

Biology

For decades, much of the Sunrise Project area has undergone considerable change since until recently, it formed part of the eastern edge of the urban growth boundary. Now within the urban growth boundary, subsequent urban development has brought associated adverse impacts to its wildlife, fish, and botanical habitats. Some important wildlife features maintain a tenuous hold. The urban areas are adjacent to larger tracts of moderate- to high-valued wildlife habitats, lying just to the east, that are connected to the project area via vegetated corridors along streams or undeveloped tracts.

Road construction can impact fish and wildlife through a number of pathways. Effects that are most applicable to the Sunrise Project can be broadly categorized as loss of habitat within the construction footprint; fragmentation effects of existing habitat and degradation of adjacent habitat; direct mortality through wildlife vehicle collisions, and changes in stream hydrology. Most of the wildlife and fish impacts are due to the loss of habitat, resulting in a few large habitat patches connected by narrow corridors that are bisected by numerous roads. Figure 39 and Figure 40 illustrate the habitat types, streams, and wetlands in the project area. Figure 41 through Figure 47 identify impacts to habitats for the alternatives and design options.

Within the project area, native landscapes and natural systems have largely been replaced by urban densities of industrial, commercial, and residential uses, and their supporting infrastructure. A common result of urbanization is that the number of native species declines at the same time that the total density of wildlife increases. This occurs because a few exotic species become very

The Biology Technical Report and the Water Quality Technical Report provide more detailed discussion of the following:

- Habitat types.
- Threatened and endangered species.
- Wildlife corridors.
- Fish resources, including Mount Scott Creek, Dean Creek, Phillips Creek, Clackamas River, Cow Creek, Sieben Creek, Graham Creek, Rock Creek and tributaries, Trillium Creek and tributaries.
- Botanical resources, including wetlands, uplands, forest, sensitive plant species, and noxious weeds.
- Impacts to habitat, both quantitative and qualitative.
- Water quality analysis and treatment locations.

abundant. The proportion of native bird, mammal, amphibian, and reptile species progressively declines as urban development intensifies.

Wildlife Habitat

Important habitat for wildlife is found on Mount Talbert, the Three Creeks area (a large area of mixed wetland and upland west of SE 82nd Avenue, and containing the confluence of Phillips and Dean Creeks with Mount Scott Creek), and a large forested parcel between Mount Talbert and Camp Withycombe owned by ODOT. The Clackamas River provides another regionally important habitat feature for fish and wildlife. Deer, coyote, and other small

mammals continue to move between these patches through two wildlife corridors: Mount Talbert to Three Creeks corridor and Mount Talbert to Rock Creek corridor. Wildlife use of some of these areas is well documented and is also evident to the casual observer. Wildlife use of other areas is less documented.

Wildlife corridors provide foraging and breeding habitat for small mammals and a conduit for movement among habitat patches. The quality

Upland wildlife habitats are non-riparian areas that provide wildlife with food, shelter, and corridors for moving from one habitat area to another.

Riparian habitat is land or vegetation near streams, rivers, wetlands, and lakes.

Metro ranked upland habitat and riparian corridors as low, medium, or high based on their value for protecting fish and wildlife (Class A, B, and C for upland habitats and Class 1, 2, and 3 for riparian habitat). This classification scheme provided the basis for mapping wildlife habitat within the project corridor.

of a wildlife corridor depends on several factors, including width, barriers, and fragmentation. Generally, the wider the corridor, the more species it supports and the more habitat functions it provides. In the narrow corridor segments present in the Sunrise Project area, animals are likely to pass through without seeking shelter, cover, or food. For passage, the important constraints are width of the corridor, barriers across the corridor, and the potential for those barriers to fragment habitat.

Barriers to movement within a corridor, such as roads and urbanized areas, increase the likelihood of the corridor becoming an isolated patch. When barriers surround habitat or connections between patches of habitat are cut off, habitats are fragmented and isolated and may be too small to support larger species. In some areas of the project, corridors are wide and secure, but mostly they have been bisected and crowded by development. In some areas, the corridors are extremely narrow and future development could easily sever them. The Sunrise Project further impacts these corridors by direct habitat loss and indirect habitat loss, resulting from increased noise disturbance. Generally, as traffic volume increases, traffic-related wildlife mortality increases until animals no longer attempt to cross and the road becomes a complete barrier to wildlife movement. Areas of particular concern are Mount Scott Creek to Dean Creek, Mount Scott Creek at SE 82nd Avenue, the Clackamas Bluffs, and the area between an unnamed tributary to Rock Creek and Rock Creek.

The effects of noise on wildlife are not clear-cut. Some studies have found that breeding bird densities of some species decline near roads. Some, though not all species, are sensitive to highway noise and the distance over which this effect occurs can be considerable, varying from a several feet to more than 1.5 miles. Studies of large mammals, including ungulates, do not provide a clear response to highway noise levels. Studies of small mammals are also inconclusive with respect to highway noise.

Impacts of Alternatives 1, 2, and 3 and design options on wildlife habitat

Alternative 1—No Build would result in minimal impacts. The SE 82nd Drive widening would be constructed through developed urban land that provides habitat for species that are tolerant of human disturbance. Most native vegetation has been eliminated, and much of the wildlife habitat consists of man-made structures. Exotic generalist species, such as rock doves, starlings, and house sparrows, are expected to be the most abundant species. The area does not provide for any wildlife dispersal or movement.

The OR 212 eastbound climbing lane and SE 172nd Avenue (SE Foster Road to OR 212) are located in primarily agricultural lands. The quality of wildlife habitat in this area is low. Since the project would improve existing roads, impacts would be confined along the edge of the roads that provide little wildlife habitat value. However, as traffic volumes increase, an animal's ability to cross the road decreases until traffic volumes reach a level where the road becomes a complete barrier to wildlife movement.

Alternative 2 would affect a total of 101 acres of Metro's mapped upland wildlife habitat (56 acres) and riparian corridors (45 acres), as listed in Table 20. **Alternative 3** would impact 98 acres of Metro's mapped upland wildlife habitat (53 acres) and riparian corridors (45 acres).

Wildlife travels through a very narrow corridor along the I-205 freeway fill slope from Mount Scott Creek to Dean Creek southeast of I-205.

The proposed I-205 on-ramp over Mount Scott Creek could sever the corridor unless land is set aside for a corridor or another option to maintain connectivity for wildlife between the Three Creeks area and east of I-205.



Table 20. Wildlife Impacts by Habitat Type by Alternative and Design Option

	Upland Area in Acres												Pref. Alt.
	Alt. 2 with A-2	Alt. 3 with A-2	Alt. 2 with B-2	Alt. 3 with B-2	Alt. 2 with C-2	Alt. 3 with C-2	Alt. 2 with C-3	Alt. 3 with C-3	Alt. 2 with D-2	Alt. 3 with D-2	Alt. 2 with D-3	Alt. 3 with D-3	
Class A	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	9.1	6.8	8.1	6.8
Class B	24.8	21.2	20.9	20.2	17.2	39.2	36.2	25.9	22.9	24.8	22.1	22.1	21.8
Class C	22.8	22.7	23.9	23.2	23.2	22.3	22.3	22.7	22.7	23.2	22.8	22.8	23.2
Subtotal	56.3	52.6	53.5	52.1	49.1	70.2	67.2	57.7	54.7	54.8	53.0	53.0	51.8
Riparian Area in Acres													
Class I	22.7	20.7	24.1	20.1	20.1	19.4	19.4	23.3	23.3	23.2	23.2	23.2	20.8
Class II	19.2	19.2	20.8	17.8	17.8	18.7	18.7	19	19	19.2	19.2	19.2	18.3
Class III	2.8	2.8	2.8	2.8	2.8	2.8	2.8	1.9	1.9	2.8	2.8	2.8	2.1
Subtotal	44.7	42.7	47.7	40.7	40.7	40.9	40.9	44.2	44.2	45.2	45.2	45.2	41.2
Total	100.9	97.9	98.3	95.3	101.2	92.8	89.8	111.1	98.9	101.9	100	97	94.2

Fill slopes for the I-205 on-ramp would further restrict an already narrow section of the corridor. In this same area, the North Lawnfield Extension would impact forested habitats used by deer and other small mammals. Impacts by acreage are presented in Table 20.

Under **Design Option A-2**, the North Lawnfield Extension would not be constructed, reducing impacts by 2.6 acres compared to **Alternatives 2 and 3**. Class I riparian habitat makes up 2.0 acres of the 2.6 acres of total impact. The other advantage to wildlife of **Design Option A-2** is that the fill slopes for the I-205 on-ramp would not join with those of the North Lawnfield Extension, which would create narrow, V-shaped topography that wildlife is less likely to use.

Near Mount Scott Creek at SE 82nd Avenue a new bridge is proposed to connect the southern and northern sections of SE Ambler Road. This bridge would be constructed over the Mount Talbert to Three Creeks wildlife corridor, potentially maintaining or improving access for wildlife in this corridor.

In the Midpoint area, a section of the Mount Talbert to Rock Creek wildlife corridor extends along the Clackamas Bluffs, where residential uses are prevalent along the top and industrial uses dominant along the base. The Sunrise Project would be built along the lower third of the bluff, reducing the corridor's width. **Alternative 2** would affect 3 more acres of upland Class A habitat, which would be needed to construct the interchange. **Design Option B-2** reduces upland habitat impacts by 2.8 acres but increases impacts on riparian habitat by 3 acres, for a net increase in impact of 0.3 acre compared to **Alternative 2**.

Design Option C-2, the central alignment, reduces impacts to upland and riparian habitats between SE 135th Avenue and Rock Creek compared to either **Alternative 2 or 3** at the same location by moving the proposed alignment closer to OR 212/224. The shift in the alignment reduces impacts to a large wetland between SE 135th Avenue and SE 142nd Avenue.

It would also minimize impacts to the emergent wetland behind the EZ Storage units by only filling approximately the southern third of the wetland, rather than entirely filling the wetland as **Alternative 2** would.

Impacts to the wildlife corridor along the Clackamas Bluffs would be slightly less than under **Alternatives 2 and 3**, because the **Design Option C-2** alignment would not curve around the base of the bluff just west of SE 135th Avenue. The impacts would be even less compared to **Design Option C-3**.

Design Option C-3, the modified tree-line alignment, would encroach more on the wildlife corridor than the other options. SE 142nd Avenue would be built up on fill slopes and cross over the Sunrise Project on a new bridge instead of passing under it as with **Alternatives 2 and 3** and **Design Option C-2**. Fill slopes north of the overpass would impact mixed forest habitat in the wildlife corridor and create a vertical barrier to wildlife movement. The northward curve of **Design Option C-3**, immediately west of SE 135th Avenue at the base of the bluff, would pinch the corridor to a width of about 50 feet, whereas the other alignments would leave the corridor width closer to 100 feet. Compared to **Alternatives 2 and 3**, **Design Option C-3** would increase upland habitat impacts by 14 acres and reduce riparian habitat impacts in large wetlands west of SE 142nd Avenue by nearly 4 acres, for a net increase in impacts of nearly 11 acres. **Design Option C-3** would include construction of a stormwater treatment/detention facility in the palustrine emergent wetlands behind the EZ Storage facility.

The wildlife corridor linking Mount Talbert to Rock Creek and beyond is narrowest between an unnamed tributary to Rock Creek and the Rock Creek riparian corridor. The corridor of mixed-forest land is less than 200 feet wide and sandwiched between housing developments to the north and a manufactured home development to the south. Wildlife use of this narrow patch is not documented. It is the only non-developed habitat patch remaining within

the alignment. The alignment for **Alternatives 2 and 3** runs primarily through the manufactured home park, but it also affects the wildlife corridor. The alignment inclines on slopes as it approaches the proposed new bridge over Rock Creek. Rock Creek provides the last leg of the wildlife corridor to the Clackamas River corridor.

Design Option D-2, the folded diamond interchange through forested knoll, would put the interchange south of where **Alternatives 2 and 3** alignment. The western approach to the intersection would be located farther south than the build alternatives and would avoid the narrow portion of the wildlife corridor between the housing development and the manufactured home park. **Design Option D-2** would impact 1 more acre than **Alternative 2** or **3**, but impacts are basically the same as **Alternatives 2 and 3**.

Design Option D-3, the single-point diamond interchange, has impacts similar to the build alternatives, leaving only the northernmost portion of the wildlife corridor unaffected. Construction activities and the narrowness of the remaining corridor would create a substantial barrier to wildlife movement.

Impacts of the Preferred Alternative on wildlife habitat

The impacts of the **Preferred Alternative** will be similar in nature, but not in size or exact location, compared to those described for **Alternative 2** in the I-205 Interchange area and **Design Options C-2 and D-3** in the Midpoint and Rock Creek areas. Several improvements within the right-of-way west of I-205 along the Milwaukie Expressway (OR 212/224) that were not included in the Area of Potential Impact (API) for **Alternatives 2 and 3** expand the construction area westward. However, this area is fully developed and provides minimal wildlife habitat. Figure PA-22 provides the construction impact line for the **Preferred Alternative** compared to the impact line for **Alternative 2**. Figures PA-23 and PA-24 highlight differences between **Alternative 2** and the **Preferred**

Alternative in the I-205 Interchange area and at the Rock Creek Junction, respectively. The **Preferred Alternative** will affect 94 acres of Metro's mapped upland wildlife habitat and riparian corridors (Figure PA-22). Impact areas by habitat type are listed in Table 20.

In the I-205 Interchange area (Figure PA-23) preliminary design differences between **Alternative 2** and the **Preferred Alternative** include a relocated North Lawnfield Extension, new water quality facilities along the relocated SE Lawnfield Road, two new bridges, and a new floodplain mitigation site.

For the **Preferred Alternative**, SE Lawnfield Road was relocated further east from the location identified under **Alternatives 2 and 3** to avoid impacts to cultural resources. Water quality facilities and a floodplain mitigation site (which were not included in **Alternatives 2 and 3**) were included as part of the **Preferred Alternative**. Overall, these changes will result in an increase in impacts to mapped riparian and upland habitats. The SE Lawnfield Road water quality facility would impact upland habitat that provides habitat for large and small mammals (including bats), a variety of avifauna, and terrestrial amphibians.

At Mount Scott Creek and I-205, new cut-and-fill slopes will be required to construct the new westbound Sunrise Project lanes to the northbound I-205 on-ramp. The new on-ramp will be constructed under the existing SE Sunnybrook Boulevard off-ramp, resulting in new impacts to the narrowest segment of the Mount Talbert to Three Creeks wildlife corridor. The new alignment for the North Lawnfield Extension will be constructed on the opposite side of the Adventist Medical Building, leaving no alternative for wildlife traveling down the Mount Scott Creek riparian corridor but to fit between the new on-ramp and the medical building.

The **Preferred Alternative** includes the realignment of SE Lawnfield Road (Figure PA-2, in the Executive Summary). This design feature, along with the new I-205 on-ramp, will impact

4.5 acres of Class I riparian habitat and 1.8 acres of Class C upland habitat. These impacts are greater than described in the SDEIS, where the impacts were 3.3 acres of Metro's Class I riparian habitat and 1.0 acres of Class C upland habitat.

By including **Design Option C-2**, the **Preferred Alternative** will avoid and minimize impacts to the wildlife corridor along the Clackamas Bluffs, because the Sunrise Project will not curve northward around the base of the escarpment just west of SE 135th Avenue as it does with the other design options considered.

The **Preferred Alternative** will cross SE 135th Avenue and encroach upon a large scrub-shrub and emergent wetland/upland complex on undeveloped land west of SE 142nd Avenue. By incorporating **Design Option C-2**, the **Preferred Alternative** will avoid and minimize impacts to the wetland complex and will isolate a much smaller piece of the wetland complex from wildlife use, thereby maintaining the largest patch of contiguous habitat of all the design options that were under consideration for this area. Given that all of this land is privately held, there is no guarantee that it will not be developed in the future. The **Preferred Alternative** will not require the parallel access road that extends westward from SE 142nd Avenue across the wetland complex as the other design options do, but will require a new road leading to the east from SE 142nd Avenue. That road will impact the southern half of the emergent wetland behind the EZ Storage facility (just north of OR 212/224 and east of SE 124th Avenue). Other design options would have completely filled this wetland. Between Graham Creek and the Rock Creek riparian corridor, the **Preferred Alternative** will completely avoid the wildlife corridor as it passes through a narrow strip (less than 200 feet wide) of coniferous mixed-forest land situated between housing developments to the north and a mobile home court to the south.

In the Rock Creek area, the **Preferred Alternative** will result in slight increases in impacts to mapped Class A and B upland

habitat, but a decrease to Class C habitat compared to **Alternatives 2** and **3**. These slight changes will result in no additional functional loss of wildlife habitat.

ODOT (2009) has only one record of a wildlife vehicle collision (WVC) within the API of the **Preferred Alternative** over the past ten years, putting that section of the highway in the lowest category for WVC density. Other WVCs may have occurred, but there is only one documented WVC. This collision occurred on OR 212/224 at mile post 7.8, which is close to where Graham Creek crosses under OR 212/224, indicating use of the creek's riparian corridor as a wildlife travel corridor. This highlights the importance of directing wildlife away from unsafe crossings of the highway.

Given that the Oregon Department of Fish and Wildlife linkage area is identified as a low priority area, and there is only one documented WVC within the API of the project in the past ten years, from a state-wide perspective, the API of the **Preferred Alternative** is not a priority for wildlife movement concerns.

Impacts of the **Preferred Alternative** to wildlife resources are summarized below.

Birds

- Loss of riparian/wetland nesting sites (at North Lawnfield Extension, Mount Scott Creek, Rock Creek) potentially impacting neotropical migrants.
- Loss of forested upland nesting sites (Lawnfield, Clackamas Bluffs, forested knoll) potentially impacting forest-nesting species.
- Loss of grassland/meadow nesting habitat (Camp Withycombe and SE 135th Avenue Wetlands), potentially impacting ground-nesting species.
- Loss of foraging habitat (Lawnfield, Mount Scott Creek, Camp Withycombe, Clackamas Bluffs, Rock Creek, Forested Knoll, agricultural fields) affecting a variety of species.

Mammals (excluding bats)

- Narrowing the wildlife corridor (Lawnfield, Mount Scott Creek, Clackamas Bluffs) affecting black-tailed deer, coyote, small mammals (e.g., raccoon, Virginia opossum), and potentially bobcat, red fox, and gray fox, although these species are not documented users of the corridor.
- Loss of grassland/meadow habitat (KEX, Camp Withycombe and SE 135th Avenue Wetlands), potentially impacting Camas pocket gopher.
- Loss of breeding habitat, thermal cover, and bedding areas (Three Creeks, Lawnfield, Clackamas Bluffs, Rock Creek, Forested Knoll) affecting black-tailed deer, coyote, small mammals, and potentially bobcat, red fox, and gray fox.
- Loss of forage habitat (Lawnfield, Camp Withycombe, Forested Knoll) affecting black-tailed deer and a variety of small mammals (raccoons, opossum, rodents, etc.).
- Loss of prey habitat (Three Creeks, Lawnfield, Camp Withycombe, Clackamas Bluffs, Rock Creek, 135th Avenue Wetlands, Forested Knoll) affecting predators such as coyote and potentially bobcat, red fox, and gray fox.
- Potential for wildlife/vehicle collisions affecting the public and all large mammals in project area.

Bats

- Loss of roost trees (Three Creeks, Lawnfield, Clackamas Bluffs, Rock Creek, Forested Knoll, Trillium Creek) potentially affecting all species of bat within the API including sensitive species such as long-eared myotis, fringed myotis, silver-haired bat, long-legged myotis, hoary bat, Yuma myotis, and California myotis.
- Loss of foraging habitat (Lawnfield, Camp Withycombe, Clackamas Bluffs, Rock Creek, Forested Knoll, Trillium Creek) affecting all species of bat within the API.

Amphibians

- Fragmentation of breeding from terrestrial habitat (Three Creeks, upper Cow Creek, Sieben Creek) potentially affecting species such as northwestern salamander, rough-skinned newts, and red-legged frog.
- Loss of downed, decaying logs (Three Creeks, Mount Scott Creek, Lawnfield) used as juvenile rearing habitat by terrestrial salamanders such as ensantia and western red-backed salamander.
- Loss of complex shrub layer (Three Creeks, Mount Scott Creek, Lawnfield, Rock Creek), a predictor of species richness.

Fish Habitat

Fish habitat has also suffered from development pressure over the years, and most of the smaller streams in the project area have been realigned, ditched, or piped. Under the Endangered Species Act (ESA), Lower Columbia Chinook salmon have been listed as threatened. They are present in the lower reach of Rock Creek. A natural waterfall upstream of the OR 224 bridge limits migration for this species. Chinook salmon have not been documented in Mount Scott Creek or Dean Creek but may be present in Kellogg Creek, several miles downstream of the project area. Lower Columbia River coho salmon and steelhead trout are present in lower Rock Creek, Mount Scott Creek, and the lowermost reach of Sieben Creek. Both stocks are ESA-listed as threatened. Project-area reaches of Mount Scott Creek, Rock Creek, and the Clackamas River have been designated as critical habitat for steelhead, Chinook salmon, and coho salmon under the ESA.

Water quality impacts are based upon the increase in impervious area for the various alternatives, since this increase will likely lead to a rise in automobile and truck traffic. More automobile and/or truck traffic can adversely affect receiving streams unless water quality treatment facilities are provided. Consequently, impacts on fish may be caused by increases in impervious surface in the project area, which

increases the peak flow and volume of stormwater runoff and degrades water quality, and by direct discharge of pollutants or impacts to stream channels during construction.

Impacts of Alternatives 2 and 3 and the design options on fish habitat

The project may affect fish resources primarily through three mechanisms:

- Direct impacts during in-water construction, such as removing habitat, obstructing fish migration, or causing turbidity in the water.
- Impacts caused by clearing vegetation near creeks and streams.
- Impacts of stormwater runoff from increased impervious surfaces (pavement), such as changes in stream hydrology and water quality.

The greatest potential adverse effect on fish resources would be changes to hydrology and water quality caused by stormwater runoff from the larger impervious surface area. Adding impervious surface increases the volume and intensity of stormwater runoff. The increased runoff increases the level or duration (or both) of stream flows, which can scour out gravel spawning beds, flush juvenile fish downstream from their rearing habitat, negatively change conditions for creatures on which the fish feed, and cause erosion. Increased impervious surfaces also reduce stormwater infiltration and groundwater recharge, which may lead to decreased dry season flows. Reduced flows can kill or injure fish directly by stranding them without sufficient water, or indirectly by leading to depleted dissolved oxygen in the water on which fish depend, and increasing water temperature to levels intolerable to fish.

Table 21 shows the amount of new impervious surface area created by **Alternatives 2 and 3** alone and the design options.

Stormwater runoff from impervious roadway surfaces can also carry toxic levels of pollutants that come from vehicles, such as petroleum-based compounds and metals.

Table 21. New Impervious Surface Added to Drainage Basins (in acres)

	Sieben Basin	Cow Basin	Dean Basin	Rock Basin	Total
Alternative 2	10	39	33	41	123
With a design option*					
With A-2	10	39	28	41	118
With B-2	10	43	33	41	127
With C-2	10	39	33	41	123
With C-3	11	39	33	41	124
With D-2	10	39	33	41	123
With D-3	10	39	33	42	124
Alternative 3	10	30	33	41	114
With a design option*					
With A-2	10	30	28	41	109
With B-2	10	30	33	41	114
With C-2	10	30	33	41	114
With C-3	11	30	33	41	115
With D-2	10	30	33	41	114
With D-3	10	30	33	42	115

*Totals calculated for alternative with one design option, as indicated. The combination that would produce the largest impact would include **Design Options B-2, C-3, and D-3** (129 acres, with **Alternative 2**) and **C-3 and D-3** (116 acres, with **Alternative 3**). **Design Option A-2** reduces impacts under both alternatives.

Concentrations of some dissolved metals, particularly copper and zinc, may reach levels in stormwater runoff where they exceed toxicity standards. Dissolved copper in low concentrations may adversely affect salmonids. Motor vehicle brakes are a major source of dissolved copper in streams.

Increased impervious surface in the Rock Creek basin would have more immediate effects because this stream supports salmonids, including ESA-listed species, and retains good aquatic habitat. Impacts to the on-site portions of Cow and Dean Creeks would have little immediate effect on fish resources because these basins are already highly impervious. Moreover, the project area stream reaches are already highly degraded, fully channelized, and exceed ODEQ standards for dissolved copper concentration. However, such impacts are still

of concern, because these waters drain to fish populations and more intact habitat in lower Cow Creek and Mount Scott Creek, respectively.

Alternative 1—No Build would have the least potential adverse effect on fish because it creates the least area of new impervious surface. However, impacts would be concentrated in the Rock Creek basin, which comprises the most intact salmonid populations of any on-site tributary stream and most of the project area critical habitat. This alternative has a minor impact to Dean and Mount Scott Creeks, and no impact to Sieben, Cow, or Graham Creeks.

Alternatives 2 and 3 would involve new structures over Dean, Mount Scott, Sieben, and Rock Creeks (either bridges or culverts) that would be built to Oregon Department of Fish and Wildlife fish passage standards.

Alternatives 2 and 3 would result in a substantial increase in impervious surface. Regardless of which design options are chosen, **Alternative 2** would have more potential impact than **Alternative 3** from increased impervious surface—117 to 129 acres—depending on the combination of design options (see Water Quality Technical Report, Table S1). **Alternative 3** impacts could range from 108 to 116 acres of new impervious surface. Choosing **Design Options B-2, C-3, and D-3** would have the greatest impact. Choosing **Design Options A-2 and C-2** instead of the build alternatives in that section of the highway would lower the impacts.

For the Sieben, Dean, and Rock Creek drainage basins, **Alternatives 2 and 3** have similar impacts. However, there is a considerable difference in the Cow Creek basin, where **Alternative 3** would create 9 fewer acres of impervious surface than **Alternative 2**, and 13 fewer acres than **Alternative 2** with **Design Option B-2**.

Table 22 (next page) summarizes the increase in impervious surface in each basin under the maximum-impact scenario: **Alternative 2** with

Design Options B-2, C-3, and D-3 (the alternative and design option combination that would have the most impact). This information adds perspective to the preceding comparison of alternatives by demonstrating the actual relative impact to each basin. The most significant impacts would be to Cow Creek basin. Impervious area would increase from the current 10 percent, which is generally considered a threshold for significant basin degradation, to 26 percent, at which point hydrology impacts would be assumed to severely degrade aquatic habitat. This would primarily impact the more intact reaches of Cow Creek downstream of the API. These impacts would be reduced somewhat by the stormwater detention facilities associated with the Sunrise Project.

Although the maximum impact design option would nearly double the proportion of Dean Creek basin that is impervious, this impact is actually less significant to fish because the aquatic habitat in the basin is already severely degraded by runoff from the existing 44 percent impervious surface. However, project impacts may have a more significant hydrologic effect on Mount Scott Creek downstream. These impacts would be reduced somewhat by the stormwater detention facilities associated with the Sunrise Project.

Direct and indirect hydrologic impacts to Rock Creek and Sieben Creek aquatic habitat from the Sunrise Project may be moderate even under the maximum impact alternative/option. Because these basins are so much larger than Dean Creek and Cow Creek basins, the project would increase the percentage of impervious area by only 1 percent in each basin, and would leave each well below the 10 percent threshold generally considered to reflect severe degradation.

Table 22. Analysis of Maximum Impact from Impervious Surface: Alternative 2 with Design Options B-2, C-3, and D-3

Stream Name	Basin Acreage	Existing		Maximum Percent Increase in Impervious Area	Maximum Impervious Area Added by Sunrise Project	Post-Construction	
		Impervious Area (in acres)	Percentage Impervious			Impervious Area (in Acres)	Percentage Impervious
Dean Creek	75	33	44	99	32.9	65.9	88
Cow Creek	265	27	10	158	42.7	74.2	28
Sieben Creek	1,176	50	4	22	11.2	61.2	5
Rock Creek	5,754	280	5	15	42	322	6

Impacts of the Preferred Alternative on fish habitat

Under the **Preferred Alternative**, the project boundaries will include an industrial area located west of the “Three Creeks” tract between Mount Scott Creek and the Milwaukie Expressway. A ditch collects drainage from this area and conveys it west along the tracks to discharge at Mount Scott Creek. This is an entirely artificial gravel-surfaced ditch. It has numerous piped sections and few salmonid habitat elements. Its conveyance is limited, and it undergoes localized flooding during storm events larger than the five-year recurrence.

The **Preferred Alternative** will create a net increase of 113.3 acres of new impervious surface (135.8 acres of new impervious surface, less 21.5 acres of impervious pavement removal) (Table 23, next page). The project will have 263.1 acres of impervious surface when complete. The project has an off-site contributing area of 14.1 acres, scattered in several locations, from which water would flow onto the project. Off-site contributing areas are impervious areas located beyond the project limits or API but from which stormwater runoff drains into the project area. Runoff from contributing will be treated by the project (these are shown on Figures PA-26 and PA-27). Stormwater quantity control to meet Clackamas County and ODOT will moderate the stream habitat effects.

Water Quality

The hydrologic effects of stormwater runoff from impervious surfaces related to the Sunrise Project

are discussed above under Fish Habitat, because they are the most significant potential effects to that resource. This section focuses on potential discharges of pollutants from the project-related impervious surfaces to project area streams, which also affect fish habitat quality.

The Clackamas River, Cow Creek, Rock Creek, and Sieben Creek are listed on ODEQ’s 303(d) List (§303(d) of the Federal Clean Water Act) of water bodies that do not meet water quality standards. All four are listed for not meeting standards for bacteria; the Clackamas River and Cow Creek are also listed for not meeting temperature standards.

Impacts of Alternatives 2 and 3 and the design options on water quality

Generally, **Alternative 2** is associated with more impervious surface, so it would result in more runoff and water quality issues than **Alternative 3**.

Design options for **Alternatives 2 and 3** were analyzed to determine the combination of design options that would produce maximum and minimum water quality impacts. The analysis showed that the minimum water quality impacts would be associated with **Alternative 3** with **Design Options A-2 and C-2**, and the maximum water quality impacts would be associated with **Alternative 2** with **Design Options B-2 and C-3**. In the different basins, Cow Creek would have the greatest increase in annual pollutant loads, and Dean Creek would have the greatest potential

increase in once-in-three-year exceedance criteria.

Impacts of the Preferred Alternative on water quality

New analysis was performed to determine a water quality baseline area that corresponded to the design footprint of the **Preferred Alternative** and to evaluate the impacts of the **Preferred Alternative** relative to the new baseline conditions.

Compared to the previous analysis conducted for **Alternatives 2 and 3**, the analysis for the **Preferred Alternative** added three drainage basins (Mount Scott Creek, Kellogg Creek, and Clackamas River), and removed one (Sieben Creek). The drainage basins are based on topographical information and roadway geometrics that control the direction of stormwater runoff.

The **Preferred Alternative** has the potential to affect seven major drainages—Cow Creek,

Dean Creek, Kellogg Creek, Mount Scott Creek, Phillips Creek, Rock Creek, and the Clackamas River. Table 24 shows the impacts for each of these drainages.

Existing conditions are the same as noted above for the Clackamas River, Cow Creek, Dean Creek, and Rock Creek under **Alternatives 1 through 3**. Kellogg Creek, Mount Scott Creek, and Phillips Creek are listed on ODEQ’s 303(d) List (§303(d) of the Federal Clean Water Act) of water bodies that do not meet water quality standards.

The Clackamas River has the greatest calculated increase in annual pollutant loads as a result of the **Preferred Alternative**. This is because the Clackamas River has the largest percentage increase of impervious area when the existing roadway and proposed roadway are compared to each other. The Clackamas River riparian area is wooded in the middle to upper reaches, while the portion where the Sunrise Project is located has some riparian cover along the bank, but it is impacted from development.

Table 23. Preferred Alternative: Impervious Surface Changes In Acres Within Project Area By Drainage Basin

Basin	Post Developed Subbasin	Pre-Existing Project-area Impervious	Proposed New Impervious	Additional Contributing Area*	Total (Existing, New & Contributing)	Proposed Impervious Removal	Total Post-Project Impervious
Kellogg	Dean	39.6	43.0	1.0	83.6	10.4	73.2
	Phillips	3.8	2.0	0.7	6.5	0.0	5.5
	Mount Scott	12.3	8.7	8.8	29.8	1.6	28.2
	Kellogg	26.1	4.1	0.0	30.2	0.0	30.2
Clackamas	Cow	10.4	1.5	0.0	11.9	0.0	11.9
	Sieben	0.0	0.0	0.0	0.0	0.0	0.0
	Rock/ Graham/ Trillium	8.0	30.7	3.6	42.3	1.2	41.1
	Clackamas	13.0	45.8	0.0	58.8	8.3	50.5
Totals		113.3	135.8	14.1	263.2	21.5	241.7

*Additional contributing area is included in total impervious

Table 24. New Impervious Area Added to Each Drainage Basin - Preferred Alternative

Drainage Basin	Impervious Area, Acres		
	Existing (Includes Contributing Area)	Total (Existing, New, and Contributing)	Percentage Increase over Existing
Dean	40.6	83.6	106%
Phillips	4.5	6.5	43%
Mount Scott	21.1	29.8	41%
Kellogg	26.1	30.2	16%
Cow	10.4	11.9	14%
Rock	11.5	42.3	266%
Clackamas	13.0	58.8	353%
Total	127.2	263.1	107%

The largest calculated increase in three-year exceedance concentration was in Rock Creek. The Rock Creek riparian area is heavily wooded, with steep rock banks and bedrock along the creek bottom. The Rock Creek drainage area is a mixture of forested, agricultural, and residential land use. The project area in the Rock Creek drainage is located in the lower reach just upstream from the confluence of Rock Creek and the Clackamas River.

On-site water quality and quantity mitigation for all but 16 acres of impervious surface created by the project or contributing to the project from adjacent county and state roadways is included in the project, so runoff is not expected to affect any of the creeks' morphology or water quality (see page ii and 93 of the Water Quality Technical Report).

Impacts to Cow and Kellogg Creeks are minimal, both for annual pollutant load and three-year exceedance concentrations. These creeks will undergo a small percent increase in impervious area as a result of the **Preferred Alternative**. Mitigation is included in the project, so the project in this area is not anticipated to affect water quality or water quantity issues of these creeks.

Noxious Weeds

Noxious weeds are defined by the Oregon State Weed Board as exotic, non-indigenous species that are injurious to public health, agriculture, recreation, wildlife, or any public or private property.

Past ground disturbing activities without attention to invasive plant species have provided opportunities for these aggressive non-native species to colonize and dominate vegetative communities in some areas of the project corridor and the surrounding area. Once established, invasive species can dominate plant communities, simplifying the ecosystem by reducing species richness and thus altering habitat for wildlife. This process typically favors non-native, generalist wildlife species at the expense of specialist, native species. This process is expected to continue as new development takes place.

The Oregon Department of Agriculture has designated Oregon State listed noxious weeds as either "A," "B," and/or "T," according to the its Noxious Weed Rating System. Only B-designated weeds were found in the project study area when the project corridor was surveyed in 2006. A weed designated as "B" is a weed of economic importance that is regionally abundant, but that may have limited distribution in some counties.

Field work to map noxious weeds within the project API was conducted on August 17, 2010, to update the Biology Technical Report. The field work was done at a reconnaissance level from publicly-accessible vantage points, using the noxious weed list published by the Oregon Department of Agriculture in 2010. Field-identified locations of noxious weeds are displayed in Figure PA-24A.

All of the noxious weeds identified in the technical report are still listed as B-designated noxious weeds and occur within the project area. However, Japanese knotweed is also now a T-designated weed. A weed designated as "T" is a priority noxious weed, designated

by the State Weed Board as a target weed species for which ODA will implement a statewide management plan (ODA 2003).

Additionally, three new B-designated noxious weed species were identified within the project area. These include: bull thistle (*Cirsium arvense*), tansy ragwort (*Senecio jacobaea*), and yellow toadflax (*Linaria vulgaris*). Tansy ragwort is also a T-designated weed.

Mitigation is proposed to address invasive species in the bluff and Rock Creek areas (see below).

Threatened or Endangered Fish, Terrestrial Wildlife, and Plants

The Endangered Species Act (ESA) provides for the protection of animal and plant species currently in danger of extinction (endangered) and those species that may become so in the near future (threatened). Section 7 of the Act sets forth the procedural requirements to ensure that federal actions do not adversely impact threatened or endangered species or their critical habitats.

Queries of the Oregon Natural Heritage Information Center and the U.S. Fish and Wildlife Service (USFWS) databases and personal communications with Oregon Department of Fish and Wildlife were used to identify listed wildlife and plant species that have been documented or have the potential to occur within the project corridor. The bald eagle, which was delisted in August 2007, was the only threatened or endangered wildlife species that was identified as potentially occurring within the project corridor. The bald eagle remains an Oregon state-listed species.

The query to the Oregon Natural Heritage Information Center resulted in no reported occurrences of threatened or endangered wildlife species within two miles of the project corridor, but did identify six plant species as potentially occurring in the project area. The project corridor has been subject to a history of disturbance and

at best provides marginal habitat for only Bradshaw's lomatium and Nelson's sidalcea in emergent wetlands and some upland pastures. These habitats were subject to two rare plant surveys in 2005 and 2006, which were timed to the flowering period of these two species. No individuals or populations of either species were observed during the surveys. The history of disturbance has left the remainder of the corridor unsuitable for any other sensitive plant species identified as potentially occurring with the project corridor by USFWS and the Oregon Natural Heritage Information Center. Due to the lack of known populations and lack of undisturbed, suitable habitat, there would be no direct, indirect, or cumulative impacts to listed wildlife and plant species.

Because the project would not result in direct, indirect, or cumulative impacts to listed wildlife and plant species, ESA Section 7 consultation with the USFWS is not required. ODOT has completed a No Effect Memorandum for USFWS species and a signed copy is included in Appendix D.

For project-specific information regarding the presence or absence of National Marine Fisheries Service (NMFS) trust species, NMFS relies on a combination of resources, including StreamNet and direct communication with Oregon Department of Fish and Wildlife fish biologists with on-the-ground knowledge of the specific streams and reaches in question. The Oregon Natural Resources Information Center, StreamNet, and personal communications with the Oregon Department of Fish and Wildlife identified several listed fish species in the project area.

Fish species listed as threatened are Lower Columbia River Chinook, Lower Columbia River steelhead, and Lower Columbia River coho. All three species are present in the Clackamas River, lower Rock Creek, and Kellogg Creek off-site and downstream of Mount Scott Creek. Project investigations confirmed that habitat limitations and migration barriers prevent the listed fish

species from inhabiting other streams in the project corridor. There would be no construction-related direct impacts to these streams. Impacts would be related to stormwater runoff and quality. Although stormwater impacts are likely to be mitigated, Section 7 ESA consultation with the NMFS is anticipated. Based on personal communication with NMFS on September 11, 2008, formal consultation is anticipated.

Preferred Alternative

There are no federal or state listed threatened or endangered wildlife species or their habitat within the study area. The **Preferred Alternative** will impact 41.2 acres of riparian habitat and 53 acres of upland habitat located within a highly disturbed urban environment. Removal of this habitat will result in the loss of nesting, roosting, and foraging habitat for the sensitive species identified as occurring within the project area in Table 20. However, the quality of this habitat is low due to fragmentation, low levels of snags and downed wood, high level of invasive and non-native species, and high level of human disturbance. A completed No Effect Memorandum for USFWS species has been signed by ODOT and submitted in Appendix D.

A biological assessment (BA) was completed to address potential impacts on protected fish species. The BA covers NMFS trust species, salmon and steelhead. The project "may affect and is likely to adversely affect" steelhead, coho, and Chinook. Following Formal Consultation, NMFS issued a Biological Opinion that the project "may affect, likely to adversely affect" the Lower Columbia River steelhead trout, Chinook salmon and Coho salmon. The Biological Opinion found that the action will not result in destruction or adversely modification of designated critical habitat for Lower Columbia River steelhead trout or Chinook salmon. Conservation measures are included in the Biological Opinion in Appendix D.

Indirect Effects

Indirect effects on the biological systems are those related to changes in the land use patterns and increased population growth in areas served

by the Sunrise Project. Growth would occur with or without the Sunrise Project and regardless of the project alternative chosen, but the location and intensity of impacts would vary with each alternative.

These changes would also impact wildlife by increasing traffic noise, light, and human activities, especially in the narrow wildlife corridors. With reduced available habitat, local populations of larger mammals such as deer, coyote, and bobcat would be expected to decline in the affected areas. Narrowing the wildlife corridor could also have indirect impacts to western gray squirrel by further fragmenting dispersal corridors along Mount Scott Creek and the Clackamas Bluffs. Habitat loss may also affect nesting and roosting habitat for neotropical migrant birds. Populations of generalist species that are adapted to urban environments, such as raccoons and house sparrows, would be less affected and may increase due to human disturbance.

Clearing and grading riparian (streamside) areas may lead to short-term erosion and sedimentation, and development of riparian areas would impair necessary habitat functions.

Mitigation Measures for the Preferred Alternative

Avoidance, minimization, and conservation measures for the **Preferred Alternative** were developed in close coordination with project preliminary designers and the Oregon Department of Fish and Wildlife and the National Marine Fisheries Service to evaluate impacts and identify actions to mitigate project impacts. Recommended mitigation measures follow practices outlined in ODOT's *Standard Specifications for Highway Construction* (2008), including Section 00290.00 Environmental Protection.

Wildlife and botanical resources: minimization and avoidance measures

The eastern one-third of the **Preferred Alternative** comprises **Design Options C-2** and **D-3**. These design options were developed, in large part, because they would avoid and minimize impacts to wetlands, wildlife habitat, and the main east-west wildlife corridor.

The **Preferred Alternative**, by incorporating **Design Option C-2**, will avoid and minimize impacts to mapped riparian areas (wetlands) by locating the alignment closer to OR 212/224 between SE 135th Avenue and Rock Creek relative to the other design options. Its location minimizes impacts to the large scrub-shrub/emergent wetland complex between SE 135th Avenue and SE 142nd Avenue. Impacts to the emergent wetland behind the EZ Storage units will be reduced by filling approximately the southern third rather than the entire wetland as **Alternative 2** would have done.

By being close to the existing alignment of OR 212/224, the **Preferred Alternative** will minimize impacts to the wetland complex from a wildlife use perspective compared to the other design options by maintaining the largest patch of contiguous habitat of all the design options under consideration for the Midpoint area.

The **Preferred Alternative** will minimize impacts to the wildlife corridor along the Clackamas Bluffs, because the alignment will not curve around the base of the bluff immediately west of SE 135th Avenue as it would with the other design options.

By incorporating **Design Option D-3**, the **Preferred Alternative** will completely avoid a narrow section of the corridor located between Graham Creek and Rock Creek, which would have been impacted under **Design Option D-1**.

Wildlife and botanical resources: mitigation measures

All of the committed mitigation measures have been reviewed and approved by ODOT designers, the ODOT District 2B (Lawnfield) Maintenance Manager, and the ODOT Region 1 Operations Manager. Cost estimates for the committed mitigation measures have been incorporated into the total project cost estimates, either in conjunction with development of **Preferred Alternative**, or within a 40 percent project cost contingency factor.

Wildlife

To minimize long-term wildlife access impacts and reduce animal-vehicle collisions:

- a. Where 'full wildlife access' (meaning access to all species, regardless of size) is specified in the bulleted lists below, it will have a minimum 10-foot-wide horizontal and vertical clearance, with adjacent exclusionary fencing (either along the highway and/or connected to wing walls of crossings) that will 'direct' wildlife away from the highway and towards crossings.
- b. Where culverts to allow for 'medium wildlife (e.g., smaller than deer) passage' are specified in bulleted lists below, they will be culverts with a dry bench (earthen, concrete, or metal grate; above two year flood elevation) at least three feet wide and tall, or an adjacent dry culvert at least three feet in diameter. They will include a 'ramp' sufficient for access onto the bench or into the dry culvert.

SE 82nd Avenue (OR 213)/Mount Scott Creek and Railroad Bridge

- Exclusionary fencing along SE 82nd Drive and the freeway will be installed (see Figure PA-2).

SE 82nd/Ambler Road/Dean Creek Culverts

- New culverts (including replacement or extended culverts) will allow for medium wildlife passage (per measure 'b', above) (see Figure PA-2).
- New culverts longer than 80 feet will have roadbed grates for natural light and ventilation.
- Exclusionary fencing along SE 82nd Avenue and the freeway will be installed (see Figure PA-2).

I-205/Dean Creek Crossing

- The crossing will provide for full wildlife access (per measure 'a' above) (Figure PA-2).

I-205/Mount Scott Culvert and Vicinity

- The interior of the existing culvert will be modified to include a bench (concrete or metal grate) that allows medium wildlife passage through the culvert above the 2-year flood elevation, including a sufficient 'ramp' for access onto the bench.
- Existing right-of-way fencing along the south side of I-205 between Dean and Mount Scott Creeks will be removed and new right-of-way fencing will allow for full wildlife access.

Clackamas Bluffs (Camp Withycombe to Rock Creek)

- Maintain full wildlife access (per measure 'a', above), along the north boundary of the right-of-way of the new highway, overland and upslope (see Figure PA-4).
- Avoid right-of-way fencing along the northern right-of-way boundary to maintain connectivity with existing forested habitat.
- Direct highway lighting away from the forested bluffs.

Culverts at Sieben, Graham, and Trillium Creeks

- New culverts (including any replacements for existing culverts) shall be designed to allow for medium wildlife passage (per measure 'b').

- New culverts longer than 80 feet will have roadbed grates for natural light and ventilation.

Rock Creek Bridge

- The bridge and embankments underneath the bridge will be designed to span the existing terraced landscape along west side of the stream.
- Full wildlife passage (per measure 'a', above) will be ensured through the two bridged crossings in the Rock Creek area (OR 212/224 and OR 224) by one or more of the following measures: minor hand-grading to create a path (where geologically stable and where does not require tree removal), clearing invasive weeds, revegetation with native plants or shrubs to help prevent re-growth of weeds.

Plants

Because there are no sensitive plant impacts, no mitigation measures related to sensitive plants are proposed.

To address noxious weeds, as part of construction and post-construction landscaping, the contractor will be required to remove invasive weeds and landscape with natives to discourage infestation of weeds.

Fish Habitat

The project will comply with all terms and conditions of the NMFS Biological Opinion.

Water Quality

Best management practices in accordance with ODOT Standard Specifications (in Sections 280 and 290) will be used to control or prevent the movement of sediments.

The project will treat runoff from 247 acres of impervious surfaces, all but 16 acres of the 263 acres of post-project impervious surface within the project area including existing and new as well as contributing areas. The project

will compensate for the 16 acres of untreated on-site stormwater runoff by treating stormwater runoff from equal areas of impervious surface at off-site locations (Figures PA-45a through PA-45c). These proposed off-site locations are two existing segments of I-205 located immediately north of the project area and south of the project area, from which stormwater is not currently collected and treated.

Endangered Species

The Biological Opinion issued by NMFS can be found in Appendix D. The project will implement all terms and conditions from the NMFS Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act consultation.

Plants

Because there are no sensitive plant impacts, no mitigation measures related to sensitive plants are proposed.

Fish resources: minimization and avoidance measures

The **Preferred Alternative** has been developed to avoid effects to listed fish species as much as possible. The project construction corridor has been confined as much as possible using design elements such as retaining walls. All but three of the new crossings on streams supporting ESA-listed fish would be full-span bridges in order to avoid direct impact. Only three culverted crossings would be constructed on ESA streams. One of these, on Trillium Creek at OR 224, would replace an existing migration barrier, thus opening previously inaccessible steelhead habitat between OR 224 and a pond in the adjacent subdivision of Orchard Lake (a distance of approximately 1,000 feet).

Stormwater will be collected and treated as described in the water quality mitigation section, below. This stormwater treatment will not only minimize water quality impacts, but it is expected to have an incremental beneficial effect on water quality in most project area streams because the Sunrise Project will collect and treat currently

untreated water from presently existing impervious surfaces. Similarly, the detention of collected stormwater to Clackamas County Water Environment Services standards will essentially avoid adverse effects on the flow fluctuations within streams in the project area.

Fish resources: mitigation measures

All new and reconfigured, permanent water crossings within the current historic range of anadromous fish will be designed to meet state law and federal guidances. The project will comply with all terms and conditions of the NMFS Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act consultation.

Water quality mitigation is discussed in the following section.

Water quality and quantity: mitigation measures

Mitigation of short-term impacts will primarily consist of erosion control Best Management Practices to control or prevent the movement of sediments. These erosion control techniques and water quality monitoring during construction will conform to all terms and conditions of the NMFS Biological Opinion and existing ODOT and Clackamas County Best Management Practices at the time of construction.

Project stormwater quality and quantity treatment will be designed using Clackamas County Water Environment Services standards, which are more conservative (i.e., requires a higher standard of treatment) than ODOT water quality and water quantity design standards as follows:

- Clackamas County requires two-thirds of the two-year storm to be used for water quality, and for water quantity the 25-year post-developed runoff rate be reduced to the two-year predevelopment rate.

- ODOT requires treatment of one-half of the two-year storm for water quality, and detention of 42 percent of the two-year storm through the 10-year storm for water quantity.

The project stormwater design will meet the standards of all three agencies. It will include a series of stormwater treatment and detention ponds, and employ low impact development measures including bioretention, bioslopes, infiltration ponds, and amended soils as much as feasible. The ODOT Best Management Practices Selection Tool will be followed in the project stormwater treatment design in order to effectively remove pollutants, including polycyclic aromatic hydrocarbons and dissolved metals including copper.

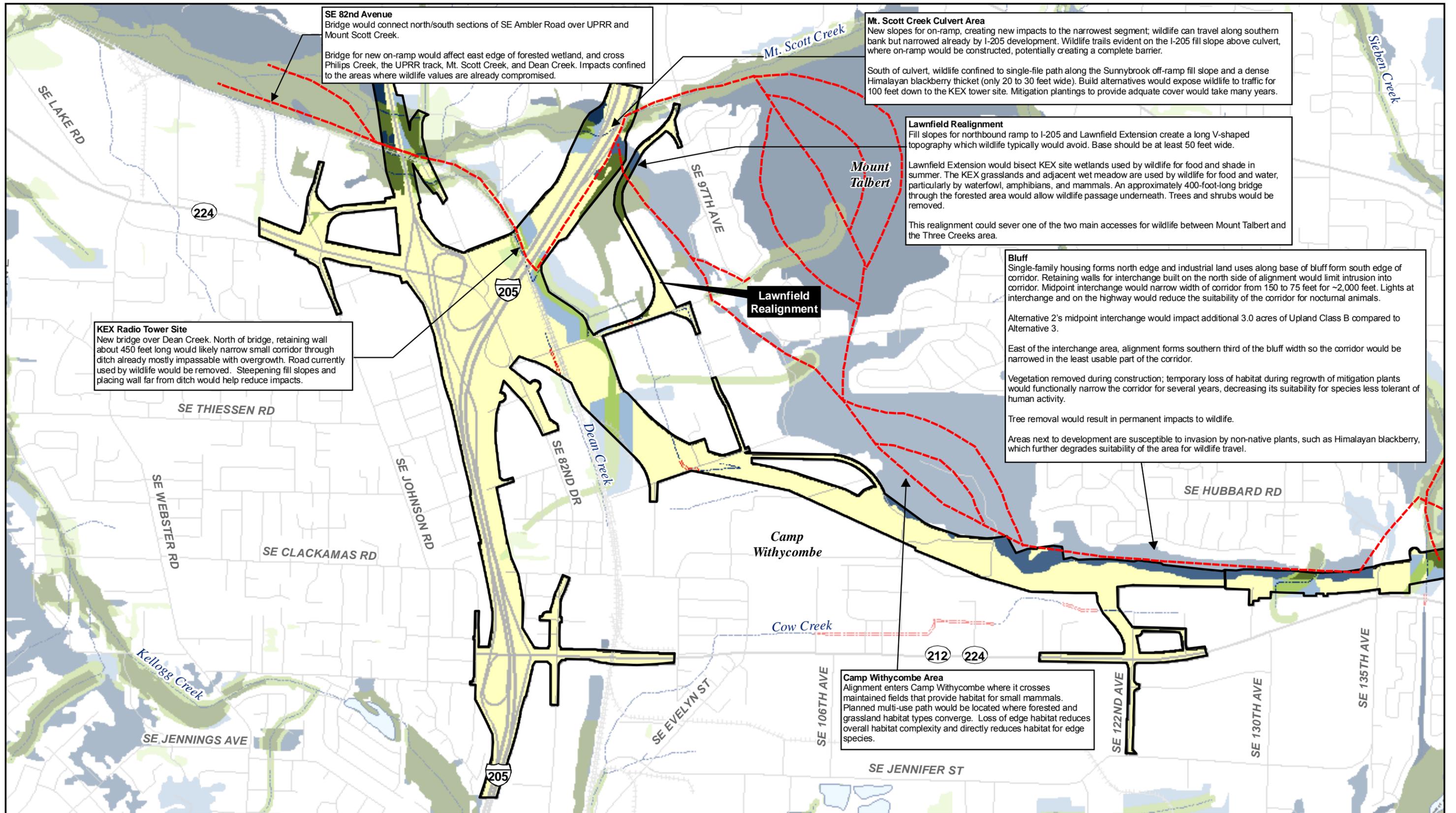
The project will treat runoff from all but 16 acres of impervious surface within the project area, including existing and new as well as contributing areas. The project will mitigate for this untreated on-site stormwater runoff by treating stormwater runoff from equal areas of impervious surface at off-site locations.

ODOT has studied treatment/detention opportunities for the I-205 corridor close to the project area (*I-205 Stormwater Analysis (I-5 to Sunnyside Road)*, 2006, and *I-205 Future Stormwater Analysis (Columbia River to Sunnyside Road)*, 2005). Using the two reports, ODOT identified additional locations where 24 acres of currently untreated impervious surface on I-205 can be treated for water quality as part of the Sunrise Project. These proposed off-site locations are two existing segments of I-205 located immediately north of the project area and south of the project area, from which stormwater is not currently collected and treated (see Figures PA-45A through PA-45C). Final design will determine the precise size and location of the bioswales. This level of stormwater control will reduce the unavoidable physical adverse impacts to stream channels and aquatic habitat.

In addition to water quality treatment, the design of the Sunrise Project will require detention as

mitigation for hydrologic impacts and/or mitigation for downstream hydraulic deficiencies.

Figures PA-26 through PA-45 show the storm water treatment facilities developed for the **Preferred Alternative**, based upon analyses provided in the Water Quality Technical Report. The series of stormwater treatment/detention ponds and low impact development treatment options are preliminary design concepts developed to demonstrate that the **Preferred Alternative** can be designed to not have adverse effects downstream on either water quality or quantity issues such as channel morphology or ecology. The treatment options were designed using Clackamas County standards, which were more conservative than ODOT design standards. During project design, a full engineering analysis will evaluate each option. If any options appear to be infeasible, other treatment options and or treatment locations would need to be determined at that time.



SE 82nd Avenue
 Bridge would connect north/south sections of SE Ambler Road over UPRR and Mount Scott Creek.
 Bridge for new on-ramp would affect east edge of forested wetland, and cross Philips Creek, the UPRR track, Mt. Scott Creek, and Dean Creek. Impacts confined to the areas where wildlife values are already compromised.

Mt. Scott Creek Culvert Area
 New slopes for on-ramp, creating new impacts to the narrowest segment; wildlife can travel along southern bank but narrowed already by I-205 development. Wildlife trails evident on the I-205 fill slope above culvert, where on-ramp would be constructed, potentially creating a complete barrier.
 South of culvert, wildlife confined to single-file path along the Sunnybrook off-ramp fill slope and a dense Himalayan blackberry thicket (only 20 to 30 feet wide). Build alternatives would expose wildlife to traffic for 100 feet down to the KEX tower site. Mitigation plantings to provide adequate cover would take many years.

Lawnfield Realignment
 Fill slopes for northbound ramp to I-205 and Lawnfield Extension create a long V-shaped topography which wildlife typically would avoid. Base should be at least 50 feet wide.
 Lawnfield Extension would bisect KEX site wetlands used by wildlife for food and shade in summer. The KEX grasslands and adjacent wet meadow are used by wildlife for food and water, particularly by waterfowl, amphibians, and mammals. An approximately 400-foot-long bridge through the forested area would allow wildlife passage underneath. Trees and shrubs would be removed.
 This realignment could sever one of the two main accesses for wildlife between Mount Talbert and the Three Creeks area.

Bluff
 Single-family housing forms north edge and industrial land uses along base of bluff form south edge of corridor. Retaining walls for interchange built on the north side of alignment would limit intrusion into corridor. Midpoint interchange would narrow width of corridor from 150 to 75 feet for ~2,000 feet. Lights at interchange and on the highway would reduce the suitability of the corridor for nocturnal animals.
 Alternative 2's midpoint interchange would impact additional 3.0 acres of Upland Class B compared to Alternative 3.
 East of the interchange area, alignment forms southern third of the bluff width so the corridor would be narrowed in the least usable part of the corridor.
 Vegetation removed during construction; temporary loss of habitat during regrowth of mitigation plants would functionally narrow the corridor for several years, decreasing its suitability for species less tolerant of human activity.
 Tree removal would result in permanent impacts to wildlife.
 Areas next to development are susceptible to invasion by non-native plants, such as Himalayan blackberry, which further degrades suitability of the area for wildlife travel.

KEX Radio Tower Site
 New bridge over Dean Creek. North of bridge, retaining wall about 450 feet long would likely narrow small corridor through ditch already mostly impassable with overgrowth. Road currently used by wildlife would be removed. Steepening fill slopes and placing wall far from ditch would help reduce impacts.

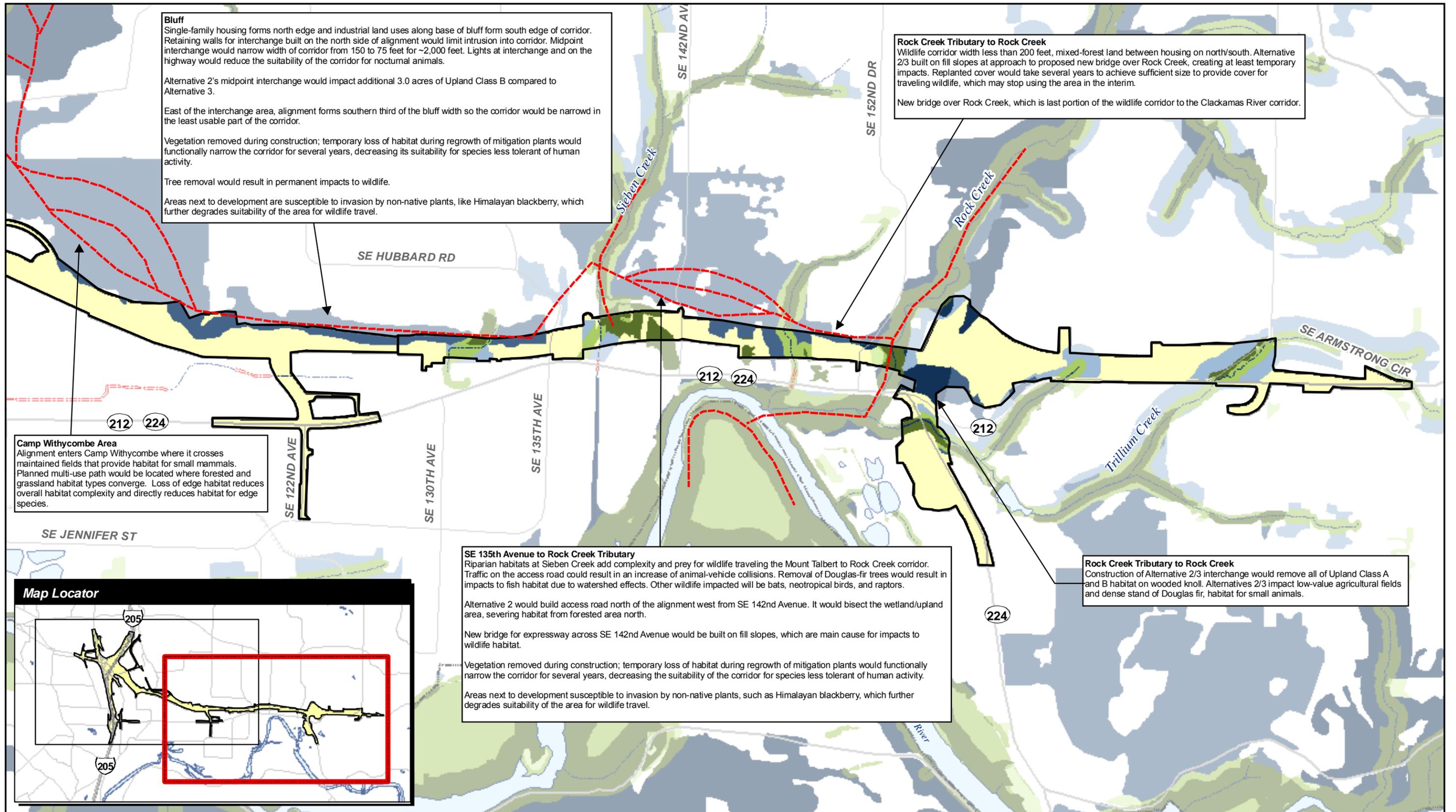
Camp Withycombe Area
 Alignment enters Camp Withycombe where it crosses maintained fields that provide habitat for small mammals. Planned multi-use path would be located where forested and grassland habitat types converge. Loss of edge habitat reduces overall habitat complexity and directly reduces habitat for edge species.



Legend		Metro Resource Habitat Classification			
	Area of Potential Impact (API)		Riparian Class I		Upland Class A
	Urban Growth Boundary (UGB)		Riparian Class II		Upland Class B
	Wildlife Corridors		Riparian Class III		Upland Class C
	River		Culvert		
	Streams				

Figure 41
 Descriptions of Wildlife Habitats and Impacts
 (I-205 and Midpoint Area)
 Sunrise Project, I-205 to Rock Creek Junction

Sources:
 ODOT and Metro, Portland OR
 (Streams as modified by DEA as found on field visit)
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Bluff
 Single-family housing forms north edge and industrial land uses along base of bluff form south edge of corridor. Retaining walls for interchange built on the north side of alignment would limit intrusion into corridor. Midpoint interchange would narrow width of corridor from 150 to 75 feet for ~2,000 feet. Lights at interchange and on the highway would reduce the suitability of the corridor for nocturnal animals.

Alternative 2's midpoint interchange would impact additional 3.0 acres of Upland Class B compared to Alternative 3.

East of the interchange area, alignment forms southern third of the bluff width so the corridor would be narrow in the least usable part of the corridor.

Vegetation removed during construction; temporary loss of habitat during regrowth of mitigation plants would functionally narrow the corridor for several years, decreasing its suitability for species less tolerant of human activity.

Tree removal would result in permanent impacts to wildlife.

Areas next to development are susceptible to invasion by non-native plants, like Himalayan blackberry, which further degrades suitability of the area for wildlife travel.

Rock Creek Tributary to Rock Creek
 Wildlife corridor width less than 200 feet, mixed-forest land between housing on north/south. Alternative 2/3 built on fill slopes at approach to proposed new bridge over Rock Creek, creating at least temporary impacts. Replanted cover would take several years to achieve sufficient size to provide cover for traveling wildlife, which may stop using the area in the interim.

New bridge over Rock Creek, which is last portion of the wildlife corridor to the Clackamas River corridor.

Camp Withycombe Area
 Alignment enters Camp Withycombe where it crosses maintained fields that provide habitat for small mammals. Planned multi-use path would be located where forested and grassland habitat types converge. Loss of edge habitat reduces overall habitat complexity and directly reduces habitat for edge species.

SE 135th Avenue to Rock Creek Tributary
 Riparian habitats at Sieben Creek add complexity and prey for wildlife traveling the Mount Talbert to Rock Creek corridor. Traffic on the access road could result in an increase of animal-vehicle collisions. Removal of Douglas-fir trees would result in impacts to fish habitat due to watershed effects. Other wildlife impacted will be bats, neotropical birds, and raptors.

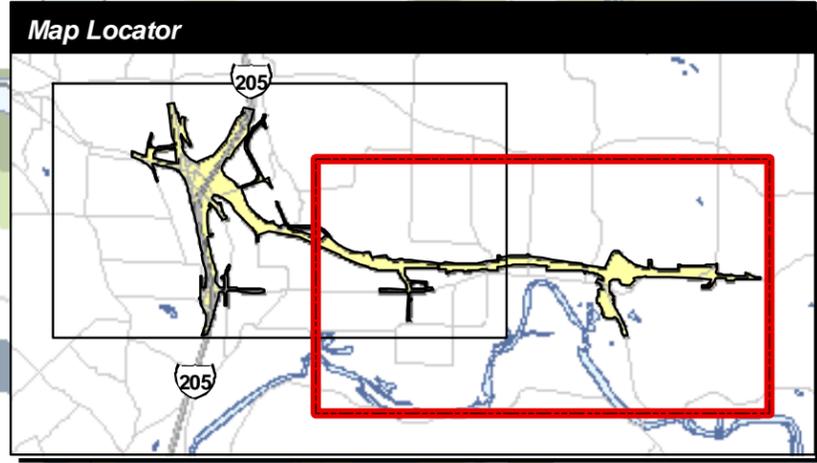
Alternative 2 would build access road north of the alignment west from SE 142nd Avenue. It would bisect the wetland/upland area, severing habitat from forested area north.

New bridge for expressway across SE 142nd Avenue would be built on fill slopes, which are main cause for impacts to wildlife habitat.

Vegetation removed during construction; temporary loss of habitat during regrowth of mitigation plants would functionally narrow the corridor for several years, decreasing the suitability of the corridor for species less tolerant of human activity.

Areas next to development susceptible to invasion by non-native plants, such as Himalayan blackberry, which further degrades suitability of the area for wildlife travel.

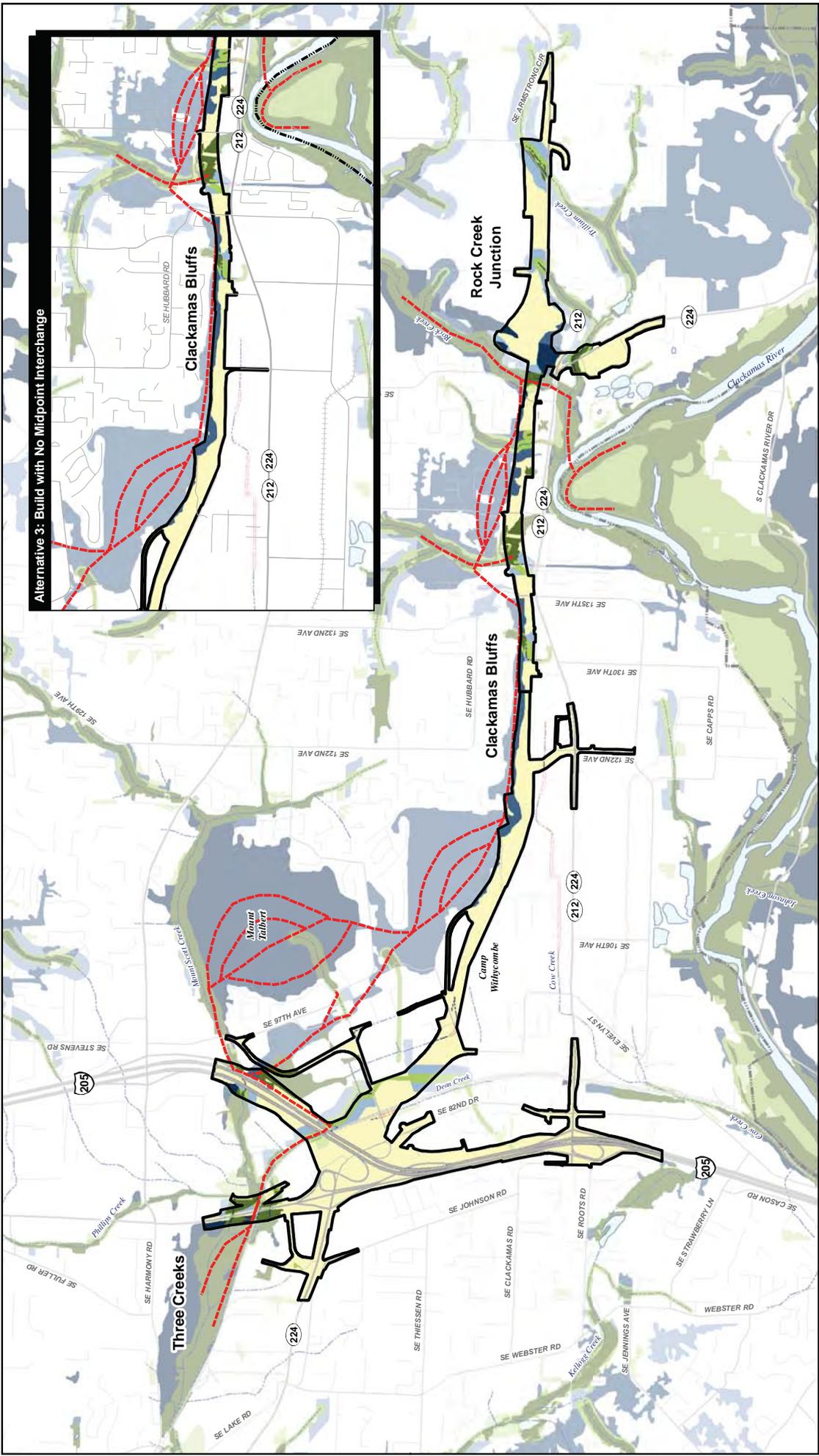
Rock Creek Tributary to Rock Creek
 Construction of Alternative 2/3 interchange would remove all of Upland Class A and B habitat on wooded knoll. Alternatives 2/3 impact low-value agricultural fields and dense stand of Douglas fir, habitat for small animals.



Legend		Metro Resource Habitat Classification	
Area of Potential Impact (API)	River	Riparian Class I	Upland Class A
Urban Growth Boundary (UGB)	Streams	Riparian Class II	Upland Class B
Wildlife Corridors	Culvert	Riparian Class III	Upland Class C

Figure 42
 Descriptions of Wildlife Habitats and Impacts
 (Midpoint Area and Rock Creek Junction)

Sunrise Project, I-205 to Rock Creek Junction



Legend

- Area of Potential Impact (API)
- Urban Growth Boundary (UGB)
- Wildlife Corridors
- River
- Streams
- Culvert

Metro Resource Habitat Classification

- Upland Class A
- Riparian Class I
- Upland Class B
- Riparian Class II
- Upland Class C
- Riparian Class III

Scale: 2,000 0 2,000 Feet

North Arrow:

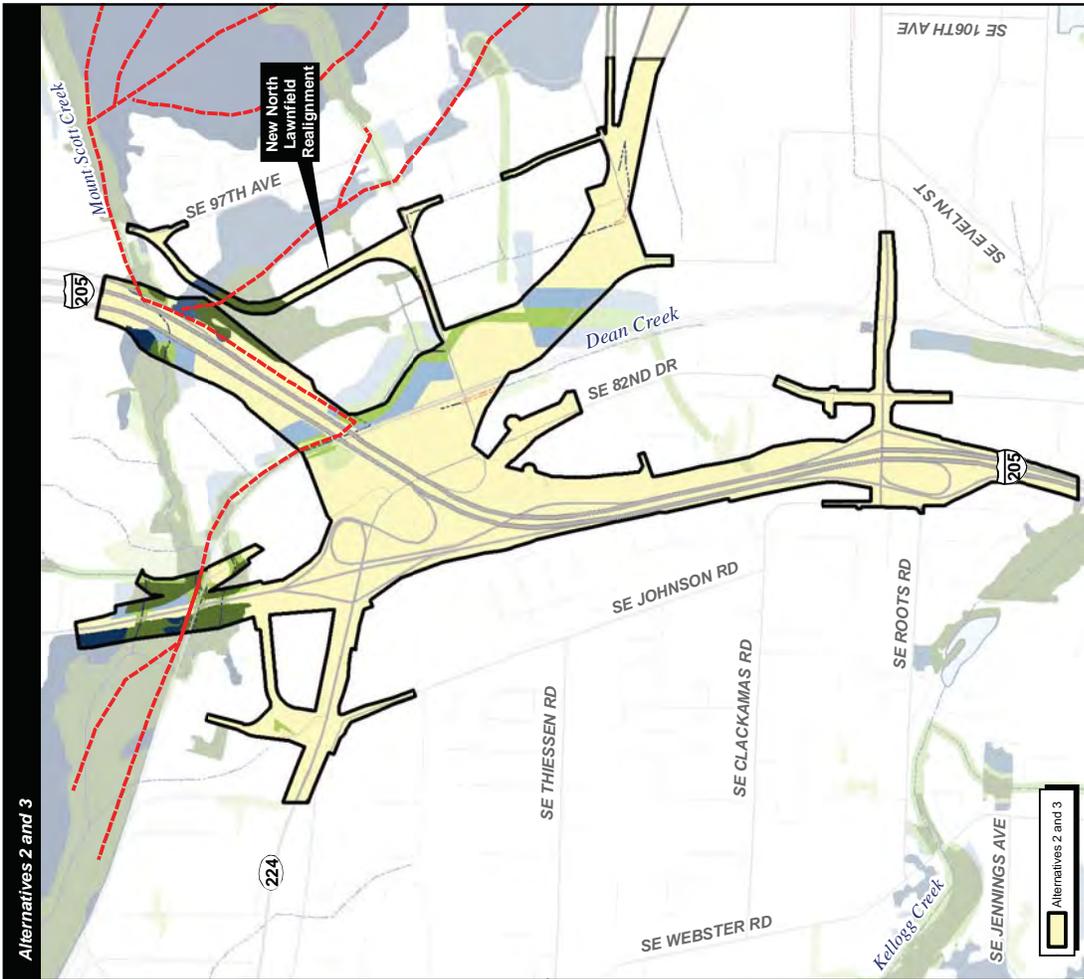
Sources: ODOT and Metro, Portland OR
(Streams as modified by DEQ, as found on field visit)

Figure 43

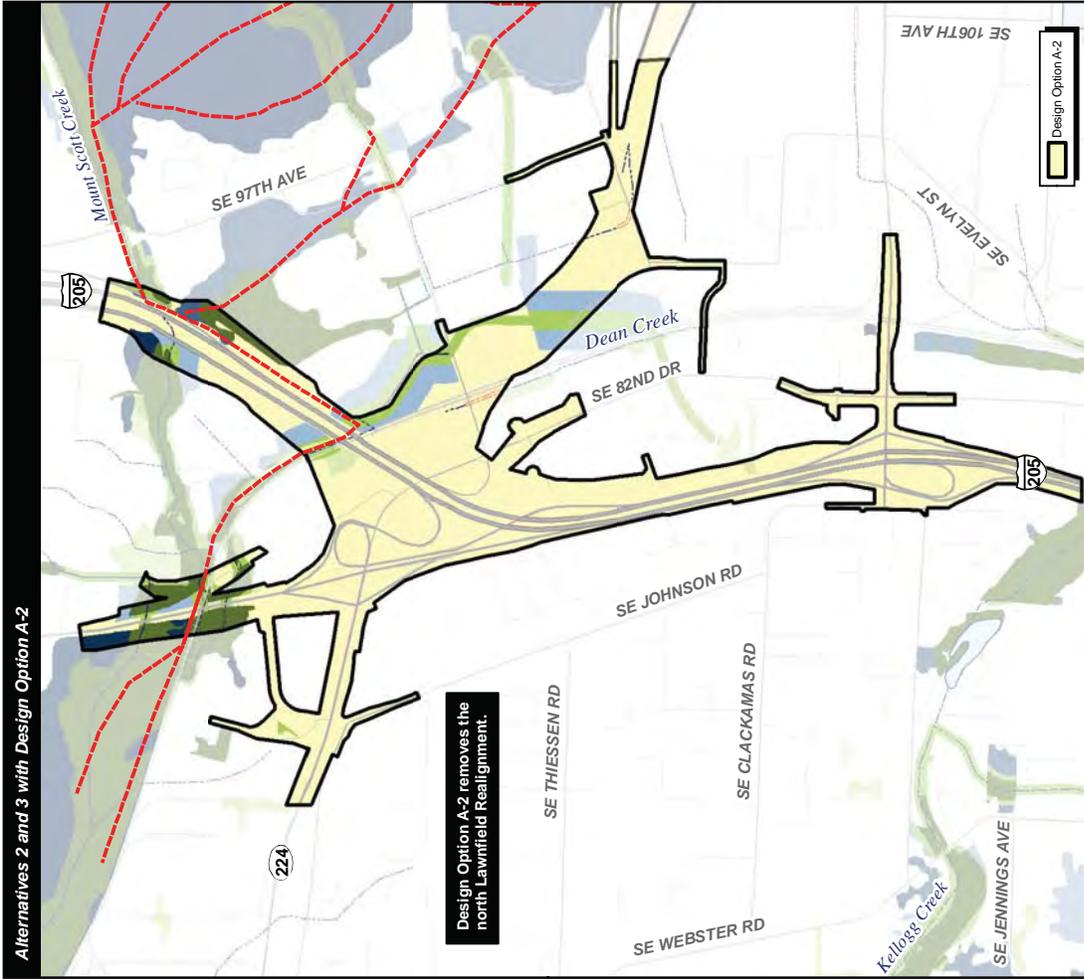
Habitat Impacts for Alternatives 2 and 3

Sunrise Project, I-205 to Rock Creek Junction

Alternatives 2 and 3



Alternatives 2 and 3 with Design Option A-2



- Legend**
- River
 - Streams
 - Culvert
 - Wildlife Corridors

- Metro Resource Habitat Classification**
- Riparian Class I
 - Riparian Class II
 - Riparian Class III
 - Upland Class A
 - Upland Class B
 - Upland Class C

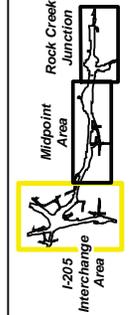


Figure 44

Habitat Impacts, I-205 Interchange Area Options

Sources: ODOT and Metro, Portland OR (Streams as modified by DECA as found on field visit)

Alternative 2



Alternative 2 with Design Option B-2



1,200 0 1,200 Feet

Source: ODOT and Metro, Portland OR
(Streams as modified by DEQ, as found on field visit)

Legend

- River
- Stream
- Culvert
- Wildlife Corridors

Metro Resource Habitat Classification

- Riparian Class I
- Riparian Class II
- Riparian Class III
- Upland Class A
- Upland Class B
- Upland Class C

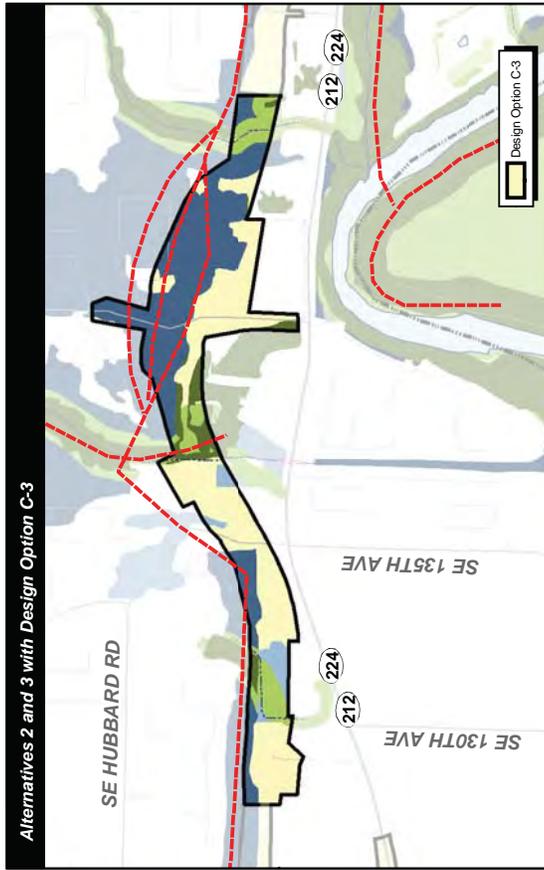
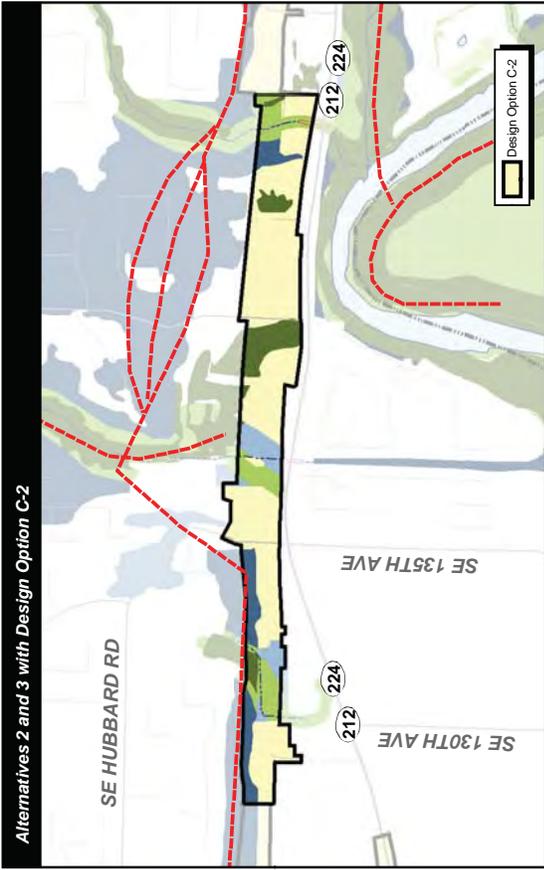
I-205 Interchange Area

Midpoint Area

Rock Creek Junction

Figure 45
Habitat Impacts, Midpoint Area Options, Alternative 2

Sunrise Project, I-205 to Rock Creek Junction



Legend

- River
- Streams
- Culvert
- Wildlife Corridors

Metro Resource Habitat Classification

- Riparian Class I
- Riparian Class II
- Riparian Class III
- Upland Class A
- Upland Class B
- Upland Class C

Figure 46

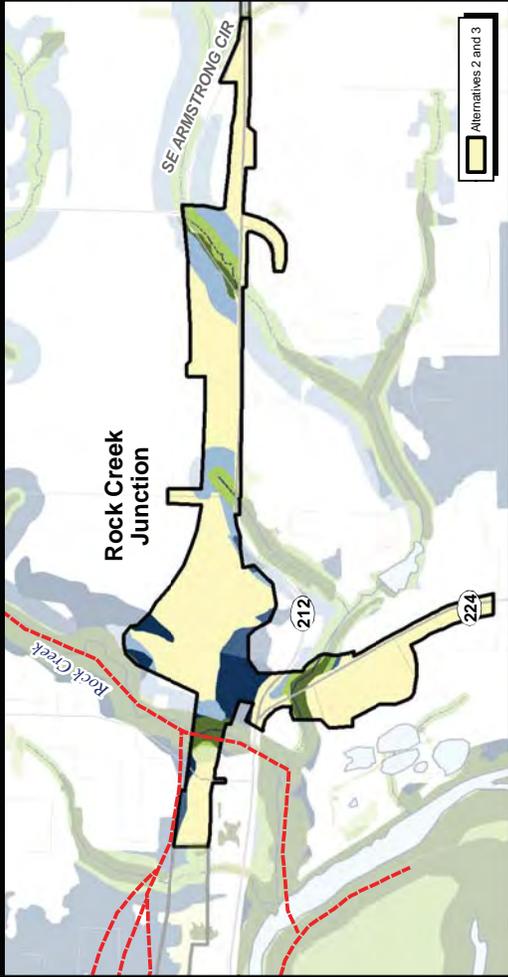
Habitat Impacts, Midpoint Area (East End) Options

Sunrise Project, I-205 to Rock Creek Junction

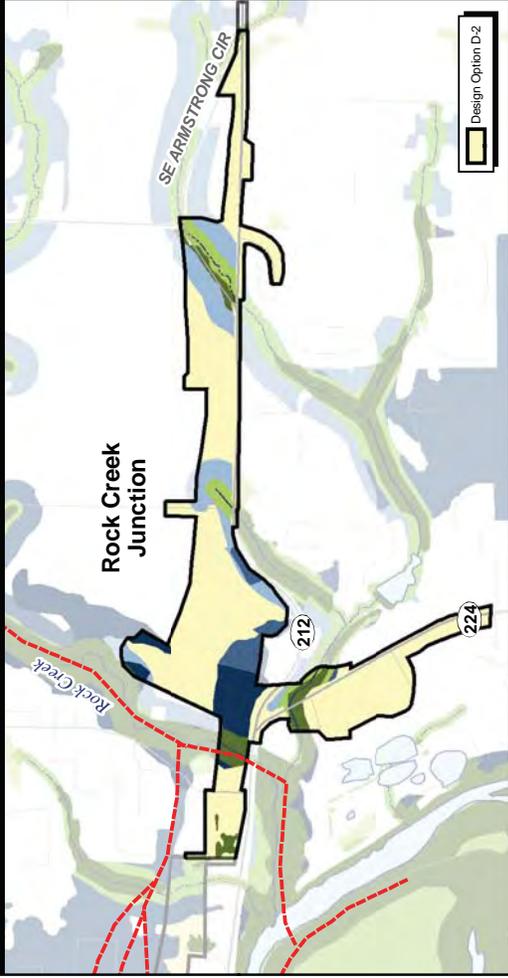
930 0 930 Feet

Sources:
ODOT and Metro, Portland OR
(Streams as modified by DEQ, as found on field visit)

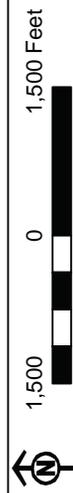
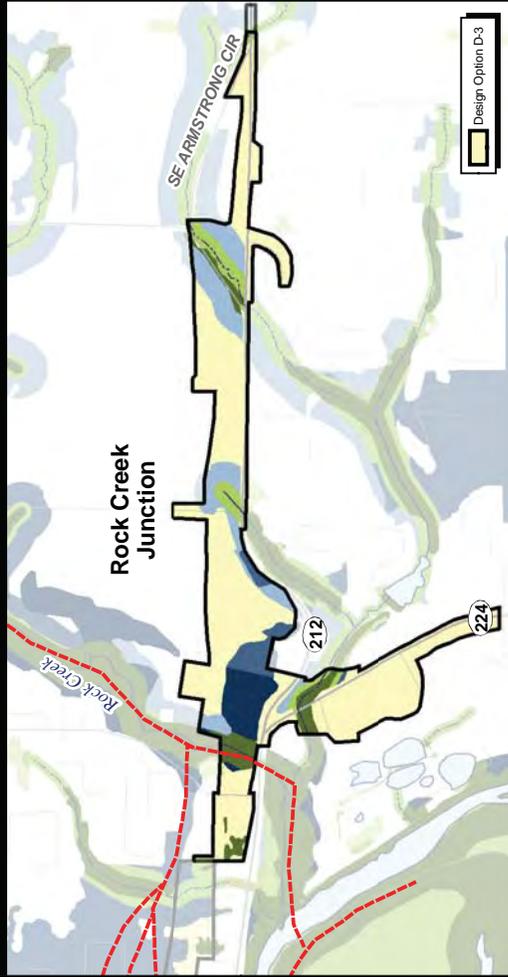
Alternatives 2 and 3



Alternatives 2 and 3 with Design Option D-2



Alternatives 2 and 3 with Design Option D-3



Sources:
 ODOT and Metro, Portland OR
 (Streams as modified by DEQ, as found on field visit)

Legend
 River
 Streams
 Culvert
 Wildlife Corridors

Metro Resource Habitat Classification
 Riparian Class I
 Riparian Class II
 Riparian Class III
 Upland Class A
 Upland Class B
 Upland Class C

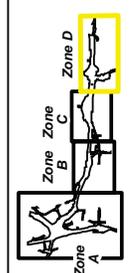
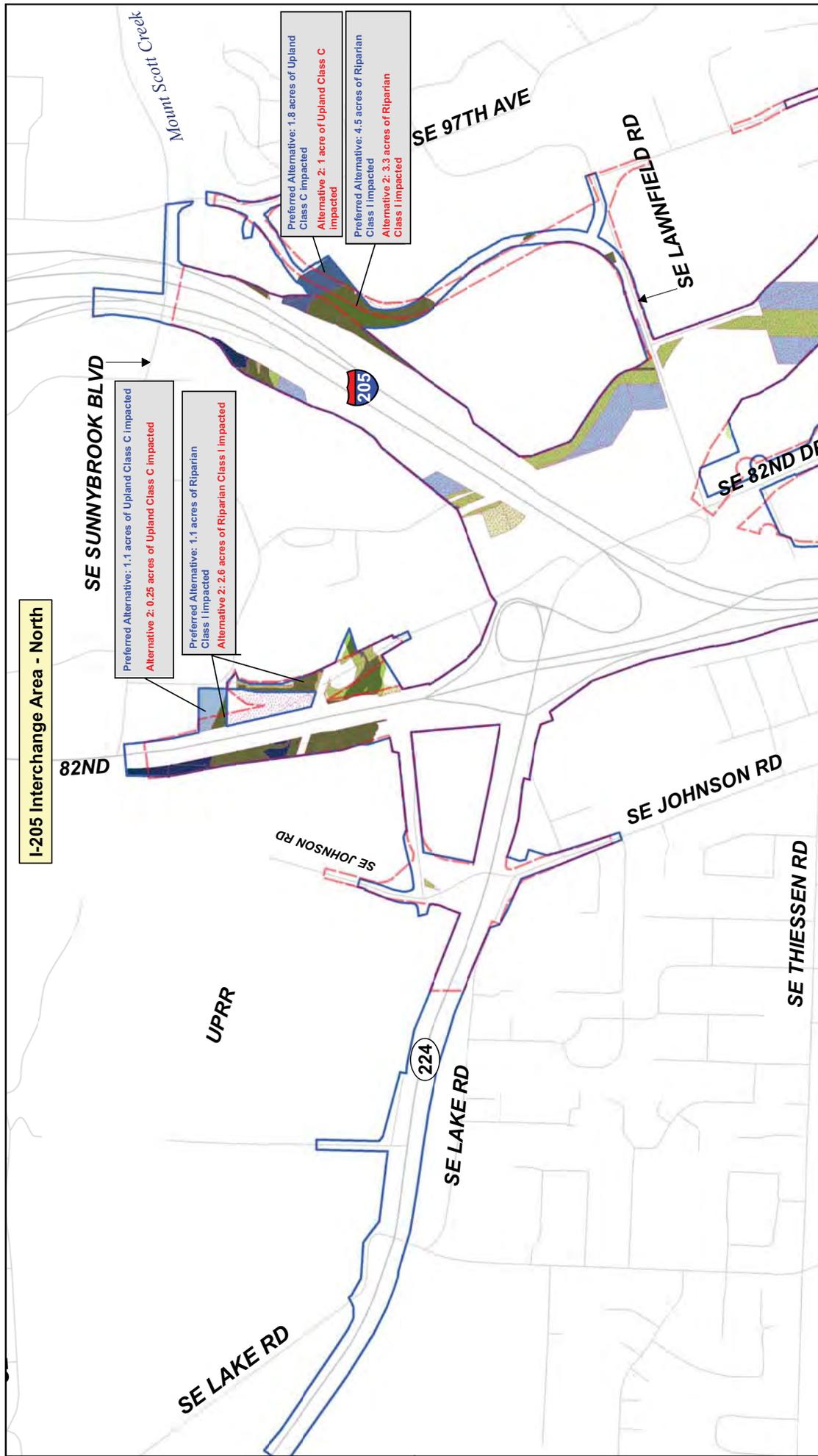


Figure 47
 Habitat Impacts, Rock Creek Junction Area Options
 Sunrise Project, I-205 to Rock Creek Junction



I-205 Interchange Area - North

SE SUNNYBROOK BLVD

Preferred Alternative: 1.1 acres of Upland Class C Impacted
 Alternative 2: 0.25 acres of Upland Class C impacted

Preferred Alternative: 1.1 acres of Riparian Class I impacted
 Alternative 2: 2.6 acres of Riparian Class I impacted

Preferred Alternative: 1.8 acres of Upland Class C impacted
 Alternative 2: 1 acre of Upland Class C impacted

Preferred Alternative: 4.5 acres of Riparian Class I impacted
 Alternative 2: 3.3 acres of Riparian Class I impacted

Figure PA-23
 Comparison of Habitat Impacts - Preferred Alternative vs. Alternative 2 Impact Area (I-205 Interchange Area)
 Sunrise Project, I-205 to Rock Creek Junction

Metro Resource Habitat Classification

- Upland Class A
- Upland Class B
- Upland Class C
- Riparian Class I
- Riparian Class II
- Riparian Class III

Habitat Impacted by SDEIS

- Preferred Alternative
- Alternative 2

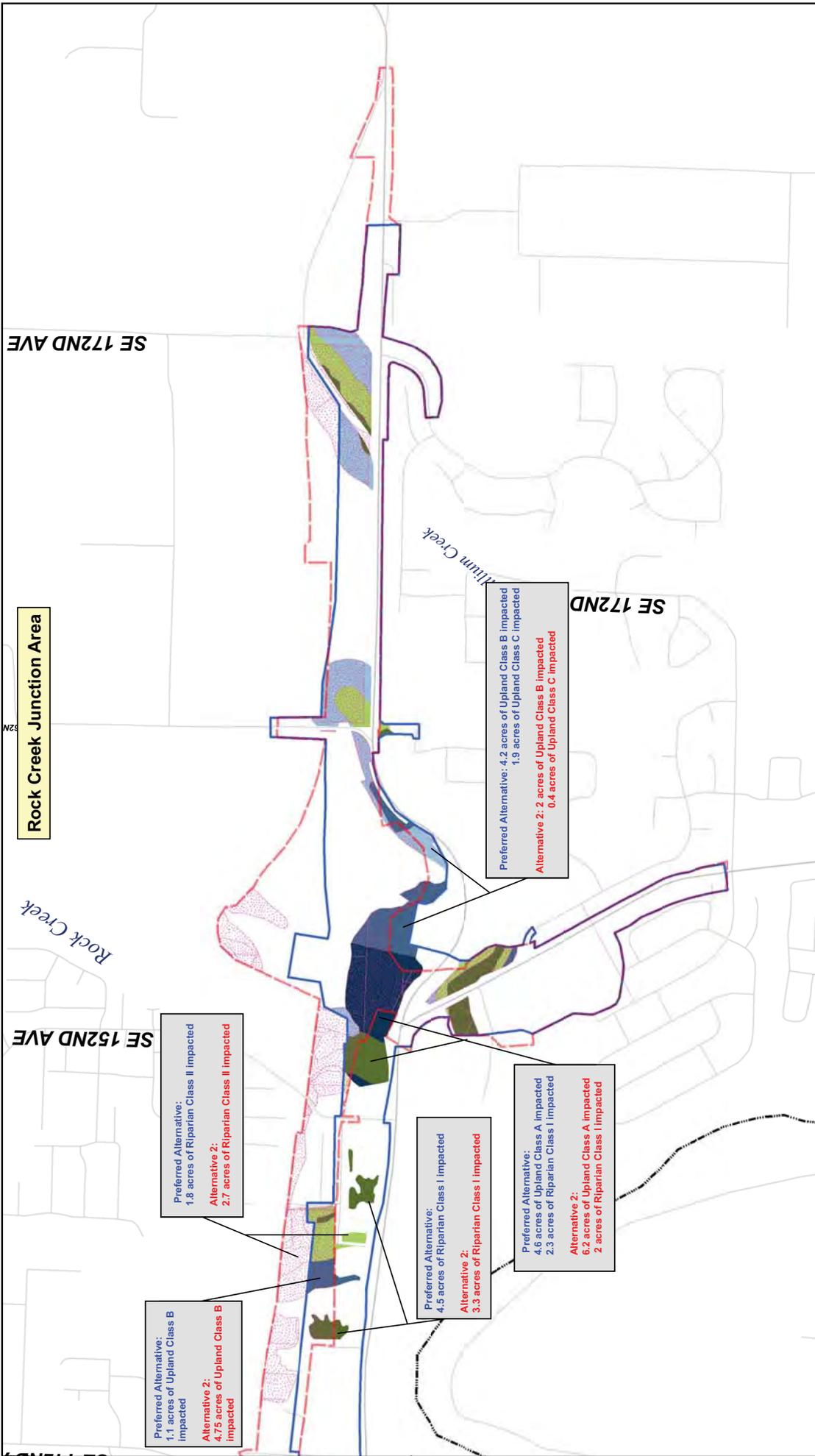
Legend

- Preferred Alternative Construction Impact Line
- Alternative 2 Construction Impact Line

Scale: 800 0 800 Feet

North Arrow: (N)

Sources: ODOT and Metro, Portland OR
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Rock Creek Junction Area

SE 152ND AVE

SE 172ND AVE

Rock Creek

Klamath Creek

SE 172ND

Preferred Alternative:
1.1 acres of Upland Class B impacted

Alternative 2:
4.75 acres of Upland Class B impacted

Preferred Alternative:
1.8 acres of Riparian Class II impacted

Alternative 2:
2.7 acres of Riparian Class II impacted

Preferred Alternative:
4.5 acres of Riparian Class I impacted

Alternative 2:
3.3 acres of Riparian Class I impacted

Preferred Alternative:
4.6 acres of Upland Class A impacted
2.3 acres of Riparian Class I impacted

Alternative 2:
6.2 acres of Upland Class A impacted
2 acres of Riparian Class I impacted

Preferred Alternative: 4.2 acres of Upland Class B impacted
1.3 acres of Upland Class C impacted

Alternative 2: 2.2 acres of Upland Class B impacted
0.4 acres of Upland Class C impacted



Legend

Preferred Alternative Construction Impact Line
Alternative 2 Construction Impact Line

Metro Resource Habitat Classification

- Riparian Class I
- Riparian Class II
- Riparian Class III

Habitat Impacted by SDEIS Preferred Alternative

- Upland Class A
- Upland Class B
- Upland Class C

Figure PA-24
Comparison of Habitat Impacts - Preferred Alternative vs. Alternative 2 Impact Area (Rock Creek Junction)



Sources: ODOT and Metro, Portland OR
 File: P:\0\00070000648\0600\WFO\GIS\workspace\FEIS_Biological_Assessment\Habitat and Resources\Comparison of Habitat Impacts_11132019.mxd
 Date: 11/13/2019 12:16 PM