ACCEPTED BY TENYO MARU TRUSTEE COMMITTEE, FEB. 2003

TERRESTRIAL SURVEYS OF MARBLED MURRELETS IN THE PACIFIC COASTAL REGION OF THE WESTERN OLYMPIC PENINSULA AND SOUTHWEST WASHINGTON 2001-2002

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Report to the *Tenyo Maru* Oil Spill Trustee Committee
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INTRODUCTION

The Washington, Oregon, and California populations of marbled murrelets (*Brachyramphus marmoratus*) are listed as federally threatened under the Endangered Species Act (ESA) and the Washington population is listed as threatened by the State of Washington. According to the Recovery Plan for the Marbled Murrelet (USFWS 1997), the major factors contributing to their threatened status include loss of nesting habitat and poor reproductive success in the habitat that remains.

As a result of the 1991 *Tenyo Maru* oil spill, the natural resource trustees (Trustees) estimated that 7-11 percent of the total outer coast marbled murrelet population was killed. The Trustee Committee developed the Final Restoration Plan and Environmental Assessment for the *Tenyo Maru* Oil Spill to restore marine birds and kelp injured in the oil spill (Tenyo Maru Oil Spill Natural Resources Trustees. 2000). The Trustees selected an integrative restoration approach as the preferred alternative to restore injured resources. A portion of the integrative restoration alternative includes a habitat-focused restoration where projects would be designed to restore, enhance, replace and/or acquire habitats that provide benefits to a range of natural resources. The goal of the habitat-focused restoration is to provide quality habitat for species injured in the oil spill.

The Trustee Committee recognized the importance of providing quality habitat such that natural processes may result in the recovery of marbled murrelet and kelp injured in the 1991 *Tenyo Maru* oil spill. The final restoration plan for the *Tenyo Maru* oil spill directs habitat-focused restoration through the Marbled Murrelet Habitat Protection and River Silt Reduction Restoration Project. Permanently protecting nesting habitat to recover marbled murrelets is a significant component of the restoration plan.

JUSTIFICATION

Tenyo Maru restoration funds were used above and beyond state and federal agency missions and their regulatory requirements when used to survey private, state, and federal forest lands to determine “occupied” marbled murrelet sites.

Restoration and recovery of marbled murrelets can focus on either improving conditions in the marine ecosystem used by the species for foraging and other daily use, or by protecting inland forest stands used for nesting. The first basic steps in the conservation process for the terrestrial environment are to describe and identify ecological characteristics of murrelet nesting forest habitat, locate the potential habitat on the landscape, and then conduct surveys to determine if the forest stands are “occupied” by murrelets. Occupancy is the status classification that a forest stand is used by the species for nesting.

Research in Washington has provided basic information on habitat characteristics so that potential habitat can be identified (Hamer et al. 1993) There has not been a comprehensive survey of marbled murrelets in the outer coastal region of southwestern western Washington and the western and northern Olympic Peninsula where murrelets impacted by the *Tenyo Maru* oil spill most likely nest. State and federal agencies and some industrial timber companies have conducted surveys in some areas of this region and have found "occupied" stands and "presence" stands. "Presence" stands are stands in which murrelets were detected but nesting behaviors were not observed. There is still some habitat in these areas that has not been surveyed at all. In addition, there are state regulatory procedures which require surveys prior to harvesting potentially "occupied" habitat, but these still allow substantial amounts of habitat to go unsurveyed on non-federal lands and be harvested. For lands or projects that have a federal nexus, there have been requests by the USFWS under ESA Section 7 consultation processes to survey potentially occupied murrelet habitat. If "occupied" stands are located on non-federal land, State Forest Practice Rules regulatory mechanisms can be implemented to provide for protection of those sites. Another approach could be that if "occupied" stands are located on non-federal land, a Habitat Conservation Plan (HCP) may be developed that includes conservation provisions that protect those sites.

The objective of this project is to conduct 2 years of surveys of potential murrelet nesting habitat in the project area, with the goal of locating "occupied" stands. Those stands can then be conserved through fee title acquisition, conservation easements, regulatory procedures, landscape planning, or other strategies.

Without surveys in this area to identify "occupied" stands, nesting habitat will continue to be lost, the species status and population trend will continue to decline, and population recovery will be compromised or precluded.

Protection and Restoration Strategies of Surveys:

Surveys are the mechanism which establish baseline population numbers of wildlife in defined geographic areas of varying scales. They are the means of getting site specific information on wildlife occurrences, habitat associations, densities and range distribution. This information is fundamental in applying management schemes for wildlife conservation. WDFW's Wildlife Resource Data System (WRDS) is the statewide repository in Washington of survey data for endangered and threatened species. Resource agencies, timber companies, and private entities contribute data to WRDS. Many users draw upon WRDS for data and map product outputs for wildlife information upon which to base land use planning and decisions. The statewide Marbled Murrelet Database is a significant component of the WRDS structure.

Site specific data on bird detections and associated maps from marbled murrelet surveys have provided the information for land acquisitions, conservation easements, and reserves for murrelet conservation involving purchase or transfer of land. Surveys are often the foundation for the development of landscape plans for endangered and threatened species.

Landscape plans include the HCP procedure of the Endangered Species Act (ESA) Section 10, Landowner Option Plans, and pilot Landowner Landscape Plans under the state Forest Practice Rules, and the federal Northwest Forest Plan ("Forest Plan Option 9"). In forested landscapes in Washington, the endangered or threatened wildlife species most emphasized in these plans are the spotted owl, marbled murrelet, and salmonids. Typically landscape planning involves conducting field surveys, locating "occupied" and "presence" sites, defining associated habitats, and setting up long term forest management strategies to protect "occupied" stands or maintain adequate habitat on the landscape to support a given number of "occupied" sites. None of this would be possible without quantitative field surveys. Within the proposed project area, WDFW has been cooperatively involved with murrelet surveys for 3 HCPs, which included locating new sites for inclusion into HCPs in development, clarifying "occupancy" status on "presence" stands, and recommending that more sites to be protected through the HCP process.

There are numerous regulatory processes that provide protection to murrelets and their habitat. These include the ESA Sections 4D, 7, and 10; National Forest Management Act (NFMA); the Presidents Northwest Forest Plan, National Environment Policy Act (NEPA); State Environmental Policy Act (SEPA); Shoreline Management Act (SMA); Migratory Bird Treaty Act (MBTA); the Revised Code of Washington (RCW), Title 77 Wildlife; and the state Forest Practices Act.

The common theme in most of these processes is that there are requirements to gain site specific status information on an endangered or threatened species. This is the basic purpose of surveys when evaluating a management action's effect upon a species or when developing a conservation management strategy.

If a proposed activity then is found to impact marbled murrelets, mitigation or site specific protection measures such as binding management plans which exclude "occupied" sites from development or harvest will be implemented. These measures may be within a state or federal regulatory framework or landscape planning as described above.

In 1992, pursuant to federal and state listings of the marbled murrelet as a threatened species, the Washington Forest Practices Board passed emergency rules for the protection of known "occupied" sites. During the ensuing five years the Board developed the current Washington Forest Practices Board Permanent Rules for the Marbled Murrelet which became effective August 22, 1997. The following summarizes key features of the Rule:

1. Protects all known "occupied" sites.
2. Requires landowners with known "occupied" sites and suitable habitat to survey habitat on which they propose a forest practice.
3. Provides a definition of murrelet habitat, nesting platforms, and "occupancy" for the Rules' regulatory purposes.
4. Establishes habitat definition thresholds to determine where surveys would be required.
5. Establishes "detection areas." The square mile section of land in which a murrelet is detected plus the surrounding 8 sections.

6. Lists five State Environmental Protection Act (SEPA) triggers that would put a forest practice into the Class IV- Special classification; further environmental review would be required under SEPA.
7. Sets up SEPA guidance to assist the DNR.

In developing the rules the Board emphasized that its mandate was to avoid substantial material harm to the environment and not to provide for 100% protection or recovery for all murrelets and their habitat on non-federal land in the state. Correct implementation of the rule therefore still has the potential to put landowners at risk of a take of marbled murrelets under the ESA. The rule's definition of murrelet habitat is structured to be most easily implemented in a field forestry application, whereas the definition used in the Pacific Seabird Group (PSG) Survey Protocol is more broadly stated in ecological terms.

The "presence" of nesting platforms is the most important stand characteristic for predicting murrelet use of a site. The definition of a nesting platform in the rules is a platform width 7 in (18 cm) or greater, whereas the PSG definition is 4 in (10 cm) or greater. Surveys are required when a forest stand meets the regulatory definition and has 7 or more platforms per acre, or if it is in the special southwest Washington zone and has 5 or more platforms per acre, or if it is in a detection area and has 2 platforms or more per acre.

The ecological models and derived probability levels that were used to develop definitions and thresholds were correctly based on an analysis of real empirical field data from several projects. The result of the application of these differing definitions and thresholds is that if they were applied to currently known "occupied" sites, significant numbers of those known "occupied" sites and unsurveyed potential habitat would fall out from this screening procedures, would not require surveys, and could be harvested. This survey project was structured to locate some of those "occupied" sites that are missed by the current rules.

Within Washington, the most powerful non-federal regulatory process that protects "occupied" murrelet sites on state and private forest lands is the Washington Forest Practices Act Marbled Murrelet Rules described above. Oregon and California do not have state regulatory processes as powerful as Washington. British Columbia does not have regulations as protective.

The Forest Practices Act regulates how and when forest landowners may harvest timber in a manner to avoid harm to the state's environment including endangered and threatened species. The implementation of the Rules has resulted in the protection of more than 150 forest stands "occupied" by murrelets on private and state forest lands since 1992. A summary of how this occurs is provided below:

1. A forest landowner submits a Forest Practices Application (FPA) to harvest forest on a geographically defined parcel of land to the DNR.

2. The DNR's Forest Practices Division screens the FPA through an interactive online computer link with the WDFW's WRDS database for species of concern.

3. If an "occupied" murrelet site is in the FPA proposed harvest unit or is connected as part of a contiguous stand of timber, the FPA is classified as a Class IV Special due to significant impacts to a threatened species and is not approved for harvest. A Special Wildlife Management Plan (SWMP) as per WAC 222-16-080(6)2 in the Rules is developed by the landowner in consultation with WDFW and the to protect the site and if possible proceed with a mitigated Declaration of Nonsignificance to harvest away from "occupied" portion of the stand.

4. Typically a site specific SWMP for murrelets will have a defined no cut zone, surrounded by a managed buffer of non-habitat and will have timing and operations restrictions to minimize disturbance to nesting birds from permitted operations nearby. These "occupied" stands will always be protected until such time that the habitat may become unsuitable through such stochastic events such as fire, windstorm, catastrophic tree disease or other event.

PROJECT MISSION

Provide quality habitat to enhance natural recovery of marbled murrelets.

PROJECT GOAL

The goal of the marbled murrelet component of the *Tenyo Maru* Restoration Plan is to permanently protect marbled murrelet nesting habitat and/or forest stands next to marbled murrelet nesting habitat. This permanent protection would occur at locations not presently protected under other regulations and are at risk of being logged, or where permanent protection will significantly enhance the future habitat availability for marbled murrelets.

PROJECT OBJECTIVES

(1) Select and prioritize forest stands of marbled murrelet habitat in the Project Area for surveys in 2001 and 2002.

(2) Conduct surveys of those sites that currently are of unknown or undetermined status and/or are unprotected marbled murrelet habitat.

PROJECT AREA

The project area was in coastal western Washington. The northern boundary is the northernmost Olympic Peninsula; the southern boundary is the Columbia River; the western boundary is the Pacific Ocean, and the eastern boundary is approximately 50 mi (80 km) inland from the marine waters which along, the Strait of Juan de Fuca, extends to about Observatory Point.

The project area encompasses all of the Sitka spruce (*Picea sitchensis)* zone and part of the

western hemlock (*Tsuga heterophylla)* zone in Washington, as described in Franklin and Dyrness (1973). These major vegetation zones are within the temperate coniferous forested region of the Olympic Peninsula and Coast Range physiographic provinces where the climate is characterized as mild and the dominant coniferous tree species can be large and long-lived.

METHODS

The 2000 Pacific Seabird Group (PSG) *Methods for Surveying Marbled Murrelets in Forests: A Protocol for Land Management and Research* (Ralph et al. 2000) defines the classification of sites on page 6 as follows:

Probable absence: A site of potential habitat where no murrelets were detected after the requisite number of surveys.

Presence: A site of potential habitat where murrelets were detected, but subcanopy behaviors were not observed. Additional survey effort is required at areas with birds present to determine whether or not a site is occupied. Presence sites include those with:

- non-stationary audio detections
- birds flying in small- or large-radius circles about the canopy. In Washington, circling at or below a height of 2 canopies is considered an occupied behavior by WDFW standards and the Washington Forest Practices Board Rules (1997).
- above-canopy dives (that do not end below the canopy) or other above-canopy flight

Occupied site: An occupied site is defined as a site where at least one of the following subcanopy behaviors or conditions occurs:

- discovery of an active nest, a recent nest site as evidenced by a fecal ring or eggshell fragments...on structures in the forest canopy, or an old nest cup and landing pad
- discovery of a downy chick, an egg, or eggshell fragments on the forest floor
- birds flying below, through, into, or out of the forest canopy within or adjacent to a site of potential habitat. This includes birds flying over or along roads, young stands, or recently-harvested areas adjacent to potential habitat. However, only the adjacent sites of potential habitat should be classified as occupied. Additional surveys may be required in some cases to determine which site is occupied. Some subcanopy flights, such as low-flying birds observed in steep canyons or crossing ridge lines in non-habitat areas, are not associated with the site of interest and should not be considered occupied behaviors. Questions about flight behavior and occupancy should be directed to your regulatory agency for resolution.
- birds perching, landing, or attempting to land on branches
- birds calling from a stationary location within the site. A detection should be considered 'stationary' when three or more calls are heard at less than 100 m (328 feet) from the observer, and the position of the bird does not appear to change. Detection of stationary calling is rare in most regions.

Survey Areas:

Within the project area, 27 and 32 survey areas were selected in 2001 and 2002, respectively **(**Figure 1, 2**)**. Survey areas were on federal, state, and private industrial forest lands where access was granted. The amount of suitable habitat at sites surveyed ranged from approximately 5 ac to 270 ac (2 ha to 109 ha).

For the purpose of determining survey coverage at each survey area, we used an area of theoretical coverage around the fixed-point survey stations from where we surveyed. Pacific Seabird Group (PSG) Marbled Murrelet 2000 Survey Protocol (Evans et al. 2000) states that "up to 12 ha (30 acres; roughly equivalent to the area of a 200-m radius circle)...is the maximum coverage for a single station. In many cases, each station will cover less." We used an area of 15 ac (6 ha), roughly equal to a 453 ft (138 m) radius circle per station.

Survey stations either addressed all or part of a survey area, and survey areas did not always include all contiguous suitable murrelet habitat. It is important to note that if "occupancy" status is obtained at 1 portion of a stand, then the "occupancy" status applies not only to the immediate area but also to all contiguous, suitable marbled murrelet habitat (Evans et al. 2000). This results in more area being protected than just that of the immediate area.

In 2001, all of the areas selected had been previously surveyed, so habitat evaluations of suitable murrelet habitat had previously been done by landowners and/or their consultants. Except for areas on WDFW land, the areas had received at least 2 years of surveys. In 2002, 25 survey areas had been previously surveyed; the remaining 7 which had not been surveyed previously.

Emphasis was placed on selecting survey areas that had "presence" status, that is, areas where marbled murrelets had been previously documented but "occupied" behaviors had not been detected. More areas with "presence" were selected on the rationale that with additional intensive survey effort at those areas, the likelihood of detecting murrelet "occupancy" behaviors was greater than at areas in which previous surveys had not detected murrelets. Most of those areas had either received inadequate to minimal survey efforts or had problems with prior surveys which when analyzed from a biological and landscape perspective, suggested that those stands were probably "occupied." The "presence" status of these survey areas did not protect them from harvest or other forest practice activities.

Most of the areas had "moderate" to "high" quality habitat, i.e. $\geq$2 platforms per ac, but several included some "marginal" quality habitat with few nesting opportunities. All areas with marginal quality habitat had been surveyed before, had multiple marbled murrelet "presence" detections, and were relatively isolated on the landscape. Isolated patches of habitat with multiple presence detections have a high probability of being occupied when greater survey effort is expended. These stands have significant value for the distribution of marbled murrelets over the range of the species within the project area.

Suitable murrelet habitat is ecologically defined as forest stands within 50 mi (80 km) of marine waters with at least 40 % of the dominant and co-dominant trees as western hemlock, Douglas-fir, western red cedar, or Sitka spruce, generally below 3,000 feet in elevation (Hamer et al.

1993). This habitat includes old growth stands, mature stands, with or without an old growth component, and younger coniferous forests that have platforms (Evans et al. 2000). The critical element in stand suitability and quality is the presence of potential nesting platforms on trees within the stand.

The Washington Forest Practices Rules (1997) is consistent with the Pacific Seabird Group 1994 Marbled Murrelet Survey Protocol (Ralph et al. 1994) which defines a potential nesting platform as "any horizontal tree structure such as a limb, an area where a limb branches, a surface created by multiple leaders, a deformity, or a debris/moss platform or stick nest equal to or greater than 7 inches in diameter including associated moss if present, that is 50 feet or more above the ground in trees 32 inches in diameter at breast height (dbh) or larger (i.e., generally more than 90 years of age), and is capable of supporting nesting marbled murrelets." The PSG 2000 Protocol defines the size of a platform as greater than 4 in in diameter and the height as 33 ft or more above the ground.

"Void areas" are blocks of the landscape where no murrelets have been detected or potential habitat has not been surveyed under the Forest Practice Rules thresholds for survey requirements. Any detection that this project observes in a void area will elevate it to a detection area, thereby lowering the survey requirement threshold to the 2 platforms/acre classification versus the 5 platforms/acre classification for habitat in southwest Washington and the 7 platforms/acre in the remainder of western Washington that is not in a detection area. That will have the conservation benefit to murrelets of increasing the likelihood that occupied sites will be found by the increased regulatory survey effort required for forest landowners in the future.

In 2001, 2 "void" areas were selected: WDFW John's River Wildlife Area and WDFW Smith Creek Wildlife Area. The WDFW has no plans to adversely modify the habitat in these 2 State Wildlife Areas. The reason to survey them was that they are strategically located in void areas of landscapes which are primarily owned by industrial timber companies. WDFW ownership provided access and a location to establish a survey area.

In 2002, 11 "void" areas were selected: # 28, # 29, # 33, # 34, # 36, # 39, # 43, # 49, # 51, # 52, and # 59. These areas were on DNR managed lands in sections bounded mostly by private timber company lands in the same or adjacent sections.

Survey area selection involved the following 5 steps:

1) Potential survey areas were first evaluated using GIS maps at a 1:100,000 scale which presented digitized marbled murrelet "occupied" and "presence" detection point locations in the project area, and also Sections (1 mi square or 1.6 km square) where surveys occurred but murrelets were not detected. These maps were produced by the WDFW Wildlife Resources Data Systems (WRDS) in the Science Division.

   The WDFW WRDS is the statewide repository for marbled murrelet survey information. Most federal, state, tribal, and private entities submit survey data to WRDS. WRDS maps are not complete, however, because some entities do not contribute their survey

data to WDFW, and also because not all suitable murrelet habitat in the state has been surveyed.

In addition, the maps can only show what is currently processed in the database. There is frequently a lag of months between the time when a new detection occurs and the time it is processed into the data systems and maps updated by WRDS. This is primarily because survey data are not submitted promptly by some entities, or less frequently, are received but not immediately processed by WRDS.

To delineate "presence" and "no-detection" stands from "occupied" stands, it was important to distinguish isolated "presence" or "non-detection" areas from "presence" points or non-detection sections in close proximity to "occupied" stands. To make these determinations, it was necessary to visually inspect the maps to identify individual or clusters of "presence" and "non-detection" point locations that appeared to be separate from "occupied" point locations. Operationally, "presence" or "non-detection" point locations were considered potentially isolated from occupied sites if they were ≥ 0.5 mi (0.8 km) from the nearest "occupied" site. These potentially isolated locations were then circled and the townships, ranges, and sections of these areas recorded.

2) It was then necessary to further verify that these potentially isolated locations (i.e. potential survey areas) were not contiguous with suitable habitat of other "occupied" areas. Otherwise they would be considered part of the same stand and considered to have the same "occupied" status. It was also important to determine whether stands with potential survey areas still existed or had been harvested. Using the townships, ranges, and sections of the areas of interest, orthophoto maps for these locations were examined in conjunction with detection information.

   We used quarter township 1:12,000 transparent overlays produced by WRDS that showed digitized "occupied" and "presence" point locations and placed these over their corresponding DNR 1:12,000 orthophoto maps. WRDS also generated 1:12,000 quarter township maps showing the DNR Olympic Region survey area polygons that had been provided by DNR. Murrelet point locations were included on these maps.

   By using these various map products, stand contiguity could be evaluated and isolated "presence" or "no-detection" stands could be selected. However, the orthophoto maps were based on 1994 or 1996 flights, so stand information was not current.

3) Once locations of potential survey areas were identified from the orthophoto maps, determining land ownership was necessary. WRDS provided most of this information from the Marbled Murrelet Data Base which had ownership information derived from survey field forms. 1:12,000 DNR orthophoto maps were also helpful for identifying DNR ownership.

4) Landowners were contacted and permission requested to access and conduct murrelet surveys on their lands. The Project Coordinator initiated contact with landowners and

explained the objectives of the project.

Cooperative landowners were identified and the Project Leader provided lists of specific candidate survey areas to landowners. Landowners were also asked to provided current forest stand information regarding selected stands, directions to survey areas, information regarding safety or logistical considerations relative to logging traffic or other operations in vicinity of selected stands, and information about their own survey plans, if any.

5) Field inspection of most of the survey areas was accomplished by the Project Leader and survey crews in May 2001 and April 2002. Crew Leaders acquired survey area maps and station directions from most landowners. We also used DNR Washington State Public Lands Quadrangle 1:100,000 maps and 1:12,000 DNR orthophoto maps to locate survey areas.

   Survey areas with dangerous or difficult physical access were rejected. Finally, a number of acceptable areas were selected for an initial list. We determined the initial number of areas to survey based on the number of surveyors available, the number of weeks in the survey season, and anticipated visit results. If time allowed, reserve areas could be added to the initial list of surveys.

In 2001, 8 of the 27 survey areas were selected through a different process than that described above. Prior to 2001, WDFW reviewed some survey efforts conducted by some landowners and found that remedial surveys were needed because of compliance problems with PSG Survey Protocol standards. In 2 other cases, the landowner's consultants identified survey problems which necessitated remedial surveys. Remedial surveys are additional surveys to compensate for prior surveys which were unacceptable due to environmental or protocol compliance problems. WDFW was invited to participate in re-surveying those survey areas in 2001. Each survey area had documented murrelet "presence" previously.

In 2002, 9 of 32 survey areas were selected in coordination with DNR who helped us identify previously unsurveyed suitable habitat or "void" areas in the Olympic Region.

Landowner Coordination:

We coordinated our surveys with landowners and/or their consultants. We told them we would notify them of any new detections, usually within 24 hours after the detection(s) occurred, and then send them copies of the detection data, usually within a week after notification. Non-detection data were to be sent after the end of the survey season. We also asked landowners if they planned to conduct their own surveys, and whether their surveys might be near our survey areas. This was important because an "occupied" detection at one area might influence an adjacent survey area due to contiguity of suitable habitat; therefore, survey plans and schedules would be affected. Visits to a survey area generally cease when "occupied" detections are documented unless additional information is desired.

On Simpson Timber Company (STC) land, the USFWS and STC consultants, Resources Northwest, Inc., joined us to cooperatively survey 2 survey areas: Survey Areas #6 and #8. With the exception of 1 survey area on DNR managed land, #42, we were the exclusive surveyors of our survey areas on lands managed by the USFS, DNR, Washington State Parks & Recreation Commission, and WDFW. With respect to the Weyerhaeuser Co., we were invited to accompany their observers to their stations during their survey visits, which we did. Weyerhaeuser wanted to have their observers verify any murrelet detections seen or heard by our observers, and required that we use station locations chosen by them.

Training of Survey Personnel:

Most survey crew personnel were hired in April in both 2001 and 2002. In 2001, WDFW survey personnel comprised 2 crews of 6 to 7 staff and 5 WDFW Region 6 staff. All survey personnel received current marbled murrelet survey training by WDFW. New observers were required to attend a week long session which covered the ecology of marbled murrelets and the survey protocol and pass a rigorous field test to qualify as officially certified observers. Prior to their hiring, all crew members received a current year hearing and vision test; normal hearing and normal vision were employment prerequisites. Four of 5 WDFW Region 6 staff were experienced observers, however, they were required to be recertified by passing a current year field test and also receive current year hearing and vision tests.

In 2002, the same Region Six staff were available and 5 survey crew personnel who worked on the project in 2001 were re-hired This continuity was very valuable since these people brought experience and expertise back to the project.

Surveyor training occurred during the last week of April in Long Beach, Washington. It was scheduled to coincide with the best time to see and hear murrelets at an area known as the Nemah Natural Resources Conservation Area (NRCA) on DNR managed state land in Pacific County. In addition to this training, survey crews also received a mid-season "refresher" visit at the Nemah stand in July to see and hear murrelets, as recommended by PSG 2000 Protocol.

In 2001, during the second week of April, survey crews received another week of training which covered the following: agency and project orientation, first aid certification, 4-wheel driving skills, how to handle bear and cougar encounters, orientation to the WRDS, and map and compass orienteering which included field exercises. Additionally, later in the season, crews received WDFW radio training. In 2002, GPS training was added. Since the majority of personnel were returnees from the previous year, it was not necessary to have as extensive training as was done in Year 1 of the project.

In April 2002, murrelet detection numbers were lower than normal at the Nemah NRCA training site, however, they were sufficient to evaluate and certify survey personnel. In May, except for 1 week, detection levels dropped so low that a newly-hired crew person initially could not be

certified. This individual was later certified in early June at a 2002 survey area near Forks where we had observed high detection numbers earlier in the survey season. In July, detection levels returned to normal at the Nemah NRCA. Survey personnel received mid-season refresher training at the Nemah NRCA and at the Forks vicinity stand.

Station Layout:

For some previously surveyed areas, we had directions to preestablished survey stations. DNR 1:12,000 orthophoto maps were also used to aid us in finding these stations, and in identifying potential new station locations prior to visiting the station in the field. Station locations were then checked in the field to determine if they would be suitable. On STC and Weyerhaeuser Co. lands, consultants laid out the stations at their survey areas. Part of this station layout involved consultation with WDFW.

In areas we exclusively surveyed, the process of station layout was dependent on the results of each sequential visit. For example, 1 or 2 stations were established prior to the first visit at a survey area, but if murrelet "occupied" behaviors were detected then the effort of establishing additional stations was not necessary because the visits would stop. If "occupied" behaviors were not detected and the survey area could benefit from the addition of another station, then another station was added for the next visit. In these areas, we did not always reestablish the original stations used during previous surveys. Some of the existing station locations had high canopy cover and poor views of the sky or stand. Some of this was due to features changing over time.

We often established new stations at locations where we could maximize our view of the sky relative to the survey area to increase our visual opportunities to see potential murrelet "occupied" behaviors. In addition, in many survey areas we did not cover 100% of a stand per PSG 2000 Protocol, but established stations only at locations with good views of the sky. As a result, we generally located stations on the outside edge of our survey areas on roads or in clearcuts or along road openings inside the survey area. This selective method of survey station layout has been a successful approach used for WDFW surveys in Southwest Washington from 1997 to the present. In survey areas where there was marginal habitat, we established stations to best visually and audibly cover available potential nesting trees.

At some survey areas, we had "supplementary" stations that were intentionally placed greater than 164 ft (50 m) from the edge of the suitable habitat where we had good views of the stand. Binoculars (7 x 50 mm) were used to aid our observation capabilities. We also placed stations at river locations which afforded good views of habitat despite river noise that could interfere with an observer's hearing.

In the field, survey crews identified station locations with a combination of colored, plastic flagging which they tied to trees or other vegetation. They marked the flagging with an indelible pen with a unique station letter or number for that survey site. Survey crews also flagged cross-country trails to stations, wrote narrative directions to new stations, and mapped station locations on 1:12,000 orthophoto maps. Garmin 12 XL and Garmin Etrex Global Positioning System units were used in the field to obtain information for mapping station locations. This GPS units were particularly useful for helping us map the location of some stations in the interior of stands where

points of reference were not visible.

Survey Methods:

Survey visits to all survey areas were individually conducted according to PSG 2000 survey protocol standards with respect to time of year to survey, visit start and end times, and observation of environmental considerations, i.e. if auditory or visibility problems exceeded 12 minutes during the first 2 hours of the visit, then the results of that visit were inconclusive and the visit considered "non-protocol."

The majority of visits conducted were also considered additional to survey visits done in past years. As a result, except for remedial surveys, it was generally not necessary for us to strictly observe certain elements of protocol such as having a minimum 6-day spacing between visits, alternating stations visited, or conducting a requisite number of visits per survey area during the survey season.

In 2002, we applied the same survey strategy as in 2001. We did, however, strictly follow protocol procedures for previously unsurveyed areas provided that we could initiate our survey visits to these areas by the third week of May per protocol recommendations. We maintained a reserve list of unsurveyed areas that we could draw from when "occupied" status was determined at other areas. For those unsurveyed areas selected for survey after the third week of May, strict protocol procedures could not be implemented since the survey visits would not be spread throughout the entire survey season.

Most of our survey areas were scheduled to receive more than 5 visits. The STC was required by the USFWS to conduct a minimum of 10 visits to their "presence" status survey sites in accordance with their HCP. At the request of the Weyerhaeuser Co., WDFW conducted 5 visits in tandem and at the same stations with Biota Pacific Consultants to their "presence" status survey areas.

In 2001, from May 7 to July 4, we extended visits 30 minutes at the end of the standard 2-hour visit when we had foggy or rainy conditions or 100% overcast conditions involving low, dark cloud cover. From July 5 to the end of the survey season on August 7, we extended visits 30 minutes regardless of environmental conditions to maximize our chances of detecting murrelets, especially since this time frame included the "peak activity period" when murrelet activity is known to increase. In 2002, we extended all visits 30 minutes regardless of environmental conditions.

We used 15 ac (6 ha) per survey station to represent the amount of area of suitable habitat theoretically covered by stations which we surveyed.

We frequently conducted "tandem visits" to survey areas. A tandem visit is one in which more than one observer does a survey visit on the same morning at the same area. This can be at the same station or a different station. We generally did tandem visits with observers at different stations to address different locations of a survey area.

Documentation of Surveys:

Survey personnel verbally documented their survey visits using hand-held mini-cassette tape recorders. This enabled observers to be constantly looking and listening for detections during their visits. Observers recorded specific information about environmental conditions and their visit results. If a murrelet was seen and/or heard, detailed data were recorded about the detection. After a visit, observers transcribed their taped information onto the standardized Washington Marbled Murrelet Survey Form and mapped any detections using indelible markers on 8.5" x 11" mylar overlays at a 1:12,000 scale.

Detection data were prioritized ahead of non-detection data for submission to WRDS and affected landowners. Before the detection information was disseminated, it was reviewed and evaluated by Crew Leaders on the morning of the observation with the observer to ensure the data were accurate, and then sent to the Project Leader who reviewed the data again. Throughout the survey season, Crew Leaders also reviewed non-detection data and submitted it to the Project Leader.

After the 2001 and 2002 survey seasons ended, the Project Leader compiled all survey data to conduct a final review of the data to ensure they were error-free and verify that all data had been submitted. The Project Leader then wrote visit summaries presenting the results of Year 1 and Year 2 surveys for each survey area. Copies of the non-detection data, visit summaries, and survey area maps were sent to the various landowners. This information was also given to WRDS for processing into the Marbled Murrelet Database.

Distribution of Survey Sites:

For the purpose of prioritizing survey efforts for survey area selection, analysis, and management, the project area was divided into 3 stratified bands based on distances inland from marine waters: (1) "near-shore inland band" which was 0 mi to 10 mi (0 km to 16 km) inland ; (2) "mid-inland band" which was >10 mi to 20 mi (16 km to 32 km) inland; and (3) "far-inland band" which was a >20 mi to 50 mi (32 km to 80 km) inland. Marbled murrelet "occupied" sites have been recorded as far-inland as 52 mi (84 km) in Washington (WDFW Wildlife Resources Data Systems).

Table 1 lists 2001 survey areas by the inland bands in which they occur. Twelve areas were selected in the near-shore or mid-inland bands north of Grays Harbor; these areas were nearest the site at which the *Tenyo Maru* sank, resulting in the oil spill. Three additional areas were selected north of Grays Harbor in the far-inland band approximately 25 to 30 mi (41-49 km) inland. South of Grays Harbor, 12 areas were selected in southwest Washington, 8 in the near-shore and 4 in the mid-inland bands.

Table 2 lists 2002 survey areas by the inland bands in which they occur. Twenty-seven areas were selected in the near-shore or mid-inland bands north of Grays Harbor. South of Grays Harbor, 5 areas were selected in the near-shore and mid-inland bands in southwest Washington.

RESULTS

All survey data and results from this project have been incorporated into the WDFW Wildlife Resources Data Systems (WRDS) Marbled Murrelet Database. This database is a component of the WRDS which is the statewide repository for species of concern information, especially for site specific data. The information is stored in various electronic formats in use by contemporary Geographic Information Systems (GIS) and digital databases. Resource agencies and other entities have cooperative agreements to access WRDS data directly online or by custom retrieval. The USFWS, USFWS, DNR Forest Practices Division, and Washington Department of Transportation regularly use this information for their regulatory and planning needs.

Combining 2001 and 2002 survey results, WDFW found 38 "occupied" survey areas that totaled 2,907.9 ac (1,176.8 ha). Of these 38 "occupied" survey areas, 31 had been designated previously as "presence" survey areas, 2 had been surveyed but had no detections, and 5 had never been surveyed.

For the purpose of analysis in this report, we based our status determinations of survey areas on DNR managed lands on the definition of occupancy as the DNR has been interpreting PSG Protocol and only recognizing subcanopy behaviors as indicative of occupancy, i.e. behaviors detected at 1.0 canopy heights or less. The regulatory mechanism for the protection strategy of all "occupied" sites on DNR managed lands is the DNR HCP. Low level circling, i.e. murrelets seen circling greater than 1.0 to 2 canopy heights, was observed at 1 survey area, # 31, and is considered an "occupied" detection under the WDFW and the Washington Forest Practices Rules definition.

As of December 31, 2002, project expenditures for both years totaled $411,918. Project personnel were directly responsible for obtaining 38 of the 41 "occupied" survey areas (Tables 1 and 2). These figures do not include Survey Area # 31 because it does not meet the DNR HCP definition of occupancy. This equates to a cost of $10,840 expended for each "occupied" survey area. Given that the total "occupied" area for all 38 survey areas was 2,908 ac (1,176.8 ha), project costs averaged $142 per "occupied" acre. Actual costs of the 1,968.5 ac (894.8 ha) surveyed of the 4,454.0 ac (2,024.5 ha) for all survey areas was $209 per surveyed acre. The difference between the $142 per "occupied" acre and the $209 per "surveyed acre" is that the latter will be a higher number because not all of the total area surveyed was found to be occupied.

The following are survey results by year.

2001:

Survey visits began May 7 and ended August 7. WDFW survey personnel conducted 354 visits to 27 survey areas (29 survey sites), 25 of which had previously been designated as "presence" areas. Of these 25 "presence" areas, 17 (68%) were classified as "occupied" in 2001 based on survey results of WDFW combined with survey cooperators; the remaining areas retained their previous status. Two of the 17 areas were documented as "occupied" by DNR and USFWS surveyors.

North of Grays Harbor, all 15 survey areas surveyed had been designated previously as

"presence" areas. Of these, 13 (87%) were found to be "occupied" in 2001. The remaining 2 areas retained their "presence" status in 2001. Of the "occupied" sites, 6 (46%) were in the near-inland band, 4 (31%) were in the mid-inland band, and 3 (23%) were in the far-inland band.

South of Grays Harbor, 10 of 12 of these survey areas formerly had been designated as "presence" areas. Four (40%) of the 10 "presence" areas were found to be "occupied" in 2001 as a result of WDFW survey efforts. The remaining 6 areas retained their "presence" status in 2001. No detections were recorded in 2001 at the 2 areas that had "no detections" recorded during surveys in previous years. Of the "occupied" areas, 2 (50%) were in the near-inland band, and 2 (50%) were in the mid-inland band. There were no survey areas in the far-inland band. Survey areas may be divided into smaller subunits or "survey sites" for survey purposes. Each site received the requisite number of survey visits per year. Two survey areas were comprised of 2 survey sites. A "presence" or "occupied" status obtained at 1 site applies to the other site and establishes that status for the entire survey area as specified in the PSG 2000 Survey Protocol.

The 27 survey areas (29 survey sites) totaled 2,340.4 ac (946.9 ha). The average size of a survey area was 86.7 ac (35.1 ha), and the average size of a site was 80.7 acres (32.7 ha). The smallest survey area was 7.0 ac (2.8 ha), and the largest survey area was 341.0 ac (132.1 ha). We surveyed 884.8 ac (357.9 ha) of suitable habitat. There were 17 "occupied" survey areas which totaled 1,786.7 ac (764.6 ha); 13 occupied areas north of Grays Harbor totaled 1,023.8 ac (414.3 ha), and the 4 occupied areas south of Grays Harbor totaled 762.9 (350.3). All 17 "occupied" areas were formerly classified as "presence" areas.

There were 11 "occupied" survey areas (11 survey sites) that involved stands which were surveyed in 2001 exclusively by WDFW observers. We used a selective approach to survey station layout. We did not place stations to provide 100% survey coverage of an entire stand, but chose only those locations that optimized views of the sky relative to the stand. We utilized roads, creeks or rivers, adjacent clearcuts, and other large openings that provided these opportunities. At most stands, we placed stations outside of the stands usually within 164 ft (50 m) of the edge of the habitat.

The 11 "occupied" areas totaled 1,303.5 ac (527.5 ha). We surveyed 396.0 ac (160.1 ha) of suitable habitat at these survey areas. The average size of an "occupied" area was 118.5 ac (47.9 ha), and we covered an average of 32.3 ac (13.1 ha) or 27% of a survey area. Nine areas were north of Grays Harbor and totaled 636.0 ac (257.3 ha); the average "occupied" survey area size was 70.7 ac (28.6 ha), and we covered an average of 23.2 ac (9.4 ha) or 33% of a survey area. Two areas were south of Grays Harbor and totaled 667.5 ac (270.1 ha); the average "occupied" survey area size was 333.8 ac (135.1 ha), and we covered an average of 32.3 ac (13.1 ha) or 23% of a survey area. All 11 "occupied" areas were formerly classified as "presence" sites.

The following presents detailed survey results for the 27 surveys. Table 1 presents a summary of these results. Figure 1 shows the locations of all areas surveyed in 2001.

2001 Survey Areas North of Grays Harbor:

1 - DNR: Occupied Status. We exclusively surveyed this survey area in 2001. We conducted 1 visit (0 tandem visits). We initiated the survey to this area on July 2.

On July 2, J. Watson had 1 "occupied" detection. He saw 2 silent murrelets circling at 0.9 canopy heights within 70 meters adjacent to the stand.

The area was 77.2 ac (31.2 ha), and we surveyed 6.7 ac (2.7 ha) or less than 10 % of the habitat. Prior to 2001, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

Our area is part of a larger contiguous stand; the amount of additional acreage that is contiguous habitat will need to be ground truthed using DNR's definition of suitable habitat as outlined in their HCP.

#2- DNR: Presence Status. We exclusively surveyed this survey area in 2001. We conducted 11 visits (15 tandem visits). We initiated the survey to this area on May 31.

On July 17, J. Watson had 2 "presence" detections. At 0601, he heard loud murrelet wing-beat sounds "circling counterclockwise" over his head at the stand. At 0602, he heard loud murrelet wing-beat sounds accompanied by 3 loud keer calls. A low ceiling of heavy fog interfered with his ability to see adequately.

The area was 60.1 ac (24.3 ha), and we surveyed 25.1 ac (10.2 ha) or 42 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, the area was surveyed by DNR consultants, Resources Northwest, Inc., and classified as a "presence" area as a result of those surveys.

3 - DNR: Occupied Status. We exclusively surveyed this survey area in 2001. We conducted 9 visits (9 tandem visits). We initiated the survey to this area on May 31.

On June 5, J. Watson had 1 "presence" detection. He heard multiple, overlapping keer calls. On July 20, D. Stumbaugh had 2 "occupied" detections. At 0520, she saw and heard 2 birds circling at 0.9 canopy heights adjacent to the stand. At 0524, she saw 2 silent birds curving at 0.7 canopy heights over the stand before the birds "disappeared over the ridge." On the same morning, J. Anthony had 1 "presence" detection. At 0520, she heard 4 faint keer calls.

The area was 91.9 ac (37.2 ha), and we surveyed 11.5 ac (4.6 ha) or 13 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, the site was surveyed by DNR consultants, Resources Northwest, Inc. and was classified as a "presence" area as a result of those surveys.

4 - DNR: Occupied Status. We exclusively surveyed this survey area in 2001. We conducted 6 visits (8 tandem visits). We initiated the survey to this area on May 30.

On July 16, D. Stumbaugh had 1 "presence" detection. At 0631, she heard multiple keer calls.

On the same morning, J. Watson had 1 "presence" detection. He heard multiple keer calls. On July 26, J. Anthony had 1 "occupied" and 2 "presence" detections. At 0550, she saw and heard 1 murrelet flying at 0.9 canopy heights adjacent to the stand. At 0511 and 0728, she heard 3 loud to moderate keer calls and 1 loud keer call, respectively. On the same morning, W. L. Mark had 3 "presence" detections. At 0510, 0549, and 0703 she heard faint keer calls.

The area was 52.4 ac (21.2 ha), and we surveyed 39.2 ac (15.9 ha) or 75 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

5 - DNR: Occupied Status. We exclusively surveyed this survey area in 2001. We conducted 14 visits (13 tandem visits). We initiated the survey to this area on May 16.

Between May 16 and July 27 on 6 separate morning visits, observers documented "presence" detections. On August 1, J. Watson had 1 "occupied" and 1 "presence" detection. At 0543, he heard 2 faint keer calls. At 0710, he heard murrelet wing-beat sounds and then saw 1 bird circling at 0.9 canopy heights adjacent to the stand. On the same morning, W. L. Mark had 2 "presence" detections. At 0544 and 0625, she heard 1 "very faint" keer call and 3 faint keer calls, respectively.

The area was 18.5 ac (7.5 ha), and we surveyed 15.4 ac (6.2 ha) or 83 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, the site was surveyed by Rayonier Company, consultant Hamer Environmental, and was classified as a "presence" area as a result of those surveys. The area included habitat on company land and contiguous habitat on DNR land. This area was part of this larger survey area, but we exclusively surveyed DNR land.

6 - STC and USFS: Occupied Status. We conducted 11 visits (3 tandem visits) to Site 1 and 11 visits (20 tandem visits) to Site 2. We initiated the survey to this area on Site 1 on May 8 and Site 2 on May 10.

At Site 2, on May 10, W. Michaelis had 3 "presence" detections. He heard 3 moderate to faint grunt calls at 0551. At the same site on July 19, he had 1 "presence" detection; 1 faint keer call at 0553. At Site 1, on July 24, USFWS observer D. Lynch had 1 "occupied" detection. She saw 1 silent bird curving at 1.0 canopy heights within the stand.

Due to the large size of the survey area (280.5 ac or 113.6 ha), the area was divided into 2 survey sites each scheduled to receive at least 10 visits during the survey season. We jointly surveyed the 2 sites with STC consultants, Resources Northwest, Inc., and the USFWS. Site 1, was 137.3 ac (55.6 ha), and we surveyed 52.9 ac (21.4 ha) or 39 % of the habitat. Site 2 was 143.2 ac (58.0 ha), and we surveyed 118.9 ac (48.1 ha) or 83 % of the habitat. Prior to 2001, Site 1 was surveyed by Resources Northwest, Inc. for the STC and was classified as a "presence" site as a result of those surveys. The site included habitat on company land and contiguous habitat on USFS land.

7 - DNR: Occupied Status. We exclusively surveyed this survey area in 2001. We conducted

9 visits (18 tandem visits) to this area. We initiated the survey to this area on May 30.

On June 29, S. Ament and A. McMillan had 1 "presence" detection each. At 0531, they both heard moderate to faint keer calls. On July 19, S. Ament had 1 "occupied" and 2 "presence" detections. At 0446, she heard 4 loud stationary keer calls within 50 to 60 ft (15 to 18 m) of her location. This detection qualified as an "occupied" behavior according to PSG 2000 Protocol 2001. At 0532 and 0607, she heard 2 faint and 2 very faint keer calls, respectively. On the same morning, A. McMillan had 3 "presence" detections. At 0446, she heard S. Ament's stationary detection. She plotted her detection greater than 328 ft (100 m) from her location. At 0532 and 0607, she heard moderate to faint keer calls the same time as S. Ament.

The area was 19.1 ac (7.7 ha), and we surveyed 18.3 ac (7.4 ha) or 96 % of the habitat. Another DNR survey area that was adjacent and contiguous with survey area # 7, was surveyed by Hamer Environmental, Inc. in 2001. Observers had no detections. Prior to 2001, the area was surveyed by DNR and classified as a "presence" area as a result of those surveys.

This occupied survey area sampled a portion of a larger contiguous stand. Any murrelet habitat in the larger stand that is contiguous with the occupied survey area is also considered as occupied habitat, thereby resulting in an occupied stand greater than the survey area.

8 - STC: Occupied Status. We conducted 14 visits (15 tandem visits) to this area. We initiated the survey to this area on May 18.

On July 10, W. Michaelis had 6 "presence" detections. Between 0522 and 0527, 5 detections were loud wing-beat sounds. At 0522, he saw 2 birds flying straight at 1.25 canopy heights. On July 17, W. Michaelis had 1 "presence" detection. At 0634, he heard 2 moderate sounding, overlapping keer calls.

On July 24 at about 164 ft (50 m) north of his survey station, W. Michaelis had 1 "occupied" detection. At 0658, he heard (wing-beat sounds and 1 keer call) and saw 3 birds circling at 1.5 canopy heights over the west edge of the stand. On the same morning, J. Wisniewski saw a segment of W. Michaelis' detection, and then she continued to watch the 3 birds at 1.3 canopy heights as they headed south of her.

We continued with more visits to this area after the "occupied" detection to gather additional information. On July 26, B. Murphie had 1 "presence" detection. At 0709, he saw 3 silent birds flying straight at 1.5 canopy heights heading in a southeast direction toward the stand.

The area was 54.4 ac (22.0 ha), and we surveyed 23.2 ac (9.4 ha) or 43 % of the habitat. We jointly surveyed the area with STC consultants, Resources Northwest, Inc.. A USFWS observer, D. Lynch, assisted us with 1 morning visit. Prior to 2001, this site was surveyed by Resources Northwest, Inc. for the STC and classified as a "presence" area as a result of those surveys.

9 - DNR: Occupied Status. We exclusively surveyed this survey area in 2001. We initiated the survey to this area on May 25.

We conducted 8 visits (10 tandem visits). On June 7, W.L. Mark had 1 "presence" detection. At 0513, she saw 1 silent bird flying straight at 1.2 canopy heights over the stand. Between June 7 and July 5, on 2 separate mornings, observers documented more "presence" detections. On July 17, D. Stumbaugh had 3 "presence" detections. Two detections were 2 silent birds circling at 1.2 canopy heights at the stand. On July 24, J. Watson had 2 "occupied" and 3 "presence" detections. At 0551 and 0553, he saw 2 birds circling at 0.8 and 0.5 canopy heights, respectively, adjacent to and at the stand. On the same morning, D. Stumbaugh had 1 "presence" detection. At 0616, she heard loud, multiple, overlapping keer calls.

The area was 44.0 ac (17.8 ha), and we surveyed 19.1 ac (7.7 ha) or 43 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, the site was surveyed by DNR consultants, Resources Northwest, Inc., and classified as a "presence" site as a result of those surveys.

10 - DNR: Occupied Status. We exclusively surveyed this survey area in 2001. We conducted 6 visits (10 tandem visits). We initiated the survey to this area on June 8.

On June 8 and June 22, J. Stofel had 1 and 3 "presence" detections, respectively. These were moderate to faint keer calls. On June 28 at station C, J. Anthony had 1 "presence" detection. At 0534, she saw 2 silent birds circling over the stand at 1.8 canopy heights. On July 13, J. Watson had 1 "occupied" and 2 "presence" detections. At 0541, he saw 1 silent bird circling at 0.7 canopy heights at the stand. The other 2 detections were loud to moderate keer calls.

The area was 93.4 ac (37.8 ha), and we surveyed 11.7 ac (4.7 ha) or 13 % of the habitat. Using the theoretical coverage of 15 ac (6 ha) per station, there was no overlap of coverage from the survey station and the habitat at the area due to the station placement. This station was located more than 164 ft (50 m) from the stand edge; however, we used binoculars to supplement our observations. This station was located on a logging road that afforded a good view of the stand as well as good audibility.

This area is an isolated stand of suitable habitat. Prior to 2001, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

11 - DNR: Occupied Status. We exclusively surveyed this survey area in 2001. We conducted 7 visits (13 tandem visits). We initiated the survey to this area on June 13.

On July 4, J. Watson had 1 "presence" detection after the visit time period was over. At 0742, while he was in his tent onsite at the station, he heard 3 loud keer calls "right above him." On July 25, J. Anthony had 1 "occupied" and 3 "presence" detections. At 0602, she heard a murrelet jet sound and then saw 1 bird at 1.0 canopy heights flying through the stand. At 0503, she heard loud wing-beat sounds within about 32 ft (10 m) of her location. At 0557, she had 2 detections: 1 keer call and then 4 keer calls with 1 grunt call.

The area was 70.3 ac (28.4 ha), and we surveyed 33.7 ac (13.6 ha) or 48 % of the habitat. Prior

to 2001, the area was surveyed by DNR consultants, Resources Northwest, Inc., and classified as a "presence" area as a result of those surveys.

This area is part of a larger contiguous stand; the amount of additional acreage that is contiguous habitat will need to be ground-truthed using DNR's definition of suitable habitat as outlined in their HCP.

12 - DNR: Occupied Status. We exclusively surveyed this survey area in 2001. We conducted 7 visits (6 tandem visits). We initiated the survey to this area on May 24.

On May 29, J. Watson had 1 "presence" detection. At 0505, he heard faint, multiple keer calls. On July 4, W. L. Mark and D. Stumbaugh had multiple "occupied" and "presence" detections. Of her 21 detections, D. Stumbaugh documented 11 subcanopy "occupied" detections (birds seen at $\leq$1.0 canopy height). Of her 21 detections, W.L. Mark noted 4 subcanopy "occupied" detections; the rest were auditory detections.

The area was 89.2 ac (36.1 ha), and we surveyed 15.0 ac (6.1 ha) or 17 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

13 - DNR: Occupied Status. We conducted 6 visits (12 tandem visits) to this area. We initiated the survey to this area on May 23.

On July 27, A. McMillan had 1 "presence" detection. At 0547, she heard 5 faint keer calls. On July 21 at an adjacent DNR survey area, a Hamer Environmental, Inc. observer, D. Hack, had 1 "occupied" detection and 2 "presence" detections. At 0514, he saw 2 silent birds flying through the stand at 1.0 canopy heights. At 0511, he heard 1 loud keer call, and at 0517, he heard and saw 1 bird flying straight over the stand at 1.4 canopy heights. This area is immediately adjacent and northeast of the Survey Area # 13. The site has contiguous suitable habitat with Survey Area # 13. Since the 2 areas share contiguous suitable habitat, they also share the same "occupied" status according to PSG 2000 Protocol. We learned of the "occupied" detection after we had conducted our July 27 visit. We then stopped our survey to Survey Area # 13 as a result.

The area was 33.8 ac (13.7 ha), and we surveyed 15.2 ac (6.2 ha) or 45 % of the habitat. Prior to 2001, the area was surveyed by DNR and classified as a "presence" area as a result of those surveys.

This area is part of a larger contiguous stand; therefore, the amount of additional acreage that is contiguous habitat will need to be ground-truthed using DNR's definition of suitable habitat as outlined in their HCP. Following the completion of DNR's habitat relationships research surveys and model development, the habitat definitions may be revised based on new information. The DNR site was 71.3 ac (28.9 ha).

14 - DNR: Presence Status. We exclusively surveyed this survey area in 2001. We conducted 11 visits (11 tandem visits). We initiated the survey to this area on May 11.

On July 5, W. L. Mark had 2 "presence" detections. At 0536, she heard 1 faint keer call, and at 0549, moderate to loud, multiple, overlapping keer calls. On July 20, W. L. Mark had 2 "presence" detections. At 0532, she heard 1 moderate sounding keer call, and at 0545, she heard multiple faint, moderate and loud overlapping keer calls.

The area was 97.8 ac (39.6 ha), and we surveyed 47.9 ac (19.4 ha) or 49 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, the area was surveyed by WDFW under contract to DNR in 1994 and 1995 and classified as a "presence" area as a result of those surveys.

This area was part of a larger stand. This area had a history of multiple "presence" detections (WRDS Marbled Murrelet Database).

15 - US Forest Service: Occupied Status. We exclusively surveyed this survey area in 2001. We conducted 4 visits (0 tandem visits). We initiated the survey to this area on May 10.

On June 6, S. Seawalt had 1 "occupied" and one "presence" detection. At 0606, she saw 2 silent birds originally together "split" off into 2 directions: 1 arced at 1.5 canopy heights over the stand and 1 flew straight at 1.5 canopy heights.

The area was 99.1 ac (40.1 ha), and we surveyed 56.4 ac (22.8 ha) or 57 % of the habitat. Prior to 2001, the area was surveyed by STC consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys. The area included habitat on company land and contiguous habitat on USFS land. We exclusively surveyed USFS land.

2001 Survey Areas South of Grays Harbor:

16 - DNR: Occupied Status. We conducted 2 visits (4 tandem visits) to this area. We initiated the survey to this area on May 5.

On May 30 , K. Figlar-Barnes had 1 "occupancy" detection. At 0500, she saw 1 silent bird flying through the stand at "about 3 feet above the water and following a river path downstream."

The area was 71.7 ac (29.0 ha), and we surveyed 40.9 ac (16.5 ha) or 57 % of the habitat. This area is part of an isolated stand of suitable habitat. Another DNR survey area that was adjacent and contiguous with this area was surveyed by DNR contracted consultant in 2001. Observers had no detections. Prior to 2001, the area was surveyed by WDFW under contract to DNR in 1994 and 1995, and classified as a "presence" site as a result of those surveys. WDFW continued to survey this area in 1997, 1998, and 1999 as part of a plan to survey southwest Washington "presence" sites that had high probabilities of actually being "occupied." Radar was used in 2000. "Presence" only was detected in all of those years.

17 - Weyerhaeuser Company: Presence Status. We conducted 8 visits (9 tandem visits) to this

area in tandem with Weyerhaeuser Company observers. We joined the survey to this area on May 25.

Surveyors had no detections at this survey area in 2001.

The area was 43.0 ac (17.4 ha), and we surveyed 43.0 ac (17.4 ha) or 100 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, the area was surveyed by Weyerhaeuser Company consultants, Beak Consultants and Biota Pacific Environmental Science, Inc., and was classified as a "presence" site as a result of those surveys. WDFW designed a new station layout and participated in limited surveys in 2000.

18 - US Bureau of Land Management & Washington State Parks & Recreation Commission: Occupied Status. We exclusively surveyed this survey area in 2001. We conducted 2 visits (4 tandem visits). We initiated the survey to this area on May 15.

On May 15, K. Figlar-Barnes had 1 "presence" detection. At 0642, she saw 2 silent birds flying straight over the stand at 2.0 canopy heights. On May 22, S. Goodman had 2 "occupied" and 1 "presence" detection. At 0524, he saw 2 silent birds circling at 0.9 canopy heights, and at 0532 he saw 2 silent birds circling at 1.2 canopy heights. At 0527, he saw 1 silent bird flying straight over the stand at 1.1 canopy heights. On the same morning, K. Figlar-Barnes had 1 "occupied" detection. At 0531, she saw 1 silent bird circling at 1.3 canopy heights over the stand.

The area was 326.5 ac (132.1 ha), and we surveyed 88.4 (35.8 ha) or 27 % of the habitat. Prior to 2001, this area was surveyed by the WDFW and classified as a "presence" site as a result of those surveys.

This area is a large stand. The amount of contiguous habitat will need to be ground-truthed using definitions of suitable habitat as applied by USFWS for Section 7 consultations.

19 - Washington State Parks and Recreation Commission: Occupied Status. We exclusively surveyed this survey area in 2001. We conducted 15 visits (24 tandem visits). We initiated the survey to this area on May 14.

On May 29, K. Figlar-Barnes had 1 "presence" detection. At 0528, she heard 1 faint keer call. On June 18, K. Figlar-Barnes had 1 "presence" detection. At 0516, she saw 1 silent bird "flying with a slight arc" at 1.8 canopy heights; we did not define the flight path as circling. On June 21, B. Maletzke had 1 "presence" detection. At 0613, he saw 2 silent birds flying straight over the stand at 1.4 canopy heights. On the same morning, S. Goodman had 1 "presence" detection. At 0509, he saw 1 silent bird flying straight over the stand at 1.6 canopy heights.

On July 5, B. Maletzke had 1 "occupied" detection. At 0546, he saw 1 silent bird circling over the stand at 1.4 canopy heights. On the same morning, S. Goodman had 1 "presence" detection. At 0546, he saw 2 silent birds flying straight over the stand at 1.1 canopy heights. We continued our survey after the "occupied" detection to gather additional information. On July 12, B. Maletzke had 1 "presence" detection. At 0613, he saw 2 silent birds flying straight over the stand at 1.1 canopy heights.

The area was 341.0 ac (138.0 ha), and we surveyed 58.0 ac (23.5 ha) or 17 % of the habitat. Prior to 2001, this area was surveyed by the WDFW and classified as a "presence" site as a result of those surveys.

This area is a large stand. The amount of contiguous habitat would have to be ground-truthed using definitions of suitable habitat as applied by the WDFW in accordance with the State Forest Practices Rules and the USFWS.

20 - Weyerhaeuser Company: Presence Status. We conducted 6 visits (6 tandem visits) to Site 1 and 5 visits (8 tandem visits) to Site 2 with Weyerhaeuser Company consultants, Biota Pacific Environmental Science, Inc.. These 2 sites are part of the same stand. We joined the survey for Site 1 on June 11 and Site 2 on May 24.

At Site 2, on July 11 at station 151039, S. Goodman had 1 "presence" detection. At 0530, he saw 1 silent bird flying straight "above edge of stand" at 2.2 canopy heights. At Site 1, on May 22, Biota Pacific observer, S. Spooner had 1 "presence" detection. At 0522, he heard 3 very faint keer calls.

Site 1 was within 0.3 mi (0.5 km) of a stand on another ownership that was being logged in June and July; logging activity noise sometimes impaired the hearing of observers. The noisy activity may have also caused disturbance to murrelets and interfered with their nesting at this site.

Site 1 was 21.8 ac (8.8 ha), and we surveyed 19.7 ac (8.0 ha) or 90 % of the habitat. Site 2 was 45.3 ac (18.3 ha), and we surveyed 34.4 ac (13.9 ha) of habitat. These sites comprise 1 isolated stand of suitable habitat. Prior to 2001, these sites were surveyed by Beak Consultants and Biota Pacific for the Weyerhaeuser Company and classified as "presence" sites as a result of those surveys.

21 - WDFW: No Detections. We exclusively surveyed this survey area in 2001. We conducted 7 visits (0 tandem visits). We initiated the survey to this area on May 18.

Surveyors had no detections at this area in 2001. This area was not a "presence" area and, therefore, considered low priority.

The area was 100.4 ac (40.6 ha), and, based on station placement, we surveyed 0 ac (0 ha) of habitat. Using the theoretical coverage of 15 ac (6 ha) per station, there was no overlap of station coverage and the habitat at the area. Stations were located more than 164 ft (50 m) from the stand edge, but we used binoculars to supplement our observations. Generally this is farther than recommended for optimum visual detectability; therefore, for conducting occupancy surveys, we calculated this as 0 ac (0 ha) or 0 % of the habitat. For this survey area the first objective was to do a broader overview type of survey to attempt to detect presence of murrelets at or in the vicinity of the survey area. One station was located on a logging road landing and afforded a good view of the stand as well as good audibility. The other station was located further away. From this location, we thought we might be able to intercept birds flying from a marine bay up a creek to that or other adjacent stands. If any murrelets were detected, closer survey stations to the

stand would have been established for the occupancy surveys. This area is an isolated stand of suitable habitat. Prior to 2001, this area was surveyed by WDFW and classified as a "no detection" area as a result of those surveys.

22 - Weyerhaeuser Company: Occupied Status. We conducted 14 visits (18 tandem visits) to this area with Weyerhaeuser Company consultants, Biota Pacific Environmental Science, Inc.. We joined the survey for this area on May 24. On July 28, S. Goodman had 1 "occupied" detection. At 0545, he saw 2 silent birds flying together adjacent to the stand at 0.95 canopy heights. The birds then split off in different directions; 1 bird circled at 0.9 canopy heights away from the stand.

The area was 23.1 ac (9.3 ha), and we surveyed 23.1 ac (9.3 ha) or 100 % of the habitat. This area is part of an isolated stand of suitable habitat. Prior to 2001, the area was surveyed by Beak Consultants and Biota Pacific Environmental Science, Inc. for the Weyerhaeuser Company and classified as a "presence" area as a result of those surveys.

This area is part of a larger contiguous stand; the amount of additional acreage that is contiguous habitat would have to be ground-truthed using definitions of suitable habitat according to the State Forest Practices Rules.

23 - DNR: Presence Status. We exclusively surveyed this survey area in 2001. We conducted 9 visits (8 tandem visits). We initiated the survey to this area on May 22.

The area was adjacent to a section of the Naselle River; river noise frequently impaired the hearing of observers. No murrelets were detected.

The area was 19.5 ac (7.9 ha), and we surveyed 19.5 ac (7.9 ha) or 100 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, this area was surveyed by DNR consultants, Hamer Environmental, and was classified as a "presence" area as a result of those surveys.

24 - Weyerhaeuser Company: Presence Status. We conducted 6 visits (12 tandem visits) to this area with Weyerhaeuser Company consultants, Biota Pacific Environmental Science, Inc.. We joined the survey for this area on May 23. On May 23, B. Maletzke had 1 "presence" detection. At 0501, he heard moderate to loud, multiple, overlapping keer calls. On July 10, Biota Pacific observer, S. Spooner had 2 "presence" detections. At 0549, he saw 1 silent bird flying straight over the stand at 1.2 canopy heights, and at 0551 he heard 1 "moderate or faint intensity" keer call.

The area was 14.8 ac (6.0 ha), and we surveyed 12.6 ac (5.1 ha) or 85 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, the area was surveyed by Biota Pacific for the Weyerhaeuser Company and classified as a "presence" area as a result of those surveys.

25 - DNR: Presence Status. We exclusively surveyed this survey area in 2001. We conducted 12 visits (15 tandem visits). We initiated the survey to this area on May 11.

On June 1, B. Maletzke had 2 "presence" detections. At 0435, he heard moderate to faint,

multiple, overlapping keer and grunt calls. He noted that the "birds appeared to be circling the stand to SW and over meadow for 5-6 seconds." At 0438, he heard 2 moderate sounding keer calls.

The area was within 0.25 mi (0.4 km) of a stand on another ownership that was being logged during part in May and June; logging activity noise sometimes impaired the hearing of observers. The noisy activity may have also caused disturbance to murrelets and interfered with their nesting at this area.

The area was 23.6 ac (9.5 ha), and we surveyed 21.4 ac (8.6 ha) or 91 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, this area was surveyed by DNR consultants, Hamer Environmental, and was classified as a "presence" area as a result of those surveys.

26 - WDFW: No Detections. We exclusively surveyed this survey area in 2001. We conducted 8 visits (6 tandem visits). We initiated the survey to this area on May 7.

Surveyors had no detections at this survey area. This area was not a "presence" area and, therefore, considered low priority.

The area was 100.4 ac (40.6 ha), and, based on station placement, we surveyed 0 ac (0 ha) or 0 % of the habitat. Using the theoretical coverage of 15 ac (6 ha) per station, there was no overlap of station coverage and the habitat at the area. Stations were located more than 164 ft (50 m) from the stand edge, but we used binoculars to supplement our observations. One station was located on a logging road landing and afforded a good view of the stand as well as good audibility. The other station was located further away at the mouth of a creek on a marine bay. From this location, we thought we might be able to intercept birds flying from the marine bay up the creek to that or other adjacent stands. If any murrelets were detected, closer survey stations to the stand would have been established for the occupancy surveys. This area is an isolated stand of suitable habitat.

27 - Weyerhaeuser Company: Presence Status. We conducted 6 visits (6 tandem visits) to this area with Weyerhaeuser Company consultants, Biota Pacific Environmental Science, Inc.. No murrelets were detected in 2001. We joined the survey for this area on May 25.

The area was 7.0 ac (2.8 ha), and we surveyed 7.0 ac (2.8 ha) or 100 % of the habitat. This area is an isolated stand of suitable habitat. Prior to 2001, the area was surveyed by Beak Consultants and Biota Pacific Environmental Science, Inc. for the Weyerhaeuser Company and classified as a "presence" area as a result of those surveys.

2002:

Survey visits began May 1 and ended August 6. WDFW survey personnel conducted 429 visits to 32 survey areas. Since all the surveys were conducted on DNR-managed lands, the definitions of murrelet "occupied" and "presence" status as it appears in DNR's HCP will be applied to all of

the results.

Twenty-four of the 32 survey areas (67%) were classified as "occupied" based on survey results of WDFW combined with 1 DNR survey. Twenty of the 32 survey areas had been designated previously as "presence" areas. Of these 20 "presence" areas, 17 (85%) were classified as "occupied" in 2002. One of the 17 former "presence" areas was documented as "occupied" by a DNR surveyor; we conducted a tandem visit with DNR at this area on the morning of the occupied detections. We obtained an "occupied" status at 2 areas that previously had 2-year protocol surveys and no detections. In addition, of 9 previously unsurveyed areas, 6 were classified as "occupied" and 1 as "presence". One former "no detection" survey area was classified as a "presence" area.

North of Grays Harbor, 16 areas surveyed were formerly designated as "presence" areas. Of these, 15 (88%) were found to be "occupied" in 2002; this includes survey area # 42. Survey area # 31 retained its "presence" status under DNR HCP definitions. Of the "occupied" areas, 9 (60%) were in the near-inland band and 6 (40%) were in the mid-inland band. There were no survey sites in the far-inland band.

South of Grays Harbor, 4 areas surveyed were formerly designated as "presence" areas. Two (50%) of the 4 "presence" areas were found to be "occupied" in 2002. One area, # 59, had a 2-year protocol survey and "no detections" prior to our survey and this area retained this status. Of the "occupied" areas, 1 (50%) was in the near-inland band, and 1 (50%) was in the mid-inland band. There were no survey sites in the far-inland band.

We had 32 survey areas constituting 36 individual "survey sites". "Occupied" behaviors were documented in each site of survey areas #36, #39, and #49. An "occupied" behavior was documented in 1 of the 2 sites that comprised the Survey Area #58, but, as previously stated, an "occupied" status obtained at 1 site applies to the other site and establishes that status for the entire survey area as specified in the PSG 2000 Survey Protocol.

The 32 survey areas (36 survey sites) totaled 2,113.6 ac (855.4 ha). The average size of a survey area was 66.1 ac (26.7 ha), and the average size of a site was 58.7 acres (23.8 ha). The smallest survey area was 26.3 ac (10.7 ha), and the largest survey area was 115.6 ac (46.4 ha). We surveyed an estimated total of 1,083.7 ac (438.6 ha) of suitable habitat.

At survey areas which previously had 2-year surveys, we used the selective approach to survey station layout as described in our 2001 results, i.e. we did not place stations to provide 100% survey coverage of an entire stand, but chose only those locations that optimized views of the sky relative to the stand. We utilized roads, creeks or rivers, adjacent clearcuts, and other large openings that provided these opportunities. At most stands, we placed stations outside of the stands usually within 164 ft (50 m) of the edge of the habitat.

With the exception of survey area #42, WDFW found "occupied" status at 23 survey areas which totaled 1,604.4 ac (649.3 ha). The average size of an "occupied" survey area was 69.8 ac (28.2 ha), and we covered an average of 34.5 ac (14.0 ha) or 49 % of a survey area. Twenty-one areas

were north of Grays Harbor and totaled 1,438.3 ac (582.1 ha); the average "occupied" survey area size was 68.5 ac (27.7 ha), and we covered an average of 32.6 ac (13.2 ha) or 48 % of a survey area. Two areas were south of Grays Harbor and totaled 166.1 ac (67.2 ha); the average "occupied" survey area size was 83.1 ac (33.6 ha), and we covered an average of 54.7 ac (22.1 ha) or 66 % of a survey area.

Survey area #31, formerly a "presence" area, was added to our survey schedule in July. We had multiple "presence" detections at this area including one detection of birds circling between greater than 1.0 and less than 2.0 canopy heights. Although the detection does not meet DNR HCP "occupied" definitions, WDFW classified the survey area as "occupied" per WDFW standards and the Washington Forest Practices Rules which currently are superceded by the DNR HCP on state managed lands.

The following presents detailed survey results for the 32 survey areas. Table 2 presents a summary of these results. Figure 2 shows the locations of all areas surveyed in 2002.

2002 Survey Areas North of Grays Harbor:

28 - DNR: Presence Status. We exclusively surveyed this survey area in 2002. We conducted 7 visits (15 tandem visits). We initiated the survey to this area on July 3.

On July 11 at station 3, A. Friel had 1 "presence" detection. At 0609, she heard "12 keers, 1 grunt groan between moderate at first, fading to faint." She plotted the detection within the survey area boundary near station 1 where J. Wisniewski was surveying on the same morning. J. Wisniewski did not hear or see A. Friel's murrelet detection; although she had a good view of the sky, loud creek noise impaired her ability to hear to (656 ft) 200 m. On July 25, S. Igloi had 5 "presence" detections between 0559 and 0656. From station 3, S. Igloi had 4 of 5 detections that were multiple, overlapping moderate to faint keer calls, and 4 of 5 of her detections originated in the west; 1 originated in the south.

The area was 94.1 ac (38.1 ha), and we surveyed 34.1 ac (13.8 ha) or about 36% of the habitat. Prior to 2002, the area was unsurveyed.

29 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 6 visits (4 tandem visits). We initiated the survey to this area on June 13.

On July 9 at station 5, J. Watson had 2 "presence" detections. These were faint keer calls and he plotted these detections within the survey area boundary. On July 16, at station 4, J. Watson had 3 "occupied" and 5 "presence" detections. At 0530, he saw 1 bird circling at 0.7 canopy heights plus he heard wingbeat sounds, and 24 seconds later, he saw 1 silent bird flying through the canopy at 0.9 canopy heights. At 0618, he heard loud, stationary "que" calls which we classified as an "occupied" detection. On the same morning at station 5, S. Igloi had 4 auditory "presence" detections, and she plotted them within the survey area boundary.

The area was 60.9 ac (24.6 ha), and we surveyed 36.3 ac (14.7 ha) or 60 % of the habitat. Prior

to 2002, the area was unsurveyed.

This area was part of a larger contiguous stand that continued west on DNR managed lands. On July 24, B. Maletzke and DNR Marbled Murrelet Survey Specialist P. Harrison conducted 1 tandem visit to the west part of the stand and both surveyors detected "presence." DNR initially did not include this part of the stand in their HCP inventory for surveys, but after we reported that the stand had suitable habitat and P. Harrison inspected the stand in the field, he added the stand to the HCP inventory. Regardless, according to PSG Protocol, the entire stand is considered "occupied." The "west unit" is approximately 80 ac (32.4 ha); added to the "east unit", the entire stand is about 140 ac (56.7 ha).

30 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 13 visits (20 tandem visits). We initiated the survey to this area on May 2.

Between May 2 and June 27, there were 10 visits conducted in which surveyors reported 1 auditory "presence" detection during each of these visits. The detections were reported from all 4 stations established at the survey area.

On July 12, 2 surveyors had "occupied" detections. At station A, J. Watson had 1 "occupied" detection and 7 "presence" detections (auditory); at 0703, he saw 2 silent birds fly through the stand at 0.9 canopy height. At station C, S. Igloi had 1 "occupied" detection and 6 "presence" detections (auditory); at 0704, she saw 1 silent bird exiting from the stand at 1.0 canopy height. At station D, B. Maletzke had 3 auditory "presence" detections.

The area was 56.9 ac (23.0 ha), and we surveyed 22.7 ac (9.2 ha) or 40 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

31 - DNR: Presence Status (DNR HCP); Occupied Status (WDFW standards, Washington Forest Practices Rules). We exclusively surveyed this survey area in 2002. We conducted 11 visits (40 tandem visits). We initiated the survey to this area on July 10.

On July 10 at station A, S. Igloi had 4 "presence" detections between 0502 and 0544. These were auditory detections.

On July 18 at station A, J. Anthony had 7 "presence" detections between 0603 and 0732; 2 were auditory, 2 were visual, and 3 were visual/auditory detections. At 0603, she saw 3 birds at 1.2 canopy heights and heard wingbeat sounds. At 0640, she saw 3 birds circling at 1.8 canopy heights over the stand; WDFW classified this detection as "occupied" based on WDFW standards and theWashington Forest Practices Rules although this detection is considered "presence" under DNR's HCP. At 0642 and 0717, she saw 2 birds flying straight over the stand at 2.0 canopy heights and 1.1 canopy heights, respectively. At 0632, she saw 12 birds flying straight over the stand at 2.0 canopy heights. This was a large group of birds to be seen flying at one time.

On the same morning of July 18, 4 other surveyors had "presence" detections at this area. At

station B, A. Friel had 2 auditory detections; at station C, S. Goodman had 7 auditory detections and B. Maletzke had 1 visual/auditory and 6 auditory detections; and at station D, S. Igloi had 2 auditory detections. At 0552, B. Maletzke saw 3 birds flying west to east within 328 ft (100 m) adjacent to the stand at 2.0 canopy heights and he heard wingbeat sounds.

On July 31 at station A, S. Igloi had 3 auditory "presence" detections between 0600 and 0618, and at station C, B. Maletzke had 3 auditory "presence" detections (including 1 detection of a single loud keer call accompanied by wingbeat sounds) between 0519 and 0618. On August 2 at station A, B. Maletzke had 1 auditory "presence" detection at 0522.

The area was 49.1 ac (19.9 ha), and we surveyed 29.1 ac (11.8 ha) or 59 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

32 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 7 visits (6 tandem visits). We initiated the survey to this area on May 6.

On June 19 at station A, J. Wisniewski had "occupied" and "presence" detections. At 0604, she heard wingbeat sounds and saw 2 birds flying at 0.1 canopy height adjacent to the survey area. At 0624, she heard multiple, loud keer calls and saw 1 bird flying at 0.8 canopy height through the stand. At 0625 she heard a single loud keer call. On the same morning at this area at station C, S. Igloi had 8 auditory "presence" detections between 0622 and 0636 to the east and east southeast of the station.

The area was 60.1 ac (24.3 ha), and we surveyed 27.0 ac (12.8 ha) or 45 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys. We surveyed this area in 2001 for this project and also had "presence" detections.

33 - DNR: No Detections Status. We exclusively surveyed this survey area in 2002. We conducted 10 visits (6 tandem visits). We initiated the survey to this area on May 3. The area has good quality habitat. No murrelets were detected by our survey crews.

The area was 58.9 ac (23.8 ha), and we surveyed 55.2 ac (22.3 ha) or 94 % of the habitat. Prior to 2002, the area was unsurveyed.

This area is part of a larger contiguous stand; the amount of additional acreage that is contiguous habitat will need to be ground-truthed using DNR's definition of suitable habitat as outlined in their HCP.

34 - DNR: No Detections Status. We exclusively surveyed this survey area in 2002. We conducted 8 visits (8 tandem visits). We initiated the survey to this area on June 18. The area has good quality habitat. No murrelets were detected by our survey crews.

The area was 65.7 ac (26.6 ha), and we surveyed 52.1 ac (21.1 ha) or 79 % of the habitat. Prior

to 2002, the area was unsurveyed.

This area is part of a larger contiguous stand; the amount of additional acreage that is contiguous habitat will need to be ground-truthed using DNR's definition of suitable habitat as outlined in their HCP.

35 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 12 visits (4 tandem visits). We initiated the survey to this area on May 8. On July 19 at station B, J. Wisniewski had 1 "occupied" detection. At 0534, she saw 1 silent bird flying through the canopy at 0.4 canopy height within 25 m of her.

The area was 33.1 ac (13.4 ha), and we surveyed 13.4 ac (5.4 ha) or 40 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

36 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 4 visits (4 tandem visits). We initiated the survey of this area on May 6 at the South Unit.

On May 29 at station 3, J. Watson had "occupied" and "presence" detections. Between 0454 and 0618, he had 68 detections of which 58 were subcanopy observations. Included in these subcanopy observations were 3 different occasions when he witnessed birds land in a tree near the station. Although J. Watson was in the South Unit, from station 3, he also saw occupied detections in the North Unit of the survey area. On the previous 3 visits at this survey area, surveyors had no detections.

Due to the large size of the survey area (114.6 ac or 46.4 ha), the area was divided into 2 sites, the North Unit and the South Unit. At the South Unit, the site was 62.2 ac (25.2 ha), and we surveyed 36.4 ac (14.8 ha) or 58 % of the habitat. At the North Unit, the site was 52.4 ac (21.2 ha) and a survey was not initiated to this site. However, as described above, occupied behaviors were observed in the North Unit from the South Unit and there was overlapping survey coverage of 8.7 ac (3.5 ha) in the North Unit from South Unit stations.

Prior to 2002, this survey area was unsurveyed.

In July, we used this survey area for the mid-session "refresher" session for our North Crew.

37 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 12 visits (16 tandem visits). We initiated the survey to this area on May 9. On July 15 at station B, A. Friel had 1 "occupied" detection. At 0552, she saw 2 silent bird circling at 0.6 canopy height within 164 ft (50 m) adjacent to the survey area.

The area was 107.8 ac (43.6 ha), and we surveyed 24.5 ac (9.9 ha) or 23 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

38 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 9 visits (8 tandem visits). We initiated the survey to this area on May 2.

On June 26 at station A, S. Igloi had 1 "occupied" detection. At 0449, she heard wingbeat sounds and saw 1 bird flying at 1.0 canopy height at the survey area.

The area was 64.0 ac (25.9 ha), and we surveyed 39.0 ac (15.8 ha) or 61 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

39 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 4 visits (4 tandem visits). We initiated the survey to this area on May 8.

On June 20 at station A, J. Anthony had 3 "occupied" detections. At 0510, she saw 2 silent birds circling at 0.8 canopy height within 82 ft (25 m) of her; the birds flew from the South Unit across a river to the North Unit. At 0529, she saw 2 silent birds circling at 0.5 canopy height in the South Unit along the river. One bird split off and flew into the forest and J. Anthony tracked the second bird. Again at 0529, she saw 1 silent bird emerge from the forest to circle and join the second bird. Both birds were at 0.5 canopy height as they flew southwest into the forest in the South Unit during which time J. Anthony heard 2 keer calls in the direction of the birds. At 0609, she heard 1 moderate to faint keer call to the west southwest.

The area was 115.2 ac (46.4 ha), and we surveyed 28.5 ac (11.5 ha) or 25 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "no detection" area as a result of those surveys. Resources Northwest, Inc. divided this area into 2 sites: the North Unit was 64.8 ac (26.2 ha) and the South Unit was 50.4 ac (20.4 ha).

40 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 5 visits (2 tandem visits). We initiated the survey to this area on May 3. On June 3 at station A, J. Wisniewski had 1 "occupied" detection. At 0523, she saw 1 bird circling at 0.7 canopy height at the survey area.

The area was 47.3 ac (19.1 ha), and we surveyed 18.8 ac (7.6 ha) or 39 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

41 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 3 visits (0 tandem visits) to the North Unit and 7 visits (6 tandem visits) to the South Unit. We initiated the survey to the North Unit on June 11 and to the South Unit on May 1.

South Unit: On May 22 at station 4, J. Watson had 2 auditory "presence" detections; 1 at 0446 and 1 at 0538. On June 17 at station 2, J. Watson had 4 auditory "presence" detections between 0510 and 0602.

North Unit: On June 11 at station 3, J. Watson had 2 auditory "presence" detections; 1 at 0507 and 1 at 0603. On June 27 at station 4, J. Watson had 2 "occupied" detections. At 0530, he saw 1 silent bird at 0.5 canopy height flying north to south from the North Unit to the South Unit. At 0531 he saw 1 bird flying at 0.6 canopy height circling in the South Unit.

Due to the large size of the survey area (94.5 ac or 38.0 ha), the area was divided into 2 sites, the North Unit and the South Unit. At the South Unit, the site was 44.5 ac (18.0 ha), and we surveyed 42.0 ac (17.0 ha) or 94 % of the habitat. At the North Unit, the site was 50.0 ac (20.2 ha) and we surveyed 16.9 ac (6.8 ha) or 34 % of the habitat.

Prior to 2002, the survey area was unsurveyed.

42 - DNR: Occupied Status (by DNR). We jointly surveyed this survey area with DNR in 2002. We conducted 9 visits (6 tandem visits). We initiated our survey to this area on May 16.

On June 10 at station F, A. McMillan had 1 auditory "presence" detection at 0528. On the same morning at station H, S. Ament had 3 auditory "presence" detections between 0527 and 0602. On July 8 at station E, S. Ament had 3 auditory "presence" detections between 0530 and 0533. On the same morning at station F, B. Ritchie had 9 "presence" detections between 0430 and 0611. Seven of the 9 detections were auditory. At 0557, B. Ritchie saw 2 silent birds flying at 2.5 canopy heights in vicinity of the survey area, and at 0604, he saw 2 silent birds flying at 1.7 canopy heights over the edge of the survey area. On July 17 from station G, S. Ament had 6 "presence" detections between 0536 and 0703. Five of the 6 detections were auditory including 2 that were wingbeat sounds. At 0703, S. Ament saw 2 silent birds flying at 1.5 canopy heights.

On July 25 at station E, DNR-contracted surveyor D. Hadersbeck had "occupied" and "presence" detections. He had 14 detections. Nine were loud keer calls and other murrelet vocalizations. Five of the 14 detections were subcanopy observations. At 0548, D. Hadersbeck saw 1 silent bird circling at 0.7 canopy height within 246 ft (75 m) adjacent to the survey area. At 0626, 0629, and 0632, he saw 2 silent birds flying within 328 ft (100 m) adjacent to the survey area. At 0632, he also heard multiple keer calls and saw 4 birds flying within 328 ft (100 m) adjacent to the survey area. On the same morning at station F, A. McMillan had 3 auditory "presence" detections between 0629 and 0714.

The area was 29.7 ac (12.0 ha), and we surveyed 16.0 ac (6.5 ha) or 54 % of the habitat. This area has "marginal" habitat. Prior to 2002, the area was surveyed by DNR and was classified as a "presence" area as a result of those surveys.

43 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 17 visits (18 tandem visits). We initiated the survey to this area on May 16.

On July 17 at station C, J. Anthony had 1 "presence" detection. At 0450, she heard wingbeat sounds over the station. On July 19 at 0559, B. Michaelis at station C and B. Murphie at station E each had the same 2 auditory "presence" detections. At 0626, B. Murphie saw 2 silent birds flying at 2.0 canopy heights over the survey area flying to the southwest. On July 24 at station E,

J. Anthony had 2 auditory "presence" detections at 0658. On August 2 at station D, J. Watson had 1 "occupied" and 1 "presence" detection. At 0558, J. Watson and J. Anthony at station E each had the same auditory "presence" detection; J. Anthony had a second auditory "presence" detection again at 0558. At 0638, J. Watson saw 2 silent birds flying at 0.8 canopy height within 66 ft (20 m) adjacent to the survey area.

The area was 49.5 ac (20.0 ha), and we surveyed 22.2 ac (9.0 ha) or 45 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

44 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 6 visits (2 tandem visits). We initiated the survey to this area on May 16.

On July 16 at station C, J. Anthony had 2 "presence" detections. One detection was 2 loud "que" calls and the other was of wingbeat sounds that came over the station. On July 17 at E, B. Murphie had 2 "occupied" detections. At 0616, he saw 2 silent birds flying at 1.0 canopy height northwest to southeast at the survey area. At 0636, he saw 2 silent birds flying with a slight arc at 1.0 canopy height northwest to northeast. On the same morning at station B, B. Michaelis had 10 "presence" detections. All detections were overlapping keer calls and plotted at about 656 ft (200 m) from the station in the southeast quadrant

The area was 93.0 ac (37.6 ha), and we surveyed 38.1 ac (15.4 ha) or 41 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "no detection" area as a result of those surveys.

45 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 7 visits (0 tandem visits). We initiated the survey to this area on May 3.

On May 3 at station D, W. Michaelis had 2 auditory "presence" detections; 1 at 0616 and 1 at 0617. On May 22 at station E, W. Michaelis had 1 auditory "presence" detection at 0601. On June 20, B. Murphie had 1 "occupied" detection. At 0511, he saw 1 silent bird at 0.8 canopy height slightly arc from the east southeast to the north northwest into the survey area.

The area was 77.1 ac (31.2 ha), and we surveyed 35.4 ac (14.3 ha) or 46 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

46 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 6 visits (10 tandem visits). We initiated the survey to this area on May 13.

On June 18 at station A, S. Igloi had 1 "occupied" and 2 "presence" detections. At 0452, she saw 1 silent bird flying at 2.0 canopy height at the survey area. At 0630, she saw 1 silent bird at 0.85 canopy height flying through the stand within (82 ft) 25 m of her. At 0636, she heard 2 keer calls at the survey area.

The area was 86.6 ac (35.0 ha), and we surveyed 27.3 ac (11.0 ha) or 32 % of the habitat. Prior to 2001, the area was surveyed by WDFW under contract to DNR in 1994 and 1995 and classified as a "presence" area as a result of those surveys.

47 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 3 visits (11 tandem visits). We initiated the survey to this area on July 11.

On July 11 at station C, B. Maletzke had 2 auditory "presence" detections at 0549 and 0617. On the same morning at station D, J. Watson had 1 auditory "presence" detection at 0540. On July 19, 5 surveyors were at different stations. All surveyors had "presence" detections. All detections were "auditory" except for 1 detection at station D by S. Goodman. At 0616, he saw 2 silent birds flying at 1.5 canopy heights over the survey area. Station D is inside the stand on a creek and has a good view of the sky.

On July 23 at station B, A. Friel had 1 "occupied" and 1 "presence" detection. At 0536, she heard multiple keer calls that sounded faint to moderate to faint in intensity; the calls originated in the west southwest and ended in the north northwest. At 0540, she saw 1 bird flying through the stand at 0.7 canopy height. On the same morning at station B, J. Watson had 1 "presence" detection. At 0537, he heard multiple, overlapping, keer and grunt calls that sounded faint to moderate to faint in intensity; the calls originated in the west southwest and ended in the north northeast.

The area was 36.7 ac (14.9 ha), and we surveyed 25.3 ac (10.2 ha) or 69 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

48 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 7 visits (5 tandem visits). We initiated the survey to this area on May 9.

On July 23 at station A, S. Igloi had 1 auditory "presence" detection at 0417. She had arrived early at the survey station and had the detection 15 minutes before official survey start time for the visit. On the same morning at station C, B. Maletzke had 1 "occupied" and 2 "presence" detections. At 0457, he saw 2 birds circling at 0.6 canopy height at the survey area; he was able to track them by their wingbeat sounds when the birds became obscured by trees. At 0515 and 0517, he heard keer calls to the southeast.

The area was 98.2 ac (39.8 ha), and we surveyed 44.0 ac (17.8 ha) or 45 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc. and was classified as a "presence" area as a result of those surveys.

49 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 3 visits (2 tandem visits). We initiated the survey to this area on May 8.

On May 31 at station 3, B. Maletzke had 1 "occupied" detection. At 0509, he saw 1 silent bird flying through the survey area at 0.8 canopy height.

The area was 26.3 ac (10.7 ha), and we surveyed 21.2 ac (8.6 ha) or 81 % of the habitat. Prior to 2002, the area was unsurveyed.

50 - DNR: Presence. We exclusively surveyed this survey area in 2002. We conducted 11 visits (9 tandem visits); 2 extra visits were conducted after August 5 which is the end of the survey season but still within the breeding season period. We initiated our survey to this area on May 21. The survey area is located next to the Strait of Juan de Fuca where it is not uncommon to see and hear marbled murrelets on the marine waters. Steep terrain, high forest canopy cover, and a rugged coastline boundary also presented a unique survey challenge.

On May 21, A. McMillan at station A and S. Ament at station E had multiple auditory "presence" detections. The surveyors plotted these detections on the Straits. A. McMillan had high winds at station A which is on a ridgetop. On May 29 at station A, S. Ament had 3 auditory "presence" detections which she plotted on the Straits. On July 18 at station A, A. McMillan had 4 auditory "presence" detections, and on July 23 at station E, S. Ament had 3 auditory "presence" detections. Each surveyor plotted their detections in the Straits.

On July 31, 3 surveyors were at different stations. All surveyors had auditory "presence" detections which they plotted in the Straits. A. McMillan at station A had 2 detections, A. Friel at station E had 1 detection, and J. Watson at station F had 2 detections. At 0518, J. Watson heard 3 loud, overlapping keer calls and again at 0518 he heard 1 loud "que" call. He plotted these detections over the land on the north edge of the survey area boundary. Loud wave noise impaired J. Watson's and A. Friel's ability to hear to 656 ft (200 m). On August 5 at station H, A. McMillan heard 3 keer calls at 0527 that were faint to moderate in intensity; she could not tell if the birds were over water or land.

On August 10 at station E, S. Ament had 11 auditory "presence" detections between 0612 and 0804. She plotted all detections except 1 on the Straits. At 0740, she had 1 detection which was 2 moderate keer calls that were "over stand (not water)" and about 410 ft (150 m) east of the survey area boundary. The detection was within another DNR site boundary, which is immediately adjacent to the survey area and has contiguous suitable habitat with it.

The area was 42.3 ac (17.1 ha), and we surveyed 26.5 ac (10.7 ha) or 63 % of the habitat. Prior to 2002, the area was surveyed by DNR and was classified as a "no detection" area as a result of those surveys; 3 "presence" detections from those surveys were plotted in the Strait of Juan de Fuca adjacent to the stand. Since the previous detections were not over the stand, the survey area was classified as a "no detection" area.

This area is part of a larger contiguous stand; the amount of additional acreage that is contiguous habitat will need to be ground-truthed using DNR's definition of suitable habitat as outlined in their HCP.

51 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 3 visits (2 tandem visits). We initiated the survey to this area on May 3. There was a known active bald eagle nest in the survey area stand.

On May 3 at alternate station 4, A. Friel had 2 "presence" detections. At 0621 and at 0623, she heard 1 keer call to the south southeast. On May 28 at station 3, J. Watson had 4 "occupied" detections. At 0509, he saw 2 silent birds circling at the survey area at 0.5 canopy height. At 0511, he heard 3 overlapping, loud keer calls and saw 1 bird circling at 1.0 canopy height immediately adjacent to the stand. At 0515, he saw 2 silent birds circling at 1.0 canopy heights on the edge of the stand, and at 0517 he saw 2 silent birds circling at 0.5 canopy height emerging from the stand.

The area was 35.0 ac (14.2 ha), and we surveyed 29.3 ac (11.9 ha) or 84 % of the habitat. Prior to 2002, the area was unsurveyed.

52 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 4 visits (0 tandem visits). We initiated the survey to this area on May 7.

On June 14 at station 6, B. Maletzke had 1 "occupied" detection. At 0606, he saw 2 silent birds circling at 1.0 canopy height in the survey area.

The area was 43.6 ac (17.6 ha), and we surveyed 33.5 ac (13.5 ha) or 77 % of the habitat. Prior to 2002, the area was unsurveyed.

53 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 6 visits (6 tandem visits). We initiated the survey to this area on May 7.

On June 12 at station A, S. Igloi had 3 "occupied" detections and 3 "presence" detections. At 0441, she saw 1 silent bird land in a tree near the station; she recorded the bird at 0.75 canopy height. At 0441, she saw 1 silent bird flying through the stand at 0.75 canopy height, and at 0442 she saw 1 silent bird flying through the stand at 0.5 canopy height. At 0444, 0446, and 0622, she heard 1 "moderate" intensity keer call.

The area was 71.8 ac (29.0 ha), and we surveyed 31.0 ac (12.5 ha) or 43 % of the habitat. Prior to 2002, the area was surveyed by DNR consultants, Resources Northwest, Inc., and was classified as a "presence" area as a result of those surveys.

54 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 7 visits (2 tandem visits). We initiated the survey to this area on May 1.

On May 1 at station 5, J. Watson had 1 auditory "presence" detection at 0714. He plotted the detection within the site boundary. On May 23 at station 2, J. Watson had 1 auditory "presence" detection at 0537 and another at 0548. One was plotted in the site boundary and 1 on the edge of the site but within the greater contiguous stand boundary. On June 5, J. Watson had 1 auditory "presence" detection at 0558; he plotted it on the edge of the site but within the greater contiguous stand boundary. On July 4 at station 5, J. Watson had 1 "occupied" detections and 3 auditory "presence" detections. At 0449, he saw 1 silent bird flying through the stand at less than or equal to 1.0 canopy height. At 0550, he had 3 separate detections of "moderate" intensity keer calls.

Prior to 2001, the area was surveyed by WDFW under contract to DNR in 1994 and 1995 and classified as a "presence" area as a result of those surveys.

In 2001, we surveyed this area for this project and kept the original identification number but expanded the size of the survey area to include more contiguous habitat. We delineated the survey area looking at suitable habitat based on aerial photo interpretation; the size was 97.8 ac (39.6 ha) (Figure 15). In 2002, DNR divided our expanded area and identified the south part as a unique site. This site excluded the 1994-95 site in the north part of the stand. Regardless, the 2 sites are part of 1 survey area and part of a larger stand.

For the 2002 map of this area, we used DNR's delineation which does not include the 1994-95 site. The site was 66.1 ac (26.8 ha), and we surveyed 66.1 ac (26.8 ha) or 100% of the habitat. Due to station locations, there was some overlapping survey coverage with the former site.

2002 Survey Areas South of Grays Harbor:

55 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. We conducted 4 visits (0 tandem visits). We initiated the survey to this area on May 1.

On May 20 at station G, K. Figlar-Barnes had 1 "occupied" detection. At 0610, she saw 1 silent bird at flying at 0.9 canopy height through the stand.

The area was 59.2 ac (24.0 ha), and we surveyed 32.9 ac (13.3 ha) or 56 % of the habitat. We selected this highest quality habitat of this area for our survey effort. Prior to 2002, this area was surveyed by DNR, and was classified as a "presence" area as a result of those surveys.

56 - DNR: Presence Status. We exclusively surveyed this survey area in 2002. We conducted 14 visits (13 tandem visits). We initiated 2 visits in April which were earlier than the official start of the survey season (May 1). We decided to see if we might get "early" detections at the survey area.

On April 19 at station A, K. Figlar-Barnes had 1 "presence" detection. At 0538, she heard 1 "very loud" keer call within 164 ft (50 m) of the station; she noted that it was "too dark to see" the bird. On June 11 at station A, K. Figlar-Barnes had 1 "presence" detection. At 0542, she heard multiple grunt calls. She plotted this detection along the edge of the survey area and the Willapa Bay. On June 27, S. Sewalt at station A and K. Figlar-Barnes at station I had "presence" detections. At 0531, S. Sewalt heard 3 faint keer calls which she plotted in the bay. At 0628, she heard 3 faint, overlapping keer calls which she plotted over the survey area. At 0624, K. Figlar-Barnes heard 3 faint keer calls which she plotted along the edge of the survey area.

The area was 57.5 ac (23.3 ha), and we surveyed 31.1 ac (12.6 ha) or 54 % of the habitat. We selected the highest quality habitat of this area for our survey effort. Prior to 2002, this area was surveyed by DNR consultants, Hamer Environmental, Inc., and was classified as a "presence" area as a result of those surveys.

57 - DNR: Presence Status (DNR HCP); Occupied Status (DNR HCP); Occupied Status (WDFW standards, Washington Forest Practices Rules). We exclusively surveyed this survey area in 2002. We conducted 12 visits (2 tandem visits). We initiated the survey to this area on May 3.

On July 16 at station B, K. Figlar-Barnes had 1 "presence" detection. At 0607, she heard multiple, overlapping keer calls that sounded moderate in intensity. She audibly tracked the birds from the east to the south southeast. She plotted the detection within the survey area boundary. On July 23, K. Figlar-Barnes had 1 "presence" detection. At 0733, she heard 1 "loud" keer call. She plotted this detection within the survey area boundary.

The area was 37.1 ac (15.0 ha), and we surveyed 29.0 ac (11.7 ha) or 78 % of the habitat. Prior to 2002, this area was surveyed by DNR consultants, Hamer Environmental, Inc., and was classified as a "presence" area as a result of those surveys. Due to a detection of a murrelet seen circling greater than 1.0 canopy but less than 2.0 canopy heights, WDFW had classified the survey area as "occupied" based on WDFW standards and the Washington Forest Practices Rules although this detection is considered "presence" under DNR's HCP.

58 - DNR: Occupied Status. We exclusively surveyed this survey area in 2002. It consisted of 2 sites. We conducted 15 visits (10 tandem visits) to the north site and 10 visits (2 tandem visits) to the south site. We initiated the survey to this area on May 2.

North site: On June 26, K. Figlar-Barnes had 1 "presence" detection. At 0453, she heard 1 faint keer call to the south southwest. She plotted the detection within the survey area boundary. On July 19, S. Sewalt had 1 "occupied" detection. At 0523, she saw 1 silent bird flying through the stand at 1.0 canopy height.

South site: Surveyors had no detections at this site in 2002. Regardless, it has contiguous suitable habitat with the north site and according to PSG Protocol, the entire stand is considered "occupied" due to the "occupied" detection in the north site.

The survey area is an isolated stand that was 106.9 ac (43.3 ha). The 2 sites, SC105 and 100601, combined constitute the survey area. The north site was 66.7 ac (27.0 ha), and we surveyed 40.1 ac (16.2 ha) or 60 % of the habitat. The south site was 40.2 ac (16.3 ha), and we surveyed 36.4 ac (14.7 ha) or 91 % of the habitat.

Prior to 2001, the north site was surveyed by WDFW under contract to DNR in 1994 and 1995 and classified as a "presence" area as a result of those surveys.

Also prior to 2002, the south site was surveyed by DNR consultants, Hamer Environmental, Inc., and was classified as a "presence" area as a result of those surveys. Due to a detection of a murrelet seen circling greater than 1.0 canopy but less than 2.0 canopy heights, WDFW had classified the survey area as "occupied" based on WA State Forest Practices Board Rules for regulatory purposes although this detection is considered "presence" under DNR's HCP.

59 - DNR: No Detections. We exclusively surveyed this survey area in 2002. We conducted 13 visits (6 tandem visits). We initiated the survey to this area on May 8.

Surveyors had no detections at this survey area.

The area was 74.8 ac (30.5 ha), and we surveyed 16.7 ac (6.7 ha) or 22 % of the habitat. We selected the highest quality habitat of this area for our survey effort. Prior to 2002, this area was surveyed by DNR consultants, Hamer Environmental, Inc., and was classified as a "no detection" area as a result of those surveys.

Budget Summary

Table 3 presents a summary of the project budget. It displays the original budget estimates by category from the Project Proposal (WDFW 2000), actual expenditures, and the variances between the proposed and actual expenditures. All categories were underspent. A brief explanation for the positive variances of each budget category follows:

A. B. Salaries and Benefits.
There was 1 less field surveyor hired each year due to recruiting difficulties in finding qualified and compatible candidates who could meet the requirements for this specialized and arduous field work. A operator for an ornithological radar survey system was not available.

C. Contracts. A personal services contract for a consultant for training in the use of radar surveys was not implemented due to the unavailability of the consultant and a WDFW staff radar technician as stated above. No potential nest trees were found, therefore no tree climbers were contracted.

E. Goods and Services. All budget subcategory transportation costs are combined here which included commercial vehicle leases, maintenance, operating costs of leased and agency owned vehicles, personally owned vehicles (POV's), State Motor Pool vehicles, and vehicle damage liability. The "Other E" subcategory included all other goods and services such as telecommunications, aerial photos, maps, expendable supplies, camp groceries, personal safety items, field forestry supplies, and commercial photocopies.

EQ. Equipment, non-capitalized. This was 1 portable computer notebook, 3 Global Positioning Satellite system units (GPS), and software for the above. These items would continue to be used in the continuation of this project if a new project proposal submitted to the *Tenyo Maru* Oil Spill Trustee Committee is approved.

G. Travel. Lodging and subsistence per diem expenses were less for project management and field staff. If a radar survey component would have been implemented, the operator would have incurred substantial travel expenses as originally planned.

K. Equipment, capitalized. A 1 ton van with telescoping boom, marine radar, video camera, and video recorder were not purchased.

DISCUSSION

Year 1 and Year 2 of this project have been extremely successful with respect to the project proposal's goal of locating "occupied" stands which can then be protected by regulatory or landscape planning processes. The 2000 Project Proposal estimate of locating a minimum of 18 "occupied" survey areas for this 2-year project was almost completely met in 2001 with WDFW obtaining 15 "occupied" survey areas (Washington Department of Fish and Wildlife 2000). We greatly exceeded this goal by the end of the 2002 survey season by obtaining 23 more "occupied" survey areas, for a combined total of 38 survey areas. With the help of survey cooperators (USFWS and DNR), there were 3 additional "occupied" survey areas: 2 in 2001 and 1 in 2002 for a grand total of 41 "occupied" survey areas.

In 2001, WFDW documented "occupancy" at 15 survey areas that previously were classified only as "presence" survey areas and, therefore, not legally protected from being harvested. In 2002, we documented "occupancy" at 23 survey areas: 16 formerly classified "presence", 2 formerly classified "no detection" areas, and 5 previously unsurveyed. These stands are now legally protected from being harvested. Those stands where we determined "occupancy" that were located in southwest Washington are of particular importance as they are were in a geographic region of the state identified as being of critical importance to marbled murrelets because there is very little suitable habitat remaining.

Since the mid-1990's, the WDFW and the USFWS have strongly advised that for determining "occupancy" at a survey area a minimum of 10 visits should be conducted per year for 2 consecutive years. Marbled murrelets are small, fast, and may not vocalize, therefore, they are very difficult to detect. By boosting the number of visits, and increasing observer coverage per visit via tandem visits, the probability of false negative results (concluding that murrelets do not occupy the habitat when, in fact they do) is reduced. Current statistical analysis being conducted by various seabird researchers and statisticians with the USFS, and overseen by USFWS and the PSG Marbled Murrelet Technical Committee, indicates that more than 10 visits may be needed to determine non-occupancy with high statistical confidence.

Without good station layout, which sets the foundation for meaningful surveys, increasing the number of visits or expanding observer coverage per visit is essentially inconsequential. Good station layout should result in station locations with predominately good visibility. One of the former "presence" areas, Survey Area #8, was surveyed for a 2-year period in the past, but the majority of stations established had high canopy cover (76-100%). There were no visual detections of murrelets at the stand. Although an observer on a previous survey heard murrelets sounding loud and circling over the stand, the observer's view of the sky was extremely limited by overhead forest cover, thereby precluding a visual sighting of the bird(s). Other than a pond/marsh area on the periphery of the Survey Area #8 area, good viewing opportunities at the stand were minimal.

In 2001, we redesigned the station layout of this survey area. More effort was made to find good viewing locations on the perimeter of the survey area and in the interior of the stand. We

established a new station on a new road on the west side of the stand that provided more viewing opportunities. A station was also established by a STC consultant in an open area that was created by a very large tree that had recently fallen over inside the stand. During the survey season, observers had multiple visual detections including an "occupied" detection.

Sometimes station layout is not well designed. Preliminary station layout may be created in an office using aerial photo maps, but evaluation of these stations in the field sometimes indicates that they may not always be at the best locations. Station establishment should not be based solely on aerial photo maps. Conditions at a stand may have changed or there are other conditions that are not apparent such as loud creeks or vehicle noise on busy highways. Sometimes, better viewing areas are not sought by field crews if doing so would compromise survey coverage from stations pre-mapped in an office.

By following protocol which recommends that the *entire* survey site be covered, the result may be that some or all stations at a site may have poor viewing opportunities. The protocol states: "Even if well placed openings are not available in a site, station coverage should not be compromised." This presents a problem because, although the minimum requisite numbers of surveys are conducted during the 2-year survey period, if the visits are done in part or wholly at stations with poor views of the sky and the survey area, visual detections of murrelets may be missed and the results of the surveys may not represent the true status of a survey area.

"Non-detection" and "presence" survey areas which have been surveyed to protocol standards (i.e., for 2 years) may actually be "occupied." If such survey areas are suspected to be "occupied" by murrelets, they could be targeted for additional survey using the following survey methods. Station layout should be reevaluated and updated to include any new opportunities that may be available such as new openings caused by wind thrown trees, new roads, and new clearcuts. If feasible in the field, survey strategies should emphasize conducting survey visits exclusively to stations with good views and conducting an increased number of survey visits to those stations throughout the survey season, especially during the month of July which includes the peak activity period. In addition, placing more than 1 observer at the same station and/or at different stations will increase the probability of detecting murrelets and obtaining occupied detections.

We applied the above survey methods to 24 survey areas: 22 medium to high quality, isolated "presence" survey areas, and 2 medium to high quality, isolated "no detection" survey areas. Nineteen areas were north of Grays Harbor and 5 were south of Grays Harbor. These survey areas had been surveyed previously by other entities for a 2-year period according to protocol standards. With our additional surveys, we got "occupied" status at 23 of these 24 survey areas; Survey Area # 56, a "presence" survey area south of Grays Harbor, was the only area where we did not get "occupied" status, but we did have more "presence" detections.

Regarding survey coverage of the 24 survey areas, none had 100 % coverage. Seventeen received less than 50 % coverage. Two former "presence" areas, Survey Area #18 at 341.0 ac (138.0 ha) and Survey Area #19 at 326.5 ac (132.1 ha), had less than 30 % survey coverage, but stations selected had good views. With the exception of the 2 survey areas above, the average size of a survey area was about 70 ac (28.3 ha). One area, Survey Area #2, received 2 additional

years of surveys. We covered about 40 % of this survey area exclusively from stations placed on roads around the perimeter of the stand; we had "presence" in 2001 including wing beats sounding low over an observer at a station and, in 2002, also observed "occupied" detections. Of the 23 "occupied" areas, 22 were classified as "occupied" based on subcanopy detections by WDFW observers. A DNR observer documented subcanopy occupancy at Survey Area # 42 from a station that we had established in 2002 which was on the outer edge of the stand and which provided very good viewing opportunities.

With respect to the protocol requirement of covering the entire stand, it may not be effective to cover 100% of a survey area if this results in observers surveying from stations with limited visibility. As previously stated, stations with limited viewing opportunities present a problem because potential "occupied" detections may be missed at a stand. Audible detections of murrelets only result in a "presence" status, unless stationary calls are heard which is a rare event.

The objective of most murrelet surveys by land managers and researchers is to determine whether there is murrelet "occupancy" at a stand, not simply "presence." To meet this objective, it may be better to repeatedly conduct survey visits only to stations with the best views. This may mean surveying at a station in a noisy location like a river where there may be good views of sky and habitat. However, as stated in PSG 2000 Protocol, "the increased opportunity to observe 'occupied' behaviors outweighs the negative aspects of noise."

Ideally, it is desirable to have both good visibility and audibility at each station of a survey area. Good audibility can be advantageous because if a murrelet is heard, then the sound may help the observer visually locate the bird. Where audibility is limited due to anticipated noise at a station, such as a station located on a loud sounding river, one approach to compensate for the audibility problem is to conduct a "tandem" visit on the same morning by placing 1 or more observers at the noisy station and placing 1 or more observers at a quieter location. Each observer should have radio communications to advise each other of any murrelet detections.

Good station layout can sometimes be very challenging with respect to stand conditions. If adequate surveys cannot be conducted, results should be considered inconclusive and subsequently the survey area status should be classified as "occupancy undetermined."

Depending on topography and access to a stand, the use of marine radar may help detect murrelet "presence" and may aid in directing observers to areas where murrelet activity is occurring or is concentrated (Cooper and Blaha 1999, Singer and Hamer 1999).

Many "presence" survey areas that were surveyed for 2 years according to the PSG protocol over the last decade in Washington have been harvested resulting in further fragmentation of the landscape and a reduction in suitable habitat available for the recovery of marbled murrelets. For the purpose of conservation, it may be wise to treat stands with "presence" as if they are "occupied," especially ones that have medium to high quality habitat and are isolated on the landscape. It may be prudent to protect these stands from harvest, perhaps through acquisition since there are no regulations that currently protect "presence" stands. WDFW survey experience

with these situations is that with more surveys and with better distributed stations, these stands usually are determined to be "occupied" sites. As Year 1 and Year 2 survey efforts of this project have demonstrated, the large majority of survey areas that were formerly classified as "presence" sites are, in fact, "occupied."

Conservation and Management:

The significance of the results of Years 1 and 2 of this project for the conservation and management of marbled murrelets and to the 5 cooperating land owners is summarized below:

(1) The DNR is currently implementing the largest HCP in the nation relative to size of state forest lands involved and the conservation benefits to threatened and endangered species, especially spotted owls and marbled murrelets. The basic interim conservation strategy for murrelets in the DNR HCP is to identify suitable murrelet habitat, conduct field surveys, locate "occupied" sites, develop mathematical models from this information, and, ultimately, develop a long-term forest management strategy to protect most of the occupied sites. DNR is conducting an extensive murrelet survey effort as specified in the HCP; however, the survey standards and procedures established in the HCP are less robust than those endorsed by the WDFW. For its HCP, DNR has chosen to more narrowly interpret the definition of classifying a stand as "occupied." Forest stands where low circling overhead is observed are not classified as "occupied" by DNR. We advocate more surveys in those situations to increase the probability of observing subcanopy flight. The situation regarding the classification of Site #31 as presence versus occupied is presented above in the Results section. This issue is part of ongoing negotiations between the USFWS and DNR relative to interpretations and implementation of the DNR HCP murrelet conservation strategies. The stand does not currently have regulatory protection. DNR is exempt from Washington State Forest Practices Rules since they have an approved HCP. An additional season of surveys at this survey area could gain more observations that might classify it as occupied according to DNR's definition.

In 2002, DNR increased survey visits from 4 to 6 visits a year to areas/sites established that year. Although this is a step in the right direction, it does not go far enough. Most major private forest companies in the state are conducting a minimum of 10 visits per year per WDFW and USFWS advisements. Newly revised 2003 PSG protocol incorporates statistical analysis regarding the number of survey visit replicates for a 2 year complete survey with respect to determining "presence" and "occupancy" probabilities of determination (Evans et al. 2003).

Recent murrelet survey protocol research and analysis by the PSG has shown that increased and improved survey effort and efficiency are needed to correctly determine site status with an acceptable probability of 95% (Evans et al. 2003). The consequences are that DNR surveys have a lesser probability of detecting occupied sites. The results of Years 1 and 2 of this project demonstrate this. Of the 36 DNR survey areas (33 "presence" and 3 "no detection") that WDFW exclusively surveyed, 28 (78 %) were found to be "occupied." Had these areas not been re-surveyed and found to be "occupied," they would have been

"cleared" for harvesting, and likely would have been harvested under the interim HCP strategy as most of the areas were more than 0.5 mi (0.8 km) from the next "occupied" site. As a consequence of the survey results, these sites are now protected under the interim HCP strategy.

In some situations, the models may not accurately classify a forest stand as suitable habitat, but when evaluated biologically the stand is habitat. Such stands are not surveyed for marbled murrelets by DNR and are available for harvest. During 2002, we identified the west part of the Survey Area #29 stand as good quality suitable habitat and were informed that the models specifically identified this forest as not qualifying for surveys. We obtained "occupied" status in the east part of this stand which has contiguous, good quality suitable habitat with similar forest characteristics to the west. After we arranged a field tour with DNR, the stand was added as suitable habitat under HCP management despite the results of the models.

The hierarchy established for selecting DNR stands for our surveys was as follows: First select stands having medium to high quality habitat with known murrelet "presence" detections, that have already been surveyed for the requisite 2 years. Second, select stands with medium to high quality habitat, that were unsurveyed or that had "no detections" after previous survey efforts. Last, was to choose some stands with multiple "presence" detections in "marginal" habitat stands that were isolated on the landscape and that could provide murrelets potential nesting opportunities in locations important for species distribution. Survey area selection for ownerships is explained in detail in the Methods section above.

This project added 1,783.3 acres to the DNR's inventory of occupied marbled murrelet habitat.

(2) The STC has an approved HCP with the same basic strategy of conducting surveys to locate "occupied" stands which would receive protection. After reviewing the effectiveness of the STC surveys conducted prior to 2001, and interpreting their results biologically in terms of the landscape, the WDFW concluded that 2 "presence" sites were probably "occupied." These sites were planned for clear-cut harvest in 2001. Both sites were found to be "occupied" by this project and are now protected under their HCP.

This project added 334.9 acres to the STC's inventory of occupied marbled murrelet habitat. In the process of surveying STC and adjacent USFS forest lands, this project added 99.1 acres to the USFS's inventory of occupied marbled murrelet habitat.

(3) The Weyerhaeuser Co. has been conducting murrelet surveys in accordance with the Washington State Forest Practices Rules. Their operations that affect Marbled Murrelets are also regulated by federal and state wildlife regulations. The procedures by which "occupied" murrelet habitat is protected on private forest lands is summarized in the Justification section above. The Rules state that the PSG Survey Protocol in effect March 1, 1997 would be used for conducting surveys for rule compliance. This resulted in the 1994 Protocol and its

subsequent annual updates in 1995, 1996, and 1997, rather than the current 2000 protocol, being the protocol for the required surveys. The additional surveys by this project on Weyerhaeuser Co. land resulted in 1 of 5 stands being reclassified from "presence" to "occupied," in spite of the restrictions that Weyerhaeuser Co. placed upon our survey efforts. Additional surveys to this stand were done in 2001 because WDFW determined that the original 2-year survey was not in substantial compliance with survey protocol.

This project added 23.1 acres to the Weyerhaeuser Company's inventory of occupied marbled murrelet habitat.

(4) Survey Area # 18 is a portion of a greater forested landscape managed by the Washington State Parks & Recreation Commission; however, it comprises land owned by the U.S. Bureau of Land Management, Army Corps of Engineers, Washington State Parks & Recreation Commission, and the U.S. Coast Guard. The WDFW and the USFWS believe that there is extensive "occupied" habitat in the forest adjacent to and contiguous with the survey area. Survey Area # 19 is also a portion of a greater forested landscape that is owned and managed by the Washington State Parks & Recreation Commission. This project conducted surveys at portions of the potential habitat in both parks and documented marbled murrelet occupancy behaviors. The habitat determination and supporting surveys have resulted in proposed developments in the vicinity of Survey Area # 18 being subject to ESA Section 7 consultation, Forest Practices Rules for defining contiguous "occupied" stands, state wildlife regulations, and Washington State Parks & Recreation Commission regulations and stewardship policies for Natural Forest designation. The forest surrounding Survey Area # 19, is subject to the same processes except for the ESA Section 7 consultation.

This project added 667.5 acres to Washington State Parks & Recreation Commission's inventory of occupied marbled murrelet habitat.

(5) The WDFW owns a network of state Wildlife Areas and other parcels of land which need wildlife surveys to guide site specific best management practices and legal compliance. Survey Area # 21 and # 26 are portions of 2 Wildlife Areas which contain murrelet habitat. If murrelets are detected on the 2 Wildlife Areas, protective strategies will be implemented by the WDFW in accordance with Forest Practices Rules, ESA compliance, and WDFW land management policies for threatened and endangered species. The presence of any murrelets on these Wildlife Areas would also focus Forest Practices Rules regulatory processes on all suitable habitat in the respective surrounding sections of land.

RECOMMENDATIONS

(1) Submit a new project proposal to continue a third year of surveys. Add a monitoring component to monitor the protection status for occupied sites found during this project for every other year for 10 years. The staffing levels and number of areas to survey will be determined by the amount of funds remaining from the original $560,000 granted for this project. The new monitoring component would be an addition of new funds.

(2) As in Year 2 of this project, the third year surveys component of the proposed project would emphasize surveys in the northern part of the project survey area because there are very few remaining stands in southwest Washington that are unsurveyed and/or meet the project's selection criteria. Continue to prioritize surveys of medium to high quality "presence"stands that are not protected from harvest. The northern part is the land north of the Quinault Indian Nation to Cape Flattery and east to the Port Angeles vicinity. There are watersheds with murrelet habitat north of Gray's Harbor such as the Humptulips, Wishkah, the Hoquiam, Dickey, and Hoko. However, most of the private timber land is owned by the Rayonier Timber Company which has denied WDFW permission to survey there in Year 1 and 2 of the project. Rayonier has already conducted surveys to many of the stands of murrelet habitat in those areas and has found "occupied" and "presence" sites. The company has not shared its survey results with the state for its lands in Grays Harbor and Pacific County. DNR has surveyed areas in the Humptulips and Hoquiam River areas in 2001 and 2002 and found some "occupied" and "presence" sites. The City of Hoquiam's watershed in Grays Harbor County may have some potential suitable habitat. This habitat is unsurveyed. The City would be required to conduct a consecutive 2-year protocol valid survey effort if they propose to harvest suitable habitat per State Forest Practices Rules.

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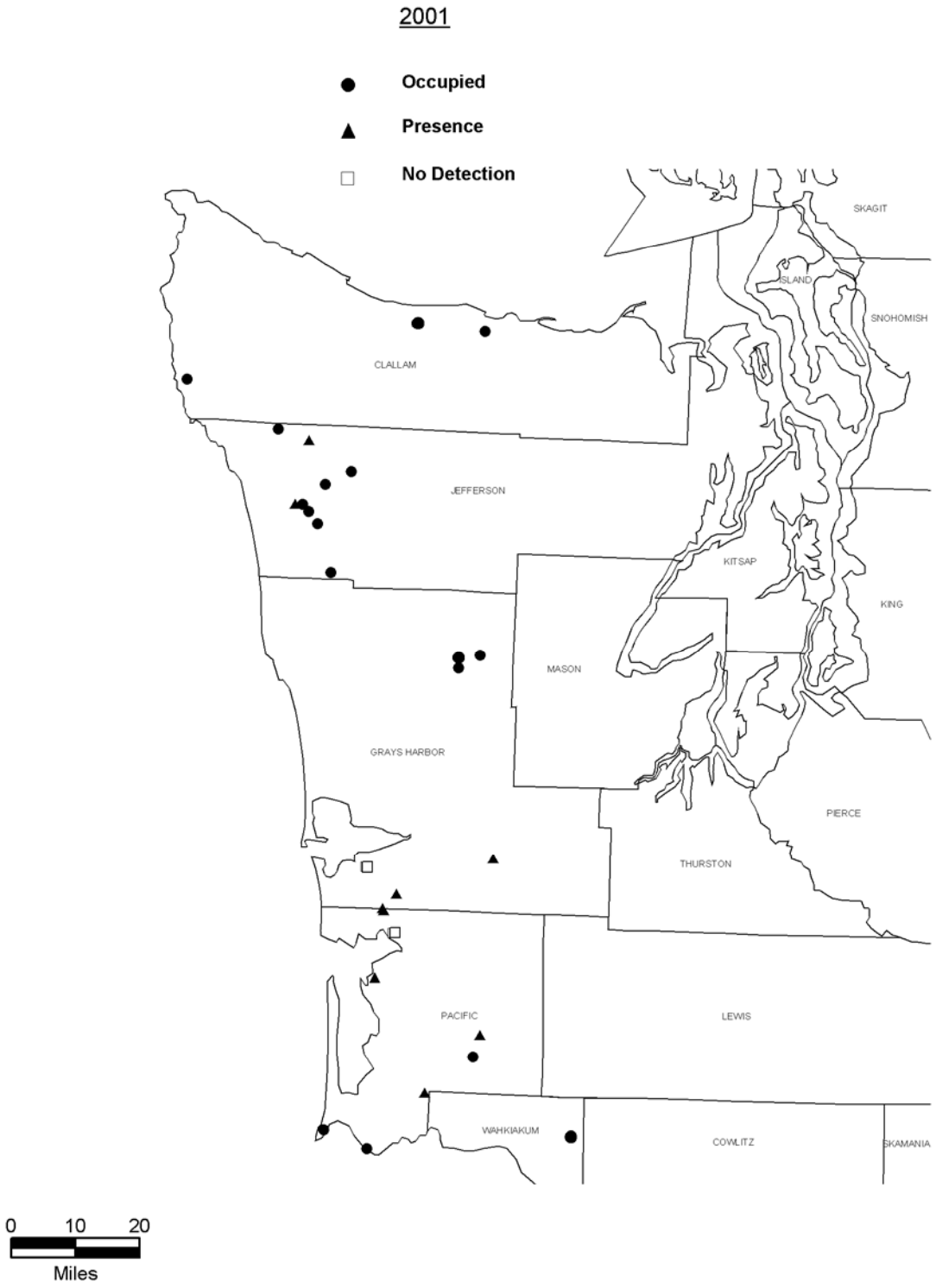

Figure 1. Distribution and status of 2001 Tenyo Maru Marbled Murrelet Project Survey Areas within western Washington.

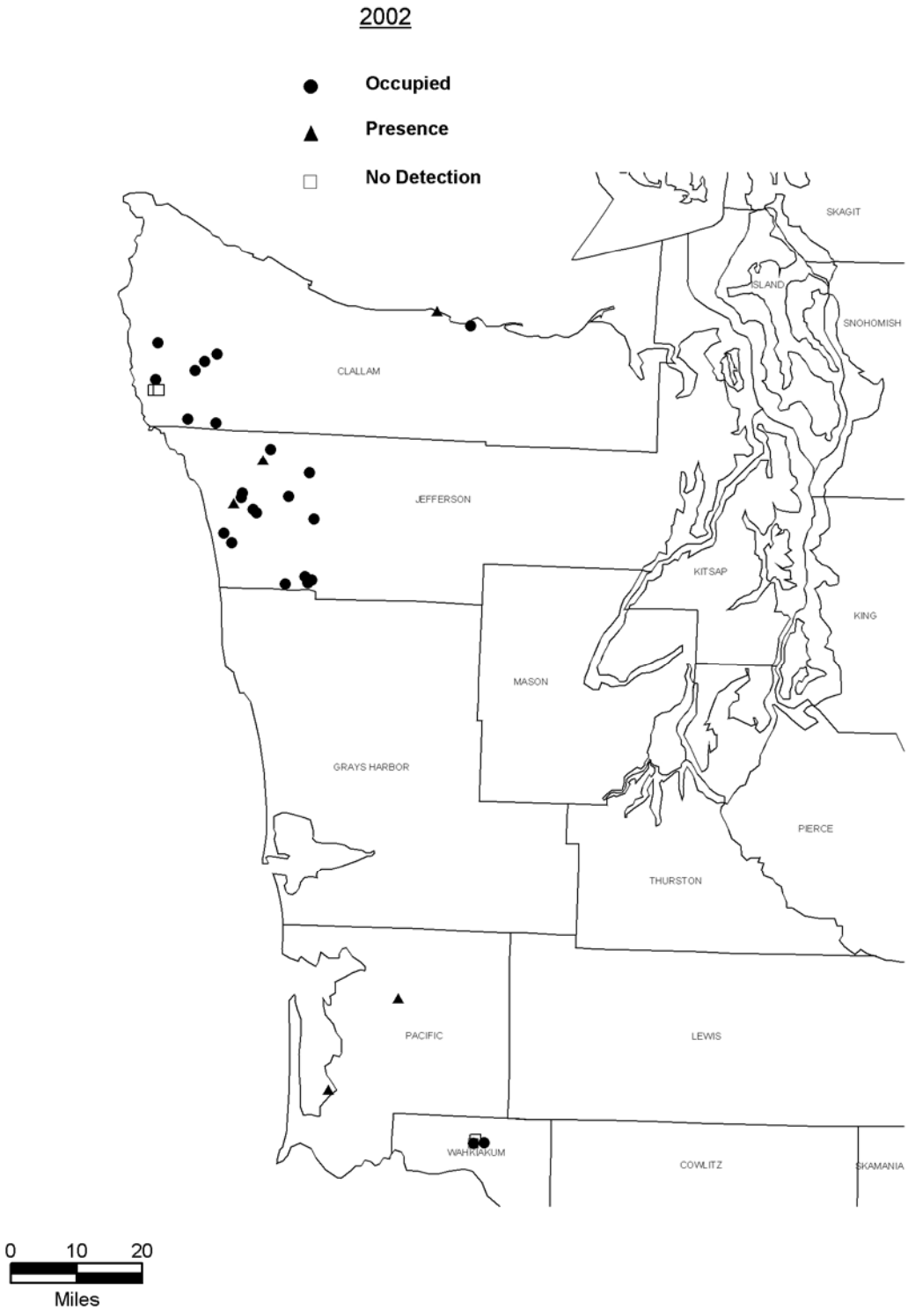

Figure 2. Distribution and status of 2002 Tenyo Maru Marbled Murrelet Project Survey Areas within western Washington.

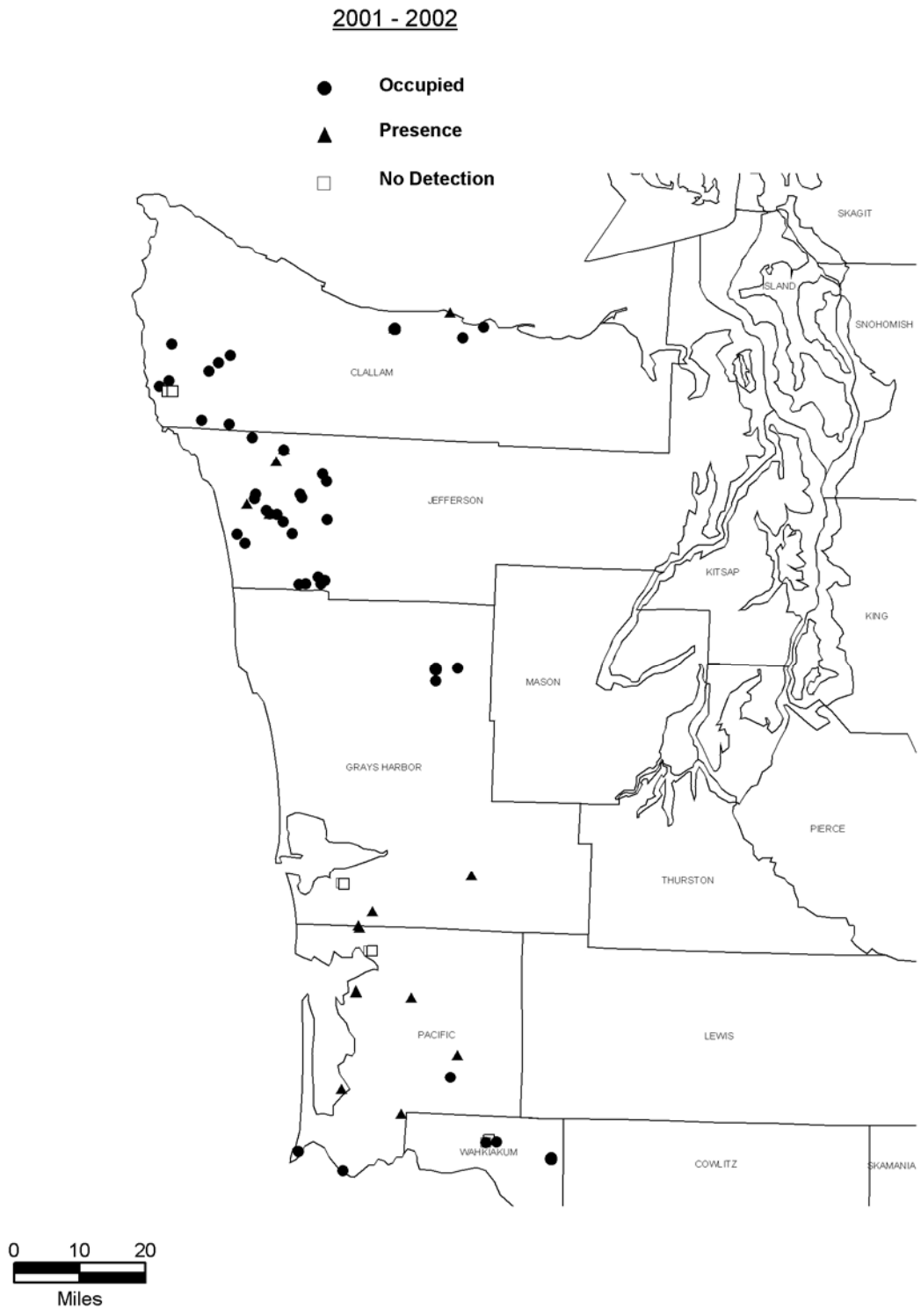

Figure 3. Distribution and status of 2001 - 2002 Tenyo Maru Marbled Murrelet Project Survey Areas within western Washington.

Table 1. 2001 Survey Areas

	Inland Band	Ownership	Status Prior to 2001	Current Status	Survey Area Size Ac (Ha)	Surveyed Ac (Ha)	Protection Strategy
1.	Near	DNR	Presence	**Occupied**	77.2 (31.2)	6.7 (2.7)	HCP
2.	Near	DNR	Presence	Presence*	60.9 (24.6)	25.1 (10.2)	HCP
3.	Near	DNR	Presence	**Occupied**	91.9 (37.2)	11.5 (4.6)	HCP
4.	Near	DNR	Presence	**Occupied**	52.4 (21.2)	39.2 (15.9)	HCP
5.	Near	DNR	Presence	**Occupied**	18.5 (7.5)	15.4 (6.2)	HCP
6.	Far	Simpson Timber/USFS	Presence	Presence*/ **(USFWS: Occupied)**	280.5 (113.6)	171.8 (69.5)	HCP/ESA
7.	Near	DNR	Presence	**Occupied**	19.1 (7.7)	18.3 (7.4)	HCP
8.	Far	Simpson Timber Co.	Presence	**Occupied**	54.4 (22.0)	23.2 (9.4)	HCP
9.	Mid	DNR	Presence	**Occupied**	44.0 (17.8)	19.1 (7.7)	HCP
10.	Mid	DNR	Presence	**Occupied**	93.4 (37.8)	11.7 (4.7)	HCP
11.	Mid	DNR	Presence	**Occupied**	70.3 (28.4)	33.7 (13.6)	HCP
12.	Mid	DNR	Presence	**Occupied**	89.2 (36.1)	15.0 (6.1)	HCP
13.	Near	DNR	Presence	Presence*/ **(DNR:Occupied)**	33.8 (13.7)	15.2 (6.2)	HCP
14.	Mid	DNR	Presence	Presence*	97.8 (39.6)	47.9 (19.4)	HCP
15.	Far	US Forest Service	Presence	**Occupied**	99.1 (40.1)	56.4 (22.8)	ESA
16.	Mid	DNR	Presence	**Occupied**	71.7 (29.0)	40.9 (16.5)	HCP
17.	Mid	Weyerhaeuser	Presence	Presence	43.0 (17.4)	43.0 (17.4)	FPA/ESA

Table 1 continued

	Inland Band	Ownership	Status Prior to 2001	Current Status	Survey Area Size Ac (Ha)	Surveyed Ac (Ha)	Protection Strategy
18.	Near	Washington State Parks / BLM	Presence	**Occupied**	326.5 (132.1)	88.4 (35.8)	Stewardship/ ESA & FPA
19.	Near	Washington State Parks	Presence	**Occupied**	341.0 (138.0)	58.0 (23.5)	Stewardship/ ESA & FPA
20.	Mid	Weyerhaeuser	Presence	Presence*	67.1 (27.1)	54.1 (21.9)	FPA/ESA
21.	Near	WDFW	No Detections	No Detections	121.0 (49.0)	6.6 (2.7)	Stewardship/ ESA
22.	Mid	Weyerhaeuser	Presence	**Occupied**	23.1 (9.3)	23.1 (9.3)	FPA/ESA
23.	Near	DNR	Presence	Presence	19.5 (7.9)	19.5 (7.9)	HCP
24.	Near	Weyerhaeuser	Presence	Presence*	14.8 (6.0)	12.6 (5.1)	FPA/ESA
25.	Near	DNR	Presence	Presence*	23.6 (9.5)	21.4 (8.6)	HCP
26.	Near	WDFW	No Detections	No Detections	100.4 (40.6)	0 (0)***	Stewardship/ ESA
27.	Mid	Weyerhaeuser	Presence	Presence	7.0 (2.8)	7.0 (2.8)	FPA/ESA
Grand Total Acreage (Hectares):					**2,340.4 (946.9)**	**884.8 (357.9)**	
Total Occupied Acreage (Hectares):					**1,786.7 (764.6)**		

HCP = Habitat Conservation Plan
FPA = Washington State Forest Practices Act
ESA = Endangered Species Act
DNR = Washington Department of Natural Resources
WDFW = Washington Department of Fish and Wildlife
BLM = U.S. Bureau of Land Management
* Presence detected in 2001
** Other Observers: Consultants: Biota Pacific Environmental Services
*** Smith Creek Wildlife Area Survey Stations >164 feet (>50 meters) from survey site edge based on 15 ac (6 ha) diameter coverage per survey station.

Table 2. 2002 Survey Areas.

	Inland Band	Ownership	Status Prior to 2002	Current Status	Survey Area Size Ac (Ha)	Surveyed Ac (Ha)	Protection Strategy
28.	Mid	DNR	Unsurveyed/ No Detections	Presence*	94.1 (38.1)	34.1 (13.8)	HCP
29.	Near	DNR	Unsurveyed/ No Detections	**Occupied**	60.9 (24.6)	36.3 (14.7)	HCP
30.	Near	DNR	Presence	**Occupied**	56.9 (23.0)	22.7 (9.2)	HCP
31.	Near	DNR	Presence	Presence*/ **Occupied*** **	49.1 (19.9)	29.1 (11.8)	HCP/ Forest Practices
32.	Near	DNR	Presence	**Occupied**	60.1 (24.3)	27.0 (12.8)	HCP
33.	Near	DNR	Unsurveyed/ No Detections	No Detections	58.9 (23.8)	55.2 (22.3)	HCP
34.	Near	DNR	Unsurveyed/ No Detections	No Detections	65.7 (26.6)	52.1 (21.1)	HCP
35.	Near	DNR	Presence	**Occupied**	33.1 (13.4)	13.4 (5.4)	HCP
36.	Mid	DNR	Unsurveyed/ No Detections	**Occupied**	114.6 (46.4)	98.6 (40.0)	HCP
37.	Near	DNR	Presence	**Occupied**	107.8 (43.6)	24.5 (9.9)	HCP
38.	Near	DNR	Presence	**Occupied**	64.0 (25.9)	39.0 (15.8)	HCP
39.	Mid	DNR	No Detections	**Occupied**	115.2 (46.4)	28.5 (11.5)	HCP
40.	Near	DNR	Presence	**Occupied**	47.3 (19.1)	18.8 (7.6)	HCP
41.	Mid	DNR	Unsurveyed/ No Detections	**Occupied**	94.5 (38.0)	86.5 (35.0)	HCP
42.	Near	DNR	Presence	Presence*/ **(DNR:Occupied)**	29.7 (12.0)	16.0 (6.5)	HCP

Table 2 continued

	Inland Band	Ownership	Status Prior to 2002	Current Status	Survey Area Size Ac (Ha)	Surveyed Ac (Ha)	Protection Strategy
43.	Mid	DNR	Presence	**Occupied**	49.5 (20.0)	22.2 (9.0)	HCP
44.	Mid	DNR	No Detections	**Occupied**	93.0 (37.6)	38.1 (15.4)	HCP
45.	Mid	DNR	Presence	**Occupied**	77.1 (31.2)	35.4 (14.3)	HCP
46.	Mid	DNR	Presence	**Occupied**	86.6 (35.0)	27.3 (11.0)	HCP
47.	Mid	DNR	Presence	**Occupied**	36.7 (14.9)	25.3 (10.2)	HCP
48.	Mid	DNR	Presence	**Occupied**	98.2 (39.8)	44.0 (17.8)	HCP
49.	Near	DNR	Presence	Occupied	26.3 (10.7)	21.2 (8.6)	HCP
50.	Near	DNR	Presence	Presence*	42.3 (17.1)	26.5 (10.7)	HCP
51.	Near	DNR	Unsurveyed/ No Detections	**Occupied**	35.0 (14.2)	29.3 (11.9)	HCP
52.	Mid	DNR	Unsurveyed/ No Detections	**Occupied**	43.6 (17.6)	33.5 (13.5)	HCP
53.	Near	DNR	Presence	**Occupied**	71.8 (29.0)	31.0 (12.5)	HCP
54.	Mid	DNR	Presence	**Occupied**	66.1 (26.8)	66.1 (26.8)	HCP
55.	Mid	DNR	Presence	**Occupied**	59.2 (24.0)	32.9 (13.3)	HCP
56.	Near	DNR	Presence	Presence*	57.5 (23.3)	31.1 (12.6)	HCP
57.	Near	DNR	Presence/ **Occupied*** **	Presence*/ **Occupied *** **	37.1 (15.0)	29.0 (11.7)	HCP/ Forest Practices
58.	Near	DNR	Presence/ **Occupied*** **	**Occupied**	106.9 (43.3)	76.5 (30.9)	HCP/ Forest Practices
59.	Mid	DNR	No Detections	No Detections	74.8 (30.5)	16.7 (6.7)	HCP

Table 2 continued

Grand Total Acreage (Hectares):	**2,113.6 (855.4)**	**1,083.7 (438.6)**
Total Occupied Acreage (Hectares):	**1,121.2 (412.2)**	

HCP = Habitat Conservation Plan
DNR = Washington Department of Natural Resources
* Presence detected by WDFW in 2002
** Surveys initiated mid-season
*** Meets Washington State Forest Practices occupancy definition, but not DNR HCP

Table 3. Budget Summary 2001-2002

Based on Washington Office of Fiscal Management (OFM) Fastrack automated budget system, effective 2/21/2003

Category		Project Proposal	Expenditure	Variance
A.	Salaries	278,982	242,352	36,630
B.	Benefits	57,566	45,818	11,748
C.	Contracts	19,500	12	19,488
E.	Goods and Services – Combined	74,961	69,938	5,023
	Vehicles/Transportation	64,877	54,333	10,544
	Other E	10,084	15,605	-5,521
EQ.	Equipment, non capitalized	6,350	5,027	1,323
G.	Travel	26,300	13,174	13,126
	Subtotal Direct Costs	**463,659**	**376,321**	**87,338**
Agency indirect @10 % less capitalized equipment K		46,366	37,632	8,734
	Subtotal	**510,025**	**413,953**	**96,072**
K.	Equipment Capitalized	49,975	-0-	49,975
	Project Total	**560,000**	**413,953**	**146,047**