

Analytical Framework Focus Paper



The Analytical Framework

Focus Paper #1

This focus paper was part of a series presented to the Board of Natural Resources in October and November 2015 to inform development of the marbled murrelet long-term conservation strategy alternatives. The purpose of this paper is to describe the framework of assumptions agreed to by DNR and USFWS to guide the development and evaluation of the long-term conservation strategy.

■ What Is the Analytical Framework?

The analytical framework is a methodology agreed upon by the Department of Natural Resources (DNR) and the U.S. Fish and Wildlife Service (USFWS), also referred to as the “Joint Agencies,” to provide objective, repeatable, science-based estimates of potential impacts and mitigation to marbled murrelet habitat from DNR’s land management activities under the *State Trust Lands Habitat Conservation Plan* (1997 HCP). The analytical framework provides the means to assess how DNR’s mitigation measures cover potential impacts. This quantification will enable the Joint Agencies to evaluate whether a proposed marbled murrelet long-term conservation strategy (long-term conservation strategy) meets the issuance criteria for the incidental take permit.

The analytical framework is based on a principal hypothesis of murrelet conservation biology: that the quantity and quality of nesting habitat affects the murrelet population.¹ The interaction of habitat quantity and quality determines the overall number of nesting opportunities, and proximity to forest edges² reduces nest success (USFWS 1997). This framework is based on current marbled murrelet science, and makes use of detailed landscape data applicable to DNR-managed lands. The analytical framework provides a means to derive objective answers to questions that the Joint Agencies began asking when discussing the specifics of forming a long-term conservation strategy. These questions included the following:

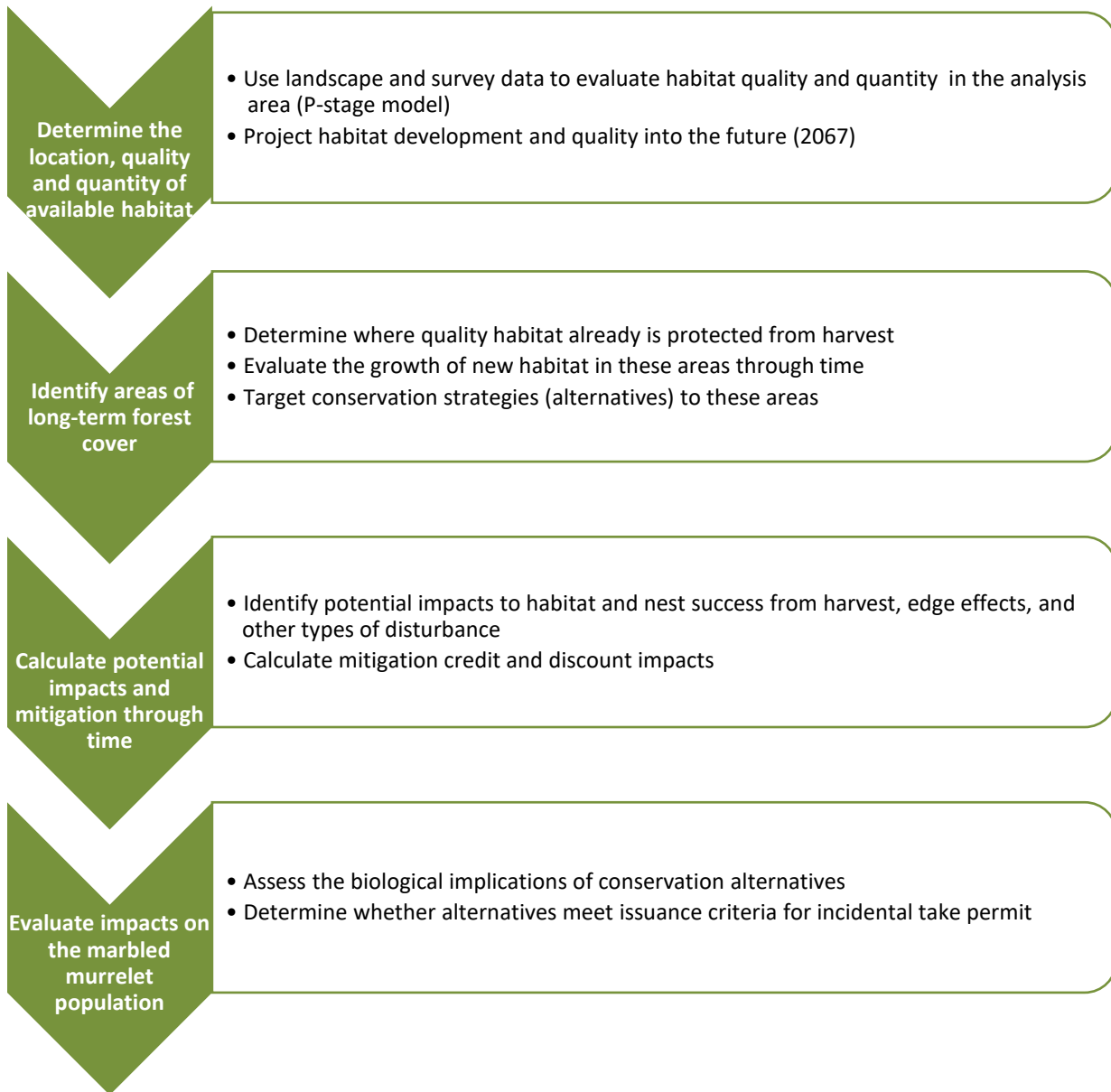
- How is habitat distinguished from non-habitat?
- How does stand structure and composition affect habitat quality?
- How do forest edges created by timber harvest and forest roads influence habitat quality?
- How does habitat quality influence its value to murrelets?
- How can impacts to habitat be quantified?
- How much habitat conservation meets the requirements of an HCP?

The analytical framework also includes an approach to evaluating impacts on the population of marbled murrelets under different conservation alternatives (a “biological implications” analysis). Figure 1 illustrates the key pieces of the framework.

¹ Refer to “Report on Marbled Murrelet Recovery Implementation Team Meeting and Stakeholder Workshop,” April 2012, USFWS.

² A “forest edge” is an abrupt transition between two populations of trees, where the characteristics of the forest on one side are different from the other.

Figure 1. Key Pieces of the Analytical Framework



■ What Is the Analysis Area for the Analytical Framework?

The analysis area for the analytical framework is all DNR-managed lands within 55-miles of all marine waters in western Washington. This 55-mile line is the same as was used in Northwest Forest Plan (USDA and USDI 1994), and is used by USFWS as an estimate of the inland range of the marbled murrelet in Washington.

The total land covered by the analysis area is approximately 16 million acres. DNR manages 9 percent of this land, or approximately 1.38 million acres. Habitat conservation in the analysis area is organized based on two categories of landscapes: high-value landscapes and marginal landscapes. High-value landscapes are further subdivided into strategic locations (Southwest Washington, North Puget, OESF and Straits (west of the Elwha River) and other high-value landscapes. (Refer to Figure 2.) Other lands within the analysis area are owned and managed by private industries, municipalities, organizations and individuals, and federal agencies. Table 1 includes a breakdown of ownership within the analysis area.

Not all of the lands owned and managed by DNR within the analysis area are marbled murrelet habitat. A key component of the analytical framework is defining what constitutes marbled murrelet habitat on DNR-managed lands so that conservation strategies, impacts, and mitigation can be evaluated.

Figure 2. Analysis Area for the Analytical Framework

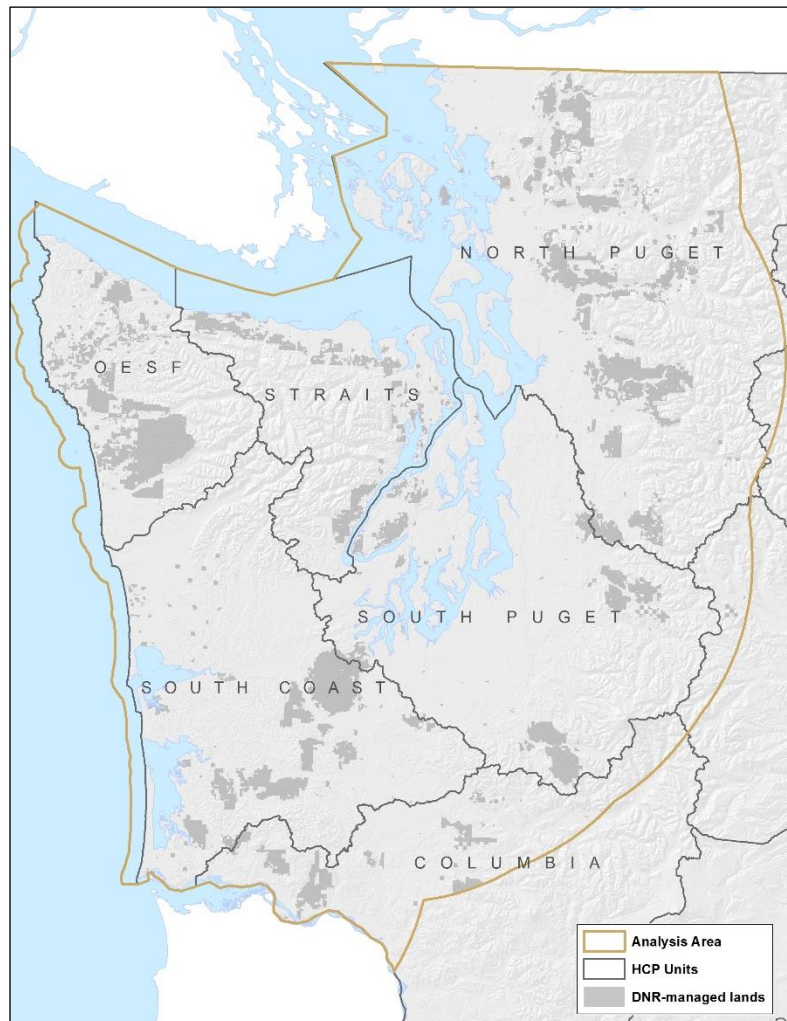


Table 1. Land Ownership within Analysis Area

Land within 55 miles of saltwater	Acres	
Total land regardless of ownership	16,060,000	
	Acres	Percent
US Forest Service, USFWS, National Park Service land	4,170,000	26%
DNR-managed land	1,380,000	9%
Private and other	10,510,000	65%

■ How Is Habitat Defined in the Analytical Framework?

In order to quantify potential mitigation and impacts, the Joint Agencies need to determine where habitat exists today and into the future on DNR-managed lands within the analysis area. The approach to assessing potential marbled murrelet habitat was developed after construction of a probabilistic model to estimate nesting habitat using survey data, and development of an expert-driven classification of this probabilistic model to give it greater geographical applicability.

This classification model, known as “P-stage,” was created and peer-reviewed as part of the Science Team Report (Raphael and others 2008), and was refined for use in the long-term conservation strategy. By using this model, the Joint Agencies can:

- Project habitat development into the future, allowing an estimate of how much habitat will grow during the remainder of the 1997 HCP;
- Identify habitat and classify its quality at the stand level;
- Use information compatible with DNR’s forest inventory data; and
- Apply the same habitat model across all DNR-managed lands in the analysis area.

Appendix E, “P-stage Focus Paper,” details the P-stage methodology and how it compares to other habitat models.

■ What Are Areas of Long-Term Forest Cover?

The analysis area includes lands already protected by the 1997 HCP or other state laws and policies that guide the management of forest lands. Areas of long-term forest cover (LTFC) include lands on which DNR maintains and grows forest cover for conservation purposes, including habitat conservation for the marbled murrelet. These areas potentially provide marbled murrelet nesting habitat and support their conservation. The location, size, and quality of these areas will vary among the conservation alternatives being developed. Appendix G, “Long-term Conservation Strategy Focus Paper,” includes a detailed description of what lands are included in LTFC.

■ How Are Potential Impacts Defined in the Analytical Framework?

Based on an assessment of activities that are permitted under the 1997 HCP, the Joint Agencies identified three categories of potential impacts: **harvest impacts**, **edge-influenced impacts**, and **disturbance impacts**. These three types of impacts are briefly described in this section; for additional detail on how each type quantifies potential impacts, refer to Appendix H, “Potential Impacts and Mitigation Focus Paper.”

What Are Harvest Impacts?

Harvest impacts result in the removal of potential marbled murrelet habitat (acres with P-stage value) through harvest activities. Harvest mostly occurs in areas outside of LTFC (some thinning may be allowed within LTFC for purposes of improving forested habitat over time). New road construction associated with harvest is another impact. The impacts of harvest on the marbled murrelet include possible loss of habitat and loss of potential future reproduction.

What Are Edge-influenced Impacts?

Edge-influenced impacts are associated with the forest edge left after harvest activities. Roads also create edges. Edge effects include microclimate changes, increased predation, and increased windthrow. Each of these effects can have a detrimental impact on marbled murrelet nesting success.

What Are Disturbance Impacts?

Disturbance impacts are impacts on murrelets that may occur from actions that generate loud noises and activity in close proximity to nesting murrelets. These types of disturbances can result in a potential disruption of murrelet breeding and nesting behaviors.

The Joint Agencies identified 36 DNR activities that may cause disturbance. Examples are:

- Recreational site use
- Sand and gravel sales
- Electronic site maintenance
- Road use and maintenance
- Collection of western greens, Christmas greens, and mushrooms.

A step-by-step description of how disturbance impacts are evaluated is included in Appendix H, “Potential Impacts and Mitigation Focus Paper.”

■ How Is Mitigation Defined in the Analytical Framework?

To quantify mitigation, the Joint Agencies examine how many acres of LTFC have a P-stage habitat value today and at the end of the 1997 HCP in 2067. Habitat values are adjusted based on time, edge effects, and other factors including geographic location. DNR's mitigation credit is calculated by subtracting current habitat from the future habitat in order to assign mitigation credit to total growth of habitat over the life of the 1997 HCP.

The alternatives feature different levels of conservation area acreage; this variation will accordingly alter the amount of mitigation credit and the potential impacts. A description of how mitigation credit is calculated is included in Appendix H, "Potential Impacts and Mitigation Focus Paper."

■ How Does the Analytical Framework Relate to the Development and Analysis of Conservation Alternatives?

Development of the long-term conservation strategy includes an analysis of different alternatives for managing habitat on DNR-managed lands. Eight alternatives are analyzed in this final environmental impact statement (FEIS). The alternatives represent a range of possible habitat conservation approaches for the marbled murrelet.

The analytical framework provides the common playing field for analyzing and comparing these alternatives. For example, although management approaches and amounts of habitat set aside for conservation may differ among alternatives, the same methodology to evaluate their potential impacts will be applied across all alternatives.

Evaluating Population Impacts

DNR provided the habitat data used in the development of alternatives to Drs. Zach Peery and Gavin Jones of the University of Wisconsin to evaluate the biological implications of different conservation approaches. They modeled relative impacts to the population (both regionally and on DNR-managed lands) from each alternative. This information was used as part of the environmental impact statement work evaluating the alternatives, and may be used by USFWS for their biological opinion on the conservation strategy.

■ Literature Cited

Raphael, M. G., S. K. Nelson, P. Swedeen, M. Ostwald, K. Flotlin, S. Desimone, S. Horton, P. Harrison, D. Prenzlou Escene, and W. Jaross. 2008. Recommendations and supporting analysis of conservation opportunities for the marbled murrelet long-term conservation strategy (Science Team Report) Washington State Department of Natural Resources, Olympia, Washington.

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