

Data Updates

Changes Between the DEIS and RDEIS

For the revised draft environmental impact statement (RDEIS), the Washington State Department of Natural Resources (DNR) and United States Fish and Wildlife Service (USFWS) incorporated newly available data and made other updates based on comments received and its own review of the data. Some of these updates changed acreage totals that had been presented in the draft EIS (DEIS) published in 2016. Following is a brief summary of these updates; refer to Appendix O of the RDEIS for more information.

- Inclusion of old-growth forests in long-term forest cover. These areas had been unintentionally omitted from long-term forest cover for the DEIS.
- Updates to some P-stage transitions which were found to be happening too early (a P-stage transition is the relative stand age at which forest stands transition from one P-stage category to another). The change in P-stage transitions affected not only the current amount of habitat, but also the amount of high-quality habitat that is projected to develop by the end of the analysis period.
- Updates to murrelet habitat GIS data to reflect recent and historic harvests.
- Updates to long-term forest cover as a result of data reviews with operational staff from each of DNR's regions.
- In Alternative G only, inclusion in long-term forest cover of an additional 1,504 acres¹ identified by USFWS and the Washington Department of Fish and Wildlife (WDFW) as having suitable murrelet nesting characteristics (in other words, large trees with suitable platforms).
- Updates to the total acres of DNR-managed lands. The total was adjusted to account for recent land acquisitions and updated land survey data.
- Adjustments of some occupied sites in the North Puget HCP planning unit per direction in a concurrence letter from U.S. Fish and Wildlife Service and addition of one new occupied site (refer to Appendix I for concurrence letters).

¹ The original total from USFWS and WDFW was 1,540 acres. DNR excluded 36 acres that were non-forested or not DNR-managed land.

In addition, DNR claimed mitigation credit for land that had been sold, reconveyed, or transferred to other entities who agreed to maintain the commitments of the 1997 HCP when managing these lands. Mitigation credit was discounted for factors such as edge.

Changes Between the RDEIS and FEIS

For the final environmental impact statement (FEIS), both data and methods of computing mitigation and impacts were updated per comments received. The following is a description of these changes and how they affect acreage totals.

Forest Inventory Data and P-stage

Forest Stands Without Inventory Data

DNR's forest resource inventory system (FRIS) is used to track the changing condition of forests on DNR-managed lands. The FRIS system is based on data that is collected from field sampling plots and summarized at a forest stand scale.

For the long-term conservation strategy, DNR used FRIS data to estimate P-stage values for DNR-managed lands in the analysis area. However, for the DEIS and RDEIS, DNR did not have forest inventory data for certain forest stands. For those stands, DNR estimated P-stage values using the best available information, such as gradient nearest neighbor (GNN) data.

DNR has recently developed a new inventory system called remote sensing FRIS (RS-FRIS). This system is based on high-resolution data that is collected through remote sensing and field sampling plots and summarized at the scale of forest stands and individual rasters of approximately 1/10 acre. RS-FRIS enables DNR to generate up-to-date, detailed data such as tree height, stand density, basal area, and volume for forests across large areas.

DNR continues to use FRIS data to estimate P-stage values for most forest stands in the analysis area. For the FEIS, DNR is now using the more detailed RS-FRIS data to estimate P-stage values for those stands lacking inventory data.

Substituting RS-FRIS for FRIS data changed the P-stage values of some forest stands, which in turn affected the total number of acres of murrelet habitat in the analysis area. Specifically, this data update decreased the number of raw (unadjusted) acres of murrelet habitat in the analysis area by 4,060 acres.

Habitat Identified by USFWS and WDFW

As noted under "Changes Between the DEIS and RDEIS," 1,504 acres were added to long-term forest cover under Alternative G. For the FEIS, all of these acres were assigned a P-stage value so they would be included in the analytical framework for all alternatives. Once assigned a P-stage value, these acres were treated like all other murrelet habitat in the computation of impacts and mitigation.

These 1,504 acres were assigned a P-stage value of 0.36 and the development path of a 100-year-old western hemlock stand (Table O-1) for the following reasons:

- The P-stage value is based on the average P-stage value of all habitat identified by the P-stage model, which is 0.402.²
- In the P-stage model, habitat with a P-stage value of 0.36 is estimated to be between 90 and 109 years old. Because the average P-stage value of habitat on these 1,504 acres (0.402) is slightly higher than the model’s categorical value of 0.36, habitat on these acres is estimated to be 100 years old.
- Many of these acres are located in areas dominated by western hemlock.

Figure O-1. Stand delineation errors

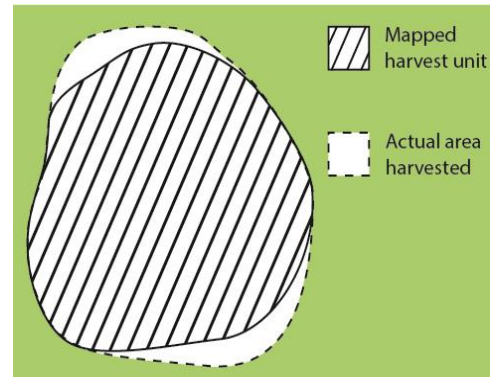


Table O-1. P-stage Developmental Pathway of a 100-year-old Western Hemlock Stand

Decade	P-stage
0	0.36
1	0.47
2	0.47
3	0.62
4	0.62
5	0.62

This data update increased the number of raw acres of murrelet habitat in the analysis area by 662. The remaining 842 acres were already assigned a P-stage value and therefore already considered habitat.

Updates to Stand Delineations

As part of the data update process, DNR compared FRIS data to the more detailed RS-FRIS data to determine if forest stand delineations were accurate. In this process, DNR found that in some cases, small areas identified as mature habitat were actually part of harvest units. These mapping errors likely occurred when harvest units were entered into DNR’s GIS system and were most common with harvest units were over 10 years old, due to the limitations of technology at the time (Figure O-1).

DNR used a two-step process to address this issue. First, DNR screened small areas of habitat across the analysis area to identify forest stands that were less than 50 feet tall and had a quadratic mean diameter of less than 11 inches. Second, DNR manually compared these areas to orthophotos. This two-step process enabled DNR to identify areas that were likely part of harvest units. P-stage values were removed from these areas. This data update decreased the number of raw acres of murrelet habitat in the analysis area by 1,184 acres.

² P-stage is a categorical model. The value of 0.402 is closest to the category of 0.36.

Acreage Totals

Combined, these three data updates (forest stands without inventory, habitat identified by WDFW and USFWS, and updates to stand delineations), resulted in a net decrease of 4,590 raw acres of murrelet habitat in the analysis area. Thus the total number of raw acres of murrelet habitat within the analysis areas fell from 211,649 to 207,067 acres for all alternatives.

Impact and Mitigation Computation and Alternative H Adjustments

The purpose of a habitat conservation plan (HCP) is to describe the potential impacts (take) on a species from permitted activities and to describe how these impacts will be mitigated³. The USFWS HCP handbook describes conceptual approaches on how to calculate impact (take) and mitigation.

The analytical framework developed as part of this FEIS is used to calculate potential impacts and mitigation and includes an assumption that the harvest of habitat outside long-term forest cover (impacts) will be offset by habitat gains within long-term forest cover (mitigation). Each acre of habitat gained has a different value as habitat depending on its P-stage value, location relative to forest edges, distance from other habitat areas, and the decade in which it develops into habitat or increases in P-stage value. The analytical framework discounts the value of mitigation based on these factors. (Refer to Appendix H for more information on the analytical framework.)

When mitigation was computed for the RDEIS, the discount for distance from edge was mistakenly applied twice during the computation process. For the FEIS, this error was corrected so the discount is only applied once. This correction increased the acres of mitigation for all alternatives (Table O-2).

In response to comments received on the RDEIS, DNR and USFWS reviewed the impact (take) calculations. After their review, DNR and USFWS agreed to apply edge discounts to harvest of P-stage slivers⁴ located outside long-term forest cover. (Prior to this change, edge discounts were not applied to any areas of habitat outside long-term forest cover.) This change reduced the acres of impacts for all alternatives (Table O-2).

Table O-2 shows the number of acres of mitigation and impacts for each alternative after the data updates described in the previous section were completed, the error in mitigation computation was corrected, and the method for computing impacts was changed. The acres of mitigation and impacts from the RDEIS are shown for comparison. All acres were adjusted for quality, time, and edge effects.

³ Refer to the USFWS HCP handbook at https://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf

⁴ P-stage slivers are areas of murrelet habitat that are less than 656 feet (200 meters) wide. Because of their size and shape, P-stage slivers have no interior forest.

Table O-2. Revised, Adjusted Acres of Mitigation and Impacts for Each Alternative, as Compared to RDEIS

Alternative	RDEIS Mitigation Acres	RDEIS impact Acres	RDEIS Mitigation minus impact	Revised Mitigation Acres	Revised Impact Acres	Revised Mitigation minus impact
Alt. A	11,831	11,342	488	12,793	10,029	2,764
Alt. B	8,297	14,620	-6,325	8,981	13,310	-4,329
Alt. C	12,371	8,935	3,339	12,998	8,028	4,971
Alt. D	11,778	12,426	-651	12,412	11,192	1,220
Alt. E	12,758	8,643	4,116	13,469	7,742	5,727
Alt. F	19,842	7,115	12,726	21,253	6,047	15,205
Alt. G	14,911	6,284	8,626	15,890	5,509	10,038
Alt. H	12,070	11,335	735	12,743	10,119	2,624

As shown in Table O-2, the deficit between mitigation and impacts for Alternative H, the Joint Agencies' preferred alternative, increased from 735 to 2,624 adjusted acres as a result of the updates and changes described in this appendix. This increase led to a change in conservation areas under Alternative H.

Alternative H was developed to meet the principals specified by the Board of Natural Resources (board). The board's direction to DNR was to minimize impacts to murrelets, offset impacts, address uncertainty, and reduce disproportionate financial impacts to trust beneficiaries. Part of this direction was to ensure that mitigation exceeded impacts by no more than approximately 500 to 700 adjusted acres to account for uncertainties, including natural disturbances (refer to Appendix T for more information).

To reduce the deficit between mitigation and impacts, the size of special habitat areas was reduced. Specifically, nine special habitat areas were eliminated and eight special habitat areas were reduced in size. In selecting special habitat areas to eliminate or reduce, the following principals were followed to the greatest extent possible:

- Support the distribution of marbled murrelets in the analysis area by maintaining special habitat areas in all three strategic locations (North Puget, Olympic Experimental State Forest and Straits [west of the Elwha River], and Southwest Washington).
- Ensure mitigation exceeds impacts in each strategic location or, if that was not possible, reduce the deficit.
- Maintain special habitat areas that include occupied sites and existing high- and low-quality habitat.

- Base boundaries on operational breaks that are identifiable on the ground to minimize risk that land management operations will impact special habitat areas, unless doing so would exclude a portion of an occupied site or buffer.

Once this step was complete, mitigation and impacts balances were as follows:

- 11,898 adjusted acres of mitigation
- 11,089 adjusted acres of impacts

The difference between the two is 809 adjusted acres, which is closer to the board’s direction of 500 to 700 acres. These changes also reduced the raw acres of long-term forest cover from 610,000 to 604,000 acres.

Number of Occupied Sites

Occupied sites are represented in DNR’s GIS database as polygons. When DNR completed the RDEIS, many of these occupied site polygons were contiguous. Reasons vary. For example, some areas were divided into sections for field surveys and those found to be occupied were entered into the database as separate polygons, even if they shared a boundary. In other cases, a single occupied site was entered as two polygons because it crossed an administrative or watershed boundary. Multiple, contiguous polygons make it difficult for DNR to consistently report the total number of occupied sites on DNR-managed land, because DNR must determine if contiguous polygons represented several occupied sites or one.

To ensure consistency for monitoring and reporting purposes moving forward, DNR has developed a method for dissolving (combining) contiguous occupied site polygons into a single polygon in DNR’s GIS database. Each of these dissolved polygons is counted as one site. This method is reliable, objective, and repeatable and does not affect the total number of acres of occupied sites that DNR will protect.

Per this method, DNR currently protects 397 occupied sites under the current interim strategy. DNR will protect 388 occupied sites under alternatives B through H.

The acres of occupied sites have not changed since the RDEIS was published: 42,975 acres of occupied sites will be protected under Alternative A and 59,331 acres will be protected under alternatives B through H⁵. There are fewer occupied sites under alternatives B through H because these sites tend to be larger and more contiguous, meaning more of them were dissolved into single polygons. Refer to Appendix D for more information on occupied sites.

Literature Cited

Falxa, Gary A. and M.G. Raphael, tech. coords. 2016. Northwest forest plan—the first 20 years (1994–2013): status and trend of marbled murrelet populations and nesting habitat. Gen. Tech. Rep. PNW-GTR-

⁵ Includes approximately 16,000 acres of occupied sites identified by the Science Team.

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