WDFW RESPONSES TO SEPA AND PSR PUBLIC COMMENTS

WDFW responses to public comments during the 90-day concurrent public review periods for the draft *Periodic Status Review for the Marbled Murrelet in Washington* conducted from July 12, 2016, to October 10, 2016. WDFW received >1650 individual comment letters from citizens, mainly form-letter emails. We received 5 extensive comment letters from forest products industry and non-governmental organizations. Most letters supported our recommendation. The comments presented here are summaries of the remarks provided by one or more people sharing similar views. We reviewed all public comments, and with the exception of comments that resulted in the need to clarify language, we made no other substantial changes to the Periodic Status Review (PSR) document.

Report Section	**Comment and Response**
General comments	Protecting Marbled Murrelet habitat will protect habitat for other species.
	Marbled Murrelets use mature and older conifer forests. Other species that use such habitats will benefit from measures that conserve murrelet habitat.
	Protecting Marbled Murrelets (and habitat) should be valued over short-term economic gain (and to alleviate adverse impacts).
	These comments reflect a policy perspective and are therefore beyond the scope of this document. However, we point out that state and federal rules and regulations are designed to address the need to protect Marbled Murrelet habitat while allowing for lawful resource extraction practices.
	Marbled murrelets continue to be impacted by "forest mismanagement…"
	Noted; the comment reflects a policy-related issue, which is outside the scope of this document.
	Government policy must reflect the danger of extinction and increase protections for this seabird. According to recent research, the most important factor in explaining the decline of the species is the decrease of suitable nesting habitat due to logging. We cannot continue funding our children's education at the expense of their ecological future.
	Noted; the comment reflects policy-related issues and is outside the scope of this Status Review document.
	The bird is on the decline and will easily become extinct in Washington if urgent conservation policy isn't enacted. We cannot allow another species to needlessly become extinct due to human activities.
	Noted; the comment reflects policy-related issues and is outside the scope of this document.
	By increasing protections for the murrelet, we protect our forests.

	Comment noted.
	The Marbled Murrelet has taken a back seat to the lumber industry. Oregon and California have both done a better job of preserving this bird and old growth trees than we in WA have done.
	Comment noted; we cannot speak to state management in Oregon and California.
General comments	
	After a storm, a raft of tree trunks, limbs, and debris had been washed into Commencement Bay. The flotsam moved north passing Poverty Bay and stretching from Normandy Park to Maury Island. I counted 10 Marbled Murrelets feeding on the fish gathered under the floating debris. In the waters off Pt Townsend we used to see many murrelets when we arrived in Seattle in the ’70’s. Nowadays there is only the occasional pair or single bird.
	Comment noted, thank you for the information.
	As a private citizen I have witnessed extensive loss of late successional habitat in southwest Washington that has impacted murrelets.
	Comment noted, thank you for the information.
	It has been nearly 20 years after the [WDNR] HCP was signed and a Marbled Murrelet Long-Term Conservation Strategy has yet to be put into place while the murrelet population is in steep decline. The HCP has benefitted the DNR with predictability of harvest and lower costs. Corresponding benefits to the murrelet population are questionable; my concern is that we have lost important habitat in the interim.
	Comment noted.
	There is no biological support for cutting more trees in MMMA's, thereby decreasing the habitat for future generations of Marbled Murrelets. We urge you to plan to defer any potential timber sales which are parts of MMMAs. We are asking you to follow the Science Team's recommendations by adopting a conservation strategy now.
	These comments reflect a policy perspective and are therefore beyond the scope of this document. However, we point out that state and federal rules and regulations are designed to address the need to protect Marbled Murrelet habitat while allowing for lawful resource extraction practices.
	Protecting the bird will have some positive effects. The nesting habitat that is currently suitable and those trees that will become suitable in future decades and centuries will be managed with much more care. The carbon stored in old growth trees and the carbon dioxide that is being taken in by growing forests are more likely to remain in the forest rather than being harvested and soon converted back into atmospheric gases.
	Comment noted.

	The PSR does not point out that we must arrest the further loss of suitable habitat and forest fragmentation is a severe threat that needs to be ameliorated.
	Comment noted; The PSR is not designed to provide management recommendations. The purpose of the PSR is to review the current status of the species and provide recommendations to the Fish and Wildlife Commission regarding Washington legal status.
	It is clear that recovery of the species will increasingly rely on greater conservation efforts on nonfederal land in the near term. It stands to reason that non-federal lands may also play an increasing role in providing terrestrial nesting areas as forests mature.
	Noted; the comment reflects a policy-related issue, which is outside the scope of this document.
Habitat and Population Status	Marbled Murrelets have been impacted by the extent and duration of past nesting habitat loss: an overall loss of 82% of old-growth forests statewide (Booth 1991) plus a net loss of 13% of habitat statewide over the past 20 years alone.
	Comment noted; WDFW appreciates the information.
	Absent some significant regulatory shifts, recent modeling demonstrates that Washington's murrelet population will continue to decline and risk extirpation in the coming decades.
	Comment noted *WDFW appreciates the information and the concern. We are aware of these data.*
	The Marbled Murrelet population has stabilized since 2010-2012 in both their entire range and within Washington.
	For the listed range of WA, OR, and CA combined for 2000-2013, we acknowledge there was no significant trend detected for population increase or decrease. However, in general, we see negative point estimates for declines in the Washington conservation zones and see stable or increasing populations to the south in recent years. *In Washington, the slopes for both zones 1 and 2 are negative and one zone has strong evidence for a decline as of 2015. Overall, Washington State Zones 1 and 2 combined show a significant decline of 4.4% per year.* *The most recent published trend information, including season 2015 data (Lance and Pearson 2016), indicates that at the scale of individual conservation zones, there was evidence for a population decline in Conservation Zone 1 (5.3% decline per year; 95% CI: -8.4 to -2.0%) (Lance and Pearson 2016 Table 2; Figures 2 and 4). The data also indicate that there is a negative trend in Conservation Zone 2, but the upper confidence interval overlaps zero – therefore, the trend for this Conservation Zone is less certain. The confidence interval for the Zone 2 trend has overlapped zero in some recent years and not in others suggesting both strong and*

	weak evidence for a decline depending on the year (e.g., compare trend estimates for this zone using data through 2013, 2014, and 2015).
	"…in addition to murrelet population stabilization since 2010-2012, the habitat loss has stabilized dramatically as well."
	Regarding murrelet population stabilization, please see comment response above. Regarding habitat loss, we know of no information that would corroborate this statement. The estimated loss on non-federal lands for Washington was -29.8% of the baseline from 1993-2012, and -13.3% statewide for all ownerships (Raphael et al. 2016a; PSR July 2016 Table 1). The NWFP does not have habitat change data beyond 2012, nor can a true rate be reliably calculated between one beginning point in 2010 and one ending point in 2012.
	Habitat gains and losses for years 2013 to present were not reported by WDFW Status Review.
	We do not know of any other comprehensive data set available that is comparable to the Northwest Forest Plan monitoring 20 year review (Falxa and Raphael 2016), which tracked murrelet abundance estimates and nesting habitat gains and losses at regional landscape provinces. Unfortunately, forest monitoring was only modeled up to the year 2012 (inclusive) for the NWFP report. We would appreciate a reference of any similar comprehensive data set covering nesting habitat for these years that we could include in the PSR.
	Commenter states "Interestingly, 'in terms of nesting habitat persistence on federal land, the NWFP' (which includes all federal critical habitat) 'has been largely effective for Washington' …, as >99% of designated critical habitat in Washington occurs on federal lands."
Habitat and Population Status	*The commenter has misquoted language in the PSR, leaving out an important phrase (the elipse above): …'has largely been effective for Washington **federal lands'** which misconstrued the meaning of the sentence. Because 99% of the designated federal critical habitat is on federal lands, it has been effective for persistence of nesting habitat on the Washington federal lands only, not the entirety of the state. We do not imply it has been effective for all ownerships in Washington; this would not be the case. This statement has been clarified in the final draft.*
	Population estimates from Zone 1 may not be reliable because of "highly volatile" population numbers from year to year. Downward trend in Zone 1 is a cause of perceived population declines as a whole, but likely affected by irregular attendance by Canadian birds. If Zone 1 fluctuations are not due to habitat on land, but to forage fish spatial shifts, then Zone 1 trends are not representative.

	Falxa et al. (2016:30) acknowledge the possibility that a northward shift in murrelet distribution from Washington to Canada could mimic a population decline in Zone 1. However, the authors think this possibility is unlikely because: (1) the murrelet distribution at sea during the breeding season generally coincides with the distribution of potential nesting habitat directly inland (Burger 2002, Meyer et al. 2002, Miller et al. 2002, Raphael 2006, Burger and Waterhouse 2009, Raphael et al. 2002, 2015);and (2) a large population fluctuation or population shift would suggest that breeders are shifting nest locations, which is contrary to existing evidence for nest site fidelity (Hebert et al. 2003, Piatt et al. 2007, Burger et al. 2009), and because population trend data in B.C. from 1996-2013 do not support such a population shift, as annual murrelet population trends in B.C. are negative for 2 of 3 sampling regions adjacent to WA waters (Bertram et al. 2015). This clarification has been included in the final draft.
	Trends derived from monitoring from zones 2-5 suggest populations not declining. Plots for Conservation zones 2-4 shows much lower variability that individual zone plots. Despite reported habitat loss there is no decline of murrelets in Conservation zones 2-4.
	Our review is focused on the status of the murrelet in Washington State only. In Washington, the slopes for both zones 1 and 2 are negative and one zone has strong evidence for a decline as of 2015. The most recent published trend information (Lance and Pearson 2016) indicates that at the scale of individual conservation zones, there was evidence for a population decline in Conservation Zone 1 (5.3% decline per year; 95% CI: -8.4 to -2.0%) (see Table 2 and Figures 2 and 4). The data also indicate that there is a negative trend in Conservation Zone 2, but the upper confidence interval overlaps zero – therefore, the trend for this Conservation Zone is less certain. The confidence interval for the Zone 2 trend has overlapped zero in some recent years and not in others suggesting both strong and weak evidence for a decline depending on the year (e.g., compare trend estimates for this zone using data through 2013, 2014, and 2015). Falxa et al. (2016a:24) show adequate power to detect trends: 95% power to detect 4% decline in Zone 1 and Zone 2 (19 years and 22 years resp.). Zone 3, the next most southerly zone was not sampled in 2015 and, as a result trends cannot be assessed through 2015. In general, we see negative point estimates for declines in the Washington conservation zones and see stable or increasing populations to the south in recent years.
	It is our belief that the underlying data and habitat models for murrelet nesting are not sufficiently reliable for their intended purposes. High AUC values of Maxent nesting habitat models may be overestimating habitat model goodness; this is supported by low correlation over time in nesting habitat area and population trends; and the model is dubious and not suitable for management purposes.
	WDFW assumes that Northwest Forest Plan (NWFP) model verification was conducted in accordance with accepted statistical principles and peer review, and as such represents the best available estimates of habitat on an ecoregion scale. The authors of the Maxent models used in Raphael et al. (2016a) did not rely on AUC (Area Under Curve) values only to assess model performance. Their models claim to have "very good (if not "excellent) classification skill as measured by the AUC and gain values and also were well-calibrated as evidenced by the P/E (AAF) plots and

	associated Spearman test results" (Raphael et al. 2016a:84-85). In addition, the sources of uncertainty with their models that the authors discuss "should predispose the models to perform worse – not better. Nonetheless, even with the 'deck stacked against' good models, good models were generated" (Raphael et al. 2016a:84-85). The authors state that using maps at face value to locate specific stands or patches of murrelet habitat on a specific ownership is not appropriate at any scale without ground verification methods. The most appropriate use of the data is across landscapes, counties and larger watersheds or ecoregions and should be based on USGS hydrologic units of size 6 or larger.
	Any robust quantification of habitat change should also include habitat recruitment during the same period.
	Table 1 in the PSR reports habitat gains (recruitment) for Washington from the NWFP model for both federal and non-federal lands ("Gains" columns). Details for habitat gains are explained briefly in Raphael et al. (2016a:77, 82, 84, 86; Tables 2-9, 2-10). WDFW reported habitat gain figures directly from these tables. Raphael et al. (2016a) do state that consistent criteria were used between model years for both gains and losses. While the methods for detecting habitat gains were less effective at distinguishing real from false gains, there is high confidence that real habitat loss has occurred 1993-2012 (Raphael et al. 2016a).
	There is a low correlation over time in available nesting habitat and population trends, so that the data in the PSR do not provide an adequate basis for the conclusion that forest habitat loss is a primary factor in the decline for the last 15 years.
	This is explained in the section: Forest Habitat and Marine Abundance Correlations*; we provide additional language below to clarify. (The reader can consult the references provided below; we did not add all of this to the PSR text because of space and time constraints.)* *For Zones 2-5, nearly 60% of the influence on murrelet at-sea abundance is explained by terrestrial factors, and for Zone 1, murrelet distribution and abundance was most influenced by the total amount of nesting habitat present in the zone (>50% of influence), indicating amount and composition of habitat on the landscape was a driver of bird distribution and abundance (Raphael et al. 2016b: figure 3-9). Also Figures 3-2 and 3-4 in Raphael et al. (2016b) suggest fairly strong correlations between the residual of murrelet abundance and nesting habitat. Finally, as we state above, the murrelet distribution at sea during the breeding season generally coincides with the distribution of potential nesting habitat directly inland in several studies that have examined this relationship to date (Burger 2002, Meyer et al. 2002, Miller et al. 2002, Raphael 2006, Burger and Waterhouse 2009, Raphael et al. 2002, 2015, 2016b). As the authors point out, these correlations do not necessarily establish cause-effect relationships but they do support the hypothesis that nesting habitat may be the factor limiting population stabilization and recovery.*
	If not all nesting habitat is occupied, nesting habitat is not limited, so then claiming nesting habitat is driving current population changes is not supported.
	The at-sea distribution and abundance is driven by both the amount of higher quality

	habitat and habitat cohesion (i.e., the amount of unfragmented habitat) adjacent to marine hotspots of murrelet abundance (See Raphael 2006, Raphael et al. 2015, 2016b). In British Columbia, 6 separate watershed-level radar studies supported a linear relationship between murrelet counts at sea and proximity to inland areas of habitat, and murrelets did not aggregate offshore where adjacent nesting habitat had been significantly reduced due to harvest (Burger and Waterhouse 2009).Because habitat is defined by both small-scale features (tree size and structure) and landscape-level features (e.g., habitat cohesion), it can be difficult to assess whether or not nesting habitat is limited. It is possible differences in habitat quality influence murrelet choice of nesting habitat. There is some evidence to suggest that nesting density of murrelets can be somewhat lower than previously thought, as Conroy et al. (2002) estimated active nest density was 0.14/hectare (~1 nest per 9 ha) in unfragmented old forest in B.C. Clearly this is an area of research that needs to be further investigated.
	If relative availability of higher quality habitat trended upward over the period of declining population, it does not logically follow that nesting habitat is limiting, or that timber harvest during this time contributed to the observed declines in population.
	There has been a net loss of higher quality nesting habitat in all conservation zones except for Zone 5, and we found no data detecting upward trends in habitat availability. In addition, there is a fairly strong relationship between murrelet population change and changes in the higher quality habitat (see Figure 3-5 in Raphael et al. [2016b:105]).
	Any trend in population (up or down) due to habitat manipulation would logically be in response to earlier trends in habitat and reproductive success, not current conditions, with majority of population persisting at sea. Therefore, while contemporary trends in nesting habitat appear correlated with population trends in Washington, causation is not apparent. Lack of a temporal delay suggests caution needed with the declining population interpretation.
Habitat and Population Status	*Apparent population declines according to demographic models and the most recent work by the Effectiveness Monitoring Team suggest that populations have been declining for a long period of time (Divoky and Horton 1995, USFWS 1997, McShane et al. 2004, Miller et al. 2010) and, in the northern portions of the continental U.S. range, are continuing to decline (Lance and Pearson 2016). There is likely a temporal delay in population responses to the factors that are driving population changes in species like Marbled Murrelet because they are long-lived and have a relatively low reproductive rate. However, the recent analyses contained in Falxa and Raphael (2016) allow for this temporal delay. The changes in nesting habitat reported in Raphael et al. (2016a) occurred between 1993 and 2012, while the population changes reported in Falxa et al. (2016a) occurred between 2000 and 2013. Consequently, the comparison between murrelet population and habitat changes in Raphael et al. (2016b) allows for up to a 7-year delay for populations to respond to the habitat changes.*
	Changes in forest structure due to natural or anthropogenic cause are not a permanent loss of habitat area. The PSR table 1 indicates more than 10,000 acres per year (over

	the period 1993 to 2012) were added to higher quality category of potential nest habitat due to forest maturation. WDFW states [July 2016 draft PSR, page 5] "…the recruitment of relatively lower quality habitat may not offset the loss of an equal amount of high quality habitat (Falxa and Raphael 2016)." It appears that 212,700 acres are categorized as higher quality, and it is not clear why the department suggests it to be "relatively lower quality". In context, it appears that the 212,691 acres [Class 3+4 Gains, Table 1] is categorized as "Higher quality" thus it is not clear why the Department suggests it to be relatively lower quality.
	WDFW appreciates the opportunity to provide further clarification. WDFW acknowledges changes in forest structure are not permanent and habitat gains have happened; however a greater amount of habitat was lost in the same time period. Forest used as nesting habitat may take 100- 200 years to develop after a stand leveling disturbance (depending on geographic location) and over that time frame several generations of murrelets may have lost the opportunity to reproduce in those areas. Raphael et al. (2016a:84-86) provide detail on the uncertainty regarding modeling the gains in habitat. *In the PSR, Table 1, we refer to 'suitability Classes 3+4' (Raphael et al. 2016a) as "higher-quality Classes 3 +4". We use the term "highest quality" in the PSR to reflect 'Class 4- highest suitability'. On the gradient scale of habitat (Raphael et al. 2016a:54-55), 'Class 3- moderate suitability' is relatively lower quality (about 0.23 to 0.53 probability for WA) compared to Class 4 (>0.53 probability). Thus the lower end of developing Class 3 is a threshold that transitions from "Class 2- marginal suitability" to Class 3 (at about 0.23 probability). Therefore, the low end of Class 3 has a lower logistic probability of providing better habitat structure conditions than Class 4 ("highest quality"), and is not an immediate and equal habitat quality replacement value for losses of highest quality. This is clarified in less detail in the Final draft.*
	It is inappropriate to exclude data from post-2010 [at-sea] surveys…which… show a dramatic increase in population between 2010 and 2013.
	Please see Figure 5 in the PSR, which clearly shows survey year data for 2001 through and including year 2015. For Washington survey zones 1 and 2 combined, there was not an increase in the population trend line, in fact the opposite, as the trend for WA was significant at -4.4% per year. The trend line regression data has 95% power to detect a significant trend only if all survey year estimates are included over the full sampling time frame (2001-2015); it is statistically inappropriate to extract the last few data points to determine a trend.
	Changes in habitat due to timber harvest have occurred only in unoccupied sites since regulatory protections have been established in the 1990s.
	Raphael et al. (2016) state that the primary causes of nesting habitat loss on federal and non-federal lands was fire and timber harvest. They do not provide insights into the relative loss of occupied and unoccupied stands. In addition the definition of murrelet habitat included in the Washington Forest Practices Rules does not capture all Marbled Murrelet habitat and there is an exception for small forest landowners. Moreover, some Habitat Conservation Plans allow for harvest of Marbled Murrelet

	habitat. Finally, recent analysis indicate that the established survey protocol (Evans Mack et al. 2003) is not adequate and some sites may have been incorrectly classified as unoccupied.
Factors Affecting Continued Existence Adequacy of Regulatory Mechanisms	There is uncertainty expressed about WDNR's Long-term Conservation Strategy for the Marbled Murrelet and the importance of maintaining habitat on state-owned lands. The USFWS recognizes preserving marbled murrelet habitat in SW Washington is critical to the species' survival and recovery.
	Comment noted. This comment reflects policy-related issues outside the scope of this Status Review.
	This process would benefit greatly from a state recovery plan for murrelets which shall include target population objectives, criteria for reclassification, and an implementation plan for reaching population objectives (WAC 232-12-297 (11.1).
	Comment noted. This comment reflects policy-related issues outside the scope of this Status Review.
	State Forest Practices Rules have clearly failed to prevent further loss of old forest nesting habitat from commercial timber harvesting. To prevent the unintended harvest of existing murrelet habitat on private lands (~129,000 acres at higher survey threshold, 5-7 platforms per acre) prior to conducting protocol surveys, the lower threshold (2-5 platforms per acre) for meeting the regulatory habitat definition should be applied whether or not it is located within a marbled murrelet detection area. We urge WDFW to assess, and the Forest Practices Board to revise the Forest Practices Rules for marbled murrelets consistent with the best available science.
	Comment noted. This comment reflects policy related issues outside the scope of this Status Review. We cannot comment on future direction by the Forest Practices Board to WDFW, as it is a policy-related issue and not within the scope of this Periodic Status Review.
	Murrelet population in Washington continues to be impacted by nest predation, declines in forage fish populations and mortality from net fisheries and pollution. Murrelets continue to decline due to habitat loss, habitat fragmentation, high nest predation rates, low fecundity and low adult survival. The marbled murrelet's population continues to decrease precipitously.
	Comment noted.
Continued Risks Threats	Forage fish declines may be a driver of murrelet declines in Washington. Prey type and abundance declines may be a contributor to Marbled Murrelet declines.
	Comment noted, and WDFW agrees; however, additional research in more marine regions of Washington is needed to fully investigate this factor. Forage fish availability is one factor. When assessing both marine and terrestrial factors on changes in the distribution and abundance of murrelet populations, terrestrial

	factors appear to have the greatest influence (Raphael et al. 2016b, and Raphael et al. 2015). Again, these correlations do not indicate cause and effect but instead support the hypothesis that terrestrial factors and nest habitat (amount and cohesion) have the greatest influence of murrelet population trends.
	There will be future loss of nesting habitat due to natural disturbance such as fire windthrow, and disease (likely to be exacerbated by more extreme climatic conditions.
	The effects of climate change on Marbled Murrelets are not clear at this time, but modeling indicates that precipitation and snow pack will decrease through time and some forest landscapes may experience higher risk of less epiphyte (moss and lichen) branch cover and possibly canopy-replacing fires and other impacts. Such events could impact Marbled Murrelets and other species.
Recommendation and Conclusion	The Marbled Murrelet should be up-listed as an endangered species in Washington due to reasons such as declining population and habitat loss. Classifying the murrelet as a state endangered species is warranted based on its declining population, and is an important step in its recovery.
	Thank you for your comment. WDFW is recommending that the status of the Marbled Murrelet be up-listed from state threatened in 1993 to state endangered.