Northwest Forest Plan Interagency Regional Monitoring, 25-year Report on Status and Trend of Marbled Murrelet Populations and Habitat

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***Objective**:* The primary objective is to address the key question of status and trend of marbled murrelet populations and nesting habitat in the Northwest Forest Plan (Plan) area. This information will help assess if implementing current management direction is contributing to the recovery of this federally-listed species by maintaining and restoring potential murrelet nesting habitat and populations on federal lands.

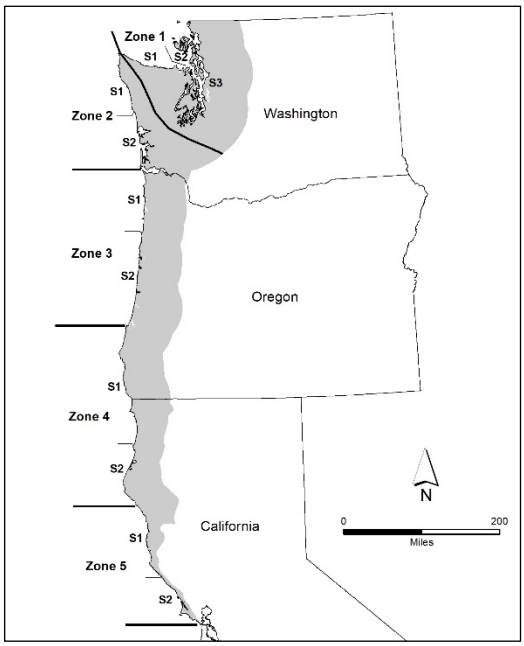
***Methods**:* Population monitoring is based on estimates of the at-sea murrelet population, for the coastal waters adjacent to the area included in the Plan. A team of cooperating scientists have conducted line transect surveys from boats in those waters during the murrelet breeding season, since 2000. Those data are used to generate annual population and trend estimates for each of five zones and for all zones combined. A reduced sampling design was implemented in 2014, in which every-other-year surveys are conducted by zones.

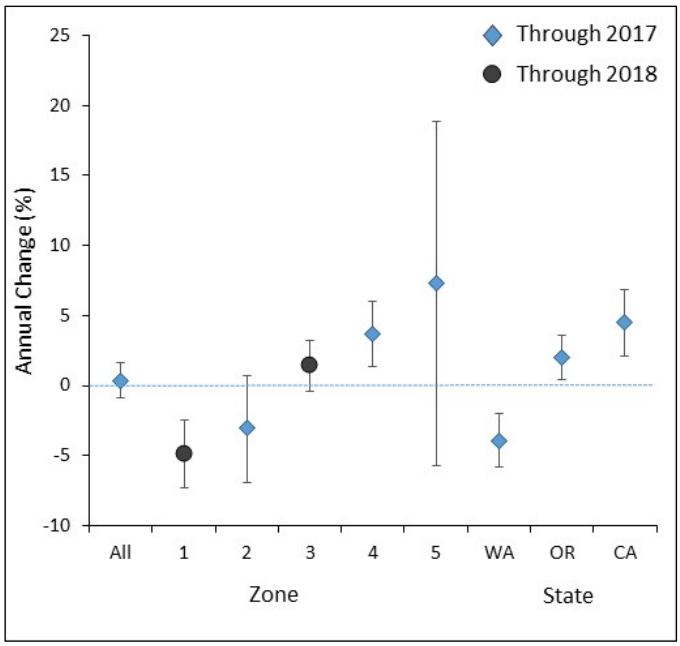
Using Maxent species distribution models, we modeled the amount and distribution of probable nesting habitat in the murrelet's range in the NWFP area in 1993, at the start of the Plan, and 25 years later (2017). Within the higher probability nesting habitat, we then estimated the amount of contiguous habitat (core) versus the amount of habitat bounding core habitat (edge) and habitat scattered in small forest fragments (scatter). We considered this "core habitat" as the best habitat.

Key Results:

Population monitoring (2000 to 2018 period)

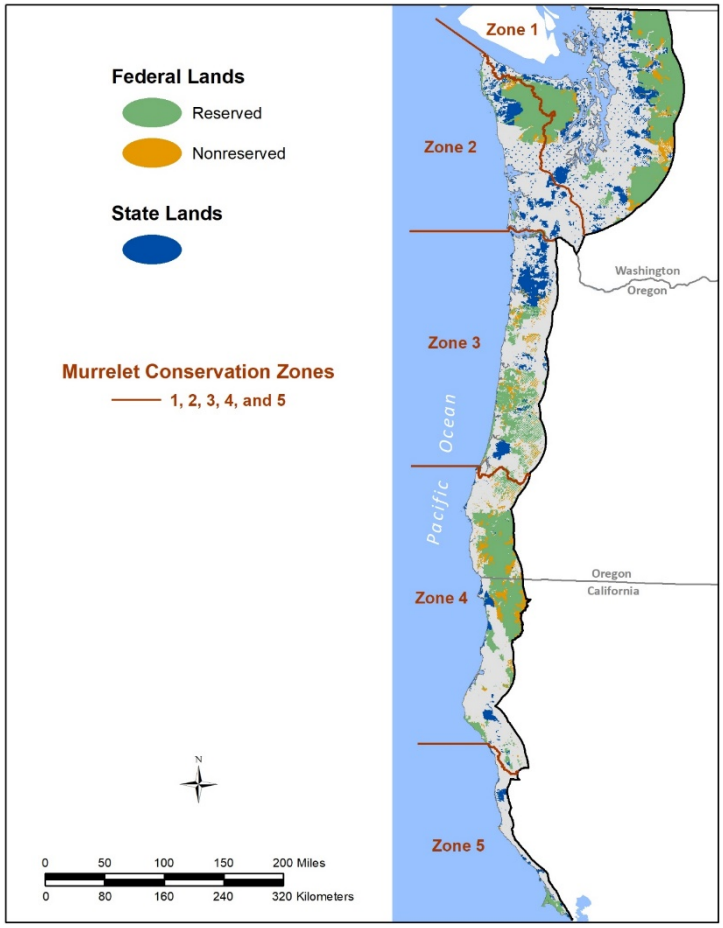
- At the Plan-scale, we did not detect a population trend.
- At the conservation zone scale, a 4.9%/year decline in at-sea abundance was observed in Conservation Zone 1 (Puget Sound area). In Conservation Zone 4 (southern Oregon & northern California), a 3.7%/year increase in at-sea abundance of murrelets was observed.
- At the state scale, we found a 3.9%/year decline in at-sea abundance of murrelets in Washington, a 2.0%/year increase in murrelet at-sea abundance in Oregon, and a 4.5%/year increase in murrelet at-sea abundance in California.





Habitat monitoring (1993 to 2017 period)

- Our models indicate that there were 1.51 million acres of higher probability nesting habitat over all lands in the murrelet's range in Washington, Oregon, and California at the start of the Plan in 1993. Most (68%, or 1.04 million acres) higher probability nesting habitat in 1993 was on federally administered lands, with 0.97 million acres (66%) in reserved land use allocations.
- From 1993 to 2017, we estimated a net loss of about 1.4% in higher probability nesting habitat plan-wide, and a net loss of 1.8% in core habitat. Timber harvest and wildfire were the major causes of habitat loss on federal lands since the Plan was implemented.
- Timber harvest was the primary cause of loss on state and 'other' nonfederal lands, accounting for 99% of all attributable losses since 1993.



Management Considerations and Next Steps

- For at-sea monitoring, the every-other-year sampling approach limits our ability to evaluate annual variation in murrelet abundance within and between years within conservation zones. In addition, we think the current every-other-year sampling design is inadequate for detecting within-season or interannual movements of murrelets among conservation zones.
- In regards to murrelet nesting habitat, the Plan has been successful in conserving higher probability nesting habitat on federal lands plan-wide but has been less successful in conserving core habitat.
- Given the amount of habitat-capable lands Plan-wide, there is great potential to create more core murrelet habitat if losses from timber harvest (for all landowners, but primarily for state and other landowners) and wildfire (for all landowners) can be reduced.