Assessing habitat quality fo

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by Carolyn Whittaker, Extension Specialist, Landscapes and Conservation Biology

The habitat needs of marbled murrelet in coastal British Columbia frequently collide with resource extraction objectives. Thanks to years of research, we have a good understanding of what constitutes high-quality habitat for murrelets. But what tools do we have for assessing habitat and ensuring that good quality habitat is set aside when we establish forest reserves along the coast? How good are these tools at actually predicting where murrelets are nesting?

Forty-two people representing scientific, resource management, and government communities met in late January at a one-day workshop in Nanaimo to address these questions and make suggestions to improve reserve selection for marbled murrelets. Co-sponsored by Simon Fraser University, the BC Ministry of Forests and Range (MOFR) Coast Forest Region, and the BC Ministry of Environment (MOE) as part of the Forest Investment Account–Forest Science Program, and co-ordinated by FORREX, the workshop had the following objectives:

- **Increase the participants' knowledge of three marbled murrelet habitat classification approaches.**
  Marbled murrelet habitat is currently classified using Geographic Information Systems (GIS)-based algorithms, aerial photography (air photos), and low-level aerial surveys. Participants were asked to provide input on how these different approaches may be used to address various habitat management objectives for marbled murrelets. In particular, workshop organizers were interested in getting feedback on how to integrate the different methods to accurately predict marbled murrelet habitat, and in discussing ways to further verify habitat that has been mapped using the different approaches.
- **Increase the participants' knowledge of new research that tests the relationship between habitat-quality ratings and murrelet habitat use.**
  How well do habitat-quality classifications align with actual murrelet habitat use? Presentations at the workshop focussed on this research, giving participants an opportunity to discuss how these results can be used to improve current habitat quality classifications and how they are applied for this species.

During the morning session, several presentations discussed using GIS-based habitat algorithms to predict potential suitable murrelet nesting habitat. **Monica Mather** (MOE) gave a presentation on the algorithm currently used by the Marbled Murrelet Recovery Team for strategically mapping habitat. She emphasized that due to limitations in the availability and scale of relevant forest cover variables, the algorithm is not meant as a substitute for more fine-grained tools for operational planning. Both Mather and **Dave Donald (**MOE) presented information on using low-level aerial surveys for verifying the suitability of the predicted habitat's structure for nesting. **Malcolm Gray** (Integrated Land Management Bureau) focussed his presentation on the usefulness of satellite imagery to correct mapping for estimating annual amounts of potential suitable habitat disturbed since 1985.

Three additional GIS-based algorithms were presented and verification testing discussed for the mid-coast by **Jared Hobbs**, MOE; for the north-coast by **Alan Burger**, UVIC; and for Clayoquot by **David Lank**, SFU. Participants expressed concern regarding the availability, consistency, and accuracy of forest cover inventories that these algorithms rely upon. Some researchers suggested approaches for correcting for these gaps. Also identified was the need to control for potential observer bias when using low-level aerial surveys for verification. Finally, the discussion included some concerns regarding the lack of understanding about the impacts of fragmentation and of edge effects on habitat quality for marbled murrelets, particularly given that structural classifications do not address the productivity of habitat for murrelet breeding success.

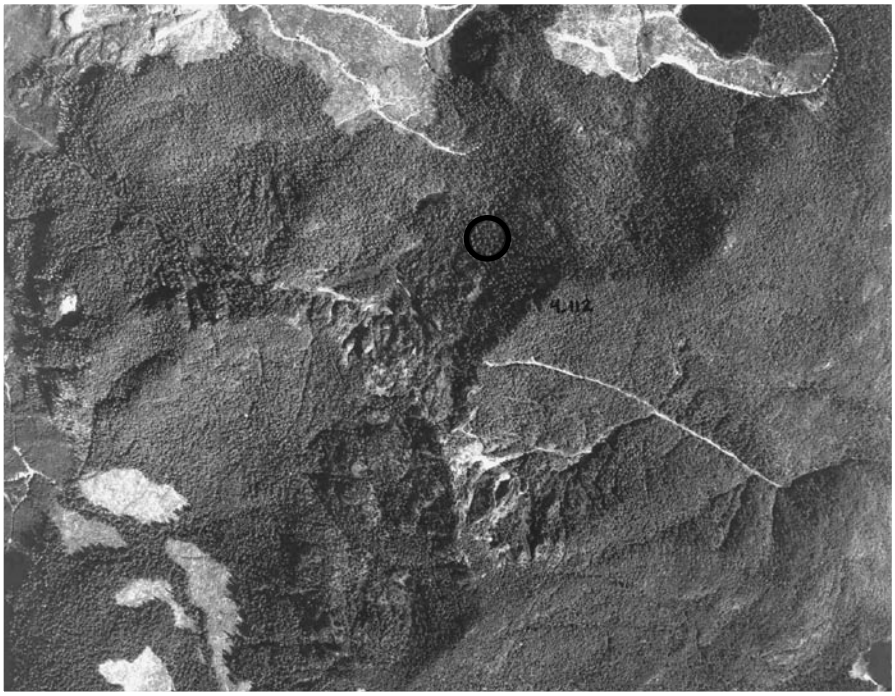
Marbled murrelet facts

The marbled murrelet (*Brachyramphus marmoratus*) is listed as threatened by COSEWIC (Committee on Status of Endangered Wildlife in Canada), is on the BC "Red List" (legally designated or being considered for legal designation as Endangered or Threatened), and is an Identified Species under the *BC Forest and Range Practices Act*. Murrelets forage near shorelines on the coast and nest in the canopies of old forests within approximately 30 km of the coast (Nelson 1997, Burger 2002). Loss of forest nesting habitat is identified as one of the main threats for this species (MMRT 2003).

Because of their tendency to nest solitarily over a large area (the entire Coast) combined with the fact that they do not congregate in large groups at any one time of the year, it is difficult to get accurate estimations of the numbers of marbled murrelets in BC. This lack of population-level data, combined with the ongoing loss of nesting habitat, highlights the importance of the habitat studies and modelling efforts to assess local and provincial population viability.

or management of marbled murrelets

From here, the workshop discussed aerial photography and low-level aerial survey standards for identifying murrelet habitat (***http://wlapwww.gov.bc.ca/wld/documents/fia_docs/mamu_standard.pdf***). **Louise Waterhouse** (MOFR) presented recent research on testing habitat use as described from air photos (1:10 000–1:20 000) and low-level aerial surveys at nest sites for the South Coast and west Vancouver Island. Operational use of these methods for mapping habitat was presented in conjunction with the research. **Alvin Cober** (MOE) presented the work on the Queen Charlotte Islands/Haida Gwaii Air photo Mapping Project. The collaborative coast-wide low-level aerial survey mapping project was presented by **Sue McDonald** (Western Forest Products), **Wayne Wall** (International Forest Products), and **Sally Leigh-Spencer** (Consultant). Discussion of these themes focussed on points of clarification from presentations, availability and verification of the newly mapped data, and differences in amounts of habitat estimated by different methods.



Province of BC photo

Finally, Alvin Cober and Louise Waterhouse outlined a verification approach for the Queen Charlotte Islands/Haida Gwaii Air photo Mapping Project using low-level aerial surveys.

To wrap up the workshop presentations, David Lank (SFU) offered an overview of landscape-level habitat use by marbled murrelets and the importance of considering reproductive success, while **Doug Steventon** (MOFR) gave an overview on how a Bayesian Belief Network model framework may be used to integrate information on habitat quality and murrelet density, and identify potential amounts of different quality habitat to meet management goals. Discussion on this set of presentations focussed on three areas: 1) the influence of baseline data on density estimates of nest sites, 2) the lack of research or understanding of site fidelity and the long-term impacts of natural disturbance, and 3) the need for more information about what happens to murrelets at upper elevations (above 900 m).

In the ensuing discussion, participants suggested a series of research priorities and questions which focussed on the need for some synthesis of the opportunities for using these modelling tools to inform forest planning and operations. Specifically, participants made the following suggestions:

- Establish a publication that outlines the trade-offs between the different tools and methodologies, and provides some direction as to which tool to use where and when.
- Set up studies that link population estimates with habitat studies to better understand the effectiveness of methodologies.
- Create reserves that meet the needs for multiple species wherever possible.

Participants also suggested there is a need for more sharing of data, particularly data obtained at coarser scales using multiple species approaches, including Old-Growth Management Areas, ungulate winter range, and other species. But workshop participants cautioned that using a coarse filter approach for multiple species may mean the risk of losing attributes that are used in fine filters.

Workshop minutes will be available through FORREX, including Web links to currently posted information. For the suggested research opportunities, workshop organizers will explore the potential to synthesize current knowledge on the modelling tools and approaches. Many participants expressed an interest in another workshop focussing on the operational aspects of implementing these management tools and methods.

Alan Burger photo

Top photo: Forest assessed for habitat potential using Air Photo Standards. Bottom photo: Forest assessed for habitat potential using Low-level Aerial Survey Standards.