

Spotted owl population modeling preliminary results using the HexSim Population modeling program

As part of the Draft Revised Recovery Plan modeling process, we have continued the modeling effort described in Appendix C of the Draft Plan, simulating population response using the individual-based population modeling program HexSim. The population simulations shown here represent preliminary evaluations of the HexSim model parameters; we anticipate changing these parameters based on review of the first few models runs. In addition, the habitat/barred owl scenarios described below are intended for model testing and are not intended to represent realistic or proposed reserve designs. Though still in draft stage, these are the population response simulations from this portion of the modeling process. These simulations do not represent estimates of what will occur in the future, but provide comparative information on potential population responses to different habitat conservation scenarios as described in the draft revised recovery plan. Some of the exploratory habitat conservation scenarios were derived using the Zonation modeling program and are depicted as "Z30all," "Z50pub," etc. Z30all indicates a conservation network derived by Zonation that captures the best 30% of habitat value (derived from the Step 1 habitat modeling results) on all lands within each of the 11 modeling regions comprising the range of the spotted owl (see Table 1 below). Z50pub indicates a conservation network derived by Zonation that captures 50% of the habitat value with emphasis on habitat value occurring on public lands (see Table 1 below). The three rounds reflected in these results represent different scenarios we evaluated as follows:

In **Round 1** the RHS values remained constant for the entire 250 time-steps and are modeled with and without the currently estimated influence of barred owls. When barred owl influences are included they are inserted at time-step 40 and their influence is held constant from time-step 40 through time-step 250. This round includes no habitat reserve scenarios.

In **Round 2** we evaluate 10 different reserve scenarios where we keep RHS constant within the reserves, but reduce RHS to a maximum value of 34 outside of reserves making this area unsuitable for spotted owl reproduction, but suitable for spotted owl dispersal and foraging. This allows us to evaluate a strong reliance on reserves, both with and without barred owl influence. Barred owl influences are inserted at time-step 40 and are then held constant through time-step 250, whereas habitat changes are inserted at time-step 50 and then held constant through time-step 250.

Round 3 is nearly identical to Round 2, except that all non-reserved public lands with $RHS > 50$ are maintained while non-reserved, public lands with $RHS < 50$ are reduced to 34. All non-reserve private lands are reduced to 34. This simulates one potential way of implementing Recovery Action 10 on public lands. In Round 3, Critical Habitat and MOCAs were not evaluated.

Table 1 - Habitat Conservation Network Scenarios evaluated

NWFP	Northwest Forest Plan Reserves
MOCAs	From the 2008 Recovery Plan
1992 Critical Habitat	As designated in 1992
2008 Critical Habitat	As revised in 2008
Z30all	Zonation-derived, on all lands, best 30% of habitat value
Z50all	Zonation-derived, on all lands, best 50% of habitat value
Z70all	Zonation-derived, on all lands, best 70% of habitat value
Z30pub	Zonation-derived, 30% of habitat value, public lands prioritized
Z50pub	Zonation-derived, 50% of habitat value, public lands prioritized
Z70pub	Zonation-derived, 70% of habitat value, public lands prioritized

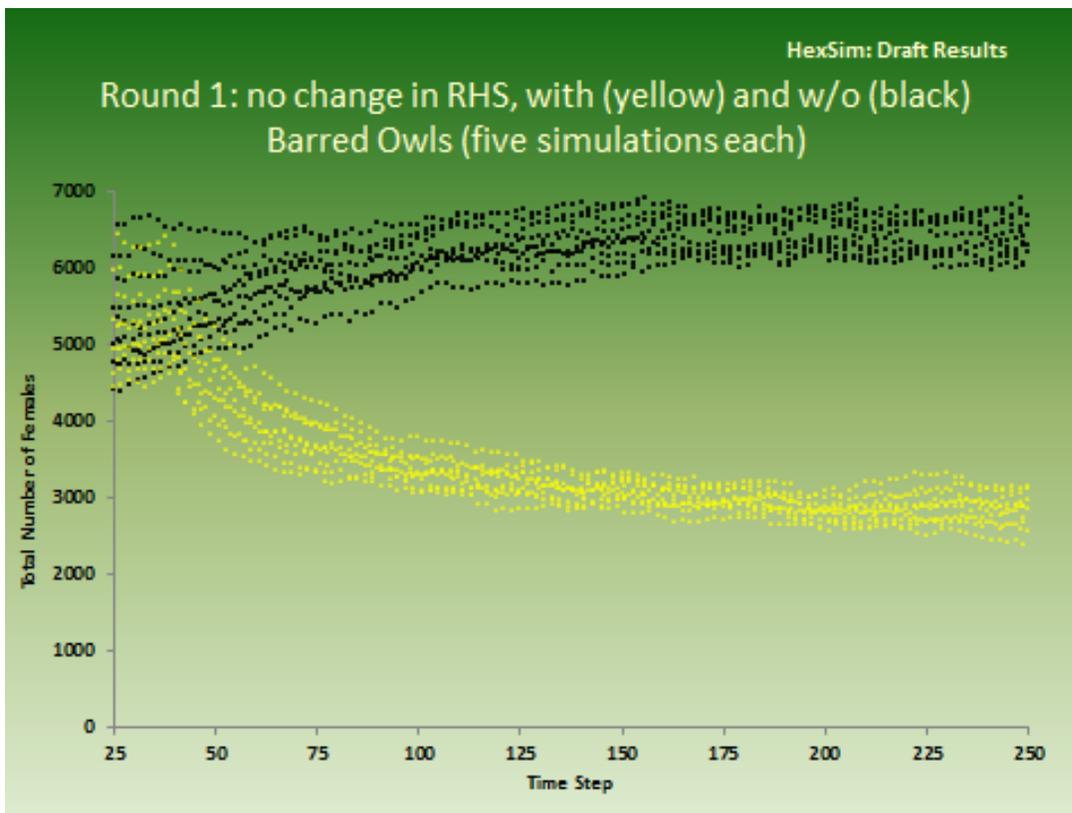


Fig. 1 – Round 1 simulation testing the landscape with current RHS values for the entire 250-step simulation, no reserve scenarios, with barred owl influences inserted at time-step 40 (yellow) and without barred owl influences (black). Five simulations are included, although it appears there are more because of even-odd year reproduction fluctuations.

Round 1: no change in RHS, with and w/o Barred Owls Modeling Regions (mean of 5 simulations)

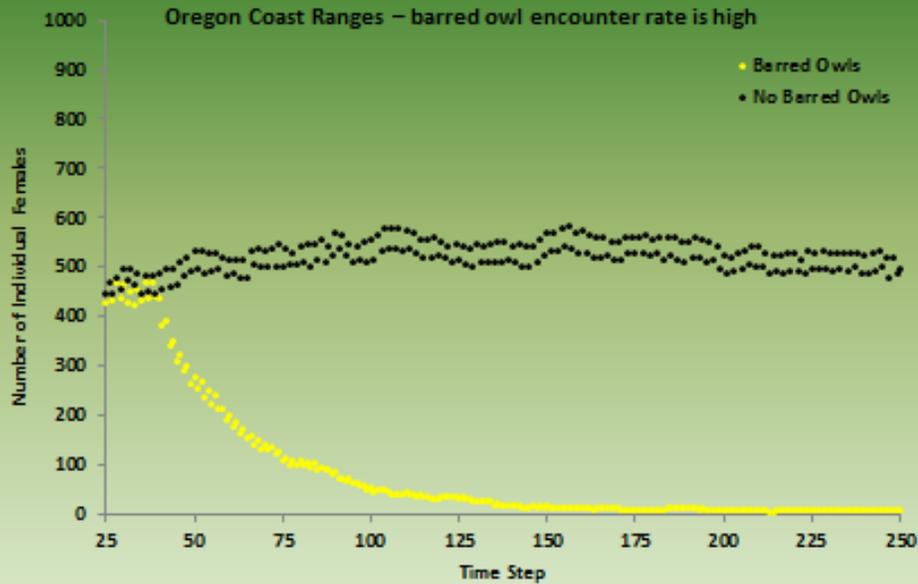


Fig. 2 – Round 1 simulation testing the Oregon Coast Ranges Modeling Region with current RHS values for the entire 250-step simulation, no reserve scenarios, with barred owl influences inserted at time-step 40 (yellow) and without barred owl influences (black). These curves represent the single mean of five simulations although two lines appear because of even-odd year reproduction fluctuations.

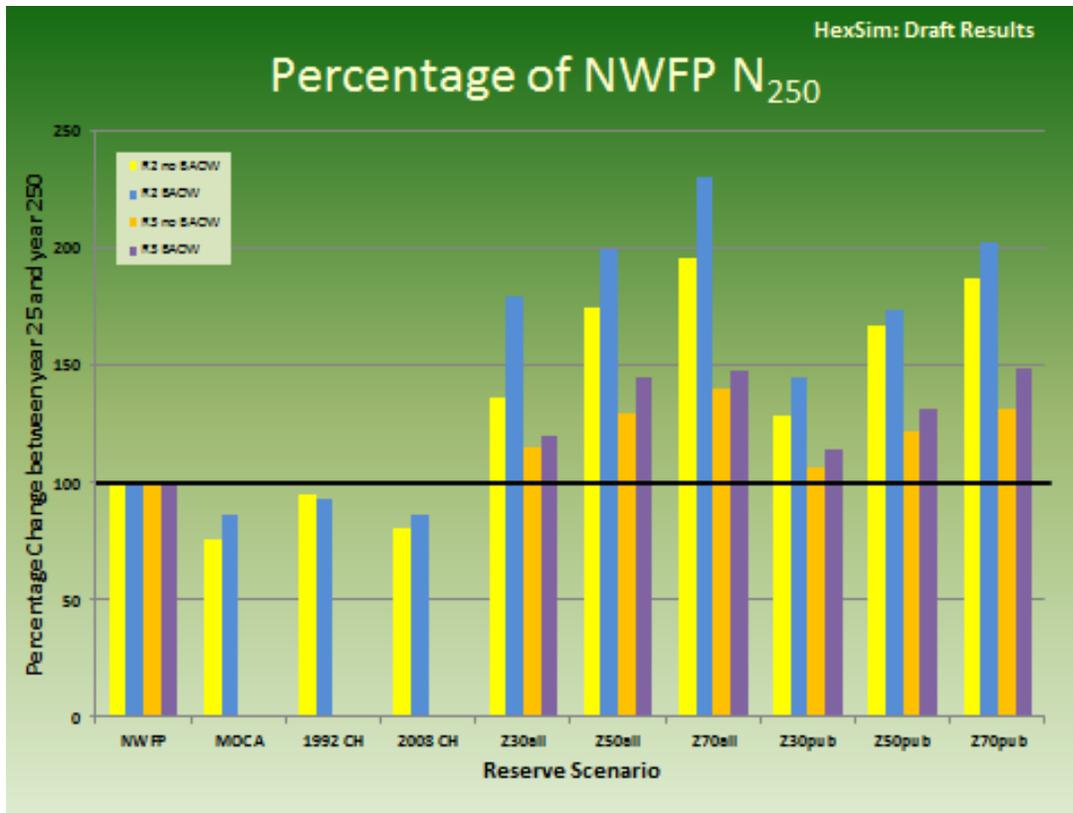


Fig. 3 – The percent difference from the simulated population response of the modeled NWFP reserve system, showing Round 2 without barred owl influences (yellow bars), Round 2 with barred owl influences (blue), Round 3 without barred owl influences (orange bars), Round 3 with barred owl influences (purple bars). Round 3 was not conducted for the MOCAs or the 1992 and 2008 Critical Habitat.

Percentage of Modeling Regions Whose Populations declined by more than 75% between years 25 and 250 (*indication of extinction risk*)

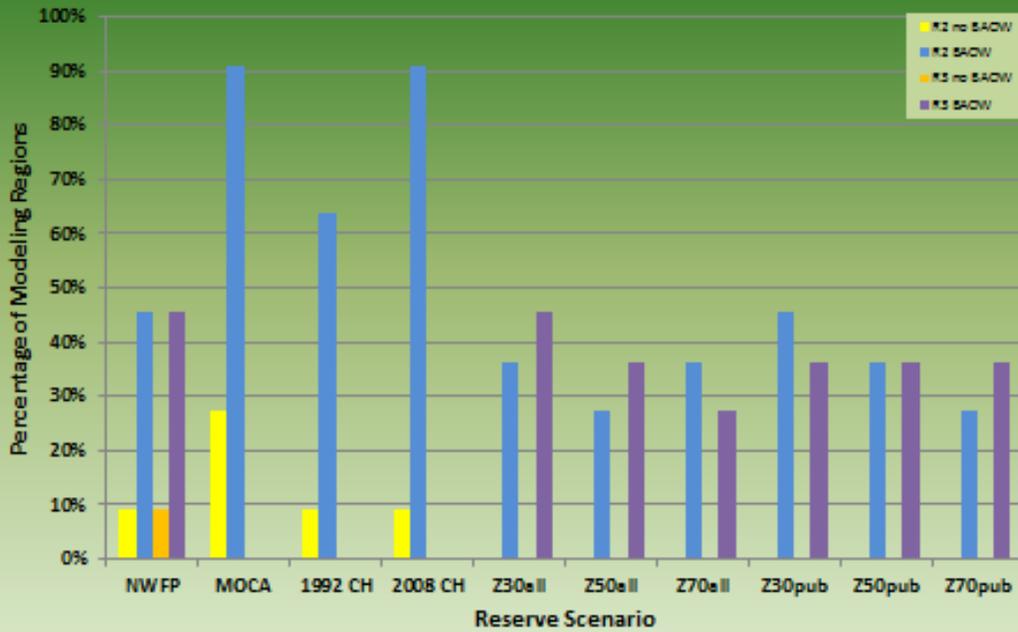


Fig. 4 – The percentage of Modeling Regions whose modeled populations declined by more than 75% between years 25 and 250, showing Round 2 without barred owl influences (yellow bars), Round 2 with barred owl influences (blue), Round 3 without barred owl influences (orange bars), Round 3 with barred owl influences (purple bars). Round 3 was not conducted for the MOCAs or the 1992 and 2008 Critical Habitat.

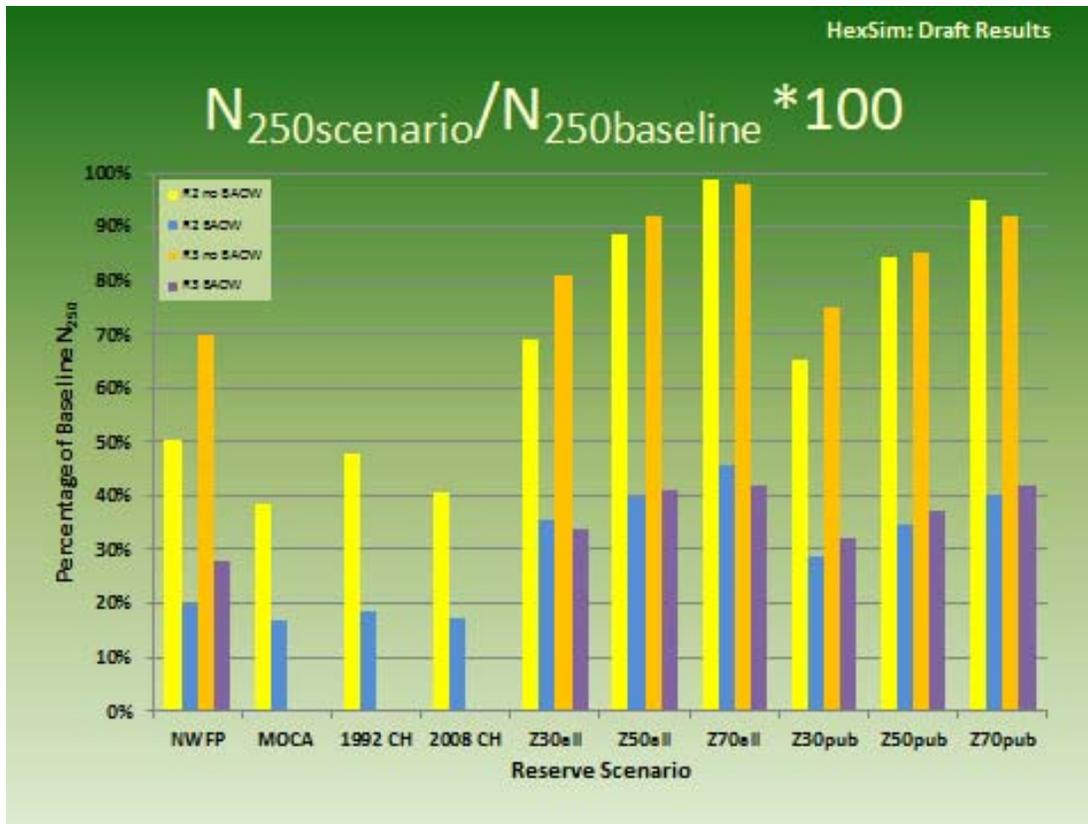


Fig. 5 – The population change over 250 time-steps as compared to the baseline population at time-step 250 in the Round 1 scenario (see Fig. 1). This figure shows Round 2 without barred owl influences (yellow bars), Round 2 with barred owl influences (blue), Round 3 without barred owl influences (orange bars), Round 3 with barred owl influences (purple bars). Round 3 was not conducted for the MOCAs or the 1992 and 2008 Critical Habitat.