

Pacific Seabird Group



DEDICATED TO THE STUDY AND CONSERVATION OF PACIFIC SEABIRDS AND THEIR ENVIRONMENT

PSG Web Site www.pacificseabirdgroup.org

MARBLED MURRELET NEST IDENTIFICATION TRAINING AND CERTIFICATION PROTOCOL FOR TREE CLIMBERS

August 2013

INTRODUCTION

The Marbled Murrelet (*Brachyramphus marmoratus*) is a small diving seabird that generally occurs in nearshore marine waters and is one of the more common alcids (Family Alcidae) in the sheltered waters throughout much of its range. This species usually nests in large (older-aged) trees from Alaska to central California, but also nests on the ground and on rock ledges in parts of Alaska, British Columbia, and Washington (Nelson 1997, Bradley and Cooke 2001, Carter and Sealy 2005, Bloxton and Raphael 2008). Murrelets in the genus *Brachyramphus* (i.e., Marbled, Kittlitz's *B. brevirostris*, and Long-billed *B. perdix*) have a breeding strategy unique among alcids. While most alcids nest nearshore, and often in large colonies, *Brachyramphus* murrelets may fly up to 40 km inland to their solitary nests; (Day et al. 1983, Nelson and Hamer 1995b, Nelson 1997). Breeding Marbled Murrelets are cryptic and secretive at nest sites, and primarily crepuscular in their flights. Marbled Murrelets are currently listed as threatened in California, Oregon, Washington, and British Columbia, and are a species of concern in Alaska (USFWS 1992, 1997). Marbled Murrelets are thought to be declining over much of their range due to loss of old-growth forest breeding habitat, at-sea mortality from oil spills and entanglement in gillnets, inland mortality due to predation on nests and adults by predators whose populations have been anthropogenically enhanced (e.g., Nelson and Hamer 1995a, Peery et al. 2004, Hébert and Golightly 2007, Piatt et al. 2006, USFWS 2009, 2011), and possibly reduced reproductive success due to changes in the availability of prey (e.g., Burger 2002, McShane et al. 2004, Peery et al. 2004, Becker and Beissinger 2006).

Tree climbing has successfully been used as a technique for finding old, recent, and active Marbled Murrelet nests in the Pacific Northwest (Nelson et al. 1994, Manley 1999, Meekins and Hamer 1999, Nelson and Wilson 2002). However, **there is no evidence that tree climbing is an effective tool for determining the absence of nests given their cryptic nature.** The success rate of using tree climbing to find murrelet nests can vary with tree species, quantity and type of limb substrate (vascular and non-vascular epiphytes, leaf/needle litter and humus, bare bark on limb depressions, etc.), time of year,

duration of the nesting attempt, exposure of the nest platform, and experience of the climbers (see below).

Attempts to use tree climbing to locate old and active nests can have adverse impacts on Marbled Murrelets and their nesting habitat. Direct impacts to active nests may occur if tree climbing is undertaken during the breeding season. Disturbance associated with the presence of tree climbers in the canopy, as well as from the tree rigging process itself, may result in nest abandonment and can attract nest predators. Indirect impacts to murrelet nesting habitat can also result from disturbance to epiphyte communities and other canopy substrates, or by damaging climbed trees through careless climbing practices.

Because of potential impacts to Marbled Murrelets and their habitat that may result from using tree climbing to locate murrelet nests, the Pacific Seabird Group's (PSG) Marbled Murrelet Technical Committee (MMTC) has identified the need for a standardized training and certification process to properly prepare tree climbers for identifying and documenting Marbled Murrelet nests, while limiting disturbance or damage to trees and nest sites. The following protocol for the training and certification of tree climbers describes both the content of the training curriculum and minimum performance standards necessary for the demonstration of tree climber proficiency and certification.

TREE CLIMBER TRAINING & CERTIFICATION

In the few instances where tree climbing is deemed appropriate, all tree climbers should successfully complete an official training program or demonstrate extensive experience in identifying and documenting Marbled Murrelet nests before they are considered qualified to climb trees to look for such nests. To enhance and standardize the ability of tree climbers to detect and correctly identify Marbled Murrelet nests, PSG has developed this tree climber training course and certification protocol. Included below are details about the acceptance requirements for participants, the qualifications of the Training Team members, the training schedule and course content, the required qualifications for certification, and the length of time for which such certification is valid.

REQUIRED QUALIFICATIONS OF PARTICIPANTS

All participants must demonstrate proficiency (as determined by the Training Team) climbing mature coniferous trees using "soft" tree climbing techniques. Previous experience with Marbled Murrelets, either through terrestrial audio-visual surveys or opportunistic observations, though not required, is encouraged.

All climbers must provide proof of sufficient (current) liability insurance coverage. To climb trees for agency contracts, one million dollars of insurance is usually required. Documentation of insurance will be required when registering for the training. A liability waiver protecting PSG and Training Team members from liability in case of accident and/or injury must be signed by each participant prior to the beginning of any training.

TRAINING TEAM

Trainings shall be conducted under the auspices of the PSG MMTC. The Training Team is comprised of a PSG MMTC representative (appointed by the MMTC coordinator), at least one experienced Marbled Murrelet researcher (can be the same as the MMTC representative), and one tree climber with extensive knowledge of forest canopy habitats and experience locating and documenting Marbled Murrelet nests. The same Training Team shall conduct both the classroom and field components of the training.

TRAINING SCHEDULE & COURSE CONTENT

The training will take place over a 2.5 day period, and will include both classroom and field components. All participants will jointly attend the classroom and half-day pre-dawn audio-visual survey during the murrelet breeding season. Individual participants will make and attend specific appointments for the field evaluation of nest tree searches in the fall after 15 September.

Day 1

The first day of the training will be spent in the classroom learning about basic Marbled Murrelet breeding biology, forest canopy habitat, appropriate climbing practices, and nest identification, verification, and documentation.

Marbled Murrelet Breeding Biology

The training will begin with an introduction to the Marbled Murrelet. This introduction will cover general murrelet biology and behavior, emphasizing breeding biology and behavior in the forest. Specific topics will include: sexual maturation, reproduction, and mating; nesting chronology; parental care; plumage development and molting; feeding and food resources; and basic egg anatomy. Images of a broad spectrum of Marbled Murrelet nests, including variations in nest age, tree species, and various substrates and surfaces, will be displayed and discussed. Images and preserved specimens of adult and juvenile birds, whole eggs, and eggshell fragments will be available for inspection.

Included in this session will be a review of the “PSG Marbled Murrelet Nest Structure Form–Version 2” (Appendix 1), which should be used to describe nests, as well as habitat characteristics when no evidence of nesting is discovered. Usage of the forms will vary depending on the nature of projects. Climbers will learn how to identify and count suitable nest platforms and accurately fill out the PSG Marbled Murrelet Nest Structure Forms.

Verification of Marbled Murrelet Nests

A substantial portion of the training will include a discussion of ambiguous cases commonly encountered in the forest canopy and the process used to evaluate whether or not evidence observed at a particular location is indicative of an actual Marbled Murrelet nest. Other organisms (e.g., rodents, other bird species, etc.) and processes (e.g., impacts from fallen branches, wind, etc.) can create disturbed areas or depressions in arboreal habitats, which can then be confused with older Marbled Murrelet nests. These possibilities will be thoroughly discussed and images and descriptions of such examples will be displayed.

Marbled Murrelet nests generally include a nest depression (with or without a fecal ring) in epiphytic cover (moss, etc.) or other substrate, a “landing pad,” and access from the tree limb (so murrelets can leave the nest site). However, as described above, all these characteristics are not always present. Nests can be classified as being definite, probable, or likely. A “definite nest” is one that includes a chick, adult, or whole egg in a depression (eggshell fragments alone may have been transported and deposited by a predator); this could also include a fecal ring and/or landing pad. A “probable nest” is one that has at least two signs (e.g., depression and landing pad, etc.), but not a chick, adult or whole egg in a depression. Probable nests may be considered definite nests when verified by a designated Marbled Murrelet nest expert. A “likely nest” is one that has only one sign (e.g., depression or landing pad, etc.). In such cases, the review of detailed photographs and the completed PSG Marbled Murrelet Nest Structure Form by a designated Marbled Murrelet nest expert is required for verification. Contact the PSG MMTC Coordinator for a list of qualified individuals.

Forest Canopy Habitat

Part of this training will address forest canopy structure as it pertains to nesting Marbled Murrelets, as well as dynamic canopy processes that affect the persistence of evidence of nesting activity. Specific topics should include a review of nest tree and nest platform structure, tree deformities, platform substrate, landing pads, and access considerations. Considerable time will be spent on nest platform substrates and arboreal surfaces utilized by Marbled Murrelets (e.g., epiphytic functional groups, bare bark on limb depressions, limb fusions or other tree deformities, and canopy humus and leaf litter—often collectively referred to as “duff”). The differential response of these organisms and materials to both their position in the canopy (exposure to weathering and disturbance) and time (*succession* of epiphytic communities and *accumulation* and *decomposition* of non-living substrates) will be explained. New findings related to nest structures from current research will also be incorporated into this portion of the training.

Appropriate Climbing Practices

Appropriate climbing practices required for working in Marbled Murrelet habitat will be emphasized during the training. In all Marbled Murrelet nest tree climbing projects, “soft” tree rigging and access methods must be used to minimize adverse impacts to trees, epiphytic communities, and other potential nesting substrates. The most common methods of “soft” tree canopy access and movement within the tree crown include the “Single Rope Technique,” the use of split-tail arborist lanyards, and other specialized equipment (e.g., ascenders, etc.) and techniques. These methods have been used successfully in forest canopy research since the 1970s and have been described in various sources (e.g., Denison et al. 1972, Perry and Williams 1981, Dial and Tobin 1994, Smith and Padgett 1997, Jepson 2000, Lilly 2005, etc.).

Climbers must avoid damaging protective tree tissues, whether by puncture, abrasion, or friction, that could compromise tree health. Climbers must also avoid degrading or damaging the epiphyte communities and potential nesting substrates. No climbing spurs or other equipment that can puncture the protective bark and underlying cambium layers

of trees will be allowed. Such damage can lead to infection by pathogens or harmful insects that could result in the death of the tree.

Tree climbers can be conspicuous foreigners in the forest canopy environment and have the potential to attract the attention of wildlife that might be predators of Marbled Murrelets and other arboreal fauna. To avoid the likelihood of attracting predators to active nests, tree climbing should not occur during the breeding season (1 April-15 September). Tree climbers and ground personnel should limit activities and behavior that might attract potential murrelet predators (e.g., corvids, raptors, etc.), such as excessively noisy or destructive canopy access maneuvers. Loud noises, such as shouting to ground personnel or other climbers, should be avoided as much as possible. Handheld, two-way radios with headsets can eliminate the need to shout. Food and associated wrappers and containers should be properly stowed and removed from the site. To reduce the chances of attracting the attention of predators to potential or known nests, tree climbers should use cryptically colored equipment and clothing, and should minimize the use of brightly colored or shiny equipment.

All climbing activity shall be in accordance with: (1) Federal and State laws pertaining to listed species; (2) all pertinent Federal, State, and local safety laws; (3) standard safe climbing practices; (4) State and Federal laws of legal and ethical conduct; and (5) any landowner access or special use permits. The course will cover a general overview of the laws and regulations, and participants will be provided with resources (web addresses of laws and agency regulations and contacts) to ensure they are knowledgeable of the laws and regulatory procedures.

Day 2

A single pre-dawn audio-visual survey will be conducted to provide trainees with firsthand experience watching Marbled Murrelet flight and behavior. This experience will serve to enhance the evaluation of Marbled Murrelet access conditions when searching for nests and can be helpful for decision-making in ambiguous cases. Climbers will not have to complete the PSG surveyor training for audio-visual surveys unless they are otherwise involved in conducting terrestrial-based “protocol surveys.”

Day 3

The final day of the training will be spent in the field climbing known nest trees with both recently used and older murrelet nests. This portion of the training will be conducted immediately after the breeding season (optimally in mid-late September) in order to observe nests before there has been enough time for the degradation of nesting evidence.

REQUIRED QUALIFICATIONS FOR CERTIFICATION

Participants will be required to successfully locate known nests and record all data required to complete the “PSG Marbled Murrelet Nest Structure Form–Version 2” (Appendix 1). If unable to identify and locate selected nests, the participant will not receive the certification. If the participant wishes to continue to pursue certification, he or she will need to successfully complete the entire training again at the next offering. In

such cases, the trainee will be required to identify nests in trees other than those initially searched.

DURATION OF CERTIFICATION

Once a tree climber successfully completes the training and is certified, he or she is considered qualified to locate and document Marbled Murrelet nests while climbing trees. The tree climber will receive a certificate of completion valid for a 3-year period. At the end of the 3-year period, if the climber wants to maintain their certification, they must provide documentation to the MMTC coordinator that they have satisfactorily participated in Marbled Murrelet nest search efforts in the interim. Such documentation should verify a reasonable and sufficient level of experience, including having climbed multiple mature trees while searching for Marbled Murrelet nests, and ideally, having documented multiple nests. Verification of experience should be made available from the agency/company that contracted with the tree climber.

If the tree climber is able to provide such documentation to the MMTC coordinator, the coordinator will issue a new certificate to the climber. If they are unable to provide compelling documentation to the MMTC coordinator, and they still wish to maintain their certification, they would need to be recertified through a subsequent training session. At the end of the 3-year certification, the MMTC coordinator may extend the certification until the next available class. Upon successful course completion and certification, the names of all qualified tree climbers shall be sent to the MMTC coordinator, who will maintain the list and make it available to relevant parties upon request.

NECESSARY FIELD EQUIPMENT LIST FOR TREE CLIMBERS

1. First Aid Kit (well stocked with contents that are kept up-to-date).
2. Tree climbing gear and equipment for rigging and climbing trees. All gear and equipment needs to meet or exceed OSHA/ANSI specifications.
3. Parachute cord or similar small diameter braided synthetic cord for use in tree access. The cord should be cryptically colored and discretely routed.
4. PSG Marbled Murrelet Nest Structure Forms.
5. Ballpoint pens for completing PSG Marbled Murrelet Nest Structure Forms.
6. Sealable collection bags (large heavy gauge Ziploc-style freezer bags work well).
7. Permanent marking pens for writing on identification tags and collection bags.
8. Metric Diameter at Breast Height (DBH) tape calibrated to one-millimeter increments.
9. Metric measuring tape for measuring linear distances as per PSG Marbled Murrelet Nest Structure Form requirements.
10. Narrow depth probe calibrated in five-millimeter increments for measuring depth of nest substrate.
11. Compass (degrees) with the capability for adjusting declination.
12. Clinometer.
13. Binoculars.
14. Digital camera with zoom lens capable of taking close-up pictures in shady conditions along with software capable of saving pictures in TIF or JPG file.
15. Photo scale or ruler to place in photo frame.

- 16 Two-way radios for quiet communication between climber and ground crew.
- 17 Extra batteries for digital camera and radios.
- 18 Closable stuff sack or hard-sided case for passing small equipment and supplies between climber and ground crew.

LITERATURE CITED

- Becker, B.H. and S.R. Beissinger. 2006. Centennial decline in the trophic level of an endangered seabird after fisheries decline. *Conservation Biology* 20:470-479.
- Bradley, R.W. and F. Cooke. 2001. Cliff and deciduous tree nests of Marbled Murrelets in southwestern British Columbia. *Northwestern Naturalist* 82:52-57.
- Bloxton, Jr., T.D., and M.G. Raphael. 2008. Breeding ecology of the marbled murrelet in Washington State: Five year project summary (2004-2008). Unpublished report, USDA Forest Service, Pacific Northwest Research Station, Olympia, Washington. 41pp.
- Burger, A.E. 2002. Conservation assessment of Marbled Murrelets in British Columbia. Part A: a review of the biology, populations, habitat associations, and conservation. Canadian Wildlife Service, Pacific and Yukon Region, Delta, British Columbia. Technical Report 387.
- Carter, H.R., and S.G. Sealy. 2005. Who solved the mystery of the Marbled Murrelet? *Northwestern Naturalist* 86:2-11.
- Day, R.H., K.L. Oakley, and D.R. Barnard. 1983. Nest sites and eggs of Kittlitz's and Marbled Murrelets. *Condor* 85:265-273.
- Denison, W.C., D.M. Tracy, F.M. Rhoades, and M.A. Sherwood. 1972. Direct, nondestructive measurement of biomass and structure in living, old-growth Douglas-fir. *Proceedings—research on coniferous forest ecosystems*. Pages 147-158. Bellingham, WA.
- Dial, R. and S.C. Tobin. 1994. Description of Arborist Methods for Forest Canopy Access and Movement. *Selbyana* 15(2):24-37.
- Hébert, P.N., and R.T. Golightly. 2007. Observations of Predation by Corvids at a Marbled Murrelet Nest. *Journal of Field Ornithology* 78(2):221-224.
- Jepson, J. 2000. *Tree Climber's Companion*. 2nd Edition. Access Pub. Inc.
- Lily, S. 2005. *Tree Climber's Guide*. 3rd Edition. International Society of Arboriculture. Champaign, IL.
- Manley, I.A. 1999. Behaviour and habitat selection of Marbled Murrelets nesting on the Sunshine Coast. M.Sc Thesis, Burnaby, BC Simon Fraser University. 163pp.
- Manley, I.A. 1999. Behaviour and habitat selection of Marbled Murrelets nesting on the Sunshine Coast. M.Sc Thesis, Burnaby, BC Simon Fraser University. 163pp.
- McShane, C., T. Hamer, H.R. Carter, G. Swartzman, V. Friesen, D. Ainley, R. Tressler, K. Nelson, A. Burger, L. Spear, T. Mohagen, R. Martin, L. Henkel, K. Prindle, C. Strong, and J. Keany. 2004. Evaluation report for the 5-year status review of the Marbled Murrelet in Washington, Oregon, and California. Unpublished report, EDAW Inc., Seattle, WA (prepared for U.S. Fish and Wildlife Service).
- Meekins, D.J. and T.E. Hamer. 1999. Marbled Murrelet nest site selection in relation to habitat characteristics in western Washington. Unpublished Report, Hamer Environmental, Mt. Vernon, WA. 28pp. (prepared for Washington Department of

- Natural Resources, U.S. Fish and Wildlife Service, and Rayonier Northwest Forest Resources).
- Nelson, S.K. 1997. Marbled Murrelet (*Brachyramphus marmoratus*). In A. Poole and F. Gill, eds. Birds of North America, No. 276. The Academy of Natural Sciences, Philadelphia; The American Ornithologists Union, Washington, D.C.
- Nelson, S.K. and T.E. Hamer. 1995a. Nest Success and the Effects of Predation on the Marbled Murrelet. Pages 89-97 in C.J. Ralph, G.L. Hunt, Jr., M.G. Raphael, and J.F. Piatt, eds. Ecology and conservation of the Marbled Murrelet. USDA Forest Service Gen. Tech. Rep. PSW-GTR-152, Albany, CA.
- Nelson, S.K. and T.E. Hamer. 1995b. Nesting biology and behavior of the Marbled Murrelet. Pages 57-68 in C.J. Ralph, G.L. Hunt, Jr., M.G. Raphael, and J.F. Piatt, eds. Ecology and conservation of the Marbled Murrelet. USDA Forest Service Gen. Tech. Rep. PSW-GTR-152, Albany, CA.
- Nelson, S.K., R.W. Peck, and T.L. De Santo. 1994. Tree climbing as a technique for finding Marbled Murrelet nests. Pacific Seabirds 21:46.
- Nelson, S.K. and A.K. Wilson. 2002. Marbled Murrelet habitat characteristics on state lands in western Oregon. Unpublished Report, Oregon Cooperative Fish and Wildlife Research Unit, Oregon State University, Department of Fisheries and Wildlife, Corvallis, OR. 152 pp. (prepared for Oregon Department of Forestry).
- Piatt, J.F., K.J. Kuletz, A.E. Burger, S.A. Hatch, V.L. Friesen, T.P. Birt, M.L. Arimitsu, G.S. Drew, A.M.A. Harding, and K.S. Bixler. 2006. Status Review of the Marbled Murrelet (*Brachyramphus marmoratus*) in Alaska and British Columbia. U.S. Geological Survey, Open-File Report 2006-1387, 630 pp.
- Smith, B., and A. Padgett. 1997. On Rope, 2nd Edition. National Speleological Society. Huntsville, AL.
- Peery, M.Z., S.R. Beissinger, S.H. Newman, E. Burkett, and T.D. Williams. 2004. Applying the declining population paradigm: diagnosing causes of poor reproduction in the Marbled Murrelet. Conservation Biology 18:1088-1098.
- Perry, D.R. and J. Williams. 1981. The tropical rain forest canopy: a method providing total access. Biotropica 13:283-285.
- U. S. Fish and Wildlife Service. 1992. Endangered and threatened wildlife and plants; determination of threatened status for the Washington, Oregon and California population of the Marbled Murrelet. USDI Fish and Wildlife Service Fed. Reg. 57: 45328-45337.
- U. S. Fish and Wildlife Service. 1997. Recovery plan for the Marbled Murrelet (*Brachyramphus marmoratus*) in Washington, Oregon and California. Oregon Field Office, Portland, OR. 203 pp.
- U.S. Fish and Wildlife Service. 2009. Evaluation report for the 5-year status review of the Marbled Murrelet in Washington, Oregon, and California. Unpublished report, U.S. Fish and Wildlife Service, Region 1, Lacey, WA.
- U. S. Fish and Wildlife Service. 2011. Marbled Murrelet Population Monitoring Results: 2000-2010. Marbled Murrelet Effectiveness Monitoring Program, NWF Plan March 30, 2011.

Appendix 1. PSG MARBLED MURRELET NEST STRUCTURE FORM, V2 Pg. 1 of 4

Site Name: _____ State: _____ Date: _____

Observer Name(s): _____ Phone: _____

Legal Location: T _____ N or S R _____ E or W S _____ QQ (1/16) _____ Q (1/4) _____

UTM Location: zone 10, E (x) coordinate _____, N (y) coordinate _____, source _____, datum _____, FOM _____ Distance Inland from Nearest Saltwater: _____ km

Location Description: _____

Nest Discovered by: (1) Tracking adults to tree; (2) Fledgling found on ground; (3) Eggshells on ground,

Distance from Bole: _____ m, Describe distribution around tree and location relative to nest

limb: _____

Distance to Nearest Surface Water: _____ m Width or Area: _____ m

Water Type: (1) Permanent River or Stream; (2) Intermittent Stream; (3) Lake; (4) Marsh; (5) Ocean

Distance to Nearest Disturbance, Opening, or Road: A _____ m, B _____ m, C _____ m

Disturbance Type: A _____, B _____, C _____

(1) Road; (2) Clearcut; (3) Meadow; (4) Windthrow; (5) Reprod. edge; (6) Gap; (7) Trail; (8) Riparian zone; (9) Other (describe): _____

Breeding Stage Nest Found: (1) Pre-egg laying; (2) Incubation; (3) Chick; (4) Old nest

Outcome of Nest: (1) Fledged; (2) Depredated; (3) Unknown; (4) Failed, non-predator

Number of Days Nest Active / Monitored: _____ Year Nest Active (if known): _____

NEST TREE DESCRIPTION

Tree Species		1)PSME; 2)TSHE; 3)PISI; 4)THPL; 5)ABAM; 6)ABGR; 7)TSME; 8)CHNO; 9)SESE
Dbh (cm)		Bole diameter at 1.3 m (4.5 ft) above ground from uphill side.
Height (m) / Type		Indicate type (1) climber, or (2) clinometer measurement.
Bole Diameter at Nest Limb (cm)		Bole diameter measured directly above nest limb.
Condition of Tree		1)Alive; 2)Dead; 3)Declining
Condition of Treetop		1)Alive; 2)Dead; 3)Declining Broken Top (Y or N):
Describe Tree Defect		
Mistletoe Presence		0=none; 1=<50%; 2=>50%
Platform Count (ground/climber)		Indicate both ground and climber totals.
Canopy Dominance		1)Dominant; 2)Codominant; 3)Understory
Canopy Lift (m)		Height from ground to bottom of continuous crown.
Crown Diameter (m)	North-South:	East-West:

NEST TREE DESCRIPTION (continued)

Nest Height / Tree Height (%)		Nest height relative to (÷) tree height.	
Limb Diameter at Bole (cm)			
Diameter at Nest, Proximal (cm)			
Diameter at Nest, Distal (cm)			
Diameter at Nest (cm)			
Length (m)			
Aspect (°)		Compass bearing limb is oriented facing away from bole.	
Angle of Repose (° + or -)		Angle limb is oriented at + or - perpendicular from bole.	
Condition of Limb		1)Alive; 2)Dead; 3)Declining	
Limb Epiphyte Cover, Moss (%)		Average Depth (cm):	
Limb Epiphyte Cover, Lichen (%)		Average Depth (cm):	
Canopy Litter & Debris Cover, (%)		Average Depth (cm):	
Landing Pads or Adult Perches: (Y or N)	Length x Width (cm)	Limb Diameter (cm)	Distance to Nest (cm)
LP # 1 (Primary or Closest)			
LP # 2 (Secondary)			
LP # 3 (Least used or Most distant)			

NEST DESCRIPTION

Nest Location		1)Primary limb; 2)Secondary limb; 3)Mistletoe; 4)Witch's broom; 5)Fork; 6)Non-mistletoe deformity; 7)Other-explain
Distance from Bole (cm)		Distance from outer proximal edge of nest cup to bole.
Nest Distance / Limb Length (%)		Distance from nest to bole relative to (÷) nest limb length.
Platform Type		1)Large limb; 2)Moss Pad; 3)Leader; 4)Defect; 5)Other
Nest Platform Length (cm)		Size of limb or defect and substrate where nest is located.
Nest Platform Width (cm)		Size of limb or defect and substrate where nest is located.
Platform Moss Cover (%)		Average Depth (cm):
Platform Lichen Cover (%)		Average Depth (cm):
Nest Platform Description		

NEST DESCRIPTION (continued)

Nest Cup Measurements	Length (cm)	Width (cm)	Depth (cm)
Outside Dimensions			
Inside Dimensions			
Nest Cup Shape		1)Circular; 2)Oval; 3)Irregular	
Ave. Depth of Cup Bottom (cm)		Average depth of substrate material in bottom of nest cup.	
Eggshells Present: Y or N		Describe:	
Excrement Present: Y or N		Describe:	
Down Present: Y or N		Describe:	
Total Vertical Cover (%)		Foliar and limb cover in 1 m radius above nest. Any height.	
Cover Distance Above Nest (m)		Nearest foliar or limb cover above nest.	
Nest Cup Cover (%)			
Dist. to Nearest Vertical Limb (cm)		Distance from outer cup to 1 st vertical limb on nest limb.	
Vertical Cover from Vertical Limb?		Indicate 1)Yes or 2)No.	
Horizontal Cover (%) (1 m radius circle)	0° (toward bole)	90°	180° 270°

COMMENTS:

Collections: Collect samples of eggshells, feathers, mosses, lichens and debris from 1) inside the nest cup, 2) the nest platform, and 3) the nest limb. Place samples in separate bags or containers and label each to indicate collection site, date, and contents.

Have Samples Been Collected? **Y** or **N** Indicate Number and Describe Contents:

Photographs: (List additional photos on page 4)

Disk ID #	Photo #: (minimum 2 ea.)	Description
		Close-up of nest facing toward bole, with scale.
		Close-up of nest facing toward bole, without scale.
		Close-up of nest from above, with scale.
		Close-up of nest from above, without scale.
		Close-up of landing pad(s), with scale.

		Close-up of landing pad(s), without scale.
		View of nest and platform facing toward bole.
		View of nest and platform facing away from bole.
		View of nest and cover toward each side perpendicular to limb.
		Wide angle view of nest limb from side (if possible).
		Wide angle view of nest and platform from above (include cover if possible).
		Nest Tree

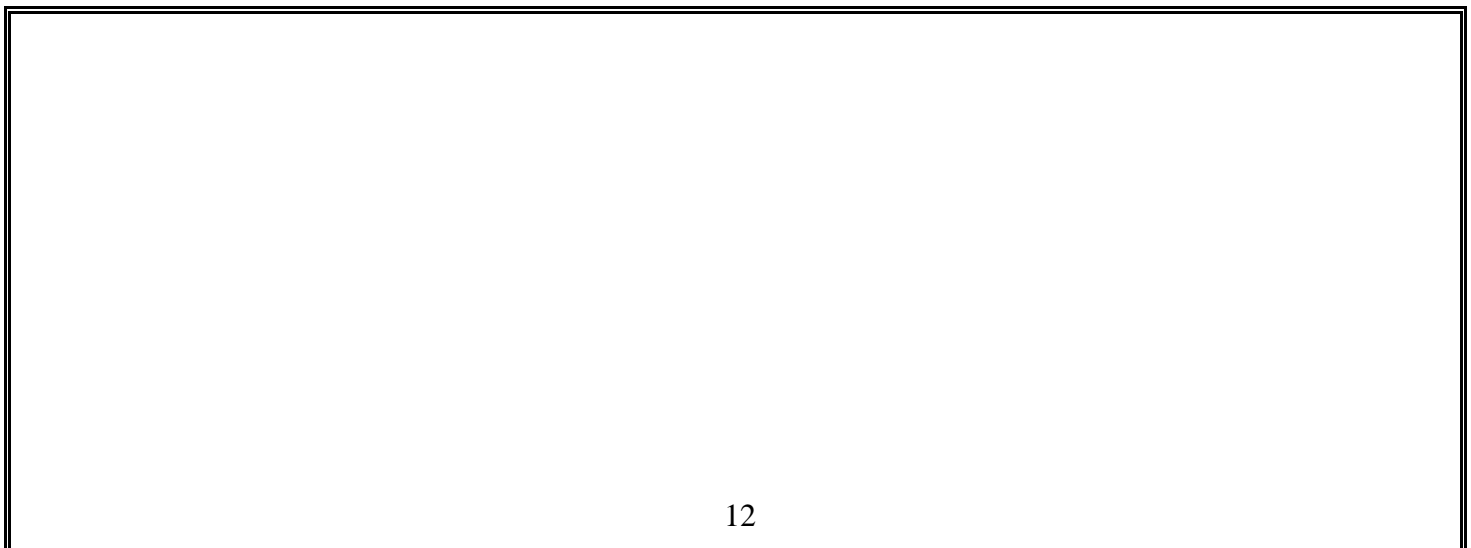
Drawings:

Draw view of nest limb from above showing aspect. Include location of nest cup, bole, area covered by epiphytes, landing pads and access and departure locations of adult birds, if known. Draw view of nest limb from side showing aspect. Include nest cup, bole, location of vertical branches and vertical cover and location of landing pads.

OVERHEAD VIEW:



VIEW FROM SIDE:



Additional Notes: