

A recent publication on population trend for the Kittlitz's Murrelet in Prince William Sound (PWS) reported a decline of -13% per year since 1989 (Kuletz *et al.* 2011a). This estimate was influenced by an extraordinarily high population estimate. The 1993 estimate in PWS was 9 times higher than the survey before it and 16 times higher than the survey after it. Did large numbers (15,000 to 20,000) of Kittlitz's Murrelet immigrate into PWS in 1993, never to reappear?

I believe there is a simple alternative explanation. Misidentification of murrelet species occurred. There are four special and compelling circumstances in PWS in 1993 that point to misidentification of species.

First, a very low species identification rate: The observers, stationed on three vessels, were only able to identify 11% of the murrelets they saw. The lowest identification rate for any survey before 1993 was 41%, and the lowest rate after 1993 was 79%. It is obvious that identification of murrelets was not easy for most of the 1993 observers.

Second, a very high population estimate: In PWS, the ratio of Marbled Murrelet to Kittlitz's Murrelet was roughly 20 to 1 (mean 1996 – 2007). Therefore, when even a small percentage of Marbled Murrelet is misidentified as Kittlitz's Murrelet, the effect is a large inflation of the Kittlitz's Murrelet estimate. This effect is magnified further when just 11% of the murrelets are identified to species. The combined effect means that in PWS in 1993, a hypothetical misidentification rate of just 2% of the murrelets would result in a 4.3 fold increase in the Kittlitz's Murrelet population estimate. The 1993 population estimate was 4.1 times higher than the 2 surveys prior, and 27 times higher than the 2 surveys after.

Third, an unusually high percentage of the Kittlitz's Murrelet were recorded outside of their core habitat: Kittlitz's Murrelet are found almost exclusively in fjords with tidewater glaciers (Day *et al.* 2003, Kuletz *et al.* 2003). Since Marbled Murrelet are found throughout the Sound, misidentification should express itself as an unusual number of Kittlitz's Murrelet sightings outside of the fjords with tidewater glaciers. Between 1996 and 2007, an average of 12% (maximum 17%) of the Kittlitz's Murrelet was found outside of the core Kittlitz's Murrelet habitat. Yet, in 1993, 65% of the Kittlitz's Murrelet sightings occurred outside of the core habitat.

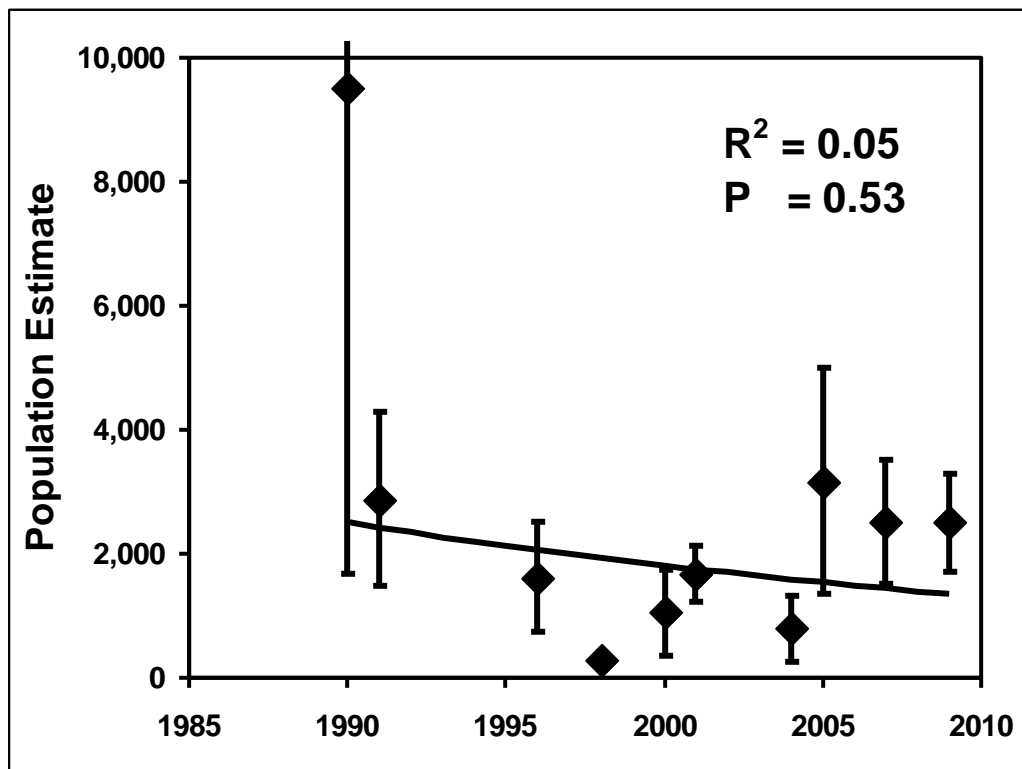
Fourth, the same observers had the same result in Lower Cook Inlet: The same observers conducted a multi-species survey in Lower Cook Inlet in June of 1993 and then conducted the multi-species survey the following month in PWS. They identified only 18% of the murrelets in Lower Cook Inlet, similar to the 11% in PWS. Kuletz *et al.* (2011b) believed the 1993 counts in Lower Cook Inlet were wrong, and assumed that those observers should have recorded half as many Kittlitz's Murrelet in their sample. Kuletz *et al.* (2011b) accepted the total *Brachyramphus* murrelet count in 1993, but substituted the Kittlitz's Murrelet portion with the average proportion Kittlitz's Murrelet seen during the 1996 – 1998 surveys, with this justification: "The survey crews during 1996-1999 had experienced murrelet observers, crew members were fairly consistent across years, protocols were identical, and observers achieved a higher rate of species

identification (77% across all years)”. There is similarly no reason to believe the high population estimate from those same observers a month later in PWS.

Misidentification can not be ignored as a probable cause of the extraordinarily high population estimate in PWS in 1993. One other year, 1989, stands out with similar symptoms of misidentification. These two years should be omitted from trend analysis because of possible corruption from misidentification.

Two other years of data are available for the trend analysis, 2001 and 2009. Those were intensive surveys of the core Kittlitz’s Murrelet habitat. They can be adjusted to represent all of PWS by adding to them the 12% Kittlitz’s Murrelets (mean 1996-2007) that were found outside the core area.

The exponential trend curve for PWS is shown in Figure 1 (whiskers are one standard error). We can have very little confidence that this curve differs from a stable population because of its large P value of 0.53.



REFERENCES

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