

Marbled Murrelets associate with fish prey

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Abstract: Marbled Murrelet presence and abundance was positively related to the presence and density of fish prey.

Key Words: Marbled Murrelet, *Brachyramphus marmoratus*, fish prey, fish finder sonar

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Marbled Murrelets (*Brachyramphus marmoratus*) in Alaska and California are thought to associate with schools of small fish (Ostrand et al. 1998, Becker and Beissinger 2003). We tested the hypothesis that murrelets associate with their prey by comparing counts of murrelets with fish densities in Johnstone Strait, Milbanke Sound in B.C. and Tongass Narrows in Alaska on 66 occasions between 8 and 12 July 2007. We predicted a positive relationship between the presence and abundance of murrelets and the density of their fish prey.

We used a Furuno sounder (model similar to FCV-582L) with a 15–20 degree cone set at 1 m intervals to “identify” and quantify schools of small fish. The sonar uses colour imaging to indicate the density of schools of fish ahead of the boat where red and orange are high density, and yellow and green are low density. We travelled by boat at about 10 knots. At 5 minute intervals, we recorded the number of murrelets in front of the boat and the simultaneously highest density colour on the sounder. We chose a 5-minute interval to allow enough time for the boat to move to a new group of murrelets.

On 66 occasions, murrelets were present more than twice as often when fish were present than when fish were absent (Table 1). The difference is significant (Chi-square test=4.48, df=1, p<0.05). Murrelets were absent about equally often when fish were present and absent (Table 1). However, the number of murrelets that were present was clearly related to the presence of fish. There were 175

Table 1. Number of occasions that murrelets were present and absent when fish prey were present and absent.

	Murrelets present	Murrelets absent
Fish present	19	19
Fish absent	8	20

Table 2. Number of occasions murrelets were counted and the corresponding colour on the sonar. Fish density was highest when the sonar colour was red and orange and lowest when it was yellow and green. Black refers to no fish detected on the sonar.

Sonar colour	Red + Orange	Yellow + Green	Black
No. occasions	20	24	22

murrelets present on 38 occasions when fish were present compared to only 13 murrelets present on 28 occasions when fish were absent (Chi-square test=33.5, df=1, p<<0.001).

The greatest number of murrelets was associated with high density schools of fish (red and orange sonar reading, Table 2), most likely young Pacific herring (*Clupea pallasii*) or Pacific sandlance (*Ammodytes hexapterus*, Nelson 1997).

Of 188 murrelets counted at all 66 of the 5 minute intervals, 166 (88.3%) were associated with fish schools with a median group size of 22 (range 1 to 50 birds). In contrast, only 11 (5.9%) murrelets as singletons or groups of < 4 murrelets were counted where fish school density was low. Murrelets were either in pairs or single birds where fish were absent.

Our study supports the findings of Ostrand et al. (1998) and Becker and Beissinger (2003) that the at sea distribution of murrelets closely mirrors that of its prey. The majority of murrelets in our study were associated with schools of fish and nearly 90% of the murrelets we encountered were with high density schools. Similar findings using different methods in Alaska and California lend support to the hypothesis that murrelets associate with their prey. Not all murrelets were found with schools of fish - small numbers were found where we detected no fish. We do not know if

these murrelets were foraging or resting. How murrelets locate their prey is not clear. Murrelets might sample areas for fish, they might be drawn to the presence of other murrelets that stay on prey (Becker et al. 2003) or they might simply return to known good fishing areas.

We offer a simple method to assess the distribution of murrelets and fish prey at sea. Birders on pelagic trips could contribute to the knowledge of seabirds and prey by employing this method on boats equipped with fish finder sonar.

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