

## Appendix A

# Pathways Alternative

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The Pathways Alternative involves application of management “pathways” to each of the 11 landscapes in the OESF. A description of this alternative and the pathways can be found in Chapter 2 of the Final Environmental Impact Statement (FEIS).

In the following appendix, DNR describes how it developed the Pathways Alternative for this FEIS, including how it identified candidate forest stands for active and passive management under the pathways and how it estimated the range of habitat that may result from applying the pathways. At the end of this appendix, DNR provides a description of each landscape, the pathway (s) applied to that landscape, and the projected decades in which landscapes may reach northern spotted owl habitat thresholds under all three management alternatives (No Action, Landscape, Pathways).

For an understanding of the northern spotted owl conservation strategy, refer to Chapter 2 of the FEIS.

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# How This Alternative was Developed for This FEIS

The Pathways Alternative was based on the Landscape Alternative but features the application of management “pathways” to each landscape. A pathway is a course of action DNR will take to achieve one or more of the following: attain threshold proportions of northern spotted owl habitat in each landscape more quickly than projected under the Landscape Alternative (refer to sidebar, right), create or accelerate habitat development in areas deferred from harvest to take full advantage of these areas where possible, and consolidate habitat in larger patches or near existing high quality habitat on state trust lands or adjacent federal lands where feasible.

To develop this alternative, DNR first evaluated outputs from the analysis model<sup>1</sup> for the Landscape Alternative to understand the challenges and opportunities in each landscape for attaining threshold proportions of northern spotted owl habitat in each landscape. Those outputs included the harvest schedule, which represents the analysis model’s “optimal solution” of which forest stands to harvest, when, and by what method and which stands to retain across all state trust lands in the OESF over 10 decades to meet objectives for revenue production and ecological values, and the state-of-the-forest file, which represents the forest conditions that may result from implementing the harvest schedule. DNR considered:

- The current amount of northern spotted owl habitat in each landscape,
- The amount of habitat needed to meet northern spotted owl habitat thresholds and the amount of habitat projected by the analysis model to develop over time in each landscape,
- The percent of each landscape currently deferred from harvest in the analysis model,
- The availability and location of forest stands that may respond well to active management to create or accelerate development of habitat in each landscape, and
- Additional considerations such as the location of existing or future habitat in each landscape.

DNR then considered how it could alter the analysis model’s optimal solution, expressed as a harvest schedule, to meet the objectives stated above. For example, DNR explored whether habitat thresholds could be met more quickly by delaying the analysis model’s recommended variable retention harvest of some areas of northern spotted owl habitat. In another example, DNR explored whether it could shift northern spotted owl habitat into deferred areas by thinning some forest stands in deferred areas to create or accelerate development of northern spotted owl habitat. In some landscapes, DNR found that simply following the model’s recommended optimal solution was the best way to achieve its objectives. From these ideas, DNR defined eight management pathways: four pathways for attaining the 40 percent Young

## Threshold Proportions of Northern Spotted Owl Habitat

In each landscape, DNR will restore, then maintain:

- Forty percent (by area) of DNR-managed lands as Young Forest Habitat and better (Young Forest or Old Forest)
- At least 20 percent (by area) of DNR-managed lands as Old Forest Habitat

Forest Habitat and better threshold and four pathways for attaining the 20 percent Old Forest Habitat threshold. Text Box A-1 provides a brief description of each pathway.

#### **Text Box A-1. Brief Description of the Pathways**

DNR refers to stands selected for active or passive management as “candidate stands” since the final decision on how to manage them would be made during implementation.

##### **Passive Management of Young or Old Forest Habitat**

- **Pathway 3:** Select candidate stands of Young or Old Forest Habitat in operable areas for passive management to help meet the 40 percent Young Forest Habitat and better threshold. Passive management means the stand will not be harvested for as long as the pathway remains in effect.
- **Pathway 4:** Select candidate stands of Young or Old Forest Habitat in operable areas for passive management to help meet the 20 percent Old Forest Habitat threshold.

##### **Active Management of Non-Habitat**

- **Pathway 5:** Select candidate stands of non-habitat in operable areas for active management (thinning) to help meet the 40 percent Young forest Habitat and better threshold.
- **Pathway 7:** Select candidate stands of non-habitat in deferred areas for active management to help meet the 40 percent Young Forest Habitat and better threshold.

##### **Active Management of Young Forest Habitat**

- **Pathway 6 (not used):** Select candidate stands of Young Forest Habitat in operable areas for active management to help meet the 20 percent Old Forest Habitat threshold.
- **Pathway 8 (not used):** Select candidate stands of Young Forest Habitat in deferred areas for active management to help meet the 20 percent Old Forest Habitat threshold.

##### **Model’s Optimal Solution Pathways**

- **Pathway 1:** Allow model to develop its optimal solution without any candidate stand selected for active or passive management to meet the 40 percent Young Forest Habitat and better threshold.
- **Pathway 2:** Allow model to develop its optimal solution without any candidate stand selected for active or passive management to meet the 20 percent Old Forest Habitat threshold.

Once DNR defined the pathways, the next step was to select pathways for each landscape, and (for all pathways except Pathway 1 and 2) forest stands as candidates for active management (thinning) or passive management (no harvest) under the pathways.

For the purpose of this environmental analysis, DNR then modified the harvest schedule for the Landscape Alternative to reflect the pathways. Under pathways that involve active management, DNR added thinnings of candidate stands to the harvest schedule, replacing any previously scheduled management (or lack thereof) for those stands. Under pathways that involved passive management, DNR cancelled the model’s recommended management of candidate stands. Changes to the harvest schedule were performed in a post process (outside the analysis model); DNR did not run the analysis model for the Pathways Alternative.

As part of this process, DNR also determined how long each pathway should remain in effect. Most pathways apply to the restoration phase only,<sup>2</sup> but DNR extended some pathways into the maintenance and enhancement phase<sup>3</sup> if doing so would enable DNR to better meet its objectives.

## ■ Criteria for Selecting Candidate Forest Stands for Active or Passive Management

### *Pathways 3 and 4: Passive Management of Young or Old Forest Habitat*

For **Pathway 3**, DNR selected candidate forest stands of Young or Old Forest Habitat in **operable areas** for passive management to help meet the 40 percent Young Forest Habitat and better threshold. In the analysis model, operable areas were either partially deferred from harvest (restricted to thinning) or not deferred from harvest (thinning and variable retention harvest permitted). These areas were coded in the analysis model as “Na” or “Partial.”

To select candidate stands, DNR used the following criteria:

- The candidate stand was currently classified in the analysis model as either Young or Old Forest Habitat.
- The candidate stand was classified as operable (either partially deferred or not deferred).
- Passive management of the candidate stand results in the development of Young or Old Forest Habitat that would not occur under the analysis model’s optimal solution for the Landscape Alternative.
- Passive management of the candidate stand results in the development of Young or Old Forest Habitat at least one decade sooner than it would under the analysis model’s optimal solution for the Landscape Alternative.

**Timing:** Pathway 3 was applied at the earliest instance (decade) in which each candidate stand met the selection criteria.

For **Pathway 4**, DNR used the following criteria to select candidate forest stands of Young or Old Forest Habitat in **operable areas** for passive management to help meet the 20 percent Old Forest Habitat threshold:

- The candidate stand was currently classified in the analysis model as either Young or Old Forest Habitat.
- The candidate stand was classified as operable (either partially deferred or not deferred).
- Passive management of the candidate stand results in the development of Old Forest Habitat that would not occur under the analysis model’s optimal solution for the Landscape Alternative.

- Passive management of the candidate stand results in the development of Old Forest Habitat at least one decade sooner than it would under the analysis model's optimal solution for the Landscape Alternative.

**Timing:** Pathway 4 was applied at the earliest instance (decade) in which each candidate stand met the selection criteria.

## ***Pathways 5 and 7: Active Management of Non-Habitat***

For **Pathway 5**, DNR used the following criteria to select candidate forest stands of non-habitat in **operable areas** for active management to help meet the 40 percent Young Forest Habitat and better threshold:

- The candidate stand was not classified in the analysis model as either Young or Old Forest Habitat.
- The candidate stand was classified as operable (either partially deferred or not deferred).
- The candidate stand met all the components of the definition of young forest marginal habitat<sup>4</sup> except one: stand density was too high (more than 280 trees per acre with a diameter at breast height greater than or equal to 3.5 inches):
  - Dominant and co-dominant trees in the candidate stand were at least 85 feet tall (measured using the average height of the 40 largest diameter live trees).
  - The candidate stand had at least two snags per acre with a diameter at breast height greater than or equal to 20 inches, *or* at least 4,800 cubic feet of down woody debris per acre.
  - Curtis' relative density of the candidate stand was greater than or equal to 48 for trees with a diameter at breast height of great than or equal to 3.5 inches.
  - At least 30 percent of the dominant and co-dominant trees in the candidate stand were conifer, by count of trees per acre.
- Or, the candidate stand met all the components of the definition of sub-mature habitat except one: stand density was too high (more than 280 trees per acre with a diameter at breast height greater than or equal to 3.5 inches):
  - Dominant and co-dominant trees in the candidate stand were at least 85 feet tall (measured using the average height of the 40 largest diameter live trees).
  - The candidate stand had at least three snags per acre with a diameter at breast height greater than or equal 20 inches.
  - The candidate stand had at least 2,400 cubic feet of down woody debris per acre.
  - Curtis' relative density of the candidate stand was greater than or equal to 48 for trees with a diameter at breast height of great than or equal to 3.5 inches.

- At least 30 percent of the dominant and co-dominant trees in the candidate stand were conifer, by count of trees per acre.

**Timing:** Candidate stands may satisfy these selection criteria at multiple times (decades) during the analysis model’s 100-year analysis period. DNR applied Pathway 5 at the earliest instance (decade) in which each candidate stand met the selection criteria. Pathway 5 was applied during the restoration phase only.

For **Pathway 7**, DNR used the following criteria to select forest stand of non-habitat for active management in **deferred areas** to help meet the 40 percent Young Forest Habitat and better threshold. “Deferred areas” include forest stands that were deferred from harvest for multiple decades in the analysis model (coded in the analysis model as “9999”). These deferred areas were not available to the analysis model for either thinning or variable retention harvest.

- The candidate stand was not classified in the analysis model as either Young or Old Forest Habitat.
- The candidate stand was classified as deferred.
- The candidate stand meets all the components of the definition of young forest marginal habitat except one: stand density was too high (there were more than 280 trees per acre with a diameter at breast height greater than or equal to 3.5 inches):
  - Dominant and co-dominant trees in the candidate stand were at least 85 feet tall (measured using the average height of the 40 largest diameter live trees).
  - The candidate stand had at least two snags per acre with a diameter at breast height greater than or equal to 20 inches, *or* at least 4,800 cubic feet of down woody debris per acre.
  - Curtis’ relative density of the candidate stand was greater than or equal to 48 for trees with a diameter at breast height of great than or equal to 3.5 inches.
  - At least 30 percent of the dominant and co-dominant trees in the candidate stand were conifer, by count of trees per acre.
- Or, the candidate stand met all the components of the definition of sub-mature habitat except one: stand density was too high (more than 280 trees per acre with a diameter at breast height greater than or equal to 3.5 inches):
  - Dominant and co-dominant trees in the candidate stand were at least 85 feet tall (measured using the average height of the 40 largest diameter live trees).
  - The candidate stand had at least three snags per acre with a diameter at breast height greater than or equal 20 inches.
  - The candidate stand had at least 2,400 cubic feet of down woody debris per acre.
  - Curtis’ relative density of the candidate stand was greater than or equal to 48 for trees with a diameter at breast height of great than or equal to 3.5 inches.

- At least 30 percent of the dominant and co-dominant trees in the candidate stand were conifer, by count of trees per acre.

**Timing:** Candidate stands may satisfy these selection criteria at multiple times (decades) during the analysis model’s 100-year analysis period. DNR applied Pathway 7 at the earliest instance (decade) in which each candidate stand met the selection criteria. Pathway 7 was applied during the restoration phase only, although during implementation this pathway may be applied during the maintenance and enhancement phase to maximize the amount of habitat located in deferred areas.

## **Pathways 6 and 8: Active Management of Young Forest Habitat**

Pathways 6 and 8, which involve active management of Young Forest Habitat, were not selected in this process for any of the 11 landscapes.

### **■ Estimating the Upper and Lower Bounds of Northern Spotted Owl Habitat**

For the purpose of this environmental analysis, and based on the modified harvest schedule described in this appendix, DNR also estimated a range of how much northern spotted owl habitat each landscape may have at each decade of the 100-year analysis period under the Pathways Alternative. This information was used to analyze the indicator “number of acres of modeled northern spotted owl habitat” in “Northern Spotted Owls” in Chapter 3 of the FEIS. These estimates were developed in a post process (outside the analysis model).

As a result of applying the pathways in each landscape, DNR anticipated that the total amount of northern spotted owl habitat in each landscape eventually would meet and then exceed northern spotted owl habitat thresholds. In accordance with the northern spotted owl conservation strategy described in the *State Trust Lands Habitat Conservation Plan* (HCP), habitat in excess of northern spotted owl habitat thresholds in each landscape is available for harvest so long as thresholds are maintained in the landscape.

The analysis model, had DNR used it, would have been able to optimize the selection for harvest of those forest stands in operable areas that a) developed into northern spotted owl habitat as a result of applying the pathways, and b) were not needed to maintain northern spotted owl habitat thresholds. Because DNR did not run the analysis model for the Pathways Alternative, DNR was not able to determine which of these forest stands would be harvested in the context of all of DNR’s management objectives. Instead, DNR reported the *total amount* of northern spotted owl habitat in each landscape at each decade of the 100-year analysis period as a range (using an upper and lower bound for each habitat type).

In developing these upper and lower bounds, DNR assumed that non-habitat would become Young Forest Habitat immediately following a thinning, and habitat that was thinned would become Old Forest Habitat four decades later through natural forest growth.

## Calculating the Upper Bounds

DNR calculated the upper bounds per the following assumptions:

- The upper bound for Old Forest Habitat includes all Old Forest Habitat that would result from applying the selected pathways.
- The upper bound for Young Forest Habitat and better included all Young and Old Forest Habitat that would result from applying the selected pathways.

## Calculating the Lower Bounds

DNR calculated the lower bounds for Old Forest Habitat and Young Forest Habitat and better using the following process. Each step refers to “baseline” habitat, which is defined in Text Box A-2.

**Step 1.** Is the Old Forest Habitat baseline greater than or equal to 20 percent of the landscape?

YES: Old Forest Habitat lower bound = Old Forest Habitat baseline.  
Go to step 2.

NO: Retain Old Forest Habitat in operable areas to bring the total amount of Old Forest Habitat to 20 percent of the landscape, if possible. Go to step 2.

**Step 2.** Is the Young Forest Habitat and better baseline + Old Forest Habitat in operable areas retained in Step 1 greater than or equal to 40 percent of the landscape?

YES: Young Forest Habitat and better lower bound = Young Forest Habitat and better baseline + Old Forest Habitat in operable areas retained in Step 1. Stop.

NO: Retain Young Forest Habitat in operable areas to bring the total amount of Young Forest Habitat to 40 percent of the landscape (if possible). Go to step 3.

**Step 3.** Is the total amount of Young and Old Forest Habitat in the landscape (Young Forest Habitat and better baseline + any Old Forest Habitat in operable areas retained in Step 1 + any Young Forest Habitat retained in Step 2) greater than or equal to 40 percent of the landscape?

YES: Young Forest Habitat and better lower bound = Young Forest Habitat and better baseline + Old Forest Habitat in operable areas retained in Step 1 + Young Forest Habitat retained in Step 2. Stop.

NO: Add in any remaining Old Forest Habitat in operable areas not already retained in Step 1 to bring the total amount of Young and Old Forest Habitat to 40 percent of the landscape (if possible). At this point, there is no more habitat to add. Report the total as the Young Forest Habitat and better lower bound.

### Text Box A-2. Baseline Habitat

#### Old Forest Habitat Baseline

Old Forest Habitat located in deferred areas + Old Forest Habitat located in partial deferrals

#### Young Forest Habitat and Better Baseline

Old Forest Habitat baseline + Young Forest Habitat located in deferred areas + Young Forest Habitat located in partial deferrals

DNR assumed that habitat that develops in deferred areas and partial deferrals will always be habitat because management actions in these areas are either prohibited or limited such that they cannot convert habitat into non-habitat.

## Pathways Selected in Each Landscape

In the following section, DNR provides a description of each landscape, the pathway that was selected for that landscape, and DNR's projection of when the landscape will reach northern spotted owl habitat thresholds under each alternative (No Action, Landscape, Pathways). For each landscape, DNR provides the number of acres classified as deferred and operable in the analysis model.

For comparison, DNR also included the decade in which the HCP anticipated each landscape would reach habitat thresholds. To account for time since the HCP was adopted, DNR subtracted two decades from those listed in Table IV.7 on p. IV.94 in the HCP.

DNR's current methods for projecting habitat and thresholds are different than those used to develop the HCP. For the HCP, DNR projected habitat development using stand age only; in other words, when a stand reached a certain age it was assumed to be habitat. By contrast, DNR's current method is to project habitat development based on stand structure. With this technique, a forest stand is not habitat until it has developed all of the structural attributes of habitat.

Also, the HCP based its calculation of thresholds on all acres in the landscape, whether those acres are forested or non-forested (such as roads, administrative sites, water bodies, or rock quarries). For all three alternatives, DNR based its calculation on forested acres only.

The projections shown in this appendix were developed using data that was current when the analysis model was built and therefore does not reflect recent harvest activities or land transactions.

DNR anticipates carrying its preliminary selection of pathways and candidate stands into implementation, although over time, pathways and candidate stands may be adjusted as needed.

## ■ Clallam Landscape



The Clallam landscape includes 17,276 acres of state trust lands:

- 79 percent (13,592 acres) is operable, and
- 21 percent (3,684 acres) is deferred from harvest.

The Clallam landscape encompasses state trust lands in the Clallam River drainage as well as scattered parcels to the east in the Pysht River and Deep Creek basins. This landscape borders the Strait of Juan de Fuca. Because of its access to water-borne transportation, substantial timber harvest occurred here in the early 20th century.

### Habitat Projections

Table A-1 shows the decades in which this landscape is estimated to achieve habitat thresholds under the three alternatives. For reference, DNR also provides the HCP estimate of when this landscape would achieve thresholds.

**Table A-1. Estimated Decades for Reaching Habitat Thresholds, Clallam Landscape**

| Current acres of Young Forest Habitat         | Decade(s) to achieve 40% Young Forest Habitat and better threshold |              |    |   | Current acres of Old Forest Habitat        | Decade(s) to achieve 20% Old Forest Habitat threshold |              |   |   |
|---|--|--------------|----|---|--|---|--------------|---|---|
|   | HCP  | Alternatives |    |   |  | HCP   | Alternatives |   |   |
|   | NA   | LA           | PW |   | NA   | LA  | PW           |   |   |
| 5,662 (33% of state trust lands in landscape) | 0  | 1            | 2  | 1 | 314 (2% of state trust lands in landscape) | 5   | 5            | 5 | 5 |

NA: No Action Alternative; LA: Landscape Alternative; PW: Pathways Alternative

### Pathways Selected

► **40 percent Young Forest Habitat and better pathway: Pathway 1**, allow model to develop its optimal solution without any candidate stands selected for active or passive management.

► **20 percent Old Forest Habitat pathway: Pathway 4**, select candidate stands of Young or Old Forest Habitat in operable areas for passive management.

## ■ Clearwater Landscape



The Clearwater landscape includes 55,203 acres of state trust lands:

- 42 percent (23,024 acres) is operable, and
- 58 percent (32,179 acres) is deferred from harvest.

The Clearwater landscape includes the headwaters of the Clearwater River, a major tributary of the Queets River. This landscape is separated from the Queets and Hoh River basins by steep ridges with ridgetop elevation ranging from 2,500 to 3,500 feet. Mountainous, rugged terrain occupies much of the area above 1,000 feet. DNR timber

harvests from the 1960s through the 1980s resulted in a landscape dominated by plantations of young forest stands in the Competitive Exclusion stand development stage. However, unharvested areas in the mid and upper elevations provide significant acreage of western hemlock/Pacific silver fir stands in the Structurally Complex stand development stage.

## Habitat Projections

Table A-2 shows the decades in which this landscape is estimated to achieve habitat thresholds under the three alternatives. For reference, DNR also provides the HCP estimate of when this landscape would achieve thresholds.

**Table A-2. Estimated Decades for Reaching Habitat Thresholds, Clearwater Landscape**

| Current acres of Young Forest Habitat        | Decade(s) to achieve 40% Young Forest Habitat and better threshold |              |    |    | Current acres of Old Forest Habitat            | Decade(s) to achieve 20% Old Forest Habitat threshold |              |    |   |
|--|--|--------------|----|----|--|---|--------------|----|---|
|  | HCP  | Alternatives |    |    |  | HCP   | Alternatives |    |   |
|  |  | NA           | LA | PW |  | NA  | LA           | PW |   |
| 3,105 (6% of state trust lands in landscape) | 1  | 4            | 7  | 4  | 14,101 (26% of state trust lands in landscape) | 0   | 0            | 0  | 0 |

NA: No Action Alternative; LA: Landscape Alternative; PW: Pathways Alternative

## Pathways Selected

► **40 percent Young Forest Habitat and better pathway: Pathway 7**, select candidate stands of non-habitat in deferred areas for active management.

► **20 Percent Old Forest Habitat pathway: Pathway 2**, allow model to develop its optimal solution without any candidate stands selected for active or passive management.

## ■ Coppermine Landscape



The Coppermine landscape includes 19,246 acres of state trust lands:

- 53 percent of state trust lands (10,246 acres) is operable, and
- 47 percent (9,000 acres) is deferred from harvest.

The Coppermine landscape in the OESF is named for the DNR campground “Coppermine Bottom” on the lower Clearwater River. DNR manages approximately half of this lower-elevation landscape, which is largely foothill terrain with moderate slopes. Timber harvests beginning in the 1960s and resulted in a landscape

dominated by plantations of young western hemlock/Douglas-fir stands in the Competitive Exclusion stand development stage.

### Habitat Projections

Table A-3 shows the decades in which this landscape is estimated to achieve habitat thresholds under the three alternatives. For reference, DNR also provides the HCP estimate of when this landscape would achieve thresholds.

**Table A-3. Estimated Decades for Reaching Habitat Thresholds, Coppermine Landscape**

| Current acres of Young Forest Habitat      | Decade(s) to achieve 40% Young Forest Habitat and better threshold |              |    |    | Current acres of Old Forest Habitat           | Decade(s) to achieve 20% Old Forest Habitat threshold |              |    |   |
|--|--|--------------|----|----|---|---|--------------|----|---|
|  | HCP  | Alternatives |    |    |   | HCP   | Alternatives |    |   |
|  |  | NA           | LA | PW |   | NA  | LA           | PW |   |
| 708 (4% of state trust lands in landscape) | 1  | 5            | 6  | 5  | 3,107 (16% of state trust lands in landscape) | 6   | 8            | 8  | 7 |

NA: No Action Alternative; LA: Landscape Alternative; PW: Pathways Alternative

### Pathways Selected

► **40 percent Young Forest Habitat and better pathway: Pathway 7**, select candidate stands of non-habitat in deferred areas for active management.

► **20 Percent Old Forest Habitat pathway: Pathway 2**, allow model to develop its optimal solution without any candidate stands selected for active or passive management.

## ■ Dickodochtedar Landscape



The Dickodochtedar landscape includes 28,047 acres of state trust lands:

- 70 percent (19,753 acres) is operable, and
- 30 percent (8,294 acres) is deferred from harvest.

The Dickodochtedar Landscape, which bears the Quileute name for what is now called the Dickey River (Powell and others, undated), occupies much of the coastal plain on the northwest Olympic Peninsula. This landscape was largely shaped by continental glaciation and is dominated by private industrial forest lands. DNR manages about one-fourth of this landscape. These low-elevation forestlands are productive for timber.

### Habitat Projections

Table A-4 shows the decades in which this landscape is estimated to achieve habitat thresholds under the three alternatives. For reference, DNR also provides the HCP estimate of when this landscape would achieve thresholds.

**Table A-4. Estimated Decades for Reaching Habitat Thresholds, Dickodochtedar Landscape**

| Current acres of Young Forest Habitat         | Decade(s) to achieve 40% Young Forest Habitat and better threshold |              |    |   | Current acres of Old Forest Habitat          | Decade(s) to achieve 20% Old Forest Habitat threshold |              |   |   |
|---|--|--------------|----|---|--|---|--------------|---|---|
|   | HCP  | Alternatives |    |   |  | HCP   | Alternatives |   |   |
|   | NA   | LA           | PW |   | NA   | LA  | PW           |   |   |
| 5,059 (18% of state trust lands in landscape) | 1  | 2            | 3  | 2 | 2,570 (9% of state trust lands in landscape) | 6   | 5            | 4 | 4 |

NA: No Action Alternative; LA: Landscape Alternative; PW: Pathways Alternative

### Pathways Selected

► **40 percent Young Forest Habitat and better pathway: Pathway 1**, allow model to develop its optimal solution without any candidate stands selected for active or passive management.

► **20 Percent Old Forest Habitat pathway: Pathway 4**, select candidate stands of Young or Old Forest Habitat in operable areas for passive management.

## ■ Goodman Landscape



The Goodman landscape includes 23,799 acres of state trust lands:

- 59 percent (14,036 acres) is operable, and
- 41 percent (9,763 acres) is deferred from harvest.

This low-elevation coastal landscape encompasses two small, discrete coastal basins: Goodman and Mosquito creeks. It also contains state trust lands that drain to the lower Bogachiel River. Old-growth western redcedar stands are a notable feature of some state trust lands in the Goodman Creek basin.

### Habitat Projections

Table A-5 shows the decades in which this landscape is estimated to achieve habitat thresholds under the three alternatives. For reference, DNR also provides the HCP estimate of when this landscape would achieve thresholds.

**Table A-5. Estimated Decades for Reaching Habitat Thresholds, Goodman Landscape**

| Current acres of Young Forest Habitat         | Decade(s) to achieve 40% Young Forest Habitat and better threshold |    |    |    | Current acres of Old Forest Habitat           | Decade(s) to achieve 20% Old Forest Habitat threshold |    |    |    |
|---|--|----|----|----|---|---|----|----|----|
|   | HCP  | NA | LA | PW |   | HCP   | NA | LA | PW |
| 2,392 (10% of state trust lands in landscape) | 1  | 4  | 3  | 1  | 4,822 (20% of state trust lands in landscape) | 0   | 0  | 0  | 0  |

NA: No Action Alternative; LA: Landscape Alternative; PW: Pathways Alternative

### Pathways Selected

► **40 percent Young Forest Habitat and better pathway: Pathway 5**, select candidate stands of non-habitat in operable areas for active management; *and* **Pathway 7**, select candidate stands of non-habitat in deferred areas for active management.

► **20 Percent Old Forest Habitat pathway: Pathway 2**, allow model to develop its optimal solution without any candidate stands selected for active or passive management.

## ■ Kalaloch Landscape



The Kalaloch landscape includes 18,122 acres of state trust lands:

- 56 percent (10,149 acres) is operable, and
- 44 percent (7,973 acres) is deferred from harvest.

This low elevation, coastal landscape encompasses Cedar and Kalaloch creeks; small, discrete coastal basins; and the lower Hoh River. State trust lands are most abundant in the Kalaloch, Cedar, and Nolan (Hoh tributary) creek basins, where previous intensive forest management resulted in many Douglas-fir/western hemlock plantations. Notable stands of old-growth western redcedar are conserved in several areas of this landscape, including the South Nolan Natural Resource Conservation Area.<sup>5</sup>

### Habitat Projections

Table A-6 shows the decades in which this landscape is estimated to achieve habitat thresholds under the three alternatives. For reference, DNR also provides the HCP estimate of when this landscape would achieve thresholds.

**Table A-6. Estimated Decades for Reaching Habitat Thresholds, Kalaloch Landscape**

| Current acres of Young Forest Habitat         | Decade(s) to achieve 40% Young Forest Habitat and better threshold |              |    |    | Current acres of Old Forest Habitat           | Decade(s) to achieve 20% Old Forest Habitat threshold |              |    |   |
|---|--|--------------|----|----|---|---|--------------|----|---|
|   | HCP  | Alternatives |    |    |   | HCP   | Alternatives |    |   |
|   |  | NA           | LA | PW |   | NA  | LA           | PW |   |
| 1,956 (11% of state trust lands in landscape) | 1  | 4            | 4  | 3  | 2,472 (14% of state trust lands in landscape) | 6   | 6            | 5  | 5 |

NA: No Action Alternative; LA: Landscape Alternative; PW: Pathways Alternative

### Pathways Selected

► **40 percent Young Forest Habitat and better pathway: Pathway 5**, select candidate stands of non-habitat in operable areas for active management; *and* **Pathway 7**, select candidate stands of non-habitat in deferred areas for active management.

► **20 percent Old Forest Habitat pathway: Pathway 4**, select candidate stands of Young or Old Forest Habitat in operable areas for passive management.

## ■ Queets Landscape



The Queets landscape includes 20,807 acres of state trust lands:

- 56 percent (11,562 acres) is operable, and
- 44 percent (9,245 acres) is deferred from harvest.

The Queets River Corridor of Olympic National Park bisects this low-elevation landscape, which was largely shaped by alpine glaciers during the last ice age. State trust lands comprise most of this landscape, which is dominated by Douglas-fir/western hemlock plantations that resulted from previous intensive timber harvest.

### Habitat Projections

Table A-7 shows the decades in which this landscape is estimated to achieve habitat thresholds under the three alternatives. For reference, DNR also provides the HCP estimate of when this landscape would achieve thresholds.

**Table A-7. Estimated Decades for Reaching Habitat Thresholds, Queets Landscape**

| Current acres of Young Forest Habitat        | Decade(s) to achieve 40% Young Forest Habitat and better threshold |    |    |    | Current acres of Old Forest Habitat           | Decade(s) to achieve 20% Old Forest Habitat threshold |    |    |    |
|--|--|----|----|----|---|---|----|----|----|
|  | HCP  | NA | LA | PW |   | HCP   | NA | LA | PW |
| 1,579 (8% of state trust lands in landscape) | 1  | 4  | 4  | 4  | 5,179 (25% of state trust lands in landscape) | 0   | 0  | 0  | 0  |

NA: No Action Alternative; LA: Landscape Alternative; PW: Pathways Alternative

### Pathways Selected

► **40 percent Young Forest Habitat and better pathway: Pathway 7**, select candidate stands of non-habitat in deferred areas for active management.

► **20 percent Old Forest Habitat pathway: Pathway 2**, allow model to develop its optimal solution without any candidate stands selected for active or passive management.

## ■ Reade Hill Landscape



The Reade Hill landscape includes 8,479 acres of state trust lands:

- 48 percent (4,083 acres) is operable, and
- 52 percent (4,396 acres) is deferred from harvest.

The Reade Hill landscape is located west of Olympic National Forest, mostly in the foothills of the Olympic Mountains between the Bogachiel and Calawah rivers. State trust lands comprise over half of the landscape, with the city of Forks and private forest lands making up the remainder. The predominant forest cover is western hemlock/Douglas-fir plantations, which resulted from the hurricane-force winds of the Great Olympic Blowdown in 1921 (locally known as the “21 Blow”).

## Habitat Projections

Table A-8 shows the decades in which this landscape is estimated to achieve habitat thresholds under the three alternatives. For reference, DNR also provides the HCP estimate of when this landscape would achieve thresholds.

**Table A-8. Estimated Decades for Reaching Habitat Thresholds, Reade Hill Landscape**

| Current acres of Young Forest Habitat            | Decade(s) to achieve 40% Young Forest Habitat and better threshold |              |    |    | Current acres of Old Forest Habitat              | Decade(s) to achieve 20% Old Forest Habitat threshold |              |    |    |
|--|--|--------------|----|----|--|---|--------------|----|----|
|  | HCP  | Alternatives |    |    |  | HCP   | Alternatives |    |    |
|  |  | NA           | LA | PW |  |   | NA           | LA | PW |
| 2,038<br>(24% of state trust lands in landscape) | 0  | 0            | 0  | 0  | 1,933<br>(23% of state trust lands in landscape) | 0   | 0            | 0  | 0  |

NA: No Action Alternative; LA: Landscape Alternative; PW: Pathways Alternative

## Pathways Selected

► **40 percent Young Forest Habitat and better pathway: Pathway 1**, allow model to develop its optimal solution without any candidate stands selected for active or passive management.

► **20 percent Old Forest Habitat pathway: Pathway 2**, allow model to develop its optimal solution without any candidate stands selected for active or passive management.

## ■ Sekiu Landscape



The Sekiu landscape includes 10,014 acres of state trust lands:

- 82 percent (8,210 acres) is operable, and
- 18 percent (1,804 acres) is deferred from harvest.

State trust lands are sparsely scattered across this large landscape, which is composed mostly of private, industrial forest lands. High ridges of the Crescent Formation bisect the landscape, with watersheds to the north draining to the Strait of Juan de Fuca and those to the south draining to the Pacific Ocean. State trust lands in this landscape were

harvested intensively in the past.

## Habitat Projections

Table A-9 shows the decades in which this landscape is estimated to achieve habitat thresholds under the three alternatives. For reference, DNR also provides the HCP estimate of when this landscape would achieve thresholds.

**Table A-9. Estimated Decades for Reaching Habitat Thresholds, Sekiu Landscape**

| Current acres of Young Forest Habitat         | Decade(s) to achieve 40% Young Forest Habitat and better threshold |              |    |    | Current acres of Old Forest Habitat       | Decade(s) to achieve 20% Old Forest Habitat threshold |              |    |    |
|---|--|--------------|----|----|---|---|--------------|----|----|
|   | HCP  | Alternatives |    |    |   | HCP   | Alternatives |    |    |
|   |  | NA           | LA | PW |   |   | NA           | LA | PW |
| 1,424 (14% of state trust lands in landscape) | 1  | 4            | 5  | 5  | 75 (1% of state trust lands in landscape) | 6   | 6            | 6  | 6  |

NA: No Action Alternative; LA: Landscape Alternative; PW: Pathways Alternative

## Pathways Selected

► **40 percent Young Forest Habitat and better pathway: Pathway 1**, allow model to develop its optimal solution without any candidate stands selected for active or passive management.

► **20 percent Old Forest Habitat pathway: Pathway 2**, allow model to develop its optimal solution without any candidate stands selected for active or passive management.

## ■ Sol Duc Landscape



The Sol Duc landscape includes 19,146 acres of state trust lands:

- 70 percent (13,365 acres) is operable, and
- 30 percent (5,781 acres) is deferred from harvest.

The Sol Duc landscape encompasses state trust lands in the Sol Duc River drainage north of the city of Forks and includes a few isolated parcels in the Calawah River basin. The US Forest Service manages most of the higher elevation lands in the Olympic Mountains and on the high ridges of the Crescent Formation in the eastern portion of this large landscape. Private and state trust lands are mostly in the Sol Duc and North Fork Calawah valleys.

## Habitat Projections

Table A-10 shows the decades in which this landscape is estimated to achieve habitat thresholds under the three alternatives. For reference, DNR also provides the HCP estimate of when this landscape would achieve thresholds.

**Table A-10. Estimated Decades for Reaching Habitat Thresholds, Sol Duc Landscape**

| Current acres of Young Forest Habitat         | Decade(s) to achieve 40% Young Forest Habitat and better threshold |    |    |    | Current acres of Old Forest Habitat        | Decade(s) to achieve 20% Old Forest Habitat threshold |    |    |    |
|---|--|----|----|----|--|---|----|----|----|
|   | HCP  | NA | LA | PW |  | HCP   | NA | LA | PW |
| 4,682 (24% of state trust lands in landscape) | 0  | 2  | 2  | 2  | 643 (3% of state trust lands in landscape) | 4   | 7  | 8  | 5  |

NA: No Action Alternative; LA: Landscape Alternative; PW: Pathways Alternative

## Pathways Selected

► **40 percent Young Forest Habitat and better pathway: Pathway 3**, select candidate stands of Young or Old Forest Habitat in operable areas for passive management.

► **20 percent Old Forest Habitat pathway: Pathway 4**, select candidate stands of Young or Old Forest Habitat in operable areas for passive management.

## ■ Willy Huel Landscape



The Willy Huel landscape includes 37,428 acres of state trust lands:

- 50 percent (18,714 acres) is operable, and
- 50 percent (18,714 acres) is deferred from harvest.

The Hoh River runs through the center of this landscape, with the prominent Willoughby, Huelsdonk, and Owl ridges paralleling it along the north and south sides. The ridges encompass the Hoh River valley that starts at 200 feet in elevation and rises to over 3,000 feet at the ridges. The Hoh Valley bottom has meandering river channels with deep soils. Large portions of this landscape have been harvested in the last 40 years, resulting in younger forest conditions. However, approximately 20 percent of the native forest remains, mostly on mid to upper ridges. The north and east sides of the landscape are bordered by Olympic National Park.

### Habitat Projections

Table A-11 shows the decades in which this landscape is estimated to achieve habitat thresholds under the three alternatives. For reference, DNR also provides the HCP estimate of when this landscape would achieve thresholds.

**Table A-11. Estimated Decades for Reaching Habitat Thresholds, Willy Huel Landscape**

| Current acres of Young Forest Habitat      | Decade(s) to achieve 40% Young Forest Habitat and better threshold |    |    |    | Current acres of Old Forest Habitat           | Decade(s) to achieve 20% Old Forest Habitat threshold |    |    |    |
|--|--|----|----|----|---|---|----|----|----|
|  | HCP  | NA | LA | PW |   | HCP   | NA | LA | PW |
| 993 (3% of state trust lands in landscape) | 1  | 9  | 6  | 5  | 7,520 (20% of state trust lands in landscape) | 0   | 0  | 0  | 0  |

NA: No Action Alternative; LA: Landscape Alternative; PW: Pathways Alternative

### Pathways Selected

► **40 percent Young Forest Habitat and better pathway: Pathway 5**, select candidate stands of non-habitat in operable areas for active management; *and* **Pathway 7**, select candidate stands of non-habitat in deferred areas for active management.

► **20 percent Old Forest Habitat pathway: Pathway 2**, allow model to develop its optimal solution without any candidate stands selected for active or passive management.

<sup>1</sup> The forest estate model DNR used to develop the DEIS, RDEIS, and FEIS.  
<sup>2</sup> The amount of time it takes to achieve the 40 percent Young Forest Habitat and better threshold.  
<sup>3</sup> The period of time between attainment of the 40 percent Young Forest Habitat and better threshold and the end of the HCP permit period (2067).  
<sup>4</sup> Young Forest Habitat is an aggregation of sub-mature habitat and young forest marginal habitat.

- <sup>5</sup> Natural resource conservation areas (NRCA) are areas set aside to protect native plants, plant communities and animals, and for use as outdoor classrooms for environmental education and scientific research. NRCAs often include significant geologic features, archaeological resources, or scenic attributes.