Summary Report
Airphoto Interpretation of 92 Landscape Units
on the Central Coast, Mid Coast and North Coast
2007 – 2009

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Disclaimer

This report was commissioned by the Ecosystem-Based Management Working Group (EBM WG) to provide information to support full implementation of EBM. The conclusions and recommendations in this report are exclusively the authors', and may not reflect the values and opinions of EBM WG members.

INTRODUCTION

From 2007 to 2009, Brian Smart, RPF, RPBio, and Ann Donaldson, RPF carried out a Marbled Murrelet (*Brachyramphus marmoratus*) (MAMU) habitat mapping project that encompassed 92 Landscape Units within the Central Coast LRMP area, and the Mid Coast and North Coast TSAs. This project report outlines the methodology, use of two systems for the air photo interpretation, and considerations for future projects.

MATERIALS

Airphotos

The Ministry provided the digital airphotos on two sets of three hard drives. Two of the hard drives contain the 2006 midcoast photography. The third hard drive contains the 2007 mid coast-north coast photography. The hard drives also contain the photo indices, and surface and design files required for use by PurVIEW. These hard drives will be returned to the Ministry at the conclusion of the project.

Most of the hardcopy airphotos were provided by the Ministry. A small portion was accessed at the Ministry of Forests Port McNeill office, at the airphoto library in Victoria, or were provided by licensees in the case of some TFL areas. All photos were approximately 1:15,000 scale, and a mix of colour and black and white. The majority were from 1991 to 2006, although a few small gaps in this set of photography for the central coast required going back to older photos, particularly 1988.

Software

The Ministry of Environment supplied the PurVIEW software and associated viewing hardware for this project. PurVIEW ArcGIS Desktop extension, developed by I.S.M. International Systemap Corp. provides a stereo-viewing environment that enables 3D visualization and data capture. PurVIEW interacts directly with the geodatabase, digital elevation models, and georeferenced imagery data and provides for positional accuracy of features and direct editing of the map.

Data

The forest cover mapping was provided by the Ministry on DVD for the central coast LRMP area. Tree Farm Licence forest cover data was provided by the mid coast CIT forest cover, a layer that was put together for the LRMP process. The remainder of the forest cover maps were downloaded directly from GeoBC Data Distribution Service, titled VRI - Forest Vegetation Composite Polygons and Rank 1. The Ministry also provided either 2005 orthos photo images, or 2004 Spot 5 satellite images for areas where hardcopy photos were used and TRIM data for the same areas.

METHODOLOGY

The air photo interpretation was conducted to the standards as outlined in Part II of "Burger, A. 2004. Standard Methods for Identifying and Ranking Nesting Habitat of Marbled Murrelets (*Brachyramphus marmoratus*) in British Columbia Using Air Photo Interpretation and Low-Level Aerial Surveys."

The existing forest cover mapping was the base for the habitat mapping. These forest cover polygons were individually assessed for MAMU habitat suitability as per the protocol. Where the forest cover polygon contained significant areas of different habitat suitability ranking, the polygons were divided accordingly. The amount of polygon division depended on the accuracy and suitability of the existing forest cover mapping, and in general there was less division of polygons for MAMU habitat ranking in the more southern areas which had newer forest inventories.

Where hardcopy air photos were used, the forest cover mapping was overlaid on either 2005 orthos photo images, or 2004 Spot 5 satellite images, as provided by the Ministry, in ArcMAP. Where digital photos were used, the forest cover was overlaid directly on the digital images using ArcMAP and PurVIEW.

The photo interpretation of all forested stands with the protocol's 6 class ranking system was done in stereo on the digital photos where available, or otherwise on the hard copy photos provided. Where older hard copy air photos were used, either the ortho photo images or satellite images were used to update areas that had been logged since the date of the air photos. In the case of these newer logged openings, the ortho or satellite images were used to delineate and class the newly logged openings as rank 5 as per the protocol. For the polygons harvested since the date of the air photo coverage, the air photo interpretation protocol was also applied to the forested pre-harvest stand as a separate entry in the database.

MAMU ranks were entered directly into the forest cover database in ArcMAP. Data checks and quality control were done to ensure that mapsheets were tied together, data entry was accurate, and interpretation was consistent between the two interpreters.

As agreed with the Ministry, shape files of the habitat mapping were submitted as a final product where hard copy airphotos were used. These were then processed for use by the Integrated Land Management Bureau. Where PurVIEW software was used for the digital photos, shape files were submitted to a GIS contractor for cleaning, as geometric errors were introduced during use of the PurVIEW software. This is standard practice for files generated with PurVIEW and the final mapping product is not affected by the temporary errors. The simple file cleaning procedure cost $20 per Landscape Unit. The final mapping files for these landscape units were submitted in e00 ARC/INFO interchange file format.

USE OF PURVIEW AND DIGITAL PHOTOS

There was a learning curve associated with the use of PurVIEW and the initial set-up caused a delay in the start of the project. This was caused mainly by attempting to use the software on a Microsoft VISTA operating system. Vista was a fairly new system at the start-up of the project, and at that point PurVIEW had not been tested with it. We worked extensively with the PurVIEW technical support staff and after some time decided to reinstall the software on a Microsoft XP workstation. PurVIEW users also need to be aware of the graphics card and CRT monitor requirements associated with the program. These requirements are specified clearly on the PurVIEW website at http://www.mypurview.com.

Contrast with Hard Copy Photos

Digital photos and PurVIEW software	Hard copy photos and desktop stereoscope
Can zoom in and out for wider viewing scale range, which is beneficial when looking at more complex stands or delineating polygon breaks	Fixed scale, approximately 1:15,000 photos used for this project
Absolute photo scale is set and known, contributing to consistency in interpretation	Photo scale is approximate and may vary slightly, particularly between flight lines. Extra effort required to keep scale in perspective to maintain interpretation consistency
No photo handling, software automatically focuses on the appropriate stereo photo pair	Handling, sorting, and storage of large quantity of photos, use of photo indices, significant time required to return to a previously viewed flight line or photo pair
Efficiencies resulting from all work carried out on the computer screen, polygon is viewed in just one location and data entry is directly entered into the database in ArcMap. Time savings due to these efficiencies.	Requires looking at the photographs on the desk and locating the polygon in ArcMap on the ortho or satellite photo. Data entry is the same as for the PurVIEW application.
Significant hardware and software requirements including the software licence, stereo viewing eyeware and emitter, quality graphics card, hard drive capacity for photo and other required data storage	Standard computer for operating ArcMap
Extra file cleaning step required in converting shape files to e00 files	Minimal file cleaning required
In this project, the newer digital photography allowed for identification of the most recent cutblocks	In this project, newly harvested areas may have been missed if more recent than the 2004 satellite imagery, or 2005 orthophotos, or not identified in the VRI data

LITERATURE CITED

Burger, A. E. (ed.) 2004. Standard methods for identifying and ranking nesting habitat of Marbled Murrelets (*Brachyramphus* marmoratus) in British Columbia using air photo interpretation and low-level aerial surveys. Ministry of Water, Land and Air Protection, Victoria, BC and Ministry of Forests, Nanaimo, BC. Available at: http://wlapwww.gov.bc.ca/wld/documents/fia_docs/mamu_standard.pdf