Summary of Input Received During the Expert Review of the Draft Marbled Murrelet Technical Report

November 8, 2018

Introduction

The Department of Forestry (hereafter Department) and the Board of Forestry (Board) are actively engaged in a process to consider new rules for the marbled murrelet under the Forest Practices Act (FPA). Administrative rules direct the process and materials required for the Board to use when considering a threatened and endangered fish or wildlife species for possible rule-development under the FPA (OAR 629-0680-0100). As per OAR 629-0680-0100 (1)(a) and (1)(b) a technical review paper that summarizes the best available information on the species must be developed and then reviewed, including a technical review by experts chosen by the State Forester".

A Draft Technical Report (TR) on the marbled murrelet was written by Department staff to meet the requirements of a technical review paper as per OAR 629-0680-0100 (1) (a). The draft was submitted to the Board in April, 2018 (Attachment 2). During the meeting, the Department described the planned process to establish a team of professionals to conduct the expert review. The intent was to establish a slate of experts from a spectrum of backgrounds, including individuals from academia and/or research, private forest landowners, public forest landowners, conservation communities, and tribal governments. The Board directed the Department to initiate the expert review of the TR.

In May of 2018, the Department solicited participation and established a group of six individuals to conduct the expert review of the Department's Draft Marbled Murrelet Technical Report. Participants included 1) Marty Raphael, PhD, Emeritus Senior Scientist with the US Forest Service Pacific Northwest Research Station; 2) Jason Robison, Natural Resource Director of the Cow Creek Band of Umpqua Tribe of Indians; 3) Michael Rochelle, Wildlife Biologist with Weyerhaeuser Company; 4) Bob Sallinger, Conservation Director of the Audubon Society of Portland; 5) Jake Verschuyl, Biodiversity Research Coordinator, National Council for Air and Stream Improvement (NCASI); and 6) Tim Vredenburg, managing partner of Northwest Resource Solutions, LLC – contracted by the Association of Oregon Counties to conduct review. Numbers above for each reviewer are used throughout this document (e.g., input from Marty Raphael is noted as Reviewer # 1) when summarizing input.

The Department developed a project charter to establish the framework for the expert review (Attachment 3). The charter describes the context and background of the project as well as the purpose, desired outcome, and goal of the expert review, including the type of input "in scope" versus "out of scope". The Department's intent is to only use feedback considered "in scope" to revise the TR.

The Department held a web meeting with the expert reviewers to discuss the background for the rule analysis, the content of the TR, the expert review project charter, and to answer any questions. All reviews were received by August 20.

This report contains a summary of the input received from the expert reviewers. The major areas of input are summarized below by five major themes: 1) identification of missing citations or recommendations for citations to incorporate into the TR, 2) topics or themes missing from the TR, 3) areas where scientific information was misinterpreted or where additional clarity is needed, 4) the scientific merit of the policy options presented, and 5) areas where feedback conflicted between two or more reviewers.

In addition to the above major themes, most of the reviewers also recommended edits to wording, grammar, or minor edits to content. The Department expects to be able to incorporate most of the

minor edits into the final TR. Minor recommendations are not summarized here, but can be viewed in Attachment 4 which includes the review documents received from the expert review panel members.

The Department's response and planned action for revising the TR to respond to reviewers' comments are included in the summary of comments.

Major Themes for Input of the Expert Reviews

Missing Publications

Expert reviewers recommended adding 33 citations (Table 1) to the TR. Six of the recommended publications were already used, but recommended to also be cited in additional sections of the TR (noted with an * in Table 1) and two were new publications released after completion of the TR: the 2017 marbled murrelet effectiveness population monitoring report (Pearson et al. 2018) and the USFS Science Synthesis for the Northwest Forest Plan, which included a chapter on marbled murrelets (Raphael et al. 2018). Multiple reviewers also recommended instead of citing review documents (e.g., ODFW 2018, Plissner et al. 2015, etc.), the source publications should be cited.

Table 1: List of publications recommended to be added to the Marbled Murrelet Technical Report.

Citation	Report Section	Reviewer (#)
Barbaree, B.A., S.K. Nelson, B.D. Dugger, D.D. Roby, H.R. Carter, D.L. Whitworth, and S.H. Newman. 2014. Nesting ecology of marbled murrelets at a remote mainland fjord in southeast Alaska. Condor 116: 173-184.	Life History	4
Becker, B.H. and S.R. Beissinger. 2006. Centennial decline in the trophic level of an endangered seabird after fisheries decline. Conservation Biology 20: 470-479.	Life history	1
Burger and Page. 2007. The need for biological realism in habitat modeling a reinterpretation of Zharikov et al. 2006. Landscape Ecology 22(9): 1273-1281.	Landscape pattern: nest success	1, 4
Chen, J., J.F. Franklin, and T.A. Spies. 1993. Contrasting microclimates among clearcut, edge, and interior of old-growth Douglas-fir forest. Agricultural and Forest Meteorology 63: 219-237.	Forest practices conflicts	4
Chen, J., J.F. Franklin, and T.A. Spies. 1995. Growing-season microclimate gradients from clearcut edge into old-growth Douglas-fir forests. Ecological Applications 5: 74-86.	Forest practices conflicts	4
Chen, J., S.C. Saunders, T.R. Crow, R.J. Naiman, K.D. Brosofske, G.D. Mroz, B.L. Brookshire, and J.F. Franklin. 1999. Microclimate in forest ecosystem and landscape ecology. Bioscience 49: 288-297.	Forest Practices Conflicts	4
Cooper, B., M.G. Raphael, and D.E. Mack. 2001. Radar-based monitoring of marbled murrelets. The Condor 103: 219-229.	Life History	1

Citation	Report Section	Reviewer (#)
Davis, R.J., J. Ohmann, R.E. Kennedy, W.B. Cohen, M.J. Gregory, Z. Yang, H.M. Roberts, A.N. Gray, T.A. Spies. 2015. Northwest Forest Plan—the first 20 years (1994-2013): status and trends of late successional and old-growth forests. Gen. Tech. Rep. PNW-GTR-911. USDA Forest Service, PNW Research Station. 112 pp.	Population status and trends: marbled murrelet habitat	5
E. Nonaka and T.A. Spies. 2005. Historical range of variability in landscape structure: a simulation study in Oregon, USA. Ecological Applications 15: 1727-1746.	Nesting habitat: (and other references to stand age throughout)	2
Herbert, P.N. and R.T. Golightly. 2006. Movements, nesting, and response to anthropogenic disturbance of marbled murrelets (*Brachyramphus marmoratus*) in Redwood National and State Parks, California. Unpublished report, Arcata, CA. Prepared for California Department of Fish and Game.	Nest success	4
Herbert, P.N. and R.T. Golightly. 2007. Observations of predation by corvids at a marbled murrelet nest. Journal of Field Ornithology 78: 221-224.	Nest success	4
Lorenz, T.J., M.G. Raphael, and T. Bloxton. 2016. Marine habitat selection by marbled murrelets (*Brachyramphus marmoratus*) during the breeding season. PLoS One 11(9): 1-19.	Landscape pattern: off-shore distribution	1
Luginbuhl, J.M., J.M. Marzluff, J.E. Bradley, M.G. Raphael, and D.E. Varland. 2001. Corvid survey techniques and the relationship between corvid relative abundance and nest predation. Journal of Field Ornithology 72: 556-572.	Nest success; Forest practices conflicts	4
Manly, I.A. 1999. Behavior and habitat selection of marbled murrelets nesting on the Sunshine Coast. M.Sc. Thesis, Simon Fraser University, Burnaby, B.C., 178 pp.	Landscape pattern: habitat use; nest success	2
Marzluff, J.M. and E. Netherlin. 2006. Corvid responses to human settlements and campgrounds: causes, consequences, and challenges for conservation. Biological Conservation 130: 301-314.	Nest success; forest practices conflicts	4
*Marzluff et al. 1999	Forest practices conflicts	4
*McShane et al. 2004 (specifically population viability modeling information)	Population status and trends; nest success	4
McWethy, D.B., A.J. Hansen, and J.P. Verschuyl. 2009. Edge effects vary with forest productivity. Forest Ecology and Management 257: 665-678.	Forest practices conflicts	5
*Nelson 1997	Landscape pattern: habitat use; nest success	2
*ODFW 2018 (specifically historical population information and to add details regarding how “edge” was defined)	Population status and trends; nesting habitat characteristics/ nest location	1, 4

Citation	Report Section	Reviewer (#)
Oregon Fish and Wildlife Commission, Minutes from June 7, 2018 meeting in Baker City.	Listing status	2, 3, 5
Pearson, S.F., B. McIver, D. Lynch, J. Baldwin, M.M. Lance, M. G. Raphael, C. Strong, R. Young, T. Lorenz, and S.K. Nelson. 2018. Marbled murrelet effectiveness monitoring, Northwest Forest plan: 2017 summary report. 19 pp.	Population status and trends	1, 3, 4
Prisley, S. and J. Verschuyl. 2018. NCASI technical analysis of recent trends in forest growth and harvest within 50 miles of the Pacific Ocean. Letter to Oregon Department of Fish and Wildlife, February 1, 2018.	Population status and trends: marbled murrelet habitat	3, 5
*Raphael et al. 2002 (Studies in Avian Biology)	Forest practices conflicts	4
Raphael, M.G., D.E. Mack, and B.A. Cooper. 2002. Landscape-scale relationships between abundance of marbled murrelets and distribution of nesting habitat. Condor 104: 331-342.	Landscape pattern: landscape condition and off-shore distribution of murrelets (identified in follow-up e-mail with reviewer)	1
*Raphael et al. 2016	Landscape pattern: habitat use; nest success	1
Raphael, M.G., G.A. Falxa, and A.E. Burger. 2018. Chapter 5 – Marbled murrelet. Pages 301-350 ***In***: Spies, T.A., Stine, P., Gravenmier, R., Long, J.W., and Reilly, M. Tech. Coords. Synthesis of science to inform land management within the Northwest Forest Plan area (Vol. 1). Gen. Tech. Rep. PNW-GTR-966. Portland, OR, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 370 pp.	Population status and trends (habitat trends); landscape pattern	1, 4
Raphael, M.G., G.A. Falxa, K.M. Dugger, B.M. Galleher, D. Lynch, S.L. Miller, S.K. Nelson, and R.D. Young. 2011. Northwest Forest Plan – the first 15 years (1994-2008): status and trend of nesting habitat for the marbled murrelet. Gen. Tech. Rep. PNW-GTR-848. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 52 pp.	Life history	1
Ripple, W.J., S.K. Nelson, and E.K. Glenn. 2003. Forest landscape patterns around marbled murrelet nest sites in the Oregon Coast Range. Northwest Naturalist 84: 80-89.	Landscape pattern	4
Rivers, J. Marbled Murrelet Project preliminary results, OSU Study; new 2018 nest data to date.	Nesting habitat characteristics	3, 5
Ryder et al. 2012. Earliest well-described nest of the marbled murrelet: Elk Creek, British Columbia. Wildlife Afield 9(1): 49-58.	Life history	4
Tappeiner, J.C., D. Huffman, D. Marshall, T.A. Spies, and J.D. Bailey. 1997. Density, ages, and growth rates in old-growth and	Nesting habitat: nest tree (and other	2

Citation	Report Section	Reviewer (#)
young-growth forests in coastal Oregon. Canadian Journal of Forest Research 27: 638-648.	references to stand age)	
*Zharikov et al. 2006	Landscape pattern: habitat use; nest success	2

ODF Response

The Department anticipates most, if not all of the recommended citations will be added to the final TR. One exception may be the recommendation to include information from the ongoing OSU Marbled Murrelet research project. We will seek permission to include statistics for the newly discovered marbled murrelet nests from the 2018 field season, however it is not clear if permission will be granted as this work has not yet been published and to our knowledge, no progress reports are available.

Missing Topics

Expert reviewers were asked to identify topics or subject areas not addressed in the report that should be included in the TR. Many reviewers recommended added content to the TR. All of the additions are related to existing topics already in the TR, relate to materials already presented to the Board or are considered out of scope. No major topics were identified as missing from the TR that met the "in scope," criteria as per the expert review charter document (Attachment 3).

The following topics were recommended (Table 2) and are considered in-scope.

Table 2: Recommended topics to be addressed in the TR.

Page	Report Section	Topic recommended to be added	Reviewer(#)
11	Listing Status	Need to assess implications of survival guidelines adopted by the ODFW Fish and Wildlife Commission	4
27	Forest Practices Conflicts	Include risk of blowdown due to adjacent clearcut harvests as a potential conflict	4
n/a	Introduction	Inadequacy of current protection for marbled murrelets should be discussed	4
29	Prescriptive approaches to protection	Reviewer indicates the key components should be addressed and identified in the TR	4

The above topics will be addressed in the final TR. The topic of current protection (termed regulatory inadequacy by the reviewer) for marbled murrelets was included in the report presented to the Board in March, 2017 (Marbled Murrelet Specified Resource Sites: a Progress Report to the Board of Forestry). However, the Department agrees the topic of current protection under the FPA should be added to the final TR. Blowdown is already noted as a contributing factor that may pose a conflict in the existing TR. Language will be added to further describe how blowdown due to the creation of a hard edge may pose a conflict. The advisory survival guidelines for marbled murrelets recently passed by the Oregon Fish

and Wildlife Commission (OAR 635-100-0137) will be noted in the revised TR. Key components will be generally discussed in the final TR. The details needed to define specific key components will likely vary depending on the definition of the resource site and will be determined at a later phase of the project.

Additional topics were identified by reviewers, but are out of scope for the TR. These include areas of new research, monitoring, or modeling that are recommended as well as policy topics which may be taken up later by the Board during future discussions.

The TR relies on existing research and readily available information, thus new research is out of scope for this particular report. Review comments in this category include:

- Habitat modeling: additional work should be done to model habitat in Oregon, taking into account areas/watersheds of high use based on current survey data (reviewer 2)
- Habitat modeling: additional work should be done to look at trends in recruitment and loss of potential habitat using available USFS FIA data (reviewers 3 & 5)
- New research is needed to look at predation pressures and edge effects over time—does nest depredation lessen as the adjacent, harvested stands grow (reviewer 2).
    - *One study exists that looked at predation rates of artificial nests (designed to mimic murrelet nests) in relation to the age of the adjacent regenerating stand. This study will be added to the TR.* The topic has not yet been studied using actual murrelet nests.
- New research on the relationship between nest success and ocean conditions (reviewer 2). This was identified as a missing topic, but is noted here as to our knowledge, this topic has not yet been studied.

In addition, other recommended topics represent policy issues. These policy issues are most appropriate to be addressed by the Board of Forestry during a later phase of this project. They are listed below, but will not be added to the TR.

- Relative contribution of federal versus non-federal lands to providing habitat, from this point forward. Will additional protections off federal lands significantly change population trends? Also need to look at a tiered protection strategy, with federal lands being considered first for species protection, followed by state lands (reviewers 2 and 6).
- Tribal/ Indian lands should be considered differently under any administrative process and omitted from protection strategies (reviewer 2).
    - *The Department recognizes Oregon's nine federally recognized Tribes have sovereign rights unique to other Oregonians. The Department seeks to partnership with Tribes on services ODF provides that support their forest management objectives. The Department encourages all forest landowners to take voluntary measures to help make Oregon's forest resources sustainable.*

Misinterpretation of Scientific Information/ Additional Clarity Needed

Expert reviewers were asked to identify areas where scientific information was not accurately interpreted or used in the TR. In addition to identifying areas of possible misinterpretation of the science, most reviewers also noted areas where clarity or additional information is needed in the TR. Comments received are shown in Table 3, along with the Department's response to individual comments.

Table 3: Areas identified by the reviewers that reflect possible misinterpretation of scientific information or where additional clarity is needed in the TR. *ODF response to individual comments are noted in italicized bullets.*

Page	Policy Option	Reviewer comments (summarized)	Reviewer (#)
6	Life history	Two reviewers indicated use of terminology with regards to forest age classes was too general. Reviewer 2 recommended using specific terminology for forest age classes that matches terms and age class brackets used in the forest ecology literature. Reviewer 4 indicated the use of terminology of "very old forests" incorrectly omitted the classification of mature forests [defined by reviewer as 80-200 years old] as an age class known to be used by murrelets. • *General terminology was purposely used as the literature does not indicate murrelets select habitat based on stand age or age class but rather for specific structural attributes of the trees that tend to only be present in very old forests (e.g., platform branches).* • *Will revise TR to address these comments.*	2, 4
7-8	Life history	Reviewer disagreed with the statement in the TR that murrelets only use forests for nesting and states murrelets also use forests for roosting, courtship, fledging, and investigation of nest sites. • *Department considers all of the mentioned uses, with the exception of roosting, to be associated with nesting. Thus, those uses are related to nesting and are considered behaviors associated with nesting.* • *Reviewer cites Nelson 1997 to support statement, including use of forests for roosting. The Department considers roosting to mean nighttime resting. There is no evidence in Nelson 1997 or any primary literature we are aware of to support the statement that murrelets use forests for roosting.* • *Will not add this to the TR.*	4
16	Landscape pattern: nest success	Reviewer had concerns with the section of the report on nesting and forest edges. Indicated the report conflated natural gaps with gaps created by logging and also the TR suggested murrelets had a preference for gaps created by logging. Reviewer indicated the scientific information may have been misinterpreted to overemphasize nesting near gaps. • *Literature supports the statement that murrelets have been shown to nest near gaps in the forest canopy, including*	4

Page	Policy Option	Reviewer comments (summarized)	Reviewer (#)
		natural and artificial edges between stand types. It is also documented that nest success may be reduced for birds nesting near hard edges created from logging. • *Will review this section of the TR and revise as needed to add clarity.*	
16	Habitat use and nest site selection	Reviewer suggests limiting use of the Meyer and Miller 2002 publication because it is based on detection data and not actual nests. • *It is noted in the TR that this paper is based on detection data. It is being used to describe general habitat use and not specifically nest-site selection. Was added based on earlier input that this body of research was missing.* • *Will not modify TR in response to this comment.*	6
17	Landscape pattern: nest success	Reviewer suggests Zharikov et al. (2009) needs further interpretation with regards to nest success. Specifically, recommends addressing possible competing hypotheses not included in the study that may explain patterns for observed results (e.g., differences between study areas such as local climate and available prey resources). • *Will review this publication again to ensure we did not inaccurately describe results of the research, including any caveats mentioned in the publication.* • *Will also review Burger and Page 2007 which is a published critique of Zharikov et al. (2009) and incorporate into TR as appropriate.* • *Because this research is published in a peer-reviewed journal, the Department believes it should be described as published for the TR. The work has already been through scrutiny of the peer review process.* • *Will consider adding and cite as expert reviewer input.*	5
18	Landscape pattern: nest success	Reviewer suggested this section of the TR indicates uncertainty in the effects of edge on nest success and the last paragraph in this section may be making too general of a statement on effects of edges on nest success. • *There is some uncertainty, however taking the existing research as a whole, most studies looking at this question indicate lower nesting success for nests near hard edges.* • *Will consider rewording this paragraph to be sure the uncertainty on this topic is reflected.*	3
19	Existing murrelet survey methods	Reviewer indicated the first sentence of this section did not correctly describe the purpose of the Pacific Seabird Group protocol • *Will double-check our language against the PSG protocol and revise TR as needed.*	1
19-20	Existing survey methods	Reviewer stated the PSG was misinterpreted in many places, including the scale at which to apply occupancy and disagreed with	4

Page	Policy Option	Reviewer comments (summarized)	Reviewer (#)
		our assertion that information is extrapolated when applying occupied designations from the survey site to the entire survey area. • *The 2003 PSG survey protocol includes a description of the methods of analysis to derive the required number of visits (appendix A of the protocol document). The protocol indicates occupancy is determined at Survey Station(s) through visual observation of birds exhibiting occupied behaviors. The survey methods were designed to determine presence or occupancy at the scale of the Survey Site; this is the scale the statistical analysis was conducted. At the end of the survey effort, status is established for each Survey Site. The protocol then indicates the highest status observed for any of the Survey Sites should be applied to all of the contiguous Survey Sites within the Survey Area. Thus, the status for one Site is essentially extrapolated to all other Sites with a lower final status. Although the protocol indicates occupancy should be applied throughout all contiguous habitat in the entire Survey Area, this is based on a series of assumptions and hypotheses about murrelets, not on statistical principals.* • *Will not revise TR in response to this comment.*	
21	Data Gaps	For data gaps relating to the relationship between occupied behaviors and nesting as well as long term patterns of habitat use, the reviewer points to the PSG survey protocol as a scientific document that provides information on these topics. • *On the data gap identified regarding the relationship between occupied detections and actual nesting, the point made is there are still unanswered questions on this topic. The PSG protocol provides a summary on this topic, but does not represent primary literature and does not address the specific data gaps identified.* • *On the data gap regarding long term use, the PSG protocol relies on hypotheses to make assumptions about long term use. The Department maintains additional peer-reviewed published literature is needed on this topic.*	4
21	Data Gaps	Regarding the data gap relating to nest site fidelity, the reviewer indicates existing research does not support the statement that a data gap exists for fidelity at the scale of the stand or watershed. • *The specific paragraph of concern is actually discussing a data gap regarding information on nest side fidelity of specific individuals.* • *Will revisit the Plissner et al. 2015 publication and may revise this section to strengthen the statement that the primary gap in knowledge is regarding whether or not specific individuals exhibit site fidelity.*	4

Page	Policy Option	Reviewer comments (summarized)	Reviewer (#)
22	Nest site fidelity	Reviewers indicated we incorrectly interpreted Zharikov et al. (2007) to indicate murrelets were "packing" into remaining areas in fragmented forests to nest. • *Will revise TR and remove all inference to "packing" of murrelets.* • *Will review Zharikov et al. (2007) and ensure the language used to describe the higher density of nests found in the fragmented study area reflects language used in the publication.*	1, 2, 5, 6
22	Data Gaps	Reviewer indicated the first sentence of the last paragraph reflects incorrect interpretation of information (not well understood if number of detections reflects local abundance). • *The term "local abundance" was meant to indicate number of nesting pairs in a stand or watershed and not actual population size or status.* • *Will revise TR and reword this paragraph.*	4
27	Forest Practices Conflicts	Reviewer had concern with the Van Rooyen et al. (2011) publication on forest edges and effects on microclimate and canopy epiphytes. Statements made in the publication (and used in the TR) were based on non-statistically significant results or were overstated. • *Will review the publication again and modify TR to add caveats if needed.*	5
27	Executive summary & Forest Practices Conflicts	Reviewers indicated risks of increased exposure to the elements due to creation of hard edges at clearcuts was overstated and not supported in the literature • *This topic has not been researched.* *Was included in the technical report and cited in the TR as a professional opinion. Will revise TR and remove or indicate this is an untested hypothesis.*	2, 3, 5
28	Forest practices conflicts	Reviewers indicated the section of the report that discussed possible disturbance to nesting murrelets was not based on scientific information. • *This section is not based on scientific research or published studies.* • *Relied on a literature review and guidelines published by the USFWS. This review summarizes the few publications/ reports available on this topic, all of which represent anecdotal information.* • *Because of their nature as a listed-species, doing purposeful experiments to study what/how/where activities result in a disturbance to murrelets may not be allowed without special permits from the US Fish and Wildlife Service. Thus this type of research is challenging.* • *Reviewer 2 suggested adding Herbert and Golightly 2006 for a different topic. This unpublished report contains*	2, 5

Page	Policy Option	Reviewer comments (summarized)	Reviewer (#)
		information on nestling response to human activity and chainsaw use. Will add information from this publication to TR. • *Will review TR and add language if needed to make it clear that this section is based largely on professional judgement of the USFWS staff.*	
9	Life History	Reviewer suggests Burger et al. (2009) needs further interpretation with regards to nest re-use. Specifically, recommends addressing conditions not included in the study that may explain patterns (e.g., differences between study areas such as local climate and available prey resources). • *Will review this publication to ensure we did not inaccurately describe results of the research, including any caveats mentioned in the publication.* • *Because this research is published in a peer-reviewed journal, the Department believes it should be described as published for the TR. The work has already been through scrutiny through the peer review process.* • *Will consider adding and cite as expert reviewer input.*	5

Scientific Merit of the Policy Options presented

Expert reviewers were asked to provide input on the scientific merit of the policy options presented. This included both the options for the definition of a resource site for marbled murrelets and the options to address protection of those resource sites. One or more reviewers provided input on the scientific merit, or lack thereof, for one or more of the policy options presented.

Input on scientific merits of policy options are shown Table 4, ODF additions to reviewer comment, for clarity, are indicated by brackets [ ]. In addition, many reviewers weighed in on their preferred policy option without specifically discussing the scientific merit of that option. These comments are shown in Table 5. Policy decisions will be ultimately decided upon by the Board of Forestry.

Table 4: Comments on policy options considered to be in scope as per the expert review charter.

Page	Policy Option	Reviewer comments (summarized)	Reviewer (#)
n/a	Identification of resource site and Protection options	Reviewer made general statement that additional research and analyses are needed prior to formalizing the administrative process for defining a resource site or identifying protection measures [assume this is meant to indicate there is a lack of scientific merit for any of the policy options].	6
23	Identification of resource site:	Reviewer indicates due to the challenges in locating nests, even if one or more nests are found, it is likely others will be missed.	6

Page	Policy Option	Reviewer comments (summarized)	Reviewer (#)
	option 1 (nest trees)	Reviewer also indicates because murrelets tend to nest near natural edges and because there are conflicting results in the literature regarding whether or not edges impact nest success, it is uncertain as to how a resource site (the nest) can be adequately protected or if protection is required. Reviewer points out that key components will need to be defined for this option; seems to suggest presence of potential nesting platforms as a key component.	
23-24	Identification of the Resource Site: Option 2 (occupied detections)	Reviewer indicates use of occupied detections as a proxy for nest trees could result in significant inaccuracies regarding the actual location of nesting murrelets and may result in identifying areas not actually occupied (used for nesting).	6
24	Identification of resource site	Reviewer recommends the resource site be defined as the Survey Area (based on protocol surveys) and points to the PSG protocol as providing the scientific basis for this approach. Also indicated designation of presumed occupied habitat as a valid option based on a precautionary approach.	4
24-25	Identification of the Resource Site: Option 3 (presumed occupied habitat)	Reviewer indicates by protecting suitable habitat as "presumed occupied" areas under the definition of a resource site, it is likely this option would provide far more protection than needed to meet the intent of the statute. Reviewer seems to assert that additional information is needed on the variability of nest sites selected by murrelets in both natural and fragmented landscapes [presumably to refine the definition of presumed occupied habitat].	6
26	Table 2— Identification of resource site	Reviewer indicates a combination of the three options will likely be needed, but there is not enough current data to make a decision on the definition of a resource site.	2
29	Protection options: Prescriptive approaches	Reviewer states there is not enough scientific data to support any of the options.	2
29-30	Protection options: Option 1 (nest trees)	Reviewer asserts even with PSG surveys, it is difficult to determine the location of nests and new methods are needed to provide more certainty around occupancy and nesting. Believes this option will result in many areas being protected which are not actually occupied or used for nesting.	6
30	Table 3 Protection options	Not ripe for discussion at this time; more research needed to validate need and definition of a resource site.	2
30 & in cover letter	Identification of resource site	1) Reviewer indicates options 1 – 3 are flawed because landowners are not required to conduct surveys for marbled murrelets and instead rely on readily available information, thus nesting sites will go undetected. Recommends ODF make surveys mandatory. 2) Also indicated option 1 is flawed because most nest sites are undetected and thus would be unprotected. Option 2 is flawed	4

Page	Policy Option	Reviewer comments (summarized)	Reviewer (#)
		because neither the Survey Station nor location where the occupied behavior occurs is the same as the location where the birds is actually nesting. Recommends requiring surveys using PSG protocol.	

Table 5: Additional comments on policy options considered out of scope as per the expert review charter. The TR will not be revised in response to these comments, however they may be considered during a later phase of this project.

Page	Policy Option	Reviewer comments (summarized)	Reviewer (#)
23	Identification of resource site (option 2 occupied detections)	Yes, [presumably meaning occupied behaviors may be used as a proxy for nests], however occupancy should be followed up with nest identification.	2
23	Identification of resource site	Reviewer recommends, in general, a resource site be defined as a patch of habitat rather than a fixed point.	4
29-30	Protection options: Option 2 (occupied detections)	Reviewer indicates this option would result in a more realistic level of protection, but would require an arduous process. Indicates this option could expand protection from established sites on federal lands to adjacent nonfederal lands with little rationale or justification.	6
30 & cover letter	Identification of resource site	3) Indicates option 3 is valid and the Survey Area could qualify as a key component for a marbled murrelet resource site. 4) Indicates option 4 is the most viable alternative.	4
32	Protection options : Programmatic Safe Harbor Agreement	Reviewer indicates not realistic to state a landowner can create habitat for murrelets during the term of a Safe Harbor Agreement.	4

ODF Response

The Department will further evaluate comments relating to the scientific merit of the policy options and consider these comments as the final TR is being drafted. It is unclear at this time if the existing policy options will remain the same, be revised, or if additional options will be added.

Areas of conflicting input

Input received was not always consistent between expert reviewers. There are a few topics where we received conflicting or contrasting input from two or more reviewers. The topics, and a general synopsis of the conflicting input received are described below.

Site fidelity

The topic of site fidelity, the propensity of birds to return to the same location to nest year after year was addressed in the TR. Existing information on this topic was summarized and gaps in our knowledge were discussed. The reviews received indicated there is not general agreement between reviewers on whether or not the murrelet exhibits strong site fidelity. The main area of disagreement appears to be whether or not individual birds return to the same nest cup, nest tree, or same area in a stand to nest year after year. Summary of comments received from two of the reviewers with contrasting views on this topic are below:

Reviewer #4 indicates murrelets exhibit strong site fidelity in multiple comments and appears to state there is little ambiguity in this topic. Indicates the statement "marbled murrelets are thought to exhibit some level of site fidelity" should be changed to "marbled murrelets are known to exhibit some level of site fidelity. In the section on landscape pattern; relationship to nest selection and success, the reviewer stated, "important to note that a murrelet nesting in the vicinity of a man-made gap is not showing a 'preference'. They have strong site fidelity. As the forest is cut around them, they return and try to nest successfully." In the section on data gaps and nest site fidelity, the statement is made that additional text needs to be added to indicate high site fidelity at watershed and stand scales for murrelets as a whole (although not well studied for individuals"

Reviewer #6 stated "The question of site fidelity is an area that the TR handles well. It is important however, to disclose within that discussion that, while the two studies cited did observe a few birds returning to the same nest, there were more birds observed not returning to the same nest. Taken as a whole, the studies cause doubt that actual single nest fidelity is a common occurrence"

Forest edges, nest success, and effects of fragmentation

Another topic where the Expert Reviewers disagreed is the topic of forest edges, whether or not murrelets tend to nest near edges, and whether or not "edge effects" result in negative impacts to nesting success. The range of comments received are noted below:

- Reviewer #2 noted murrelets may use the presence of edges as a selection criteria [for nest sites]—cites Nelson 1997, Manly 1999, and Zharikov et al. 2006). Also states additional research is needed in more natural areas to sort out this relationship [the relationship between edges, nest site selection, and nesting success]
- Reviewer #3 suggests there is uncertainty in the effects of edge on nest success and the issue seems unresolved—disagreed with the general statement in the TR that edge effects may lower nest success.
- Reviewer #4 appears to indicate we have overstated that murrelets tend to nest near edges and indicates the report should be modified to state edges created by logging are detrimental to the species. Additional comments throughout the document indicate greater emphasis is needed on fragmentation/ edges and the relationship to corvid populations and nest depredation and studies are lacking to indicate the relationship between gap size and edge effects.
- Reviewer #6 appeared to have concern over the statement made on page 18 of the TR that murrelets nesting near edges, especially hard edges, may suffer lower nest success than murrelets nesting in the interior of the stand'; points to Zharikov et al. (2006) as a study with results that conflicted with this statement.

Pacific Seabird Group Protocol—scale of occupancy

Reviewers gave varied comments on the section of the report regarding survey methods for murrelets. The primary comments that contrasted for this section was with regards to how the Department described the assignment of survey results to the various scales used in the survey protocol (e.g., Survey Station, Survey Site, and Survey Area), especially the assignment of "occupancy" to the entire Survey Area. Two of the comments received on this topic are summarized below:

- "The PSG protocol is clear and explicit on this issue and states that if any sites within a survey area yields behaviors indicating occupancy, the occupied designation should apply to the entire survey area. We see no credible scientific basis for deviating…." Reviewer 4 (from letter)
- "report accurately states that the protocol then recommends results be extended to the entire Survey Area, based on an assumption that suitable habitat contiguous with the location where the occupied behavior is observed is important for murrelets for current and future nesting'… "no primary peer reviewed literature exists to support the assumption" –Reviewer 6

Resource Site Options

We received a range of comments on both the scientific merit as well as general "preference" for the three options described in the TR for the definition of a resource site for marbled murrelets. Option 1 was the use of nest sites only as the resource site, Option 2 was the use of nest sites in addition to the locations of occupied detections as the resource site, and Option 3 was the use of "presumed occupied" habitat as the resource site. Contrasting comments received for each of these options are listed below (in order of Option #):

- Reviewer #4 indicates Option#1 is not feasible because nests are difficult to locate and because surveys for murrelets are not required under the FPA.
- Reviewer #6 appears to indicate Option #1 (nest site) is not a feasible option due to difficulty and expense in locating nesting sites and the lack of evidence sites will be used long-term (e.g., individual nest site fidelity).
- Reviewer #4 indicates Option #2 is not adequate because murrelet nests are not necessarily at the same location where occupied behaviors are observed and because surveys are not required under the FPA. Further indicates this option would only be adequate only if surveys were required and the entire survey area was required to be protected.
- Reviewer #6 stated Option #2 (occupied detections) could result in inaccuracies regarding actual location of nesting murrelets and may identify areas as "occupied" that are not actually occupied (used for nesting).
- Reviewer #2 indicated Option #2 could result in either under or overestimating required protection for a site—Nest identification and confirmation should follow-up the observation of the occupied behavior.
- Reviewer #2 suggests other factors besides habitat for Option #3, such as watershed conditions, existing detections in an area, or other biological criteria, be incorporated to inform the likelihood of murrelet presence.
- Reviewer #4 indicates Option #3 (referred to in their review as Option #4) is the most viable option, particularly because landowners are not currently required to survey for murrelets prior to logging.
- Reviewer #6 indicated Option #3 (presumed occupied habitat) would likely provide more protection than needed to meet the intent of statute. Also indicated additional information is needed to better understand nesting habitat selection [presumably to help define criteria to use in defining and mapping suitable habitat]

Protection Options

There were a range of comments for possible protection strategies for marbled murrelets. Options described in the TR included prescriptive protection of sites using either a "user-defined" protection area or the default Sites or Areas as designated as a part of protocol surveys. Also included is an option to protect "presumed occupied" habitat until further on-the-ground habitat analysis or surveys indicate the area is not habitat or murrelets are not present. Options for programmatic approaches to encourage voluntary protection of habitat were also described in the TR. Comments varied widely for this section from statements that none of the options are appropriate at this time to statements that one or more options are not valid. A summary of the range of comments received are shown below:

- Reviewer #2 indicated there is not enough data to support any of the proposed protection requirements at this time.
- Reviewer #4 indicates the preferred option for protection would require protocol surveys and to require protection of the entire survey area (as defined in the PSG protocol).
- Reviewer #6 indicated using polygons of habitat from surveys (e.g., survey site or survey area) may be inadequate because it is difficult to determine the location of murrelet nests. Stated this option may result in identifying areas occupied by the species not actually used for nesting.
- Reviewer #6 indicated the option to have operators identify protected areas around known nest sites and/or occupied detections would likely lead to a more realistic level of protection for the resource site by taking into account site specific/ biological criteria, but will also require an arduous process for identifying nest trees.

In addition, the following general comments were received on the overall project and protection for marbled murrelets and illustrate the range of contrasting views on the topic of marbled murrelet protections under the FPA.

- Where data is lacking on marbled murrelets, a precautionary approach is warranted. Lack of data should not be viewed as license to continue the status quo (Reviewer #4).
- More work is needed prior to adopting a definition of a resource site and/or protection measures. Additional research should be conducted prior to formalizing the administrative process (Reviewer #6). Reviewer #2 also had a similar comment, but also noted based on population trend data, the need for protection measures is difficult to justify.