the state.

What are the expected environmental consequences?

What beneficial effects would result?

No-Build Alternative

The No-Build Alternative would not result in beneficial effects to recreation.

Exhibit 3-41
Developed Recreation Destinations

Recreation Destination	Access from I-90	Estimated Average Annual Use
Hyak and Gold Creek Sno-Parks	Exit 54	50,000
Gold Creek Pond picnic area	Exit 54	7,000
Keechelus Lake boat launch, trailhead, and picnic area	Exit 54	5,000
Iron Horse State Park/John Wayne Pioneer Trail between Hyak and Easton, including Cold Creek Campground and Roaring Creek Campground	Exit 54 and Exit 62	90,000
Stampede Pass Trailhead	Exit 62	NA
East Kachess Group Site	Exit 70	NA
Rachel Lake trailhead	Exit 62 and Exit 63	NA
Kachess Lake Campground and trailhead	Exit 62	23,000
Kachess Lake boat launch	Exit 62	11,000
Kachess Lake Sno-Park	Exit 62 and Exit 63	NA
Price Creek Sno-Park (Westbound)	Exit 62	NA
Crystal Springs Campground	Exit 62	2,000
Crystal Springs Sno-Park	Exit 62	NA
Cabin Creek Cross Country ski area and Nordic racetrack	Exit 63	14,000
Cabin Creek Sno-Park	Exit 63	14,000
Pacific Crest Trail	Exit 54 and Exit 62	NA
Lake Easton State Park	Exit 70	212,400
Alpine Lakes Wilderness Area	Exit 54 and Exit 62	NA

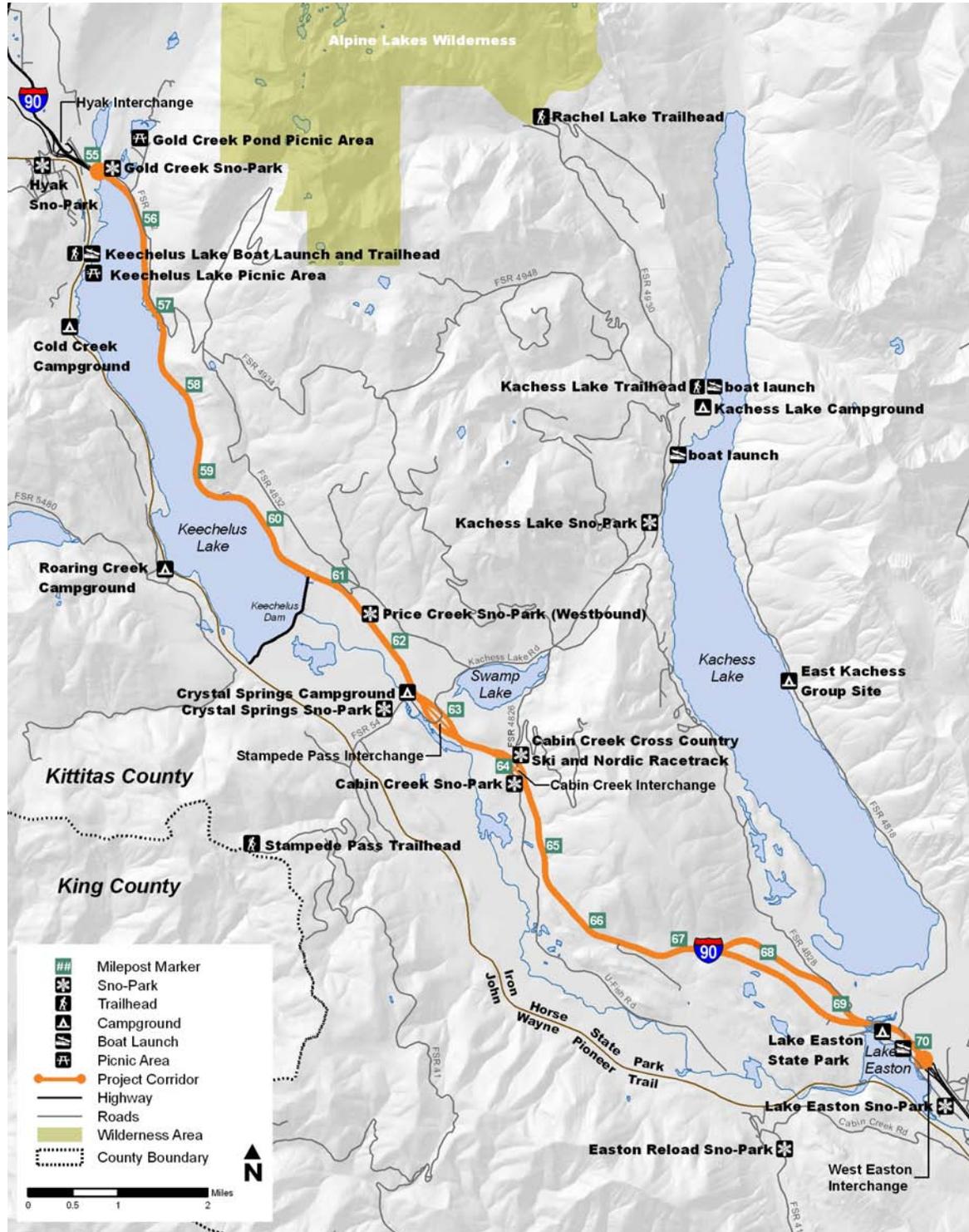
NA – not available

Build Alternatives

All of the build alternatives would result in beneficial effects to recreation, including reduced travel time and increased safety for travelers to area recreation sites. Additionally, FHWA and WSDOT have committed to making improvements the Crystal Springs and Cabin Creek Sno-Parks following their use as staging and stockpiling sites. These improvements would be consistent with long-term plans for these locations. The project would make similar improvements to any other recreation sites that are used by the project.

The proposed tunnels in Alternatives 1 and 2 would slightly reduce noise for recreation users compared to present conditions.

Exhibit 3-42
Recreation Areas Within or Accessible from the I-90 Corridor



Recreation areas and adjacent lands are managed by the USFS and State Parks. WSDOT is working with recreation area managers to replace the Price Creek Sno-Park parking capacity at a location that will meet recreation needs without affecting ecological connectivity objectives.

What adverse impacts are expected?

No-Build Alternative

The No-Build Alternative would not result in any temporary adverse impacts to recreation resources from construction. This alternative also would not result in any direct permanent impacts to recreation. However, there would be indirect impacts from the continued deterioration of the highway, increased traffic volumes, and increasing congestion. These may result in increased driver frustration and decreased user enjoyment.

Build Alternatives

Temporary Impacts

All of the build alternatives would create temporary impacts to recreation from construction, including changes to access, detours, or noise, which could cause temporary impacts to Gold Creek Sno-Park, Crystal Springs Campground, Crystal Springs Sno-Park, Cabin Creek Sno-Park, and Lake Easton Sno-Park.

WSDOT may use the Crystal Springs Sno-Park, Cabin Creek Sno-Park, or Price Creek Sno-Park (Westbound) for materials staging or stockpiling during construction of the project. These are winter recreation areas, and would not be affected by any of the build alternatives. Construction generally will not take place during the winter; however, even in the event of winter construction, WSDOT will maintain access to the sno-parks and return the parking areas to their intended use.

WSDOT may use FSR 4832, FSR 54, or other USFS roads as haul roads, which would impact access to recreation sites temporarily. However, WSDOT would maintain access during construction activities.

For all of the build alternatives, WSDOT would temporarily close ramps at Exit 62 and 63 to reconfigure the Stampede Pass and Cabin Creek Interchanges. WSDOT would ensure that access to recreation facilities in the area would be available throughout construction. Ramp closures would last less than one construction season.

Increased noise and construction activity in the vicinity of the Crystal Springs Campground may cause temporary impacts to users of this facility. However, because the location of this campground is adjacent to I-90, visitors would not expect a quiet wilderness experience while camping there.

Blasting noise could impact some recreation users. WSDOT will limit blasting to weekdays during daylight hours to the extent possible.

Permanent Impacts

Only one recreation area would experience permanent impacts as a result of the project: the Price Creek Sno-Park (Westbound). The project would require closure of this area under any of the build alternatives for the following reasons:

- Removing the sno-park would eliminate the potential conflict between the recreation and wildlife in this area. The area just east of this sno-park has one of the highest concentrations of deer and elk collisions in the project area, indicating that it is a favored crossing area for wildlife. The project includes improvement to wildlife passage at this location under all of the build alternatives.
- The sno-park is accessed directly from I-90, and this direct access does not meet FHWA's safety standards, which specify that access to recreation areas should be from secondary roads. Removing the sno-park would eliminate this safety hazard.
- Problems with a high water table prevent the development of a septic system and rest rooms for recreation users.

WSDOT originally designated the Price Creek Sno-Park (Westbound) as a future full-service rest area. FHWA, WSDOT, USFS, and State Parks developed a joint use easement for that purpose. However, WSDOT could not develop the rest area because of difficulties with providing water and septic service. The area is

being used as a sno-park, but it is located in the I-90 right-of-way and WSDOT continues to designate it for transportation use.

The USFS has classified the Price Creek Sno-Park (Westbound) as Roaded Natural, with a management prescription of RE-1 (developed recreation), in recognition of its current use. However, since the site is within the I-90 right-of-way, this classification by the USFS does not prevent FHWA and WSDOT from changing the use of this site. Following use by the project, the area would revert to the USFS Roaded Natural classification.

Because the site is located within the I-90 right-of-way, it does not qualify as a Transportation Act Section 4(f) resource, and FHWA and WSDOT are not obligated to mitigate for the loss of this area under Section 4(f). However, FHWA and WSDOT will mitigate for the loss of parking at the sno-park as a commitment under NEPA. WSDOT has studied potential mitigation sites for the loss of the sno-park, which are discussed in the *Recreation Impacts/Preliminary Mitigation Site Analysis* (Appendix S).

The Price Creek Sno-Park (Westbound) would remain in operation until the construction phase that affects the sno-park is funded and an alternative site has been selected and approved. After closing the site, WSDOT would restore the sno-park to the standards for the USFS Roaded Natural designation.

The *Section 6(f) Recreation Lands Technical Memorandum* (Appendix T) documents that no recreation properties funded with Land and Water Conservation Fund grants through the Interagency Committee for Outdoor Recreation would be converted to a non-recreation use by the project.

The project does not occur within any USFS Inventoried Roadless Areas or Potential Wilderness Areas.

How will FHWA and WSDOT mitigate for adverse environmental impacts?

Avoidance and Minimization

WSDOT has designed the project to avoid the use of or impacts to recreation sites in the project area wherever possible.

Best Management Practices

BMPs for recreation will be designed to meet applicable commitments and performance standards, including:

- The agreement between WSDOT and State Parks to use the Crystal Springs Sno-Park for materials staging and stockpiling
- Permit conditions, which may include the Special Use Permits from the USFS for the temporary use of and improvements to the Cabin Creek Sno-Park, and FSR 4832 and FSR 54 if they are used as haul roads
- Applicable conditions related to the transfer of or use authorization for federal land from the USFS and USBR for highway easement

Some example BMPs that WSDOT could use to comply with these standards include:

- Limiting temporary occupancy of winter recreation sites to snow-free months
- Coordinating with or providing links to recreation management agencies or private organization websites and newsletters
- Coordinating with the USFS and State Parks to provide alternative access routes to forest roads, state parks, campgrounds, and trailheads

Compensatory Mitigation

FHWA and WSDOT will work with the USFS and State Parks to mitigate for the temporary occupancy of the Crystal Springs and

Cabin Creek Sno-Parks, and for the loss of the Price Creek Sno-Park (Westbound).

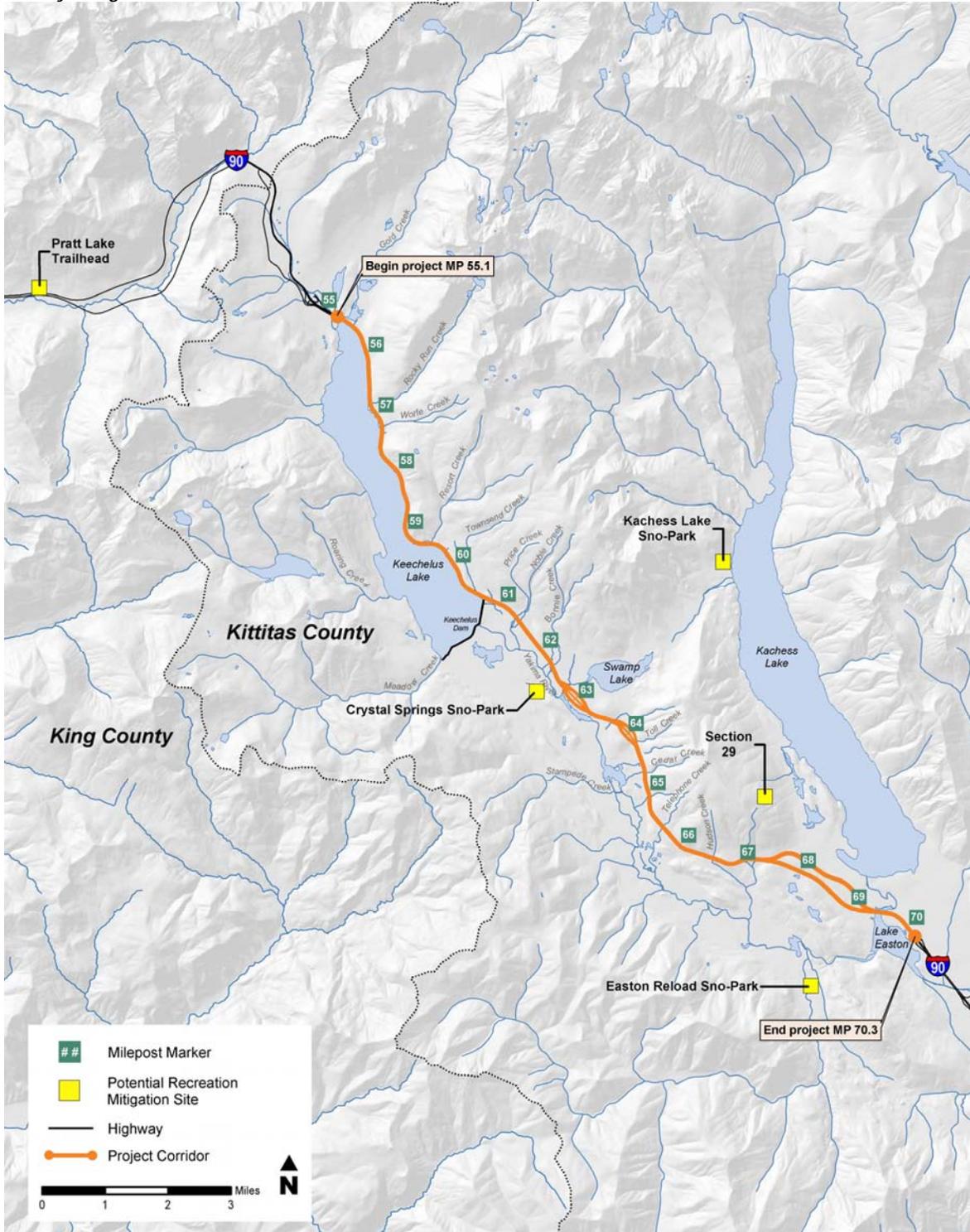
WSDOT will develop an agreement with State Parks for the Crystal Springs Sno-Park to identify temporary and long-term commitments for the site. WSDOT will lease the sno-park for use as a materials and staging area. After project completion, WSDOT will re-grade the area to meet State Parks' long-term plans. WSDOT will work with the USFS to develop a Special Use Permit that will specify details for WSDOT's temporary occupancy of the Cabin Creek Sno-Park and long-term reclamation for the site.

WSDOT will improve FSR 4832 or FSR 54 to accommodate their use as haul roads. WSDOT will replace the parking afforded by the Price Creek Sno-Park (Westbound) at a location to be determined in consultation with the USFS and State Parks, and the current parking lot will be restored to forested conditions. The new sno-park location will not conflict with resources managed by State Parks or the USFS.

WSDOT has studied potential replacement parking areas for the Price Creek Sno-Park (Westbound) in consultation with the USFS and State Parks. The *I-90 Corridor Winter Recreation Strategy* (State Parks 2007) identifies and describes sites in or near the project area that could help provide more sno-park capacity. After reviewing the State Parks report and recommendations, WSDOT prioritized the State Parks-recommended sites based on WSDOT's criteria and identified priority mitigation sites. Exhibit 3-43 shows WSDOT's priority mitigation sites, which include expansion and enhancement at the sites.

WSDOT will study these sites further as design proceeds and funding to construct the remainder of the project is secured. Refer to the *Recreation Impacts/Preliminary Mitigation Site Analysis* (Appendix S) for details.

Exhibit 3-43
Priority Mitigation Sites for Price Creek Sno-Park (Westbound)



Recreation areas and adjacent lands are managed by the USFS and State Parks. WSDOT is working with recreation area managers to replace the capacity of Price Creek Sno-Park at a location that will meet recreation needs without affecting ecological connectivity objectives.

3.11 Land Use

This section discusses expected impacts of the project alternatives to land use. The study area for land use includes lands within three miles of the highway within the project area. More detail is available in the *Land Use Discipline Report* (WSDOT 2003f) and Section 3.11 of the Draft EIS.

What new information has been developed since the Draft EIS?

Since completing the Draft EIS, WSDOT completed the *Land Use Technical Memorandum* (Appendix U), which analyzed current land use patterns and conservation-related land transfers in the project area. Information from this memorandum has been incorporated into this section.

There were no comments on the Draft EIS concerning land use.

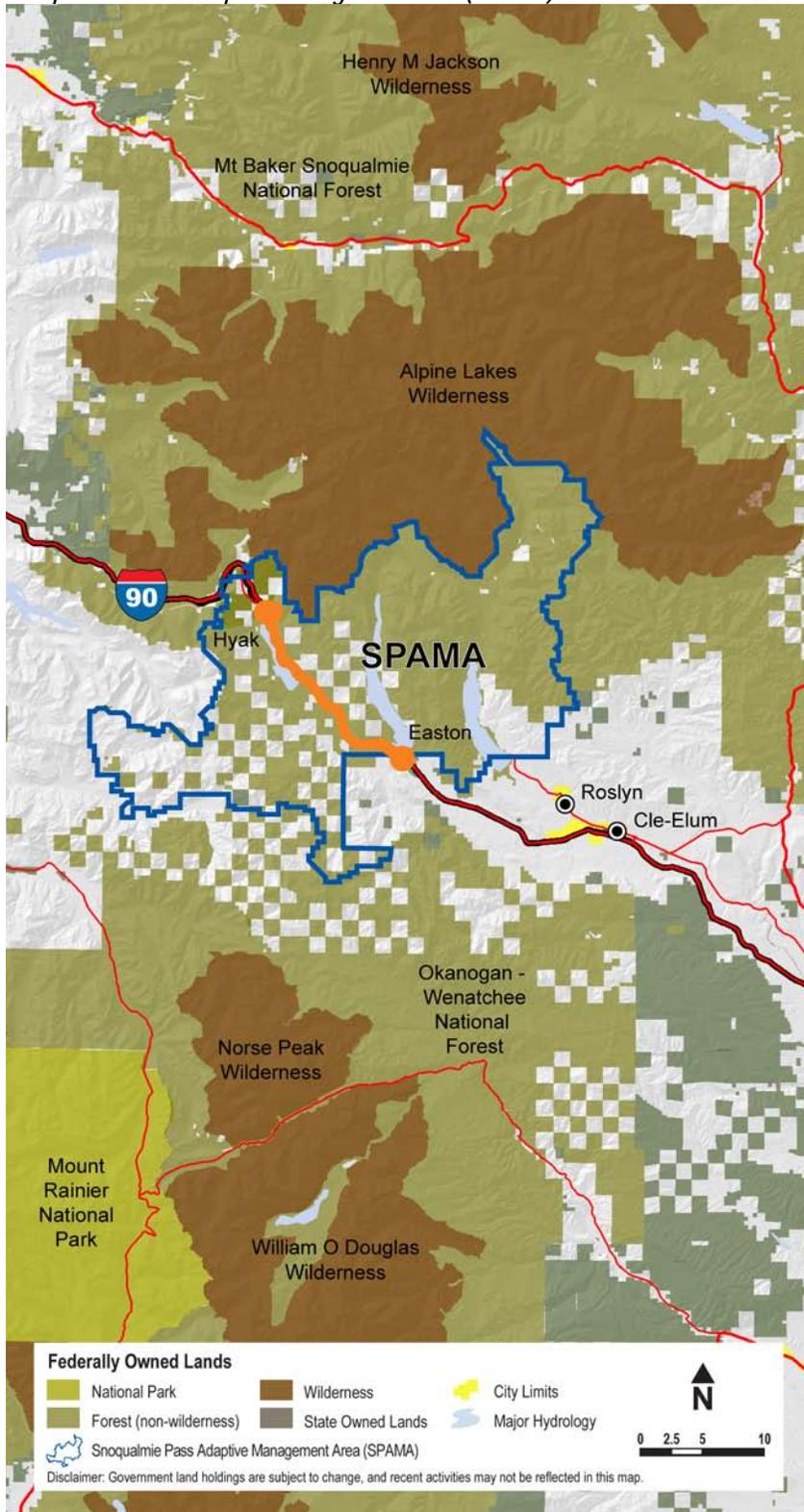
What are the major characteristics of the affected environment?

Public Land

Most of the land within the project area is public land managed by the USFS as part of the Okanogan-Wenatchee National Forest. The USBR manages the land within Keechelus Lake as part of its management of the Yakima Project irrigation water system. The WDNR manages a small amount of property near Easton, and State Parks manages the land in and around Lake Easton State Park.

National Forest land within the project area is part of the 212,700-acre SPAMA, one of ten adaptive management areas in the western United States (Exhibit 3-44). When the SPAMA was established in 1994, it marked an important change to federal land management in the area. In place of an earlier emphasis on timber production, the goals of the SPAMA (USFS and USFWS 1997) are to provide mature forests and habitat connection for species moving north and south.

Exhibit 3-44
Snoqualmie Pass Adaptive Management Area (SPAMA)



Federal land in and near the project area is heavily used for recreation, as described in Section 3.10, *Recreation Resources*. State Parks operates a network of developed sno-parks in the project area, most of which are located on National Forest land through cooperative agreements with the USFS.

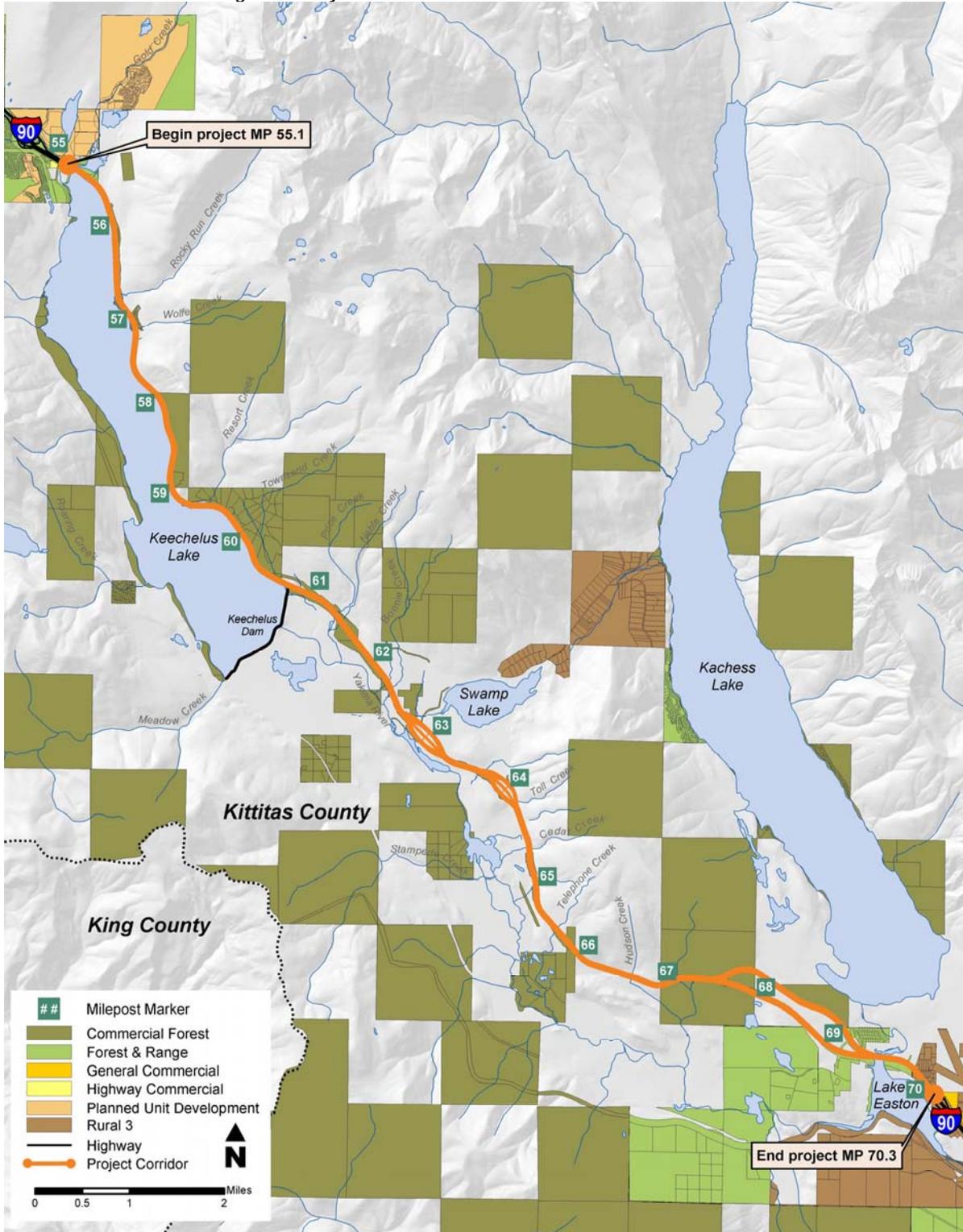
Private Land

Private land in the I-90 project area exists mostly as large blocks surrounded by National Forest land (Exhibit 3-45). This unique “checkerboard” land pattern has had a major impact on land management in the project area.

Beginning in 1864, the United States government deeded every-other-square-mile blocks of federal land to three railroad companies in order to support construction of the trans-continental railroad lines. The Northern Pacific Railroad received the largest of these land grants: 40 million acres in an 80-mile wide swath running 2,000 miles from the Great Lakes to Puget Sound. The original railroad route ran over Stampede Pass, and the land grants covered almost all of the area between White Pass and Stevens Pass, including the I-90 project area.

By 1989, most of the original railroad company land in the I-90 project area had been transferred to Plum Creek Timber Company, one of the successors to the Northern Pacific Railroad. Plum Creek in turn sold some of this land to other private owners for residential development, while retaining the majority of the land for commercial timber harvest. Much of the railroad land has been logged, including the construction of a dense network of roads. Until the 1980s, the emphasis on logging and road building on private timber land was similar to the way the USFS managed adjacent National Forest land. Logging and road building on both federal and private land has contributed to habitat fragmentation.

Exhibit 3-45
Private Land Use and Zoning in the Project Area



Land use designations shown were based on existing zoning and allowed development densities. These designations were taken into account in the design of the CEAs.

The Northwest Forest Plan (USFS and BLM 1994) and the *Snoqualmie Pass Adaptive Management Area Plan Final Environmental Impact Statement* (USFS and USFWS 1997) changed how the USFS manages the Okanogan-Wenatchee National Forest in the project area. The focus of USFS land management in the project area is now on ecosystem management, especially restoring late-successional forests and connecting important areas of wildlife habitat. Timber harvest is limited to activities that are beneficial to the restoration or creation of late-successional forest habitat, and the USFS is actively decommissioning roads to improve wildlife habitat and watershed conditions.

The USFS recognized, however, that the goals of ecosystem management could not be accomplished without acquiring additional private land within the boundaries of the National Forest. As long as this land remained in private hands, management could not be coordinated, roads could not be decommissioned, and timber harvest and housing development would continue to fragment habitat.

In response, the USFS worked closely with Plum Creek and statewide conservation groups to transfer key Plum Creek land parcels to public ownership, through a combination of land trades and purchases. Since 1998, approximately 80,000 acres of Plum Creek land has been acquired.

Conservation groups, including the Mountains to Sound Greenway Trust, Conservation Northwest, and the Sierra Club, formed an umbrella organization, the Cascades Conservation Partnership, to assist in the original acquisition effort. After the USFS completed its campaign of major acquisitions, the Cascades Lands Conservancy assumed this role. This organization continues to make targeted purchases of key private land parcels in the project area, which are then transferred to public ownership.

Before the USFS changed its land management direction and acquired the Plum Creek lands, FHWA and WSDOT would not have made the large-scale investments in wildlife passage across I-90 that are now part of the project. However, the actions of the USFS and conservation groups created a new context. These actions gave the

lead agencies the confidence to make substantial investments in ecological connectivity as part of the I-90 project, knowing that the management of the surrounding federal lands would be consistent with project investments.

Size and Number of Private Land Parcels

WSDOT analyzed private land parcels within approximately three miles of the I-90 project. The study area boundary was designed to include private land parcels where development would add additional traffic in the I-90 project area, or could potentially affect the project's ecological connectivity goals and investments. The analysis did not include private land parcels in and near the communities of Hyak and Easton, except for the Gold Creek Area. The study area contains approximately 890 private land parcels, as shown in Exhibit 3-46. Exhibit 3-47 shows the general distribution and size of these private land parcels, which range from under one acre to over 600 acres.

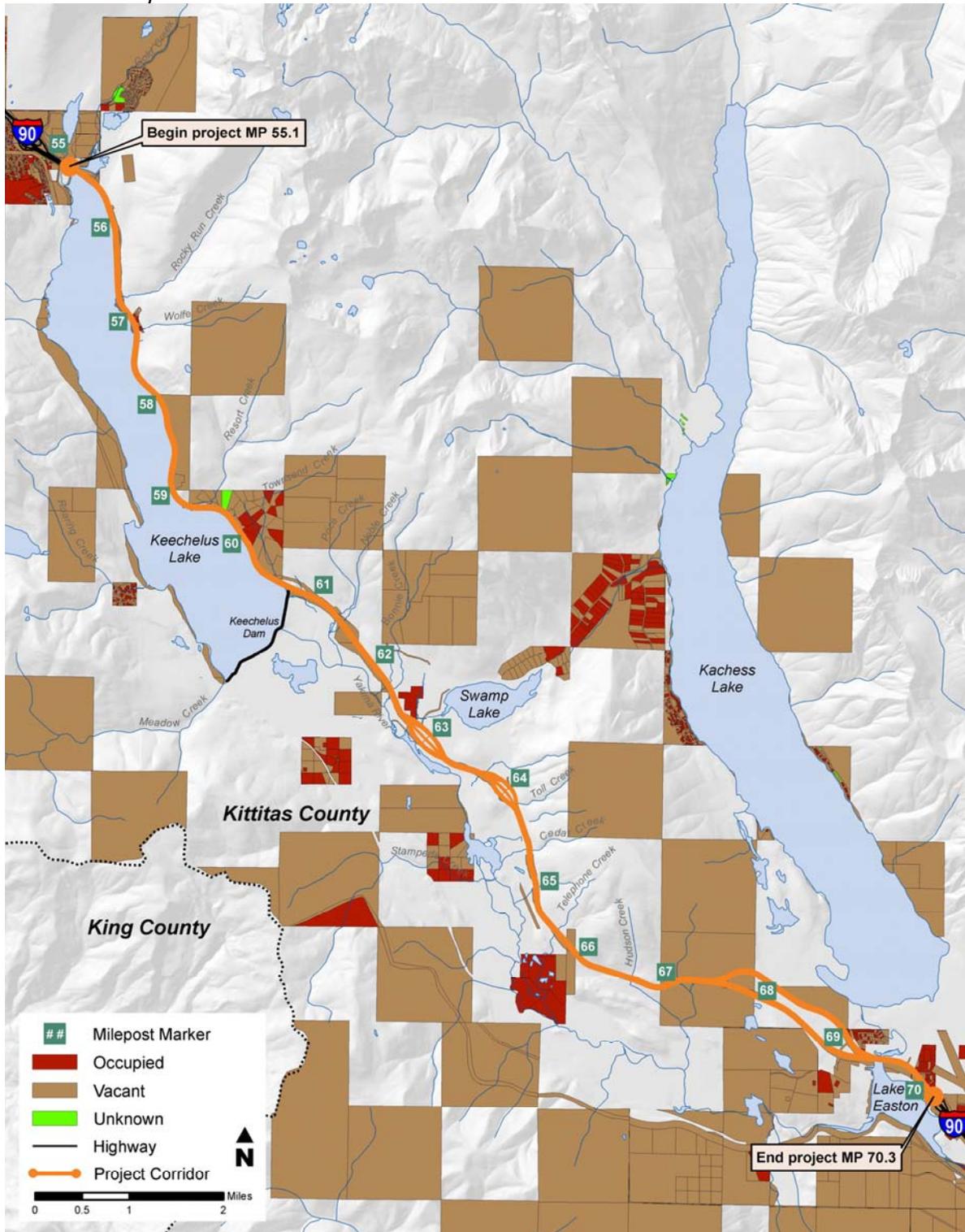
Exhibit 3-47 shows that the 565 parcels under two acres in size make up approximately 175 acres, which is approximately one percent of the total private land acreage in the study area. Most of these small parcels are either lakeshore view lots or Planned Unit Development parcels in the SkiTur Planned Unit Development in the Gold Creek Valley. The 49 largest parcels, consisting of 81 or more acres each, make up 78 percent of the privately-owned land in the study area.

Approximately 61 percent of the private land parcels in the study area are vacant. These parcels represent 95 percent of the private land acreage in this area (Exhibit 3-48). Consequently, most of the private land in the study area could still be developed.

Private Land Regulation

Private land in the project area is regulated by Kittitas County zoning and comprehensive planning regulations, in compliance with the Washington State Growth Management Act (GMA). Exhibit 3-45 shows county zoning designations in the project area.

Exhibit 3-46
 Vacant and Occupied Private Land



Land use designations shown were based on existing zoning and allowed development densities. These designations were taken into account in the design of the CEAs.

Exhibit 3-47
Size of Private Land Parcels in the Study Area

Type	Size (acres)	Number of Parcels	Total Acreage	Percent of Total Acreage
Large parcels	81 - 679	49	13,581	78
Mid-sized parcels	2 - 80	276	3,675	21
Small parcels	0.01 - 2	565	175	1
Totals	NA	890	17,431	100

Note: Values have been rounded

Exhibit 3-48
Private Land Vacancy Rates

Type of Land	Percent of parcels	Percent of acreage
Vacant	61	95
Occupied ¹	34	5
Unknown	4	0

Source: Kittitas County 1996

¹ Parcels with improvement values over \$5,000 were assumed to be occupied. Most occupied parcels are believed to be occupied part time.

There are no commercially zoned parcels within the project area, although there are several commercial land uses just outside the project area at Hyak and Easton. One proposed Planned Unit Development in the Gold Creek area includes a proposed commercial area. Additionally, there is one commercial business within the project area, the Kachess Lodge rental and towing business, located near MP 61.5 in an area zoned Commercial Forest.

In addition to these overall land use categories, the Kittitas County Comprehensive Plan establishes two other designations that could affect future development in the project are: Urban Growth Nodes and Planned Unit Developments.

Urban Growth Nodes. The 1996 Kittitas County *Comprehensive Plan* (Kittitas County 1996) established Urban Growth Nodes to recognize existing unincorporated communities that had urban characteristics such as established residential, commercial, and industrial uses. The Urban Growth Nodes classification permits

zoning designations that are more typical of incorporated communities, including higher-density residential, commercial, and industrial uses. There are two Urban Growth Nodes just outside the I-90 project area: the unincorporated community of Hyak, and Easton (Exhibit 3-49).

Planned Unit Developments. A Planned Unit Development is a development classification that allows for more flexible regulation and development than traditional zoning. Planned Unit Developments generally allow higher densities of development than the underlying zone, while reserving substantial areas for open space or recreation. In Kittitas County, a Planned Unit Development is the result of a site-specific zoning change, based on a binding site plan. Kittitas County records show three existing Planned Unit Developments within the project area: SkiTur Valley, Chickman Vista, and Mardee Lake/SnoCadia, all in the Gold Creek Valley.

The web site for the proposed SnoCadia development (www.snocadia.com) describes a proposal to develop 112 single-family lots, 110 condominium units, and 260,000 square feet of commercial and retail space. Development of this planned unit development is contingent on pending applications to Kittitas County.

Kittitas County also allows the development of Master Planned Resorts, which is a specific form of Planned Unit Development allowed under the GMA. In Kittitas County, a Master Planned Resort requires a site of at least 320 acres. There is one Master Planned Resort in Kittitas County: the 6000+-acre SunCadia development, which is located east of the project area near Roslyn.

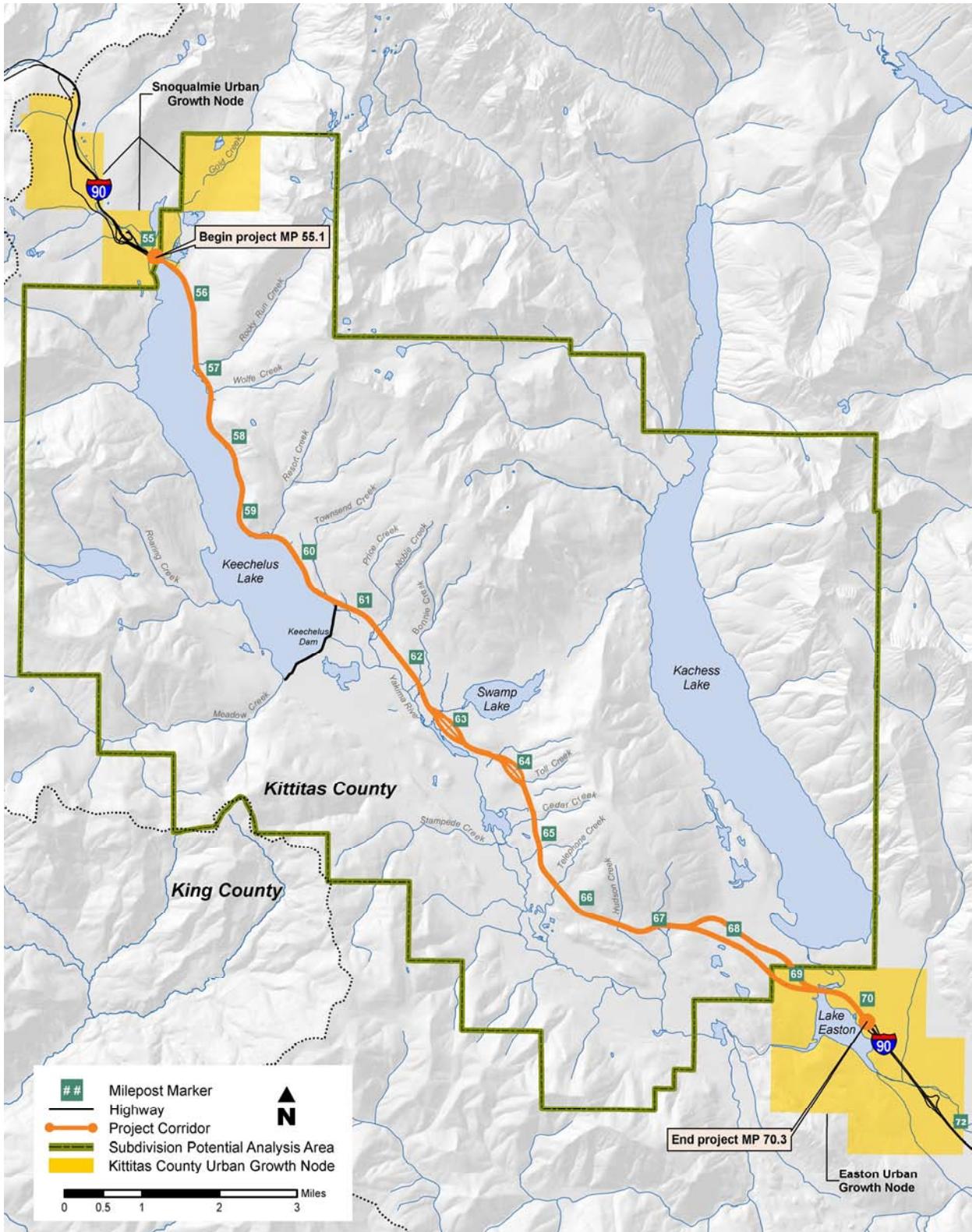
What are the expected environmental consequences?

What beneficial effects would result?

No-Build Alternative

The No-Build Alternative would not result in any beneficial effects to land use.

Exhibit 3-49
Urban Growth Nodes



Build Alternatives

Any of the build alternatives would result in direct beneficial effects to land use by supporting the USFS land management goals, which emphasize establishing habitat connections for wildlife movement.

Additionally, any of the build alternatives would provide safer and more reliable access to all of the existing residential, commercial, and recreational land uses in and near the project area.

What adverse impacts are expected?

No-Build Alternative

The No-Build Alternative would not result in any direct adverse impacts to land use. Indirect impacts would include:

- I-90 would continue to function as a barrier to wildlife movement, which is inconsistent with the USFS land management goals
- Over time, increased traffic congestion would make access to all land uses more difficult

Build Alternatives

Temporary Impacts

Constructing any of the build alternatives would result in temporary traffic impacts, which could affect access to land uses in and near the project area. Section 3.7, *Transportation*, discussed these potential impacts and measures to mitigate for them. Temporary impacts would be limited to the period of construction.

Permanent Impacts

Adverse impacts to land use are defined as changes to existing land use patterns or incompatibility with existing land use regulations. WSDOT analyzed both of these potential impacts, and this analysis is presented in the *Land Use Technical Memorandum* (Appendix U).

Potential Changes to Land Use Patterns

WSDOT examined potential changes to land use and ownership patterns, including closing the Price Creek Sno-Park (Westbound) and the Price Creek Interim Rest Area (Eastbound), land acquisitions for new highway right-of-way, and land relinquishment.

Closing the Price Creek Sno-Park (Westbound) and the Price Creek Interim Rest Area (Eastbound). Under any of the build alternatives, WSDOT would permanently close the Price Creek Sno-Park (Westbound) and the Price Creek Interim Rest Area (Eastbound). Closing these two sites would not constitute a change to established land use patterns. WSDOT will mitigate for the loss of recreation opportunities from closing the sno-park at a site within or near the project area. WSDOT will restore this area to the standards for USFS land classification Roaded Natural, which is compatible with the USFS's land management goals for the surrounding areas of National Forest.

Land Acquisitions for New Highway Right-of-Way. Under any of the build alternatives, the project would need to acquire or secure authorization to use both public and private land for new highway right-of-way. Land would be acquired in long, narrow strips adjacent to the existing highway. These land acquisitions would take place throughout the corridor, with the largest acquisitions occurring in the Amabilis Grade area. The majority of these acquisitions would be public rather than private land, including some areas of undeveloped National Forest land and some USBR land in Keechelus Lake.

In addition to the land acquired for highway right-of-way, WSDOT will seek to acquire private land for preservation and mitigation. Where possible, these preservation and mitigation areas will be located in the CEAs. WSDOT will work with private land owners, agencies and conservation groups to facilitate purchasing private land.

FHWA and WSDOT have concluded that these acquisitions would not change the existing land use patterns or ownership, nor would

they be incompatible with adjacent land uses. The exact boundaries of the areas for acquisition will be determined during final design. Preliminary estimates for the amounts of land to be acquired for highway easement are shown in Exhibit 3-50 and Exhibit 3-51.

*Exhibit 3-50
Permanent Land Acquisition, Keechelus Lake Alignment Alternatives (acres)*

Land Acquisition	No Build	Alternative 1	Alternative 2	Alternative 3	Alternative 4/ Preferred Alternative
Private Land	0	6.8	7.4	4.5	0.7
Public Land	0	89.3	48.6	43.5	39.3

*Exhibit 3-51
Permanent Land Acquisition, CEA Improvement Packages (acres)*

Land Acquisition	No Build	Option Package A	Option Package B	Option Package C	Preferred Alternative
Private Land	0	6.6	6.6	6.6	6.6
Public Land	0	87.9	87.9	87.9	87.9

The Draft EIS and other project documents indicate that the project might affect the 30-lot subdivision near MP 59.3. FHWA and WSDOT have changed the design of the build alternatives to move the alignment further away from this subdivision, and believe that there would be no impacts.

Land Relinquishment. Under all of the build alternatives, WSDOT would move the highway away from its existing right-of-way in several areas. This would allow FHWA and WSDOT to relinquish some areas of former right-of-way. Section 1.13, *What other actions are necessary to complete the project?*, provides information about procedures for land acquisition and relinquishment. Exhibit 3-52 through Exhibit 3-56 show the approximate areas for potential acquisition and relinquishment. Relinquishing these areas would not change existing land use patterns, nor would they be incompatible with adjacent land uses.

Exhibit 3-52
Potential Acquisition and Relinquishment Areas MP 55 to MP 57

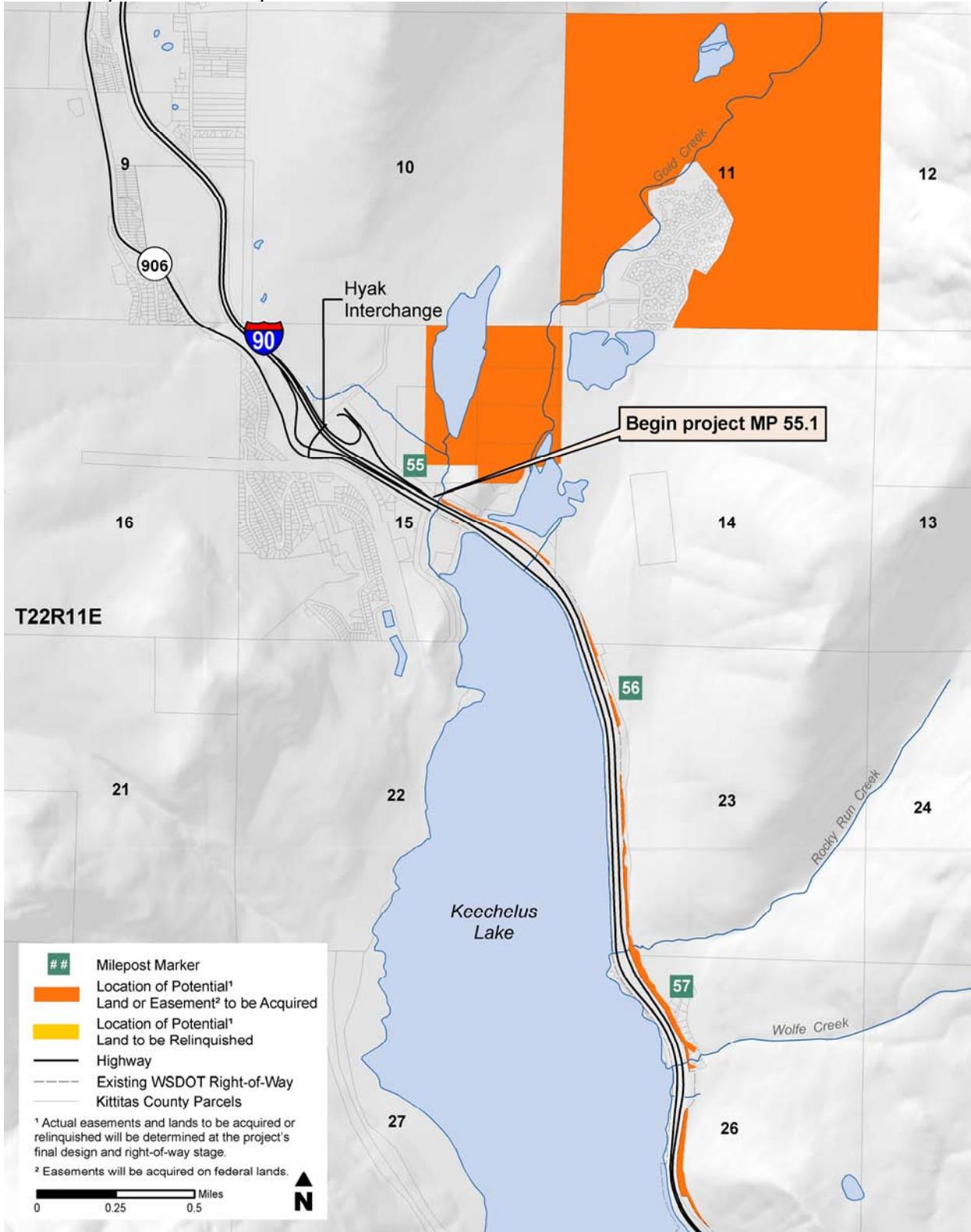


Exhibit 3-53
 Potential Acquisition and Relinquishment Areas MP 57 to MP 61

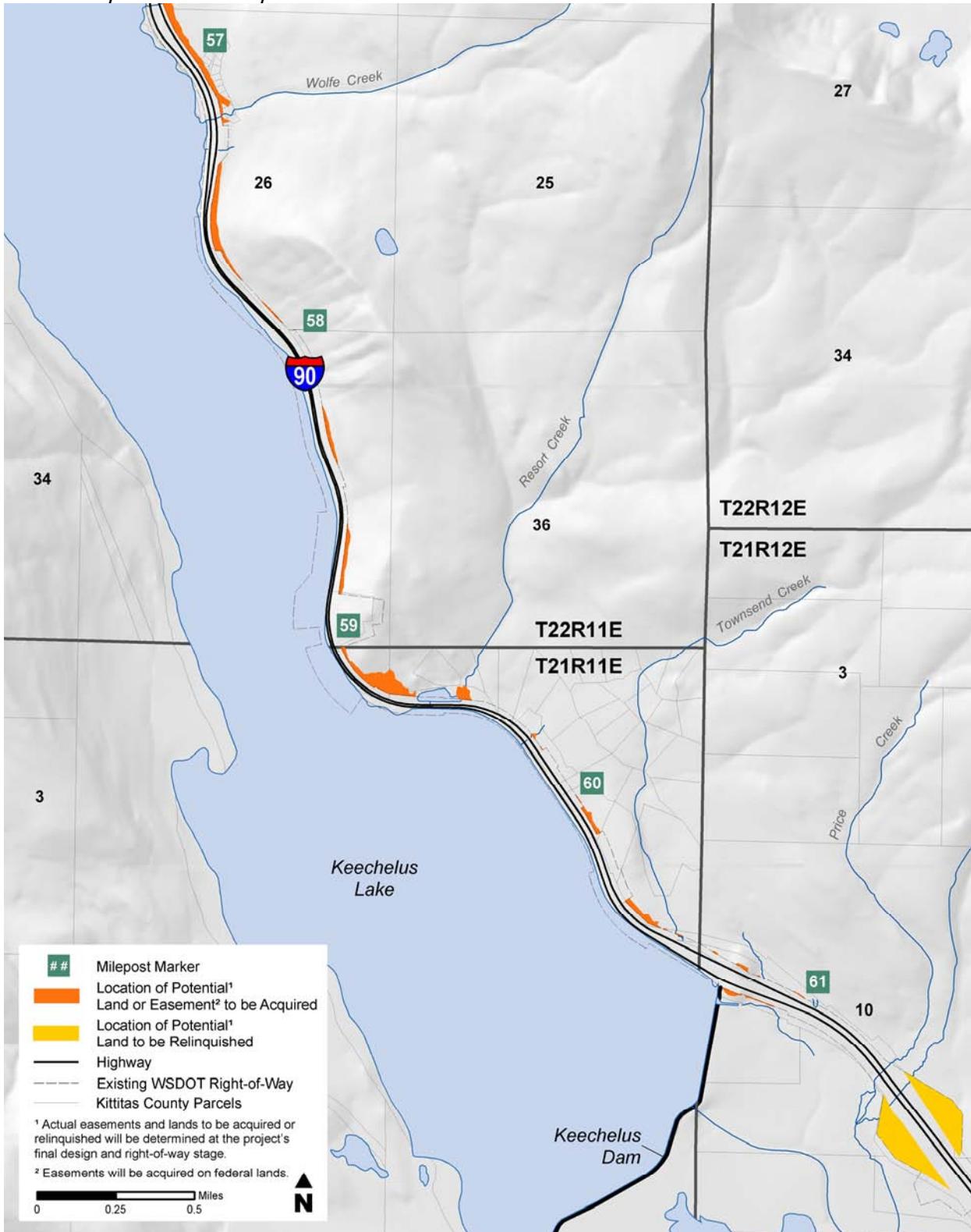


Exhibit 3-54
Potential Acquisition and Relinquishment Areas MP 61 to MP 65

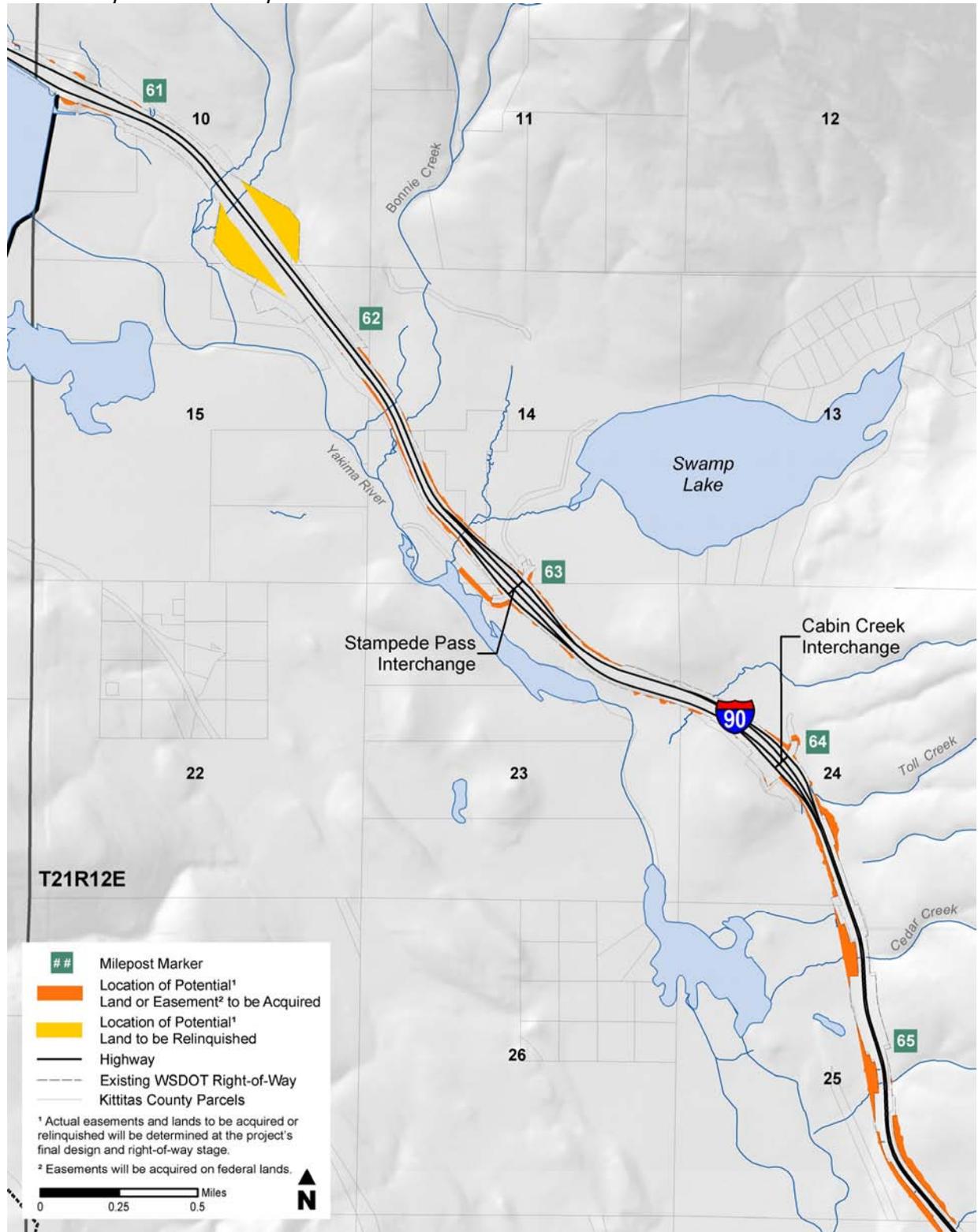


Exhibit 3-55
Potential Acquisition and Relinquishment Areas MP 65 to MP 68

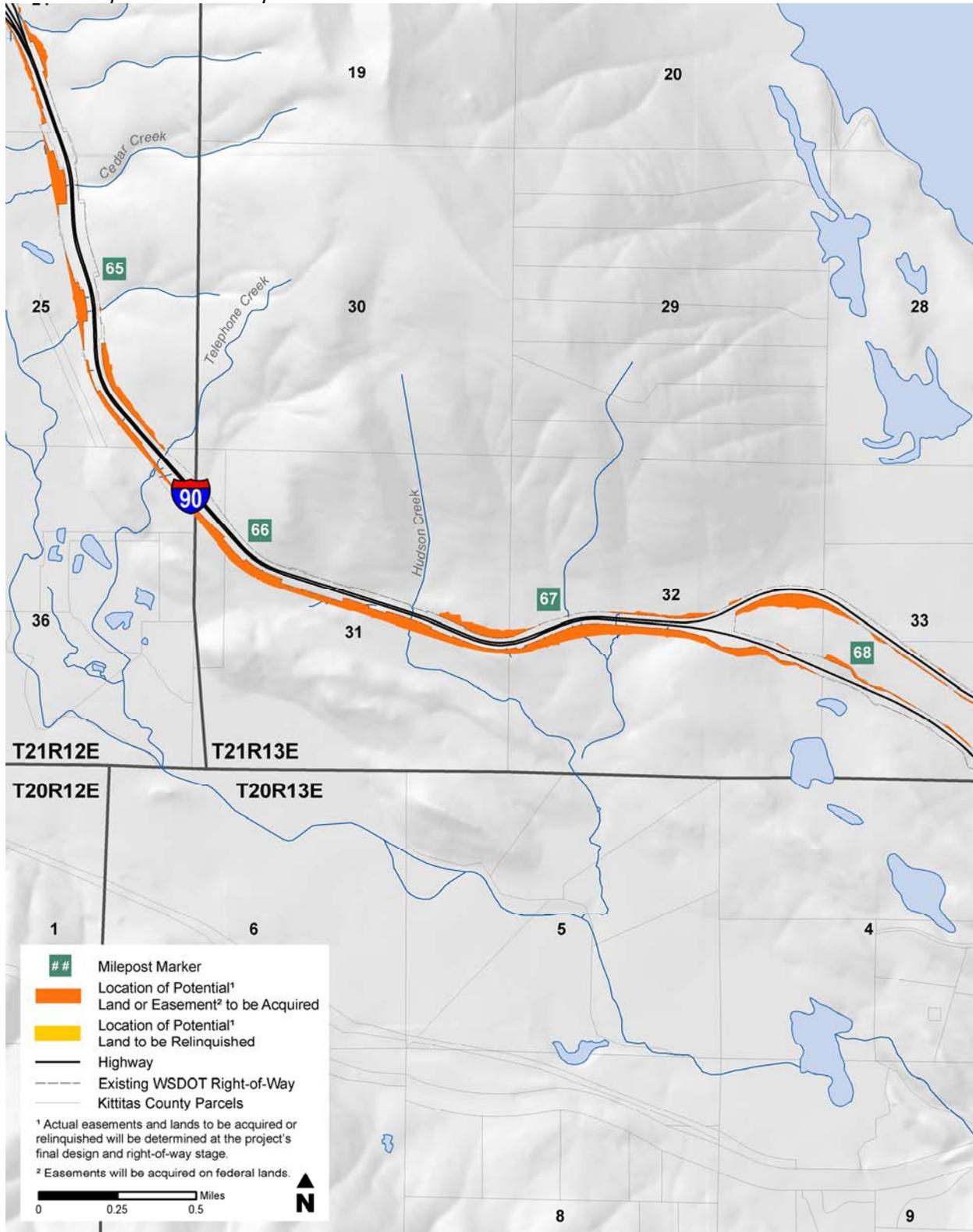


Exhibit 3-56
Potential Acquisition and Relinquishment Areas MP 68 to MP 70



Potential Compatibility with Existing Land Use Regulation

WSDOT also examined potential compatibility of the project with the regulation of surrounding lands, including public land and Kittitas County land.

The USFS will make a formal determination as to whether the project is consistent with USFS land management plans after FHWA and WSDOT complete the Final EIS and FHWA publishes the ROD. The lead agencies have worked cooperatively with the USFS throughout the process of planning and design, and believe that the project is consistent with these documents. Section 1.13, *What other actions are necessary to complete the project?*, describes some of the stipulations that would be included in transferring federal land for the new right-of-way.

Kittitas County will make a formal determination about whether the project is consistent with its land use regulations as part of project permitting. Some additional development could take place under existing private land use regulation, including building on vacant parcels, subdivision to existing minimum lot sizes, and development at the existing planned unit developments. WSDOT studied the amount of potential development under existing land use regulation in the *Land Use Technical Memorandum* (Appendix U), and FHWA and WSDOT concluded that if private land development continues to follow existing zoning and comprehensive plan designations, this development can be designed to be compatible with any of the build alternatives.

Adverse impacts to project connectivity investments could occur if Kittitas County rezoned project area lands to higher densities. Kittitas County has received rezoning applications in the project area, some of which are still pending. FHWA and WSDOT assume that Kittitas County will only approve rezoning applications if they are consistent with the Kittitas County *Comprehensive Plan* (Kittitas County 1996), Washington State Growth Management Act, and the SPAMA Plan Final EIS (USFS and USFWS 1997).

WSDOT has requested that Kittitas County recognize the work done on the I-90 project, including the science-based discipline reports and the *Mitigation Development Team Recommendation Package* (Appendix D), as representing best available science for wildlife connectivity in the project area, and to consider the project's CEAs in its Critical Areas regulations.

Potential Indirect Impacts

East of the project area, residential development is proceeding rapidly. Part of this development appears to be second homes, and some of the owners commute to Western Washington for work. According to the 2000 US Census, 1,341 workers commuted from Kittitas County to Western Washington. It is possible that the I-90 project could make commuting from these areas easier, by increasing safety and capacity and reducing congestion through the project area. However, there is no evidence that the existing level of congestion is impeding residential growth in developments such as Suncadia. Any impacts from decreased congestion would not be felt until project construction was complete: six years for Phase 1 and seven to 15 additional years for the remaining project area. Further, the incentive to commute between Eastern and Western Washington depends on fuel prices, which are likely to continue to rise. The lead agencies' best judgment is that the I-90 project by itself is unlikely to lead to substantial additional development or population growth east of the project area.

How will FHWA and WSDOT mitigate for adverse environmental impacts?

Avoidance and Minimization

The project has avoided impacts to existing land use patterns by adjusting the location of the build alternatives to avoid the use of private property wherever possible.

WSDOT has designed connectivity improvements to be consistent with USFS land management plans.

WSDOT will use eminent domain and condemnation procedures only as a last resort.

Best Management Practices

No BMP-related commitments have been made. Construction BMPs will avoid and minimize impacts to adjacent private property.

Compensatory Mitigation

In the event that residents or businesses are relocated, WSDOT will comply with the terms of the federal Uniform Relocation Act of 1970, as amended.

Eminent Domain: The power of the state to take property for public use, usually with payment to the owners.

Condemnation: The formal act of exercising eminent domain to transfer title of private property.

3.12 Visual Quality

This section discusses the expected impacts of the project alternatives to visual resources, focusing on views from key viewpoints. The study area for visual resources consists of the I-90 corridor from the Hyak Interchange to the West Easton Interchange. More detail on visual quality can be found in Section 3.12 of the Draft EIS and the *Visual Impact Assessment Discipline Report* (WSDOT 2004c).

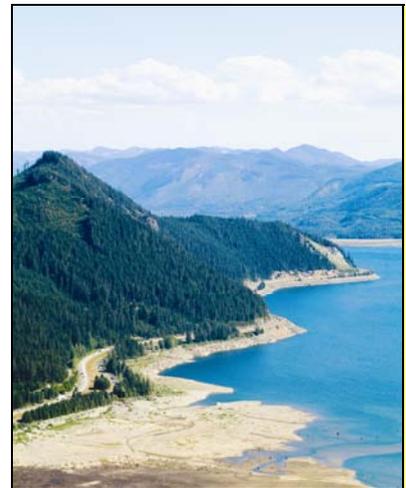
What new information has been developed since the Draft EIS?

After publishing the Draft EIS, WSDOT prepared a *Visual Discipline Report Supplement* (Appendix V) to address highway design changes that were made subsequent to the Draft EIS. WSDOT also developed project-specific *Architectural Design Guidelines* (Appendix X).

Comments from the public and reviewing agencies have been incorporated into this section.

What are the major characteristics of the affected environment?

The project area is within the Mountains-to-Sound Greenway National Scenic Byway, which is designated as a Washington State Scenic Byway. This designation is based on the route's outstanding scenic character and environmental experiences. Because this project is within a State and National Scenic Byway, visual quality of all components of the project is especially important, and any changes in the corridor must retain those qualities as much as possible. FHWA and WSDOT are coordinating with the Mountains-to-Sound Greenway Trust to ensure visual elements of the project will complement this status. The National Scenic Byway Program is managed by FWHA as a grass-roots collaborative effort established to help recognize, preserve and enhance selected roads throughout the US.



I-90 can be seen from many vantage points near Snoqualmie Pass.

The project area runs through public lands that are managed for multiple objectives, including habitat, ecological connectivity, recreation, and resource production. The principle land manager throughout the project corridor is the USFS. The USFS manages the I-90 corridor as a scenic viewshed, among other uses.

Landscape Units

For analysis purposes, WSDOT divided the project area into four landscape units based on topography and viewsheds with similar characteristics. The locations of key views were established to analyze the change in visual quality between current and proposed conditions for three viewer groups: travelers on I-90 trying to reach a destination, people viewing I-90 from across Keechelus Lake while on the Iron Horse Trail or nearby USFS roads, and people traveling to the mountains for the scenery on this National Scenic Byway. WSDOT performed the visual analysis following the *Visual Assessment for Highway Projects* guidelines (FHWA 1981).

Landscape Unit 1 – MP 55.1 to MP 60.8. Landscape Unit 1 has an open character and runs from the western project limits along the entire eastern shore of Keechelus Lake. The view from the highway is of a sharp rise to the east, the lake, and distant mountains. This is the only landscape unit with extensive views toward the highway. There are several rock cuts in this unit that are visible from the Iron Horse Trail. The snowshed in Exhibit 3-57 is visible when there is snow on the roof. When there is no snow, the snowshed blends into the slope because of its color and the vegetation growing above it.

Landscape Unit 2 – MP 60.8 to MP 64.4. Landscape Unit 2 is defined by broad, relatively flat topography as the highway runs along the eastern side of the narrow valley formed by the Yakima River. The landscape here allows a wide median between the eastbound and westbound lanes of traffic. Exhibit 3-58 shows typical topography.

*Exhibit 3-57
View of Topography at MP 58 (the Snowshed) in Landscape Unit 1*



*Exhibit 3-58
View of Topography in Landscape Unit 2*



Landscape Unit 3 – MP 64.4 to MP 67.5. Landscape Unit 3 runs along the southwestern flank of Amabilis Mountain before it descends to the Yakima River. The topography is similar to Landscape Unit 1, with a rise to the northeast and a valley to the southwest. Large trees screen much of the view of the Bonneville Power transmission lines (Exhibit 3-59).

Exhibit 3-59

View of Topography in Landscape Unit 3



Landscape Unit 4 – MP 67.5 to MP 70.3. Landscape Unit 4 runs along a plateau south of Kachess Lake. There is room for a wide median, which forms a heavily forested hill between the two directions of traffic. Exhibit 3-60 shows a typical view of this landscape unit.

*Exhibit 3-60
View of Topography (Eastbound I-90) in Landscape Unit 4*



Selection and Rating of Key Views

WSDOT selected 31 total key views within the four landscape units to examine the visual conditions of the existing project corridor and to assess the visual quality of the project alternatives. Key views both from and toward the highway were selected according to visibility of the project, accessibility to the public, frequency of public use, and their representation of the overall impacts within the project area. Views were rated for visual quality based on vividness, intactness, and unity. WSDOT rated recently-harvested slopes as they appear; however, ratings for these areas are expected to improve as the forests mature.

Vividness: The memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern.

Intactness: The integrity of visual order in the natural and human-built landscape, and the extent to which the landscape is free from visual encroachment.

Unity: The degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or inter-compatibility between landscape elements.

What are the expected environmental consequences?

What beneficial effects would result?

No-Build Alternative

The No-Build Alternative would not result in any beneficial effects to visual resources.

Build Alternatives

Once construction has been completed and the area has been re-vegetated, the use of appropriate design elements would result in improvements to visual quality ratings for most views. Although these improvements would not reach WSDOT's threshold for visual impacts, they still can be considered beneficial.

What adverse impacts are expected?

No-Build Alternative

The No-Build Alternative would not result in any adverse impacts, either direct or indirect.

Build Alternatives

Temporary Impacts

Under any of the build alternatives, construction would result in temporary visual impacts. Construction activities for any of the build alternatives would temporarily affect visual quality because of vegetation removal, earth-moving equipment, cranes for rock scaling, paving operations, installing bridge girders, temporary haul roads, staging and stockpiling sites, and occasional lighting for night work.

Under the Preferred Alternative, temporary visual impacts would occur during the approximately six construction seasons required for Phase 1. However, WSDOT would begin roadside restoration once each subsection of the project is completed, and WDOT anticipates

that visual impact from construction could be successfully eliminated.

Permanent Impacts

Permanent impacts would include:

- The rock cuts at MP 57.0, which would be larger than they are now
- Travelers in the new, larger snowshed would lose their view of the mountains, lake, and forest; however, a vehicle traveling 65 miles per hour would be in the tunnel for only 13 seconds
- Removing large trees in the area near MP 66 would expose the transmission towers sooner for the traveling viewer; however, new trees will be planted and in time will screen the transmission towers in a manner similar to the existing conditions

WSDOT analyzed the impacts to visual quality, and concluded that changes to visual quality in the project area because of the rock cuts, larger snowshed, and wider highway would not have a substantial impact on visual quality ratings. WSDOT considers a total visual quality rating change of 1.0 or greater to be a visual impact for the purposes of this analysis. WSDOT does not consider a total visual quality rating change of less than 1.0 to be a visual impact.

Only Keechelus Lake Alignment Alternative 1 had a visual rating decrease of 1.0 or greater from the view of the highway. For Alternative 4 (the Preferred Alternative), 71 percent of views have a total visual quality rating of either the same as existing ratings or increased ratings following construction. Twenty-nine percent had lower total visual quality ratings than the existing views; however, none reached WSDOT's standards for visual impacts.

WSDOT compared the build alternatives and concluded that visual impacts are not substantially different between the build alternatives, nor do any of the build alternatives create an impact to visual resources based on WSDOT's visual quality criteria.

WSDOT would avoid any impacts throughout the project area by using the Cascadian design theme described in the *Architectural Design Guidelines* (Appendix X) and by using the mitigation measures discussed below.

How will FHWA and WSDOT mitigate for adverse environmental impacts?

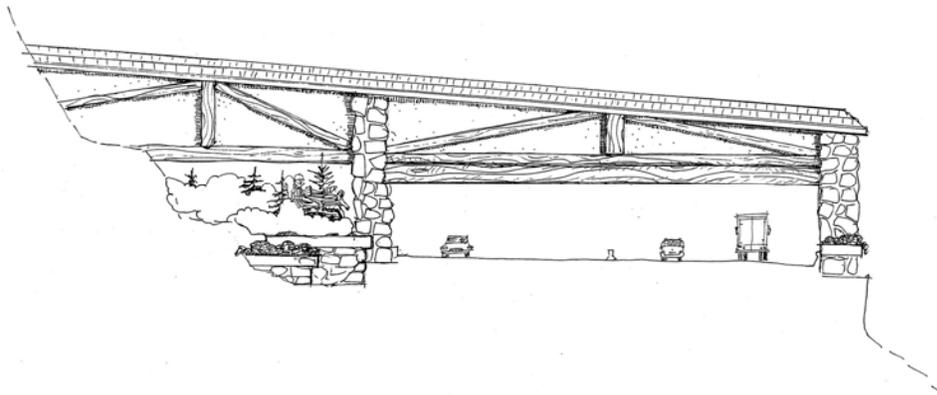
Avoidance and Minimization

WSDOT will design structures, including bridges and retaining walls, using the *Architectural Design Guidelines* (Appendix X). These guidelines recommend using the Cascadian style design theme developed by the project team in conjunction with the USFS and the Mountains-to-Sound Greenway Trust. The Cascadian theme uses native rock, or the appearance of native stone texture, on walls, barriers, piers, and tunnel portals (Exhibit 3-61). It may incorporate arches on the bridge piers, and large tapered columns with rock texture and rock-patterned barriers. The consistent use of this design theme is intended to help unify the look of the I-90 corridor, and improve the visual quality ratings from existing ratings.



The Cascadian theme will be carried through the I-90 project. (Design Visualization)

*Exhibit 3-61
Concept for Snowshed after Project Completion*



Best Management Practices

BMPs for visual resources will be designed to meet applicable commitments and performance standards, including:

- WSDOT's Integrated Vegetation Management Program
- *Roadside Classification Plan* (WSDOT 1996), which specifies the restoration of native forest communities using small plant material, as well as soil restoration, hydroseeding, fertilizing, and mulching

Some example BMPs that WSDOT could use to comply with these standards include:

- Minimize the number of trees cut
- Carefully select roadside plantings and design features
- Minimize vegetation clearing that would open undesirable views such as to power lines
- Design stormwater facilities to minimize visual impact
- Color avalanche fencing to blend with the adjacent rock where it would be highly visible, or plant screening vegetation where possible
- Use directed lighting to minimize adverse impacts from glare
- Plant shrubs in the median to soften the face of visible walls, provide visual screening between lanes, and provide visual interest and color

Compensatory Mitigation

WSDOT will meet the terms of the project *Architectural Design Guidelines* (Appendix X) and project roadside master plan.

The Roadside Vegetation

Program is a "how to" guide for the best way to manage roadsides in any given area. Washington State has diverse climates and the highways have many neighbors, so the plans vary depending on location. The plans determine the right tool or combination of tools, for the right plant at the right place and time. WSDOT often uses the term **Integrated Vegetation Management** in reference to this process.

3.13 Social and Economic Resources

This section discusses the expected impacts of the project alternatives on the local and regional economy and related resources. The primary study area for social and economic resources is Kittitas County, including the communities of Hyak and Easton. Because social and economic impacts are expected to extend well beyond the project area, the study area also includes King and Pierce Counties. For more information, see Section 3.13 of the Draft EIS and the following four discipline reports: *Socioeconomics* (WSDOT 2003g), *Environmental Justice* (WSDOT 2003h), *Public Services* (WSDOT 2003i), and *Utilities* (WSDOT 2003j).

What new information has been developed since the Draft EIS?

No new issues were introduced and WSDOT did not conduct any new analysis beyond that which was done for the Draft EIS.

Comments from the public and reviewing agencies have been incorporated into this section.

What are the major characteristics of the affected environment?

Socioeconomic Resources

The project area is a sparsely populated rural area immediately east of Snoqualmie Pass. The 2000 Census indicated that the area contains 64 residences, of which nine are occupied full time. The rest are either vacant or have seasonal, recreational, or occasional uses. However, subdivision and building activity since the 2000 Census suggests that the area is increasingly being developed, with potential for additional permanent residents.

Land within the project area is mostly undeveloped National Forest managed by the USFS, with more intensely used outdoor recreation opportunities near the highway and dispersed recreation activities



The I-90 project is just east of the ski area at Snoqualmie Summit (Shown: Summit West Ski Area)

located some distance from the highway. Recreation and tourism are a leading economic activity in the area year-round. The few commercial and retail businesses that currently operate along the I-90 project corridor generally are related to outdoor recreation and motorists.

Median annual family income in Kittitas County was \$40,148, compared with a statewide average of \$57,114 during the first quarter of 2001 (Washington Department of Labor and Industries 2001).

Cost of I-90 Road Closures

Closures of I-90 due to avalanche control, landslides, or bad weather can result in costs to the regional economy. Unexpected closures of I-90 interfere with commerce, disrupt travel, delay delivery of freight, and increase uncertainty for manufacturers and shippers. Closure-related effects on commercial trucking operations may include violation of mandated curfew hours, increased overtime costs, and missed shipping connections.

WSDOT estimated these costs in the Draft EIS using two methods: the Cross-Cascades Corridor Method and the WSDOT Method. These methods are described further in the *Socioeconomics Discipline Report* (WSDOT 2003g). The Cross Cascades method is based on a study that was not finalized, and WSDOT has not revised its findings here. For the Final EIS, WSDOT updated these results from the WSDOT method based on current estimates for traffic counts, percentage of trucks, and current costs for wages and truck operations (Exhibit 3-62).

*Exhibit 3-62
Estimated Opportunity Cost of I-90 Closure*

Alternate Route Available			No Alternate Route Available
1 hour	3 hours	24 hours	24 hours
\$29,500	\$88,500	\$708,000	\$7,962,000



Freight trucks at a standstill due to an avalanche control closure.

Opportunity costs include a multiplier for the additional delay caused by traffic backup as a result of pass closure. These cost estimates are not exact, since factors such as fuel costs and labor rates change over time. However, they are useful for describing the magnitude of the problem and comparing proposed solutions. WSDOT did not include secondary economic losses from closures, such as lost business opportunities.

Public Services and Utilities

Public Services. The project area falls within two public school districts and three fire districts. The nearest hospital is in Cle Elum. The Kittitas County Sheriff's Department provides law enforcement countywide. There are no churches, cemeteries, or other social organizations within the project area.

Water. The Snoqualmie Pass Utility District provides water in the project area. An eight-inch-diameter water line crosses I-90 at MP 55.1, then turns west parallel with I-90 along the frontage road until reaching WSDOT's Hyak maintenance site.

Sanitary Sewer. The Snoqualmie Pass Utility District provides sanitary sewer management in the project area. A 10-inch cast iron sewer line crosses I-90 at MP 55.2, then turns west parallel with I-90 along the frontage road until reaching WSDOT's Hyak maintenance site.

Electric Power. Puget Sound Energy provides electric power in the project area. Overhead power lines cross I-90 at five locations: near MP 61.4, MP 62.8, MP 64.1, MP 65.5, and MP 67.6. There are two buried power line crossings of I-90 at approximately MP 55.0 and MP 69.0. Between MP 62.6 and MP 66.6, the power line enters and leaves the I-90 right-of-way at several locations along the highway. There are approximately 20 buried power vaults along this segment of I-90. A Bonneville Power Administration high voltage transmission line (345 kilovolts) crosses I-90 at approximately MP 65.8.

Telecommunications and Fiber Optics. Qwest Communications provides telecommunication services in the project area. Buried telephone lines cross I-90 at MP 62.6, MP 62.9, MP 63.5, MP 68.6, and MP 69.0. Two buried high-density polyethylene conduits of fiber optic lines cross I-90 at MP 64.0.

What are the expected environmental consequences?

What beneficial effects would result?

No-Build Alternative

The No-Build Alternative would not result in any beneficial effects to social and economic resources, either direct or indirect.

Build Alternatives

Constructing any of the build alternatives would result in social and economic benefits.

Reliability Improvements. WSDOT designed the build alternatives to reduce the frequency of road closures, and increase the reliability of travel between eastern and western Washington. This would have a positive economic impact by reducing the economic costs of highway closures and congestion.

Construction-Related Employment. The project would create substantial amounts of construction-related employment. Section 3.13 of the Draft EIS contains estimates of the number of jobs that the project would create. These estimates were based on the estimated project costs, along with multipliers developed by Washington State. As with opportunity costs, job creation estimates are inherently imprecise, although they are useful primarily for comparing alternatives and describing the general magnitude of the employment that would be created.

FHWA and WSDOT did not update job creation estimates for the Final EIS. However, the number of jobs created would be directly proportional to the project costs. Based on these costs, Keechelus Lake Alignment Alternative 1 would create the most employment,



Direct employment of construction workers will create jobs in the project area.

and Alternative 4 would create the least for this part of the project. Of the CEA Improvement Packages, the Preferred Alternative would create the most employment, and Improvement Package C would create the least.

The Preferred Alternative would create fewer jobs than other alternatives, since it is not the most expensive alternative. However, the employment effects of the more expensive alternatives are probably overstated, since the cost of these alternatives would likely have exceeded the project's available funding. Although job creation is not part of the project's purpose and need, any of the build alternatives would create a substantial amount of construction-related employment. The Draft EIS estimated that the combination of Keechelus Lake Alignment Alternative 4 and CEA Improvement Package A would result in approximately 12,100 total jobs (4,800 direct jobs and 7,300 indirect jobs) over the entire life of the project.



Indirect economic benefits will result from the purchase of goods and services from local, regional, and statewide businesses.

Economic Benefits to Recreation. Fish and wildlife resources provide a substantial economic benefit to Washington State through hunting, fishing, and other recreational activities. Improving ecological connectivity would maintain and enhance wildlife and fish populations, and help sustain the economic role of these resources.

Benefits to Public Services. Operating the new highway may have a beneficial impact on police, fire, emergency medical response, and hospital operations through reduced traffic delay, fewer highway closures, and improved traffic safety.

What adverse impacts are expected?

No-Build Alternative

The No-Build Alternative would not result in any direct impacts to social and economic resources. This alternative would result in indirect impacts as increasing traffic congestion affects the movement of goods and services and the response time for emergency services.

Build Alternatives

Temporary Impacts

The build alternatives would have temporary construction impacts.

Employment. Potential economic impacts on local businesses near Hyak and Easton would include construction noise, dust, and temporary disruption to access. WSDOT will take measures to minimize construction noise and dust, work with business owners to maintain adequate access, and provide signage indicating that businesses are open during construction as needed.

Housing. In order to live reasonably near their job sites, construction workers on large projects often rent housing in the local market and temporarily move to the area. Because of Kittitas County's relatively inexpensive housing cost, workers on the I-90 project would have an incentive to look for housing east of Snoqualmie Pass rather than in the more expensive Seattle-Tacoma-Everett metropolitan area. Workers on the project could occupy some of the vacant housing units in Kittitas County, which would reduce housing vacancy rates in the county temporarily and could lead to increases in rental rates. However, some workers may choose to use trailer or recreational vehicle parks due to the seasonal nature of the work of this project.

Public Services. The build alternatives would not have substantial effects on public services. Water, sewer, and power lines would remain in service except for brief periods during relocation. WSDOT would use detours and route contingency plans to assure continued access for emergency service providers.

Utilities. Utilities are located in the I-90 right-of-way by franchise or other agreement. The build alternatives would require utility relocation. WSDOT would use a utility locator service prior to construction to locate underground utilities. WSDOT would require all utilities to relocate prior to or during project construction, and to comply with applicable project permits.

Permanent Impacts

The build alternatives would have few permanent economic impacts.

Employment. The build alternatives would require WSDOT to hire additional maintenance staff in order to maintain the increased number of bridges and plow the additional lanes during the winter. The number of additional staff would be higher (up to 50) for Keechelus Lake Alignment Alternatives 1, 2, or 3 since these alternatives have tunnels, and much smaller for Alternative 4 (the Preferred Alternative), since it does not have a tunnel.

Once built, operating and maintaining the new highway would have no negative impact on overall employment trends within Kittitas County or the state.

Housing. FHWA and WSDOT anticipate that the build alternatives would have no permanent impacts to housing patterns. Please see Section 3.11, *Land Use*.

Urban Quality. There are no urban areas within the project area; consequently there would be no impacts to urban quality.

Land Acquisition. The project would require acquisition of both public and private land for additional easement, as described in Section 3.11, *Land Use*. FHWA and WSDOT do not expect these easement acquisitions to affect employment, the economy, or the social fabric of the communities near the study area.

Displacement. FHWA and WSDOT believe that the build alternatives would not result in displacement of any businesses or residences. However, if any displacement occurs, the lead agencies would comply with the requirements of the federal Uniform Relocation Act of 1970, as amended.

Environmental Justice. *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (US Department of Housing and Urban Development 1994), states that people of all races, incomes, and



Additional crews will be needed to maintain the added lanes and bridges after construction. (Shown: WSDOT plow crews climbing Snoqualmie Pass eastbound)

cultures are to be treated fairly with respect to development impacts. According to the 2000 Census, all 20 persons living in the census blocks that include the project construction area are white and non-Hispanic. This is similar to Kittitas County's overall racial composition, where 91.8 percent of the population is white. A total of 13.3 percent of Kittitas County's population lives below the poverty level, compared with 10.2 percent for the state. No income data is available for the specific resident of the project area, but the project area does not appear to support a low-income population based on the small number of permanent residences (nine) located within a matrix of second homes and relatively high-value real estate.

Because there is no minority or low-income population in the project area and the project would have little to no impact to private property owners, the build alternatives would not disproportionately affect low-income or minority populations. In addition, the project would comply with:

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994)
- FHWA Order 6640.23, FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1998)
- Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (1997)

Public Services. Operation of the new highway would not affect police, fire, emergency medical response, or hospital operations. Improvements to traffic flow and transportation safety could have a positive effect on emergency services response times.

Utilities. FHWA and WSDOT do not anticipate that operation of the highway will have any direct or indirect effects on utilities.

Social. The build alternatives would not affect community cohesion or divide the communities near the project area. The two communities near the project area, Hyak and Easton, are located sufficiently far from construction activities that there should be no impacts.

How will FHWA and WSDOT mitigate for adverse environmental impacts?

Avoidance and Minimization

The lead agencies have avoided and minimized social and economic impacts by:

- Designing the project to avoid acquiring private property wherever possible
- Designing the project so that land owners can have access during construction
- Avoiding utilities during design

WSDOT will use a utility location service to provide available utility locations. Utility relocation will be included in project permits.

Best Management Practices

No BMP-related commitments have been made.

Compensatory Mitigation

Since there will be no permanent adverse impacts to social and economic resources, no compensatory mitigation will be required.

3.14 Hazardous Materials and Waste

This section discusses the potential release of hazardous materials or wastes as a result of the project alternatives. The study area for potential sources of hazardous materials and wastes is one mile on either side of I-90. Potential environmental risk from hazardous materials and waste associated with past land use appears to be low. No identified National Priority List sites are located within the study area. Additional information can be found in Section 3.14 of the Draft EIS and the *Hazardous, Toxic, or Radiological Waste Discipline Report* (WSDOT 2002j).



Accidents and spills on I-90 can release hazardous materials.

What new information has been developed since the Draft EIS?

No new issues were introduced, and WSDOT did not conduct any new analysis beyond that which was done for the Draft EIS. There were no comments to the Draft EIS concerning hazardous materials.

What are the major characteristics of the affected environment?

There are five hazardous waste sites near the project area, all of which are underground fuel storage tanks. None pose a potential threat to workers or travelers on I-90. Exhibit 3-63 details the known sites that contain hazardous, toxic, or radiological waste within the study area.

What are the expected environmental consequences?

What beneficial effects would result?

No-Build Alternative

The No-Build Alternative would not result in any beneficial effects to hazardous materials and waste.

Exhibit 3-63
Known Hazardous, Toxic, or Radiological Waste Sites

Site Name	Vicinity	UST or LUST	Status	Tank Capacity	Impact Potential
WSDOT Hyak Maintenance Facility	At Hyak, approximately 200 feet south of I-90	3 USTs	Operational	Unknown	Low
Summit West	Approximately 0.5 mile northwest of Hyak, north of I-90	1 UST	Operational	Unknown	Low
Summit Central	Approximately 0.5 mile southeast of Hyak	1 LUST	Cleanup underway	Unknown	Low
RV Town	Near Easton, approximately 500 feet south of I-90	3 USTs	Operational	5,000 – 19,999 gallons	Low
C.B.'s General Store and Service Station	At west end of Easton, approximately 0.25 mile south of I-90	4 LUSTs	Closures in process for all tanks	111 – 4,999 gallons	Low

UST – underground storage tank

LUST – leaking underground storage tank

Build Alternatives

Accidents are the primary potential source of contamination in the project area, and reducing accident rates should lower the potential for contamination. Improving traffic safety is a major part of the project's purpose and need, and the lead agencies expect that accident rates would go down as a result of constructing any of the build alternatives.

What adverse impacts are expected?

No-Build Alternative

The No-Build Alternative would not result in any adverse hazardous materials or waste impacts, either direct or indirect.

Build Alternatives

Temporary Impacts

The lead agencies do not anticipate any temporary impacts to or from hazardous materials and waste sites from constructing any of the build alternatives, because of the distance of these sites from the area of construction.

The only other potential temporary adverse impacts would come from spills during construction. These would be controlled through appropriate BMPs, as described below.

Permanent Impacts

The lead agencies do not anticipate that any of the build alternatives would result in permanent direct or indirect impacts related to hazardous materials and waste.

How will FHWA and WSDOT mitigate for adverse environmental impacts?

Avoidance and Minimization

There are no known hazardous waste sites within the proposed area of construction. WSDOT planned the location of materials staging and stockpiling sites to avoid known hazardous materials locations.

Best Management Practices

BMPs for hazardous materials will be designed to meet applicable commitments and performance standards, including:

- Spill Prevention, Control and Countermeasure Plan
- Applicable parts of the *Implementing Agreement between the Washington State Department of Ecology and the Washington State Department of Transportation* (Ecology and WSDOT 1998), or as revised
- The project health and safety plan and Occupational Health and Safety Administration regulations

Some example BMPs that WSDOT could use to comply with these standards include:

- Using documents and guidance materials to assist contractors in developing Spill Prevention, Control and Countermeasure Plans
- Conducting health and safety monitoring on work sites with potentially hazardous materials

- Implementing a WSDOT construction compliance program

Compensatory Mitigation

Since there will be no permanent adverse impacts to hazardous materials and waste, no compensatory mitigation will be required.

3.15 Energy

This section discusses energy consumption requirements for construction of the project alternatives. The study area is the project corridor. For more information see Section 3.15 of the Draft EIS and the *Energy Discipline Report* (WSDOT 2002k).

What new information has been developed since the Draft EIS?

No new analysis was conducted beyond that which was done for the Draft EIS. There were no comments on the Draft EIS from the public or reviewing agencies specific to energy.

What are the major characteristics of the affected environment?

The primary energy use in the area is fuel consumption from the vehicles that use the project corridor. No construction or manufacturing activities in the study area involve major energy consumption.

What are the expected environmental consequences?

What beneficial effects would result?

No-Build Alternative

The No-Build Alternative would not result in any beneficial energy effects.

Build Alternatives

Any of the build alternatives would increase the efficiency of traffic flow and reduce congestion, which would reduce energy consumption.

What adverse impacts are expected?

No-Build Alternative

The No-Build Alternative would not result in any adverse impacts to energy, either direct or indirect.

Build Alternatives

Temporary Impacts

The primary temporary impact to energy consumption would be the energy needed for construction. This would include manufacture of materials, transportation of materials, and operation of construction machinery.

Energy consumption during construction is difficult to calculate precisely, but is directly proportional to construction cost. Consequently, the Preferred Alternative would consume the lowest amount of energy of the Keechelus Lake Alignment Alternatives, since it is the least costly alternative. For the CEA Improvement Packages, the Preferred Alternative would use the most energy of the alternatives considered, since it is the most expensive.

Permanent Impacts

None of the build alternatives would result in permanent adverse impacts to energy use, either direct or indirect.

In some cases, building new highways can result in increased traffic demand and the resulting energy use. However, as discussed in Section 3.11, *Land Use*, traffic growth in the I-90 project area is driven almost entirely by regional and statewide trends. The project would not, by itself, result in increased traffic demand.

How will FHWA and WSDOT mitigate for adverse environmental impacts?

Avoidance and Minimization

Several project design choices would result in lower energy consumption during construction, primarily by reducing the amount of construction material and the distance that materials would be transported.

Some of these choices are:

- Choosing the Common Route over construction of a new alignment in a location where no highway currently exists
- Identifying Alternative 4 as the Preferred Alternative for the Keechelus Lake Alignment
- Modifying the Preferred Alternative to eliminate the long viaduct bridges in Keechelus Lake
- Using Crystal Springs Sno-Park, located in the center of the project corridor, as the primary materials storage and processing site

Best Management Practices

No BMP-related commitments have been made.

Compensatory Mitigation

Since there will be no permanent adverse impacts to energy, no compensatory mitigation will be required.

3.16 Cumulative Effects

This section discusses the cumulative effects of the alternatives within the context of past actions, present actions, and reasonably foreseeable future actions.

What does the National Environmental Policy Act require?

NEPA requires FHWA and WSDOT to consider the cumulative effects of the I-90 project, by looking beyond the project area to other planned actions whose impacts could combine with those of the project. Cumulative effects generally cannot be determined precisely. Therefore, the analysis in this chapter is qualitative rather than quantitative.

The analysis of cumulative effects requires the consideration of both direct and indirect impacts. Direct impacts are effects caused directly by the project, at the same time, and in the same place as the project itself. Indirect impacts are effects caused by the project that occur later in time or at some distance from the project. Indirect impacts are more difficult to quantify and more open to discussion.

How did FHWA and WSDOT analyze cumulative effects?

The I-90 project area has unique characteristics and history that have shaped its present and future conditions. Much of the surrounding land is in federal ownership and development is not possible. Consequently, there are not many traditional “reasonably foreseeable future actions,” such as large construction projects or land developments, that would add substantial amounts of traffic to the highway or create impacts to the same resources as the I-90 project within the project area. However, there are visible trends in land use and management, whose effects may be consistent or inconsistent with the project.

Cumulative effects are: “...*the summation of impacts on a resource resulting from the proposed project, when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes those actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time*” (40 CFR Section 1508.7).

The study area for cumulative impacts is the area within 10 miles of the project area, but includes a larger area when discussing state-wide trends. Because of the unique nature of the project area, the time frame for the cumulative impacts discussion covers the entire history of the use of the corridor for transportation and resources.

FHWA and WSDOT considered the effects of reasonably foreseeable future actions on all of the elements of the environment. However, the discussion concentrates on wetlands and related habitat impacts, since this is the primary area where the I-90 project would have unavoidable adverse impacts. The discussion also includes the beneficial effects of the project, since these beneficial effects would combine with the ongoing land management by public agencies, which focuses on restoring landscapes and wildlife connections.

What past, present, and reasonably foreseeable future actions are relevant to determining cumulative effects?

Future actions in and near the project area are likely to be shaped by its history as a transportation corridor and the use of the surrounding area for recreation, timber harvest, and irrigation reservoirs, which has had the largest impacts on the project area environment. This history has created the dominant trends that should continue into the future.

The lands in and near the project area were ceded to the United States government as a result of 1855 Yakima Treaty. The first private land holdings in the project area were a result of land grants to the Northern Pacific Railroad beginning in 1864, which established the “checkerboard” pattern of public and private land in the area (see Section 3.11, *Land Use*). The federal government owns the majority of the remaining land in the project area. The USBR began water storage operations at Keechelus Lake in 1907, and the Wenatchee National Forest, which comprises the majority of the project area, was established in 1908.

Between the 1940s and early 1990s, land use in the project area was dominated by timber harvest. On both federal and railroad lands, the

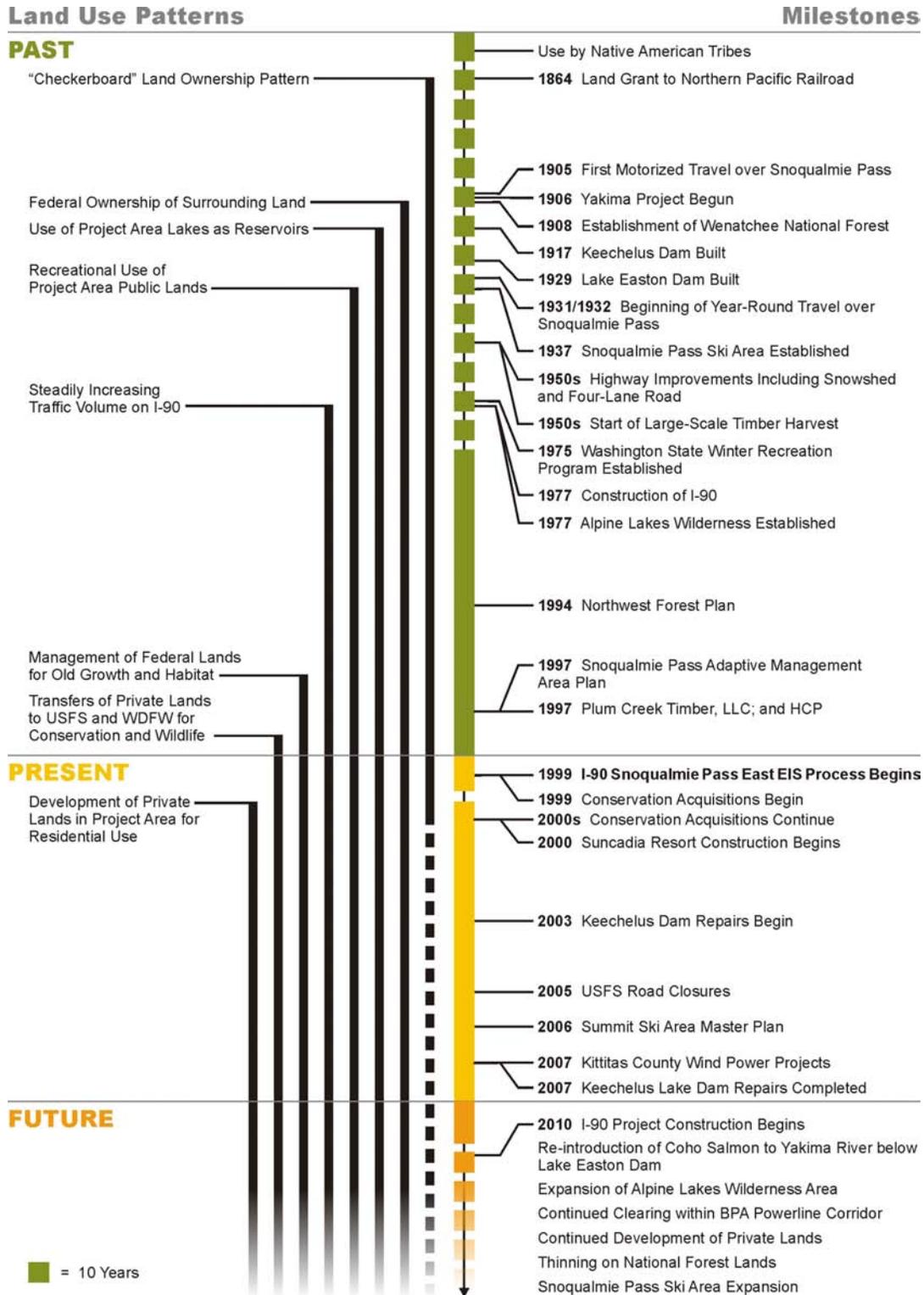
original old-growth forest was replaced in much of the project area lands by even-aged managed timber stands, with a lower diversity of species. Clear-cutting and construction of an extensive network of forest roads led to considerable habitat fragmentation. During the same period, the area began to be used for year-round recreation, and this use has grown steadily. Private railroad lands began to be sold and developed for seasonal or year-round residential use.

The I-90 corridor has been used for transportation since pre-historic times. European settlers used an existing Native American trail over Snoqualmie Pass beginning in the 1850s, and motorized traffic began crossing the pass in 1905 on what was then State Road 7. Year-round operations began in the winter of 1931/1932. The existing snowshed was built in 1950, when construction began on a four-lane road. Further improvements were made when the highway (then US Highway 10) was added to the Interstate Highway System in 1977, and additional improvements were made in the 1980s. Throughout this period, improvements to the highway changed surface water flow and created barriers to fish passage. As I-90 became the primary east-west corridor across the Cascades, growth in traffic volumes began to affect the ability of wildlife to move across the highway. At the same time, development of private land east and west of the federal lands caused the project area to have more importance as a wildlife corridor.

In the 1980s and 1990s, federal planning documents began reflecting awareness of the barrier effect of the highway. As described in Section 3.11, *Land Use*, in the 1990s federal agencies changed the management direction within the project area to favor wildlife connectivity and restoration of old-growth conditions. Large-scale timber harvest, which had affected much of the project area, largely ceased. Private groups and the USFS engaged in a program to re-acquire some of the historic railroad lands for conservation purposes.

This complex history led to trends that continue in the present and are expected to continue into the future (Exhibit 3-64 and Exhibit 3-65). Such trends are part of the “reasonably foreseeable future actions” in the project area, even when no specific project proposals have been made. Firm dates do not yet exist for all future actions.

Exhibit 3-64
Relevant Past, Present, and Reasonably Foreseeable Future Actions



*Exhibit 3-65**Description of Project Area Past, Present, and Reasonably Foreseeable Future Actions*

Date	Action	Description
1855	Treaty with the Walla Walla, Cayuse, and Umatilla 1855	The treaty of 1855 ceded more than 6.4 million acres in what is now northeastern Oregon and southeastern Washington. In exchange, the Walla Walla, Cayuse, and Umatilla retained a permanent homeland on the reservation in Mission, Oregon.
1864	Land grant to Northern Pacific Railroad	The US government granted large tracts of land, in a “checkerboard pattern,” to Northern Pacific Railroad to encourage railroad development. Some land has been transferred to other private ownership.
1906	Yakima Project begins	Dams and water reservoirs were developed to provide water for irrigation in south-central Washington.
1908	Establishment of Wenatchee National Forest	Establishment of the Wenatchee National Forest created the pattern of land use for the federal lands surrounding the project area.
1917	Keechelus Dam construction	Construction of the Keechelus Dam by USBR allowed the use of the lake as a reservoir for irrigated agriculture. This action blocked fish passage within the Yakima River at the dam.
1929	Lake Easton Dam construction	Construction of the Easton Dam by USBR allowed the use of the lake as a reservoir for irrigated agriculture.
1931-32	Beginning of year-round travel over Snoqualmie Pass	This year marked the beginning of the use of Snoqualmie Pass as a year-round connection between Eastern Washington and Western Washington.
1937	Snoqualmie Pass Ski Area established	From this time forward, the Snoqualmie Pass area has grown as a major recreation area.
1950s	Highway improvements including snowshed and four-lane road	The highway was steadily improved throughout the 1950s, becoming a more reliable route for east-west travel.
1975	Washington State Winter Recreation Program	Establishment of the Washington State Winter Recreation Program led to the establishment of sno-parks statewide, including in the project area.
1977	Construction of I-90	Construction of the modern I-90 as part of the Interstate Highway System established the project area as the main east-west corridor for freight and passengers in the state.
1994	Northwest Forest Plan	The USFS Northwest Forest Plan established goals and standards for protecting and enhancing habitat for late-successional and old-growth forests.
1997	Snoqualmie Pass Adaptive Management Area EIS and Plan	The USFS established goals for the Adaptive Management Area, including management for wildlife habitat connectivity and restoration of late-successional conditions.
1999	Conservation acquisitions begin	Congress approved a major land trade between the USFS and Plum Creek Timber, to begin to eliminate the “checkerboard” land use pattern. This effort was followed by private initiatives to purchase land for inclusion in the National Forest and other protected status.

*Exhibit 3-65**Description of Project Area Past, Present, and Reasonably Foreseeable Future Actions*

Date	Action	Description
2000	Suncadia Resort construction	Construction began on Suncadia Resort, a master planned community that would eventually have 2,000 residences, three golf courses, restaurants and shops. By 2007 construction had taken place on many parcels. Construction is still underway and is a major source of employment in Kittitas County.
2000s	Conservation acquisitions continue	Non-profit groups continued the process of purchasing private land for transfer to public ownership to further habitat connectivity. Groups include the Mountains-to-Sound Greenway Trust, Cascades Conservation Partnership, and the Cascades Lands Conservancy.
2005	USFS road closures	USFS closed roads on lands acquired from Plum Creek Timber Company. Road closures in the National Forest will continue until USFS road density standards are reached and maintenance of existing roads is within budget constraints.
2006	Summit Ski Area Master Plan	This plan governs the development of the alpine ski facility at Snoqualmie Pass, including improvements to ski lifts; construction of new trails; improvements to base area transit service; updates to support services, restaurants, and shops; and improvements to base area parking.
2007	Kittitas County Wind Power Projects	Permitting and development of major power generation facilities near Ellensburg. (The Kittitas Valley Wind Power Project is already under development.)
Ongoing	Thinning activities on National Forest lands	The USFS Roaring Thin project will treat approximately 8,000 acres on the southwest side of Keechelus Lake, beginning in 2007. Following this project, a subsequent project will treat National Forest lands in all of the drainages that are crossed by I-90. The project will include commercial and pre-commercial thinning and road closures; the goal is to improve watershed and ecological conditions in the project area.
Ongoing	Clearing the Bonneville Power Administration corridor	Bonneville Power Administration owns a 150-foot easement across National Forest lands, and expects to keep approximately 30–40 feet cleared or in an immature forest condition. Clearing will occur on the north side of the I-90 right-of-way.
Ongoing	Sale and development of former Plum Creek lands	New owners of Plum Creek property may manage these lands for residential and commercial development.
TBD	Snoqualmie Pass Ski Area expansion	Expansion of the Snoqualmie Pass Ski Area would add 400 acres of National Forest land in the Mill Creek Drainage to the ski area.
Ongoing	Reintroduction of Coho salmon to the Yakima River	Introducing Coho salmon may include building acclimatization facilities. WSDOT does not anticipate that Coho will be reintroduced above Keechelus Lake Dam.
TBD	Rocky Run Creek (FSR 4832) and Gold Creek Bridge Replacement	Replacement of the existing narrow bridges with longer bridges by USFS.

Exhibit 3-65

Description of Project Area Past, Present, and Reasonably Foreseeable Future Actions

Date	Action	Description
TBD	Wolfe Creek culvert upgrades	Increase the size of the Wolfe Creek culvert by USFS.
TBD	West-Wide Energy Corridor	Designate corridors on federal land for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities. A proposed corridor would pass within five miles of the Pacific Crest Trail and the Mountains to Sound Greenway.

EIS – environmental impact statement
FSR – Forest Service Road
TBD – to be decided
USBR – US Bureau of Reclamation
USFS – US Forest Service
WSDOT – Washington State Department of Transportation

In addition to the more specific actions listed above, the following trends are likely to continue for the foreseeable future:

- Federal ownership of surrounding land will continue, and the focus of federal land management will continue to be restoration of old-growth habitat and restoration of connectivity for wildlife.
- The density of National Forest roads will decline. The USFS will continue to close roads until recommended road density standards of 2.0 miles per square mile are met.
- Project area lakes will continue to be used as reservoirs. Passage for anadromous fish, including Coho salmon, most likely will not be restored to Keechelus Lake.
- I-90 will continue to be the state’s major east-west transportation route, and traffic volumes will continue to increase at projected rates.
- State population will continue to grow, and recreation pressure on public lands will continue to increase.
- Kittitas County will continue to designate the majority of the private land in the project area as commercial forest land. Some private land in the project area may be developed for higher

density uses based on environmental review consistent with the GMA and existing Kittitas County zoning regulation.

- Kittitas County will take the project's investments in ecological connectivity into consideration when evaluating any proposed changes to zoning or land use, and will include the CEAs in the County Critical Areas regulations, based on the research completed for the project which represents the best available science for ecological connectivity in the project area.
- The "checkerboard" private land pattern will slowly diminish as private land acquisitions continue, and this land is managed for conservation or transferred to public ownership.
- East and west of the project corridor beyond the National Forest boundary, private land development will continue to decrease the permeability of the landscape to wildlife and thus increase the importance of the project area for wildlife passage.

What are the expected environmental consequences?

Direct vs. Indirect Effects

The lead agencies have determined that almost all of the adverse effects of the I-90 project would be direct rather than indirect. This determination is true for all of the build alternatives, including the Preferred Alternative, based on the following:

- The location of the I-90 project, almost completely within the Okanogan-Wenatchee National Forest, will prevent the project from leading to housing growth or traffic growth
- The unavoidable adverse impacts of the project will be limited to the area of construction and will not result in adverse impacts either away from the project area or later in time

Where indirect effects would occur, they would be positive. For instance:

- The increased level of safety and capacity from the new highway would have positive economic effects continuing for many years throughout the state
- The project's ecological connectivity improvements would result in a gradual increase in wildlife gene flow between the North and South Cascades, as wildlife use the new crossing structures
- Increased permeability of the highway to groundwater and surface water would have a beneficial effect on water quality and habitat over many years

The impacts of the reasonably foreseeable future actions are mostly indirect, and based on longer-term trends. As discussed in Section 3.11, *Land Use*, there are few planned development projects inside the project area, and those that have been identified would have little direct impact.

Greenhouse Gas Emissions

Any of the build alternatives would have potential implications for greenhouse gas emission and global climate change, since vehicles are a major source of greenhouse gas emissions. Greenhouse gasses associated with transportation are the result of combustion, and include carbon dioxide (CO₂), methane, and nitrous oxide.

National estimates show that transportation accounts for almost 30 percent of total domestic CO₂ emissions. However, in Washington State, transportation accounts for nearly half of such emissions because the state relies heavily on hydropower for electricity generation, unlike other states that rely on fossil fuels to generate electricity.

State-Level Efforts to Control Greenhouse Gas Emissions

Washington State efforts to address greenhouse gas emissions include the following:

- In February 2007, the Governor issued Executive Order 07-02 requiring state agencies to find ways to reduce greenhouse gas emissions and adapt to the future that climate change may create.
- On May 3, 2007, the Washington State Legislature passed Senate Bill 6001 which, among other things, adopted Governor Gregoire's Climate Change goals into state law. The law aims to achieve 1990 greenhouse gas levels by 2020, a 25 percent reduction below 1990 levels by 2035, and 50 percent by 2050.

Achieving these state-level goals can be achieved primarily through:

- Creating more efficient driving conditions, including by reducing traffic congestion
- Introducing more fuel-efficient vehicles
- Reducing the amount of driving through mass transit, carpooling, telecommuting, and more efficient movement of goods and services

State efforts are included in Washington's 16-year plan to meet critical transportation needs. Improvements to maximize the efficiency of the system include:

- Low cost/high return efforts including active traffic management, ramp metering, incident response and transportation demand management such as commute trip reduction, park and rides, and local land use planning.
- Moderate to higher cost and benefit efforts including improvements to the efficiency of the road network. These include adding short lanes to connect interchanges, direct access

ramps for transit and high occupancy vehicles, and center turn lanes to allow better traffic flow.

- Higher cost, corridor-wide benefit from major investments in high occupancy vehicle lanes, high occupancy tolled lanes, transit, commuter rail, general purpose roadway lanes, interchange modifications, and bus access.

Additional efforts are underway, including improvements in land use patterns and more efficient transportation technology. In 2005 and 2007 the State Legislature mandated that vehicles sold in Washington starting with 2009 model years meet updated California emission standards. The new vehicle standards will reduce greenhouse gas emissions, and help reduce carbon monoxide and ozone pollutants.

Project-Level Efforts to Control Greenhouse Gas Emissions

The I-90 project would have positive effects on potential greenhouse gas emissions. Positive effects are the result of the lead agencies' choices during consideration of alternatives and project design.

Identification of the Preferred Alternative. Keechelus Lake Alignment Alternatives 1, 2, and 3 are more expensive than Alternative 4 (the Preferred Alternative), and would result in higher greenhouse gas emission of the alternatives considered. This is because for construction projects, energy consumption, fuel use, and other factors in greenhouse gas emissions are directly proportional to project cost. For the CEA Improvement Packages, greenhouse gas emissions would be very similar, since the only differences between these alternatives would be the type of stream crossing structures.

Construction Efficiency. WSDOT has identified materials and staging areas so as to minimize travel times, wait times, and engine idling. These measures will reduce fuel use and therefore greenhouse gas emissions. During construction, WSDOT will require BMPs that will further reduce emissions from vehicles and equipment, as noted in Section 3.2, *Air Quality*.

Operational Efficiency. The I-90 project would reduce emissions by reducing traffic congestion and pass closures. Under the project's roadside master plan, WSDOT will establish vegetation up to the pavement edge, rather than maintain an un-vegetated highway shoulder.

Design Efficiency. WSDOT has designed the project using materials with the longest available life. This includes replacing the existing pavement with Portland cement pavement rather than asphalt, and using bridges rather than highway fill at the stream crossings. These choices mean that the new highway would have a longer life before needing to be replaced, which would reduce overall emissions for highway reconstruction and replacing materials.

Preserving Vegetation. WSDOT and its partners have preserved land with vegetation from development, through purchases of private land for mitigation sites and to maintain wildlife corridors. Vegetation cover helps to reduce the effects of greenhouse gas emissions through absorption of CO₂. With the exception of identifying the Preferred Alternative, these actions and decisions would be similar for all of the build alternatives. The No-Build Alternative would not result in any direct increase in greenhouse gas emissions from construction, but would result in continued congestion and closures resulting from avalanches and rock fall.

What beneficial cumulative effects would result?

No-Build Alternative

The No-Build Alternative would not meet the project's purpose and need, and thus would not produce the beneficial effects of the build alternatives. There would be no cumulative beneficial effects.

Build Alternatives

As discussed throughout this EIS, the build alternatives were all designed to produce beneficial effects to traffic flow, public safety, and the natural environment. These beneficial effects would be greatest for the Preferred Alternative, which has been designed to best meet the project's purpose and need. These beneficial effects

would serve to mitigate for some of the adverse impacts of past actions, particularly the barrier effect of I-90 to wildlife passage, and the stormwater impact resulting from the lack of stormwater treatment on the existing highway.

The beneficial effects of the project also would create a cumulative beneficial effect when combined with the ongoing management direction on the surrounding National Forest lands. These would include:

- Compatible land management
- Reduction of road density
- Replacement of USFS bridges and culverts would be compatible with CEA objectives

What adverse cumulative impacts are expected?

No-Build Alternative

As discussed throughout this EIS, the No-Build Alternative would result in few to no direct adverse impacts, but would have indirect adverse impacts as traffic volumes continue to grow, the highway pavement continues to deteriorate, and the highway continues to function as a barrier to wildlife passage.

The adverse impacts of the No-Build Alternative would combine with the indirect impacts from some reasonably foreseeable future actions to create larger adverse cumulative impacts:

- As traffic demand increases, congestion and accident rates would become worse
- As statewide recreation demand increases, access would become more difficult
- As development continues on the private lands east and west of the project area, the project area would become even more important for wildlife passage

- As the USFS continues to manage the surrounding federal lands for late-successional conditions and restoration of wildlife passage, the No-Build Alternative would make accomplishment of these goals more difficult

Build Alternatives

Temporary Impacts

As discussed throughout this EIS, all of the build alternatives would create temporary impacts from construction. These impacts would not combine with the impacts of any of the reasonably foreseeable future actions to create an increased impact. None of the reasonably foreseeable future actions would create any type of similar impacts in the project area.

The only exception is the potential expansion of the Snoqualmie Pass ski area. No date has been announced for this project; however, this project may take place within the construction period for the I-90 project. In this case, traffic impacts from the two projects may take place simultaneously. However, impacts of the ski area expansion to traffic on I-90 are likely to be relatively minor since the ski area is located off the highway.

Permanent Impacts

As discussed throughout this EIS, the build alternatives would result in some permanent impacts, primarily related to loss of wetlands and terrestrial habitat from new highway fill. These adverse impacts would be slightly different for each of the build alternatives. These adverse impacts would be offset by the creation of additional habitat at the CEAs, as well as by more traditional mitigation.

Other potential projects, such as the Snoqualmie Pass ski area expansion, the SnoCadia development, the clearing of the Bonneville Power Administration power line corridor, or the West-Wide Energy Corridor proposal may affect mature forest and impact habitat for northern spotted owls and potentially marbled murrelets. The impact of these potential projects on mature forest and other resources has not been quantified. FHWA is currently consulting with the USFWS

on the potential effects of these projects in combination with the I-90 project.

Re-zoning to higher densities could create an adverse cumulative impact by reducing the effectiveness of both the transportation improvements and project investments at the CEAs. However, as discussed in Section 3.11, *Land Use*, FHWA and WSDOT assume that private land use development will be consistent with current zoning.

How will FHWA and WSDOT mitigate for adverse cumulative environmental impacts?

Since there will be no permanent adverse cumulative effects, no compensatory mitigation will be required.

3.17 Other Environmental Considerations

Irreversible and Irretrievable Commitment of Resources

NEPA regulations require environmental analysis to identify “...*any irreversible and irretrievable commitments of resources, which would be involved in the proposed action should it be implemented.*”

“Primary irreversible and irretrievable resource commitments” are defined as use of nonrenewable resources throughout a project that may be irreversible if: 1) resources are removed and cannot be replaced within a reasonable time frame (such as extinction of a threatened or endangered species), or 2) project completion will obstruct use of the resources (such as building over a cultural site).

Most impacts of the project are short-term and temporary, or longer-lasting but negligible. However, some resources may involve a possible irreversible or irretrievable commitment.

- All of the build alternatives would involve a long-term conversion of land resources. Reduction in wildlife habitat resulting from widening and realigning the I-90 corridor is considered an irreversible commitment of resources during the time period that the land is used for a highway. Wetlands would be filled where they cannot be avoided. Unavoidable wetland impacts could be offset by compensatory mitigation at other locations.
- The energy consumed during construction of the project would be an irreversible commitment of resources. This would consist primarily of fossil fuels used to power construction equipment and vehicles.
- Construction materials such as cement, aggregate, asphalt, sand, fill materials, lime, and steel would be expended on the road construction. Additional labor, non-renewable energy, and natural resources would be used in the fabrication and

preparation of construction materials. These materials are generally irretrievable. However, their use would not have any adverse impact upon continued availability of these resources.

- The project would require a substantial one-time irretrievable expenditure of both state and federal funds. The commitment of these funds is based on the conclusion that local, regional, state, and national residents will benefit by the improved quality of the overall transportation system. These benefits consist of improved efficiency, accessibility, and safety, as well as savings in time spent transporting goods or traveling along I-90.

Relationship between Local Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

Pursuant to NEPA regulations, an EIS must consider “...*the relationship between short-term uses of man’s environment, and the maintenance and enhancement of long-term productivity.*” This section evaluates short-term benefits of the project compared to long-term productivity derived from not pursuing the project.

Short-term effects of the project include localized disruptions, higher noise levels, increased air pollution, and rerouting traffic during the construction period. These impacts would be relatively inconsequential in the long term.

The project has taken into account future population growth in Washington State, reasonably foreseeable future land use, and existing and future transportation needs.

Long-term productivity would be reduced in areas where habitat is used for highway expansion, new alignments, or road widening. The long-term use of these areas would be affected permanently.

Long-term productivity would be enhanced through the creation of additional habitat and the connection of habitat areas that are presently separated. FHWA and WSDOT believe that the beneficial

effects to long-term productivity will be larger than the negative impacts.

FHWA and WSDOT believe that constructing the project, including the local short-term impacts and the use of resources, is consistent with the maintenance and enhancement of the long-term productivity for the study area and the State of Washington.