Managing Identified Wildlife:

Procedures and Measures Volume I

February 1999

FOREST PRACTICES CODE

BRITISH COLUMBIA

Ministry of Environment, Lands and Parks

Ministry of Forests

FOREST PRACTICES

CODE

of

BRITISH COLUMBIA

Managing Identified Wildlife: Procedures and Measures

Volume I

February 1999

Authority

Forest Practices Code of British Columbia Act
Forest Road Regulation
Operational Planning Regulation
Silvicultural Practices Regulation
Timber Harvesting Practices Regulation

Canadian Cataloguing in Publication Data
Main entry under title:
Managing identified wildlife : procedures and measures

(Forest practices code of British Columbia)

Co-published by BC Environment.
Companion volume to: Species and plant community accounts for identified wildlife.
ISBN 0-7726-3593-5

1. Wildlife management – British Columbia.
2. Wildlife conservation – British Columbia.
3. Forests and forestry – Environmental aspects – British Columbia. I. British Columbia. Ministry of Forests. II. BC Environment.

QL84.26.B7M36 1999 639.9'09711 C98–960172–2

Preface

Two companion documents have been developed to address the management of Identified Wildlife. These documents are referred to as the Identified Wildlife Management Strategy. Under the *Forest Practices Code of British Columbia Act*, Identified Wildlife are those species[1] and plant communities that have been approved by the chief forester and deputy minister of Environment, Lands and Parks or designate as requiring special management.

The first document, *Species and Plant Community Accounts for Identified Wildlife* provides a summary of the status, ecology, distribution and habitat requirements for each identified species or plant community. It is a resource document for government planners, foresters, wildlife managers and for those interested in the ecology of Identified Wildlife. It provides background technical material for the second document.

Managing Identified Wildlife: Procedures and Measures outlines specific management prescriptions for identified species or plant communities and describes the procedure for establishing, modifying and removing a wildlife habitat area. Management prescriptions consist of wildlife habitat areas and general wildlife measures. Wildlife habitat areas are mapped areas of limiting habitat that have been approved by the chief forester and deputy minister of Environment, Lands and Parks as requiring special management. General wildlife measures are legally established management practices for wildlife habitat areas that have been approved by the chief forester and deputy minister of Environment, Lands and Parks.

Together, these documents provide the necessary information and provisions to promote conservation of those species at risk from forest and range practices whose needs are not adequately addressed in other Forest Practices Code guidebooks or regulations.

[1] For the purposes of this document, species also refers to subspecies.

Acronyms used in this document

BEC	biogeoclimatic ecosystem classification
CDC	Conservation Data Centre, Ministry of Environment, Lands and Parks
CDF	coastal Douglas-fir
CWH	coastal western hemlock
FA	foraging area
FEN	forest ecosystem network
FPC	Forest Practices Code
GBMA	Grizzly Bear Management Area
GBPU	Grizzly Bear Population Unit
GWM	general wildlife measure
LU	landscape unit
LWD	large woody debris
MELP	Ministry of Environment, Lands and Parks
MEM	Ministry of Energy and Mines
MH	mountain hemlock
MOF	Ministry of Forests
NDT	natural disturbance type
OGC	Oil and Gas Commission
OGMA	old-growth management area
PFA	post-fledging area
RES	rare and endangered species specialist
RIC	Resource Inventory Committee
RMZ	resource management zones
TRIM	terrain resource information management
WAP	watershed assessment procedure
WHA	wildlife habitat area

Contents

Introduction

The conservation of biological diversity is a goal of the *Forest Practices Code of British Columbia Act*. Two Forest Practices Code guidebooks, the *Biodiversity Guidebook* and the *Riparian Management Area Guidebook*, address the requirements of the majority of species and plant communities on a broad scale. These guidebooks are referred to as the "coarse filter," as they should maintain habitat for the majority of species, plant communities and ecosystem processes. The Identified Wildlife Management Strategy is designed to be the "fine filter," addressing habitat requirements of wildlife that require additional management attention.

The goals of the Identified Wildlife Management Strategy are to minimize the effects of forest practices on Identified Wildlife, and to maintain their limiting habitats throughout their current ranges and, where appropriate, their historic ranges. In some cases, this will entail restoration of previously occupied habitats, particularly for those species most at risk.

The term "Identified Wildlife" refers to those species at risk that the deputy minister of Environment, Lands and Parks, or person authorized by that deputy minister, and the chief forester, agree require special management attention. Within the Code, the terms "wildlife" and "species at risk" have been defined so that endangered, threatened or vulnerable species of vertebrates and invertebrates, endangered or threatened plants and plant communities, and regionally important vertebrates may be designated as Identified Wildlife.

The Identified Wildlife Management Strategy can be applied only to Crown forest and range land or private land that is subject to a tree farm or woodlot licence. It only addresses forest practices regulated by the Code. It does not address activities such as hunting or poaching. Under the *Wildlife Act*, native terrestrial vertebrates designated as "wildlife" are protected from killing, capture and harrassment except by permit or regulation. The strategy also does not address agriculture or urban development. A role of the Ministry of Environment, Lands and Parks is to develop conservation strategies and recovery plans for species at risk. These strategies and plans address all habitats in the province and all requirements for a species' conservation including research and inventory needs, habitat conservation and regulatory changes. Examples of these strategies include the Provincial Grizzly Bear Conservation Strategy and the Marbled Murrelet National Recovery Plan. For information on conservation strategies, recovery plans and how other activities are being addressed contact the Ministry of Environment, Lands and Parks, Wildlife Branch.

Identified Wildlife are managed through the establishment of wildlife habitat areas (WHAs) and implementation of general wildlife measures (GWMs), or through other management practices specified in higher level plans. Wildlife habitat areas are mapped areas that have been approved by the chief forester and deputy minister of Environment, Lands and Parks as requiring special management attention. The purpose of WHAs is to conserve those habitats considered most limiting to a given species. For example, feeding lakes for American white pelican are considered limiting because they must occur near the breeding site, contain the appropriate prey species, and be relatively free of human disturbance. Breeding sites for ancient murrelet are considered limiting because this species returns to the same area each year, breeds in undisturbed old forest habitat, and requires freedom from most mammalian predators. Although research is not always

adequate to indicate which habitats or habitat attributes are most limiting, the Identified Wildlife Management Strategy adheres to the precautionary principle—where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for failing to implement appropriate, cost-effective environmental measures.

General wildlife measures describe the management practices that must be implemented within an approved WHA. A GWM may limit activities partially (e.g., seasonally) or entirely. General wildlife measures prescribe a level of management appropriate to the conservation status of Identified Wildlife. Management objectives are consistent with the goals and commitments of the Canadian Biodiversity Strategy and provincial goals for the management of wildlife (i.e., as outlined in the Provincial Wildlife Strategy). However, it should be recognized that these measures may prove to be insufficient to conserve viable populations of a species throughout its range in British Columbia and may have to be amended accordingly. Amendments will generally follow an assessment, prepared by the Ministry of Environment, Lands and Parks (MELP), of the conservation needs of the species. When an assessment indicates that additional measures are required to conserve the species and the recommendations have an impact on other resources beyond the limits approved for Identified Wildlife, it may be necessary to consider the species within a public planning process (i.e., higher level plan).

It is believed that this strategy marks a significant step toward responsible stewardship of Identified Wildlife. The management practices presented here are designed to reduce the impacts of forest and range management on Identified Wildlife within targeted social and economic constraints. They represent an attempt to balance both socio-economic considerations and conservation of species at risk in managed forests and rangelands. For the most part, Identified Wildlife provisions are stand level measures that can not address the issues of habitat supply, habitat connectivity and population viability. Such considerations should be taken into account during landscape level or regional planning.

Provincial status

Species at risk under the Forest Practices Code

Under the Forest Practices Code, species at risk includes provincially red- and blue-listed vertebrates and invertebrates, red-listed plants and plant communities as well as selected yellow-listed species (i.e., regionally important). Regionally important species are considered at risk under the Code when it has been determined that these species are not adequately addressed by coarse filter guidelines and therefore require special management attention.

Provincial status (e.g., red, blue and yellow) is determined and reviewed on a biannual basis by the Conservation Data Centre (CDC) and Wildlife Branch using the internationally accepted criteria developed by the Nature Conservancy. These criteria are provincial abundance, estimated occurrences, range, trends, protected occurrences and threats. Species and plant communities are ranked from 1–5 where 1 is critically imperiled and 5 is secure. Generally, red-listed species are ranked 1 or 2, and blue-listed species are ranked 3 or 3/4. Regionally important wildlife are species that are ranked 4 or 4/5 indicating a potential conservation concern and are “at risk” in adjacent jurisdictions. The species at risk list is approved by the deputy minister of Environment, Lands and Parks.

Identified Wildlife

Identified Wildlife are selected from the provincially red- or blue-listed vertebrates and invertebrates; regionally important vertebrates; and red-listed plants or plant communities. An inter-agency committee (Ministry of Environment, Lands and Parks and Ministry of Forests) consults with species experts to determine which of these species and plant communities should be recommended for designation as Identified Wildlife.

Species and plant communities are evaluated to determine what habitats are considered limiting for their survival. Both species experts and literature are consulted during this evaluation. For red-listed plant communities the remaining occurrences of the community are considered limiting. Plant communities and species whose known limiting habitats are not affected by forest or range management are not considered for designation as Identified Wildlife. Species and plant communities whose habitat needs are adequately addressed by the *Biodiversity Guidebook* and the *Riparian Management Area Guidebook* are also not considered.

Only species and plant communities that were not adequately addressed at the coarse filter level and were considered to need protection of limiting habitats were put forward to the chief forester and deputy minister of Environment, Lands and Parks for designation as Identified Wildlife.

Identified Wildlife may be de-designated by agreement of the chief forester and deputy minister of Environment, Lands and Parks. This is necessary when a change in species or community status occurs.

Volume 1 species

The first volume of the Identified Wildlife Management Strategy contains 36 species and subspecies and four plant communities. This is only a portion of the species and plant communities that are at risk and affected by forest and range practices. The list of species and communities reflects the efforts of the interagency committee to represent a diversity of species in a diversity of habitats, and includes species from all the forest regions. Additional species and communities will be included in the forthcoming volume 2.

Appendices 1–6 contain information on the distribution of volume 1 Identified Wildlife by ecosection and forest district.

Management of Identified Wildlife

Coarse filter guidelines

Application of Forest Practices Code documents such as the *Biodiversity Guidebook* and the *Riparian Management Area Guidebook* will contribute to the maintenance of most of the biodiversity in British Columbia, including some of the habitat needs of Identified Wildlife.

The *Biodiversity Guidebook* addresses the maintenance of biodiversity at both the stand level and landscape level. Stand level biodiversity provisions involve maintaining stand structure through the retention of wildlife trees, coarse woody debris, tree species diversity, and understorey vegetation diversity. Stand level biodiversity is addressed during operational planning (e.g., silviculture prescriptions) whereas landscape level biodiversity is addressed through landscape unit planning. During landscape unit planning, objectives for some or all of the following landscape characteristics are set: seral stage distribution, temporal and spatial distribution of cutblocks, old seral retention and representation, landscape connectivity, stand structure and species composition.

Landscape unit planning is directed by the *Guide to Landscape Unit Planning* (In prep.). This document outlines current policy for conducting landscape unit planning. In the short term, the focus or priorities are old seral retention and wildlife tree patches.

If the requirements of certain Identified Wildlife (e.g., marbled murrelet and northern goshawk) and placement of WHAs are considered during landscape unit planning, it may be possible to effectively plan for a greater number of species and accommodate their connectivity requirements while reducing the incremental forest impacts. For instance, by identifying the seral stage mosaic required by some Identified Wildlife early in the planning process, species requirements may be partially or completely accommodated by applying intermediate or higher biodiversity emphasis options to landscape units. The selection of intermediate and higher biodiversity emphasis options must still be carried out within the chief forester's policy direction including the apportionment of 45% of the timber harvesting landbase in each sub-regional planning unit to lower biodiversity emphasis, 45% to intermediate, and 10% to higher biodiversity emphasis.

Fine filter management

The fine filter component of the Forest Practices Code is the Identified Wildlife Management Strategy. As defined within the *Operational Planning Regulations*, Identified Wildlife are "those species at risk that the deputy minister of Environment, Lands and Parks or a person authorized by that deputy minister, and the chief forester, agree will be managed through a higher level plan, wildlife habitat area or general wildlife measure."

Wildlife habitat areas

Wildlife habitat areas are areas of limiting habitat that have been mapped and approved by the chief forester and deputy minister of Environment, Lands and Parks. Wildlife habitat areas are designed to minimize disturbance or habitat alteration to a species' limiting habitat or to a rare plant community. In most cases, the WHA contains a core area that is protected from habitat

alteration and a buffer to minimize disturbance (i.e., WHA includes both the core area and the buffer). All species and plant communities in volume 1 have WHA provisions, except fisher, which is addressed through higher level plan recommendations.

General wildlife measures

General wildlife measures direct forest and range practices within a WHA, and have been approved by the chief forester and deputy minister of Environment, Lands and Parks making them legally required under the Code. GWMs can address any forest practice as defined under the Code. This includes road construction, road maintenance, grazing, haying and timber harvesting. Practices have been grouped under the following headings: access, range, recreation, restoration and enhancement, and silviculture. A GWM may limit activities partially or entirely.

Because GWMs are legally required, variances are provided for some measures that enable district managers and regional fish and wildlife managers to vary measures. For more information on variances see page 17.

Higher level plans (resource management zone objectives)

Wildlife habitat areas maintain limiting habitats and cannot always address all aspects of a species' habitat requirements. Some species have large home ranges, occur at low densities, have widely and sparsely distributed limiting habitats, or are sensitive to forest level disturbances. The requirements of such species must be addressed over large areas, such as regions or subregions, in order to effectively manage their populations. For these reasons, some species habitat requirements are not appropriately managed as WHAs and cannot be adequately addressed by coarse filter provisions. Therefore management of these species is best addressed through higher level plans.

For the purposes of this document, a higher level plan is a resource management zone (RMZ) objective approved by the three ministers responsible for the Code (MELP, MOF, MEM). The definition of higher level plans has been restricted because setting RMZ objectives involves significant socio-economic considerations. During RMZ objective setting, the regional or landscape level requirements of these species will be considered in context with other species' habitat needs, measures to conserve biodiversity, other resource values, and social and economic issues. These recommendations may be considered by ongoing strategic land use planning tables who have not yet passed the scenario development stage in situations where it would not cause backtracking of the progress accomplished to date.

This document provides higher level plan recommendations for planning tables to consider for three species: fisher, bull trout and grizzly bear. Government is not recommending any other volume 1 species be considered within higher level plans at this time. Should conservation assessments indicate that one or more other volume 1 species cannot be adequately managed through the current provisions of the Identified Wildlife Management Strategy or other Code mechanisms, government may amend the strategy to include higher level plan recommendations for the additional species.

For any species to be considered in a higher level plan, government planning teams should develop a range of management options for the species before tabling this information with non-government planning team members. The government planning team should also evaluate the environmental, social and economic impacts associated with the range of options and present this information to the non-government planning team members.

Conservation assessments

The effectiveness of the fine filter management approach is dependent on the adequacy of the coarse filter mechanisms as well as the development of species-specific conservation assessments that will provide guidance on where and how much is required to maintain a species or plant community.

A conservation assessment, prepared by government, will examine the spatial arrangement of existing land use designations (e.g., protected areas, riparian reserves, ungulate winter ranges) and how these contribute to the conservation needs of a species or plant community. Conservation assessments will indicate where placement of WHAs would be most effective and will assist the regional rare and endangered species specialist (RES) in evaluating WHA proposals. They will also provide objectives for the management of the species or plant community within the context of government policy regarding the impacts of WHAs on the forest, range, mining and petroleum industries.

Inventory and monitoring

An important part of the Identified Wildlife Management Strategy is a program for inventory and monitoring of Identified Wildlife populations. Monitoring takes three forms: compliance monitoring, effectiveness monitoring and population monitoring.

Compliance monitoring confirms whether the recommendations are being followed in the field. Compliance monitoring is carried out by the Ministry of Forests and Ministry of Environment, Lands and Parks. Effectiveness monitoring evaluates the response of the habitat to the management practices within and adjacent to a WHA. Population monitoring evaluates the effectiveness of maintaining populations of Identified Wildlife. Without adequate baseline inventory information, it will be difficult to carry out population monitoring or to know when to modify the WHA design, placement, frequency or measures.

PART 1

PROCEDURES

Procedure for establishing a wildlife habitat area

A summary of the steps taken in establishing a wildlife habitat area is provided in Figure 1. Steps 3–5 should be completed in 90 days. When approval takes longer than the suggested time, a letter of explanation and revised timetable will be sent to tenure holders. Ministry of Forests regions will be the administrative units used for tracking WHAs.

Step 1. Site is proposed

Proposals may be submitted by a variety of sources including public or private individuals or institutions. When submitting a proposal, use a WHA data form (sample of form in Appendix 7). Proposals must go initially to a regional rare and endangered species specialist (RES) of MELP or designate. The RESs are the primary contacts for proposed and approved WHAs. RESs will co-ordinate responsibilities within MOF regions.

Step 2. Initial biological review (RES responsibility)

After receiving a proposal, the RES informs the Regional WHA Committee, MOF district office and licensee that a WHA proposal has been made and whether the proposal is probably valid or not. The RES will ensure that forest and range agreement holders are informed of proposals. The Regional WHA Committee is a joint Ministry of Environment, Lands and Parks (MELP)/ Ministry of Forests (MOF)/Ministry of Energy and Mines (MEM) committee (see Appendix 8 for terms of reference). One committee will be established for each MOF region.

The RES makes the initial evaluation of the proposal. The proposal must meet the species-specific criteria described in part 2 of this document. Indications of occupancy by the species and presence of the habitat feature must be confirmed. Proposed sites that pass step 2 will be posted on an intranet site. For more information see page 16.

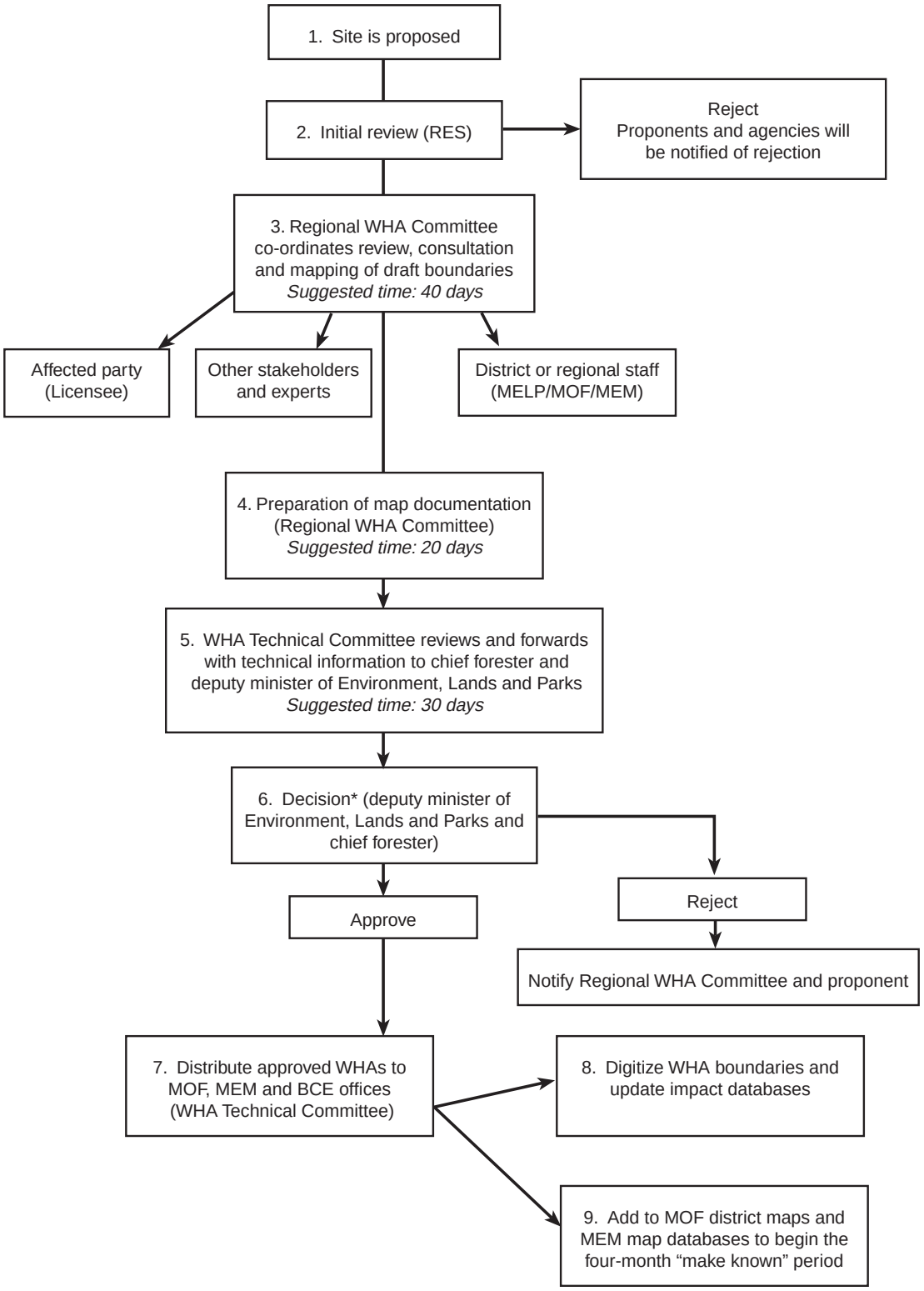
All proposals rejected for biological reasons will be reviewed and an explanation for rejection provided by a registered professional biologist or qualified individual as specified by the regional fish and wildlife manager. The proponent will be notified of the decision as will the Regional WHA Committee and MOF district office.

Step 3. Mapping draft boundaries, consultation and review (Regional WHA Committee responsibility)

Once a proposed WHA has passed the initial review (step 2), the RES will prepare a draft map (see “Mapping protocol”). The RES and Regional WHA Committee will:

- Meet with MOF/ MELP district staff, MEM field staff, and affected parties to discuss draft boundaries.

  For each species or plant community, the WHA feature and size is described in this document (see part 2). Criteria used for selecting the site and designing the boundary will include ecological considerations from part 2, operational feasibility, windfirmness and other standard boundary criteria.



* Statutory decision makers may consult with Forest Practices Code (FPC) Joint Steering Committee when MEM has documented concerns.

Figure 1. Procedure for establishing wildlife habitat areas.

When selecting sites and drafting boundaries, every effort should be made to incorporate suitable habitat, while minimizing reductions in timber supply and impact on other resources (range, petroleum and mining). Consider opportunities to use areas or parts of areas that have already been removed from the timber supply (e.g., other WHAs, riparian reserves, wildlife tree patches, old-growth management areas, protected areas, ecological reserves, parks, economically inaccessible areas, ungulate winter ranges, and environmentally sensitive areas that have been netted out of the productive forest landbase). This will ensure that the impacts of each WHA are minimized and will allow more sites to be protected within the timber supply impact limit set by government.

For some species, landscape unit planning considerations should be noted when selecting sites and designing boundaries. GWMs that limit access or harvesting through all or part of a WHA require careful boundary placement to allow future access around the restricted area.

- Conduct an impact analysis consisting of a tally of area and timber volume affected and an estimate of impacts on range, petroleum and mining values.

  The Regional WHA Committee will calculate the actual timber supply impact of the proposed WHA and any interim sites. Any proposals that exceed the district planning threshold (see page 21) must be sent forward with a strategy to deal with the timber impact (i.e., de-listing an alternate WHA and/or allowing a variance of the GWM to decrease the impact. Tracking impacts from interim measures and approved WHAs by district will enable district WHA evaluations to be made in a timely manner.

  Range impacts will be documented by MOF regional range staff. Petroleum and mining impacts will be documented by MEM regional staff.

- Consult with affected parties and stakeholders.

  Affected parties includes anyone with existing or tenured forest, range, petroleum or mining interests within the proposed WHA.

  The consultation process enables affected parties and stakeholders to work with government staff and submit comments on the WHA proposal. When agreement cannot be reached during the consultation process, concerns will be documented and options developed that reflect environmental, social and economic interests. For instance, if a proposed WHA may have severe impacts on a licensee due to the size and location of the licence and WHA, then, to the fullest extent possible, all other options for the area will be considered (e.g., selecting an alternate WHA location or locating a new operating area). When no other options exist, the consequences will be made known to the statutory decision makers.

- Apply interim measures if appropriate (see page 19).

- Compile pertinent information and options to be included with the WHA proposal.

  This includes, but is not limited to, all biological, operational and impact information gathered during site selection, boundary determination, impact assessment (local and cumulative), and consultation.

The suggested timeframe for this step is a maximum of 40 days.

Step 4. Preparation of map and documentation (Regional WHA Committee responsibility)

Once the consultation process has concluded, the RES will delineate proposed WHA boundaries on hardcopy terrain resource information management (TRIM) maps according to the procedure and standards outlined in this document (Mapping Protocol). The information and comments provided by the consultations in step 3, along with the WHA data form (Appendix 7), will form the basis for the documentation.

The draft map and documentation must be both endorsed by a registered professional biologist or qualified individual as specified by the regional fish and wildlife manager, and reviewed by the Regional WHA Committee before being forwarded to the WHA Technical Committee. If agreement has been reached at the regional level, a single recommendation will go forward. If there is not agreement, concerns and options will be prepared and sent forward to the WHA Technical Committee.

The suggested timeframe for this step is a maximum of 20 days.

Step 5. Review by WHA Technical Committee

The WHA Technical Committee will evaluate each proposal with respect to priority of the WHA for the maintenance of populations and cumulative impact on timber supply at all levels (see Appendix 9 for terms of reference). Proposals will be forwarded with supporting technical information to the chief forester and the deputy minister of Environment, Lands and Parks.

The suggested timeframe for this step is a maximum of 30 days.

Step 6. Decision (deputy minister of Environment, Lands and Parks or designate and chief forester responsibility)

WHAs will be brought forward with required documentation to the deputy minister of Environment, Lands and Parks (or designate) and chief forester for decision. When a mining or petroleum conflict has been noted in the WHA proposal, the chief forester and deputy minister of Environment, Lands and Parks may consult with the Forest Practices Code Joint Steering Committee.

Step 7. Notice of decisions and impact tracking (WHA Technical Committee responsibility)

Approved WHAs will be forwarded by the WHA Technical Committee to MOF district offices and to MOF, MELP, MEM and Oil and Gas Commission (OGC) headquarters and regional offices. Regional WHA Committees will be notified of the decision and will then notify the proponent.

The actual timber supply, range, petroleum and mining impact calculated in step 3 will be added to the cumulative total in the forest district or region (MOF regional timber supply analyst, regional range representative, regional MEM representative) and WHA Technical Committee provincial and regional databases.

Step 8. Final mapping (MELP headquarters responsibility)

Approved WHAs will be digitized by MELP headquarters. The official maps will be held in Victoria. Copies will be forwarded to the Regional WHA Committee, OGC office, MEM regions and MOF districts.

Step 9. Add boundaries to MOF district maps and MEM regional maps

All approved maps received by forest district offices will be added to the MOF district maps. Once the approved WHA is known to the tenure holder, they must incorporate it into operational plans. Maps will be incorporated into the MEM map database.

Modifying a WHA boundary or removing a WHA

A WHA can be removed or modified as a result of new information. This may be because more appropriate sites have been located, the impact of the WHA has been determined to be significantly greater than initially predicted, or changes to the WHA boundary have been recommended by the Regional WHA Committee. These changes will require the same procedure used initially to create the WHA (steps 3–9).

Internet and intranet access

An internet and intranet site are available through the MELP, Wildlife Branch, Identified Wildlife home page. The internet site will provide a list of approved WHAs by forest district. The intranet site will post the locations of proposed WHAs. Only proposed sites that are accepted at step 2 (see procedures) will be available on the intranet site.[2] For security purposes, all WHAs will be identified by WHA proposal number and not by species name. For further information about an approved or proposed WHA, contact the RES in MELP regional offices.

[2] Permission to use this site will be available to non-government agencies or individuals. Account and password will be provided upon request. Contact the Identified Wildlife project manager for assistance.

Modifying or varying general wildlife measures

Since general wildlife measures are legally established, modifying a measure is not permitted unless:

- the statutory decision makers (deputy minister of Environment, Lands and Parks and chief forester) modify a general wildlife measure as part of the WHA decision process
- a variance is provided in the GWM and approved by the district manager and regional fish and wildlife manager.

Both the district manager and regional fish and wildlife manager must approve a variance as a decision has both operational and biological implications for the site. Unless a measure specifically provides for a variance, the measure cannot be varied by the district manager and regional fish and wildlife manager. However, the chief forester and deputy minister of Environment, Lands and Parks may modify any measure during the WHA approval process.

The process for approving a variance is as follows:

- Anyone can request a variance by contacting the district manager or regional fish and wildlife manager.
- The district manager or regional fish and wildlife manager should contact the Regional WHA Committee to inform them of the request and, if appropriate, solicit comments and concerns and they may also contact stakeholders for the same purpose.
- Proponent of the WHA will be notified of any approved variances by the Regional WHA Committee and notice of each variance will be posted to an internet site (see page 16).

The ability to modify a measure or approve a variance is important for those site-specific situations where:

- a GWM is not biologically appropriate
- roads or practices previously occurred in a WHA
- a WHA may cause unanticipated impacts on forest, range, mineral or petroleum interests.

For example, where forest health is an issue, and where retaining green attacked timber within a WHA may result in further damage to the WHA and adjacent stand, and where the integrity of the identified wildlife habitat is not put at risk, a variance may be approved allowing timber salvage operations. In some extreme cases it may be necessary to de-designate a WHA and relocate it to a more suitable site.

Guidelines for approval of variances

In order to provide guidance to proponents and decision makers around the issuance of variances, answers to the following biological and socio-economic questions should be considered.

Biological considerations

- How many known sites exist for the species?
- What is the risk to the local population of the species if variance is approved? To the general population?
- How does the species react to fragmentation, noise disturbance, removal of habitat?
- Can activities under the variance be conducted in such a way as to not cause significant erosion, habitat degradation, habitat loss?
- In the case of timing, has a critical period passed during which the disturbance would have had a deleterious effect?
- In the case of access, does this bridge or road have less overall environmental impact than other alternatives?
- In the case of harvesting, can the harvesting be done in such a way as to create “favourable” structure for the species?

Socio-economic considerations

- What is the cost of not implementing the variance?
- What is the cost of rehabilitating the site (i.e., road deactivation, restoration of stream, restoring vegetation) after development has concluded?
- Has mitigation for variance been considered?
- Have other alternatives been considered?
- What is the cost of restoring the population of the species, if the variance puts population more at risk?
- What is the risk to the remaining stand of not permitting timber salvage within WHA?

Interim measures

The process for implementing interim measures is through policy established by the chief forester and referred to in the Identified Wildlife Management Strategy, letter of transmittal (February 15, 1999). Interim measures should apply to WHA proposals accepted by the RES in step 2 of the procedure for establishing WHAs. The list of Identified Wildlife, habitat attributes and interim zones that interim measures should apply to are provided in Table 1. When a WHA proposal has been accepted by the RES, it is recommended that these interim zones be established and the species' GWM be applied within the interim zone.

Interim measures are designed to minimize the effects of forest or range practices on critical habitat attributes, such as nest sites and an adjacent area, throughout the WHA approval process. When a WHA is approved, interim measures should remain until such time as the WHA is designated and "known" (as defined in the *Forest Practices Code of British Columbia Act*). When a WHA is rejected, interim measures no longer apply; however, other Code mechanisms, such as wildlife tree patches, may be used to maintain the critical feature. The number of interim sites that can be in place at any one time for some species has been limited (see "Planning thresholds" and Appendix 10).

Table 1. Recommended interim zones for Identified Wildlife

Species	Habitat attribute	Interim zone (~ha)	Interim zone (m)
Red-listed			
Night snake	hibernaculum	0.3	30 m radius
Ferruginous hawk	nest site	7	150 m radius
Prairie falcon	nest site	7	150 m radius
Queen Charlotte goshawk	nest site	12	200 m radius
Western grebe	nest site	0.8	50 m radius
Marbled murrelet	nest site[a]	113	600 m radius
White-headed woodpecker	nest site	20	250 m radius
Brewer's sparrow	nest site	up to 200	n/a
Grasshopper sparrow	nest site	up to 12	200 m radius
Sage thrasher	nest site	up to 200	n/a
Yellow-breasted chat	nest site	up to 5	n/a
Pacific water shrew	occupied stream reach	up to 18	30 m on both stream sides
Keen's long-eared myotis	hibernaculum	12	200 m radius
Vancouver Island marmot	den(s)	consult MELP	consult MELP
Mountain beaver–*rufa* subspecies	den(s)	up to 10	50 m radius
Plant communities	occurrence	up to 80	250 m radius

(continued)

Table 1. Continued

Species	Habitat attribute	Interim zone (~ha)	Interim zone (m)
Blue-listed			
Bull trout	concentration	up to 200	500 m on both stream sides
Tailed frog	natal headwater stream reach	up to 5	50 m on both stream sides
Gopher snake	hibernaculum	0.3	30 m radius
Racer	hibernaculum	0.3	30 m radius
Rubber boa	hibernaculum	0.3	30 m radius
American bittern	nest site	0.8	50 m radius
Sandhill crane	nest site	0.8	50 m radius
Trumpeter swan	nest site	up to 24	200 m radius
Long-billed curlew	nest site	up to 5	n/a
Ancient murrelet	nest site(s)	up to 10	100 m radius
Cassin's auklet	nest site(s)	up to 10	100 m radius
Lewis's woodpecker	aggregation	up to 3	100 m radius
Bobolink	nest site	up to 12	200 m radius
Mountain beaver–*rainieri* subspecies	den(s)	up to 10	50 m radius
Bighorn sheep	lambing areas	up to 50	n/a

[a] Nest site refers to occupied stands as defined in the Resource Inventory Committee (RIC) inventory manual for marbled murrelets.

Planning thresholds

Government has set a limit to the allowable impact to short-term harvest levels that may be incurred as a result of implementing measures for Identified Wildlife. This limit is equivalent to 1% of the provincial harvest at the end of 1995. An impact assessment was conducted to estimate the potential impacts of the strategy (available through the MELP, Wildlife Branch, Identified Wildlife internet home page). The projected number of WHAs used to model impacts are provided in Appendix 11. A planning threshold has been established by district in order to facilitate planning and management of the amount of timber inventory that may be affected by approved WHAs.

Although impacts are likely to vary throughout the province, they will be managed to 1% per forest district until an assessment is completed to determine how they should be allocated regionally. It is expected that the regional re-allocation will be done once the strategy has been in effect for two years.

Estimates have been provided for the number of Queen Charlotte goshawk WHAs that can be established within the 1% district thresholds (see Appendix 12). Estimates for the number of interim sites have also been provided for those species that have the potential to have high impacts (see Appendix 10). Timber supply impacts from interim measures must also be implemented under the 1% forest district threshold.

The following options will be considered if the 1% district allocation is reached before the two-year period. The WHA Technical Committee will consult with species experts and regional or district staff to develop options that will be presented to the chief forester and the deputy minister of Environment, Lands and Parks. The WHA Technical Committee may recommend:

- re-evaluation of management measures that may result in changes to WHA parameters or GWM requirements
- de-designation of another WHA in order to establish a WHA that provides a better distribution of sites or more suitable habitat.

Measuring and tracking timber impacts

The purpose of measuring and tracking the timber impacts of Identified Wildlife is to provide impact information on proposed WHAs to statutory decision makers and to track cumulative impacts of approved WHAs.

Direct measurement of timber supply impacts is not possible because timber supply is a derived characteristic that depends on the existing timber inventory, forest productivity and applied management regimes. These factors vary over time and space.

Measuring and tracking timber supply impacts of WHAs requires measurement of some forest attribute that affects timber supply. For short-term impacts, the best attribute to measure is the area of mature, harvestable timber affected by a given WHA. The relationship between mature, harvestable timber and short-term timber supply is not always direct, but it is usually close.

Adaptations may be required in specific situations, for example to account for variations in forest stand volumes and management practices. Overall, monitoring the effects on mature available timber is both simple and sufficiently accurate for this purpose. For long-term effects the impact on the entire timber harvesting land base (not just the mature timbered area) would be monitored.

Impacts may be measured on a volume or area basis. That is, either the reduction in harvestable volume can be measured, or the area of harvestable timber can be measured. Measuring the volume affected by a WHA would be direct and would not require adjustments to account for variations in volume per hectare in different areas (a hectare of high-volume valley floor timber would affect timber supply more than a hectare of low-volume subalpine forest). One issue with only measuring affected timber volumes is that inventory audits have highlighted inaccuracies in timber volume estimates in some areas. In areas where audits have shown problems, both area and volume measurements should be made.

Proposed method:

1. Establish the unit over which impact is measured. (Unit will be forest districts until the two-year review is completed. It is recognized that in some cases district boundaries and TSA boundaries will need to be reconciled.)
2. Determine the threshold effect for a) the short term, (i.e., 1% of the mature, harvestable timber area and/or volume from Timber Supply Review 1 analysis), and b) the long term (i.e., 1% of the area and/or volume of the entire timber harvesting land base). That is, the threshold would be defined as an amount of area or volume that WHAs could affect while staying within the 1% threshold for the district. When the impacts are reapportioned between districts and/or regions, the threshold effects will be recalculated.
3. Determine the proportion of the WHA that falls within the timber harvesting land base as defined at the time of measurement (that is, not necessarily as defined in TSR 1 if any changes have occurred), and measure the volume and/or area affected. If the placement of a WHA renders stands outside the WHA inaccessible, this additional impacted area will also be included as part of the WHA. If area is measured, the affected area will be adjusted to account for forest practices that may involve leaving timber standing (e.g., if 50% of the stand were to be retained, the area affected would be one-half of the total area in the timber harvesting land base). Also, the area affected might have to be adjusted to account for variation in volume per hectare in the area.
4. Record the area and/or volume effects of the WHA in a running tally for the unit.

Measuring and tracking animal unit month impacts

Impacts to individual ranchers will be measured and tracked by the range representative on the Regional WHA Committee.

Energy and mineral resources

The Identified Wildlife Management Strategy has been developed with a focus on the potential for habitat alteration associated with forest and range practices. General wildlife measures for WHAs have been created with the goal of mitigating the effect of forest practices on Identified Wildlife, and impacts resulting from application of the strategy will be quantified in terms of the timber inventory and landbase. This approach leaves some uncertainty about the application of the strategy on mineral and energy exploration and development activities. This section is intended to provide greater clarity and guidance on managing mineral and energy exploration and development activities in relation to the Identified Wildlife Management Strategy, as well as on the role the Ministry of Energy and Mines plays in implementation of the strategy.

Impacts on unknown subsurface resources cannot be predicted with any certainty at present. However, co-ordinated and flexible management actions can minimize impacts while still achieving the overall goals of the strategy. For most Identified Wildlife, the number and size of WHAs that will be subject to management restrictions is limited, therefore the possibility of a direct conflict with subsurface resource development is relatively small. Mineral and energy resource information will be fully considered in the designation of WHAs, which should minimize the chance of direct negative impact. Nonetheless, for a few wildlife species, the designated habitat area may be quite large and the potential for conflicts with subsurface resource development are greater. Co-operative, flexible management approaches will be implemented to ensure mineral and energy development activities can proceed and are undertaken in a manner that minimizes risk to wildlife.

Ministry of Energy and Mines and Oil and Gas Commission involvement

Regional WHA Committees

At the regional level, MEM will be represented on the Regional WHA Committees by MEM regional managers or designates in the Mines Branch. Most of the petroleum industry's operations are centred in northeastern B.C. Therefore, a representative of MEM from Fort St. John will participate in the Prince George Regional WHA Committee. These representatives will be the primary contact for the mining and petroleum sectors on WHA related matters.

The Regional WHA Committees provide input into WHA boundary determinations, evaluate impacts, assist in stakeholder consultation, and prepare each WHA proposal for the statutory decision makers.

The MEM representative will ensure that mineral or energy resource and tenure information is considered when determining WHA boundaries, with the intent of minimizing impacts on these resources and any related exploration or development activities. This will include explicit consideration of existing and future surface access requirements of the mineral or energy sectors to reach lands beyond a WHA.

The MEM representative will also ensure directly affected subsurface tenure holders and industry associations are consulted for each WHA proposal. Implications of the proposed WHA on mineral and energy resources, including stakeholder concerns and comments, will be documented within the WHA proposal. Where the potential exists for a WHA proposal to impact subsurface resource interests, the MEM representative may provide an alternative option to address the issues.

Provincial WHA Technical Committee

At the provincial level, MEM will be represented on a provincial WHA Technical Committee that evaluates each WHA proposal prior to forwarding to the statutory decision makers for decision. Where there are conflicts with mineral or energy resource interests, the WHA Technical Committee will forward these to the statutory decision makers. The statutory decision makers may consult with the FPC Joint Steering Committee on the documented concerns. Where conflicts persist, options that minimize impacts to mineral and energy resources will be included in any final proposal forwarded for decision to the statutory decision makers.

Energy and mineral activities

Planning

The location of all approved WHAs will be available on maps from any of the three agencies (MEM, MOF and MELP field offices) and from the MELP web site. Specific biological information on the Identified Wildlife species can be obtained through the appropriate MELP RES specialist. To assist in the planning of proposed energy and mineral development activities, information on proposed WHAs will be available from the RES or an intranet site.

The MEM regional representative will be notified of all interim zones, and proposed and approved WHAs. Management of mineral and energy activities during the interim and within WHAs will follow the GWM. As any proposals for energy and mineral exploration and development work will be reviewed in the context of these GWMs, it will expedite permit approvals if the energy and mineral sectors design their work programs accordingly. Variance to GWMs may be approved in cases where they are necessary to accommodate site-specific conditions and activities.

In addition, the mineral or energy sector, MEM, can recommend to the Regional WHA Committee that a WHA boundary be modified or a WHA removed. Where new subsurface resource information that has a direct bearing on a WHA is identified, application can be made to the Regional WHA Committee to make a major change to the WHA boundary or to remove the WHA (see page 15). In this situation, a re-assessment of the proposal and stakeholder consultation is required. An alternate WHA that reduces conflicts may be proposed, where this is appropriate. It is recommended that the MEM Mines Branch regional manager or the Petroleum Land Branch be contacted to provide information on initiating the process for this change. Up to three months will be required for stakeholder input and review before the statutory decision makers decide on the issue.

Permits

Mineral resource activities

MEM will be the primary regulator of mineral sector activities on mineral and coal tenures within WHAs, through the *Mineral Tenure Act*, *Mines Act*, *Coal Act* and the new Mineral Exploration Code. Activities that disturb the surface of the ground, including road or trail construction, will be permitted subject to specific permit conditions designed to minimize potential impacts to Identified Wildlife. Where a permit to cut timber on mineral tenures is required from the MOF, it will be issued in accordance with the *Mineral Tenure Act*, *Mines Act*, *Coal Act*, Mineral Exploration Code and the *Forest Practices Code of British Columbia Act*. The GWMs provide for such activities, either directly or indirectly through variances to standard practices when appropriate to the situation.

Approvals for road or trail construction off of mineral tenures normally require issuance of a special use permit from MOF. In most instances, road or trail access routes will be aligned to avoid WHAs, however if there is no other practicable route, a special use permit allowing access construction within a WHA will be issued with appropriate conditions designed to minimize potential effects on Identified Wildlife. The special use permit will be issued in accordance with the *Mining Rights Amendment Act* provisions for certainty of access to mineral titles.

Energy resource activities

Petroleum land tendering issues involving the Identified Wildlife Management Strategy can be addressed through the Petroleum Lands Branch of MEM.

Petroleum related activities in provincial forests which entail the cutting of trees are regulated by the OGC through the issuance of licences to cut or master licences to cut agreements, plus the associated cutting permits. WHAs must be identified during the planning stages of the subject project. The cutting permits issued by OGC will reflect the GWM of the specific WHAs encountered through the application approval process. Variances to the GWM may be requested but the review and approval process for the GWM may take up to three months.

Policy on sensitive information about species at risk

Section 18 of the *Freedom of Information and Protection of Privacy Act* states:

> The head of a public body may refuse to disclose information to an applicant if the disclosure could reasonably be expected to result in damage to, or interfere with the conservation of,
>
> a) fossil sites, natural sites, or sites that have an anthropological or heritage value,
>
> b) an endangered, threatened or vulnerable species, subspecies or race of plants, vertebrates or invertebrates, or
>
> c) any other rare or endangered living resource.

Government policy on disclosure of sensitive information on species at risk is outlined in the *Information and Privacy Handbook*, and *Freedom of Information: Formal Access Requests – Policies on Exceptions* C.4.9. The Ministry of Environment, Lands and Parks is currently developing policy and procedures on access to sensitive information about species at risk consistent with the *Freedom of Information and Protection of Privacy Act* (contact the provincial endangered species specialist in Victoria).

Ministry staff will routinely disclose information on the vast majority of species at risk, except in cases where disclosure could interfere with the conservation of that species. For example, disclosing the location of some snake or bat hibernacula through publication of a WHA could result in direct persecution of the animals at those sites. As well, the location of nest sites of some birds (particularly falcons) should not be disclosed in order to prevent illegal collection of eggs.

WHAs associated with sensitive information about species at risk will be marked as such on forest district maps. Regional rare and endangered species specialists will distribute information on these WHAs to licensees and the general public on a need-to-know basis consistent with government policy and procedures.

Mapping protocol

Mapping procedure

This section describes the mapping methodologies for delineating WHAs and mapping standards for map submissions, including base map specifications, standards for duplicating physiographic features, and symbology. It is important that WHAs are mapped in a consistent manner throughout the province for tracking and monitoring purposes. Map WHAs on hardcopy TRIM maps according to the following mapping procedure and standards. The basic steps for developing a WHA are outlined in Figure 2 and described below.

1. WHA site data

Wildlife habitat areas will largely be determined using known occurrences. There are several data sources available to provide species-specific site data. Site data, or species occurrence data, can be tied to a point (e.g., UTM co-ordinates for a nest site or an observed occurrence), a line (e.g., a stream), or an area (e.g., a foraging area or wetland). Site data can be obtained from:

- CDC Records (web site: http://www.env.gov.bc.ca/wld/cdc/)
- Inventory projects
- Private individuals or agencies.

2. WHA size

The WHA size has been determined based on knowledge of species biology, such as home range, area required to limit disturbance, or specific habitat types. WHAs may have a designated core around a habitat feature (e.g., nest, stream, wetland) or plant community and a buffer to protect the integrity of the core. The size and position of the WHA may be adjusted to incorporate such attributes as habitat use, land features or administrative boundaries.

3. Key habitat attributes

Key attributes should be used along with buffer data, map themes and field data to outline a WHA. Refer to *Species and Plant Community Accounts for Identified Wildlife* for more information.

4. Map themes

The map themes outlined in Table 2 may be useful when designing WHAs, however, themes are not limited to those shown. Use the most recent maps whenever possible. Other sources may be useful for detailed analysis (e.g., air photos, bedrock or surficial geology maps).

Note: Maps referenced to NAD27 can not be directly transferred to NAD83 maps. The neat lines on NAD83 based mapping will move east and north relative to those of NAD27 based mapping.

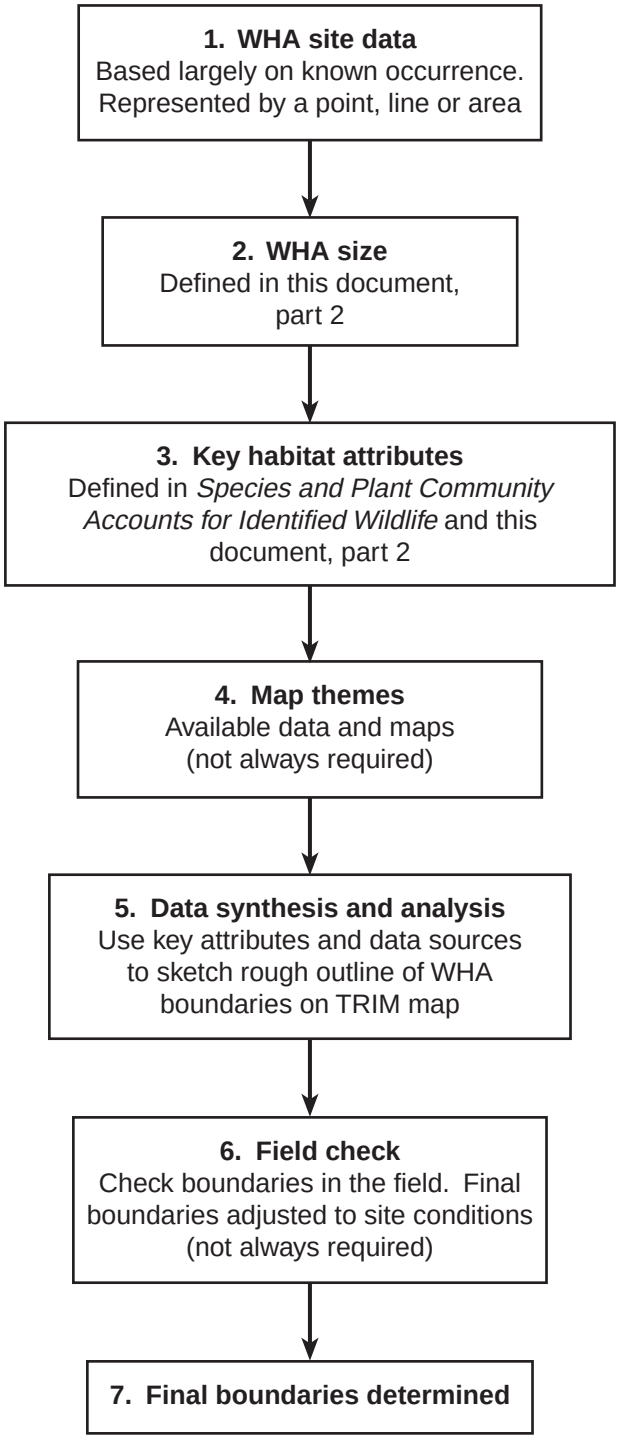


Figure 2. Wildlife habitat area mapping procedure.

Table 2. Useful map themes for WHA mapping

Map theme	Code	Scale	Source
Forest cover maps	FC	1:20 000	MOF
Vegetation resources inventory	VRI	1:20 000	MOF, where available TFL licensee
Terrestrial ecosystem mapping (replaces biophysical habitat mapping)	TEM (Biophysical)	1:50 000 to 1:20 000	MELP, where available TFL licensee
Wildlife capability/suitability	Cap/Suit	various	MELP, where available

5. Data synthesis and analysis

Using site data and recommended WHA size, sketch approximate WHA boundaries on TRIM base map. When appropriate, WHA boundaries may need to be adjusted to follow key habitat or physical attributes (e.g., elevation, water feature, road, forest cover attributes) as determined from key habitat attributes, map sources and field checking.

The boundaries of some WHAs will be delineated solely by the recommended buffer width. The determination of other WHAs, however, will require an analysis of habitat suitability or capability based on the known habitat requirements of a species. A combination of these approaches may also be necessary.

6. Field check

Preliminary WHA boundaries must be checked in the field and adjusted to accommodate site conditions, such as physical attributes and habitat use. For example, if it is found that the post-fledging area of a northern goshawk extends to the south of the nest rather than a specific radius around the nest, adjust the buffer to include the appropriate area.

7. Final boundaries determined

A full description of the methodology used to determine WHA boundaries and the rationale for the WHA must be indicated on the WHA data form (Appendix 7) and included with each map submission.

Hardcopy mapping standards

Provincial standards have been developed to ensure that WHAs are submitted in an acceptable format for digitizing and the necessary data are submitted with all hardcopy maps. Forest cover, biophysical and ecosystem unit maps and other sources of information will likely be used in the delineation of WHA boundaries; however, transfer all boundary lines to a 1:20 000 TRIM map for final production.

Format

Base map:	**TRIM UTM/NAD83**
Scale:	**1:20 000**
Format:	**Paper/hardcopy**

Equipment and supplies

- Rolled TRIM maps (1:20 000)
- Highlighter or marker pens (less than 1 mm, red, green, blue, yellow or as specified in legend)
- Drafting pen (0.2 mm–0.3 mm)
- WHA Data Form (Appendix 7).

Specifications

1. Use rolled maps (not folded) TRIM NAD83, 1:20 000 base maps.
2. Place all WHA features and boundaries on the base map. Line styles and colours for duplicating physiographic features are given below, as is symbology for representing site data.
3. Draw all lines with a high quality, very fine (0.2 mm or 0.3 mm) drafting pen or coloured marker.
4. Highlight the inside of the feature to one width of the highlighter.
5. Minimum polygon size: 5 mm × 5 mm = 1 ha at 1:20 000 scale.

Reproducing physiographic information on base maps

Colour code boundaries according to the following scheme (Table 3).

Label each WHA polygon with a letter placed outside of the WHA boundary. The species or community represented by each letter should be indicated in the legend at the margin of the map. A single WHA may be suitable for multiple species. If this is the case, list all species.

In some cases, WHAs may overlap other WHAs or be nested within another WHA (Figure 3).

Table 3. Standard line styles and colours for delineation of WHAs

Physiographic information	Colour	Line style
Core area	red	solid
Buffer	black	solid
Overlapping core area	red	dashed
Overlapping buffer	black	dashed
Classification (e.g., BEC, ecosystem unit boundaries)	yellow	dashed
Drainage (e.g., streams, lakes, wetland)	blue	solid
Contours/height of land	brown	dashed
Administrative (e.g., TFL, private land, park boundaries)	green	solid
Vegetative characteristics (e.g., seral stage, age class)	green	dashed
Transportation (e.g., roads, trails, railways)	yellow	solid
Other (describe in legend)	specify	specify

A hypothetical example of a legend describing several WHAs and their representative species follows:

A	grizzly, bull trout
B	gopher snake, Brewer's sparrow
C	American white pelican

If a WHA overlaps more than one map sheet, draw an arrow off the edge of the map to indicate that there is continuation on an adjoining sheet. Submit all map sheets together.

Symbology

Each wildlife feature protected within a WHA should be indicated on the map (Table 4). Use a small red 'x' to indicate the location of the feature, whether a point, a line or an area. When there is more than one feature within a WHA, number x's consecutively. Explain symbology in the map legend.

Table 4. Wildlife feature symbology

Wildlife feature	Symbol	Colour
Point, line, polygon (e.g., nest, stream, wetland)	x	red

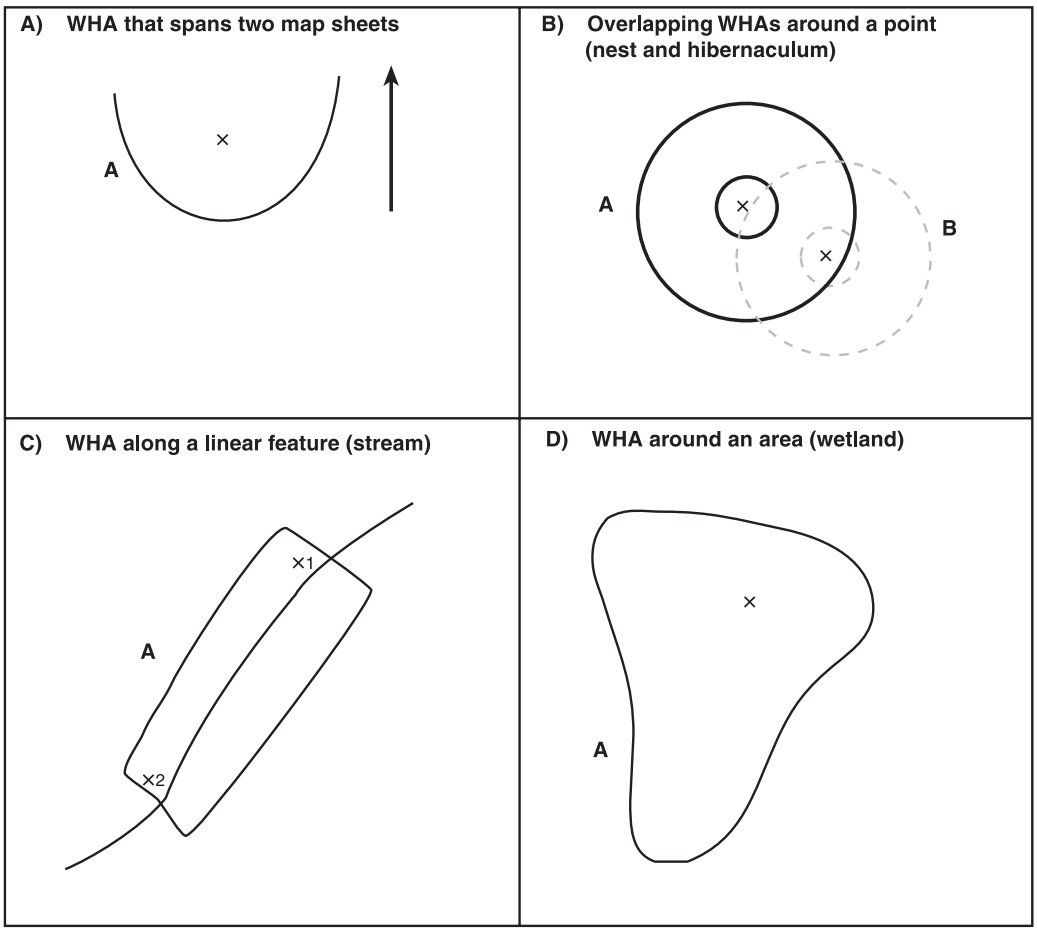


Figure 3. Examples of WHA mapping.

Map requirements

The following information must be included for each proposed WHA.

1. Date mapped (e.g., September 24, 1997)
2. Name of mapper and organization (e.g., John Smith, MELP)
3. Legend in margin or map, or attached to map, must include:
   - all colours and line styles used to delineate physiographic features or habitat and a description of each
   - Identified Wildlife species or community name. When there are multiple species or communities, WHAs must be lettered and species within each WHA listed (i.e., A, B, C…).
   - a description of marked habitat features (e.g., ×1, ×2, ×3…).

Data requirements

A WHA data form must be filled out and submitted to WHA Technical Committee for each proposed WHA (see Appendix 7).

PART 2

PRESCRIPTIONS

Prescription

Format of prescription

The following information is necessary to establish and manage a WHA for Identified Wildlife. This information is provided for each species or plant community under the following headings.

WHA planning objectives

The planning objectives refer to the overall purpose of the WHA. An understanding of these objectives will help in the placement of WHAs.

Wildlife habitat area

This section describes the limiting habitat, and is considered in regard to the establishment, the size, and the placement of the WHA. It identifies the feature or combination of features that defines a WHA for a particular species or plant community. It also defines core areas and buffers that make up the WHA and are necessary for the protection of these limiting habitats.

GWM management objectives

This section describes the desired result of the general wildlife measure.

General wildlife measures

General wildlife measures describe the management practices required to meet the needs of Identified Wildlife. GWMs are legally required and have been displayed in a box format so that they are easily identified.

These measures must be applied within a WHA approved for the species.

This section describes the management practices within the WHA, under some or all of the following headings: access, range, recreation, restoration and enhancement, silviculture and other. Measures that refer to harvesting techniques or restrictions do not apply to salvage operations. Restrictions on salvage operations are specifically mentioned. Unless otherwise directed, apply the specific practice to the entire WHA. These management practices are designed to ensure the management objectives for the WHA are met.

Management considerations (not mandatory)

Management considerations should be considered when managing the area adjacent to a WHA.

Landscape unit planning considerations (not mandatory)

Landscape unit planning considerations are provided for planning purposes and are not mandatory. They should not be interpreted as chief forester direction and must be considered within the context of chief forester policy that guides landscape unit planning.

For some species, critical habitat requirements should be viewed in their landscape context. Protection of a patch of limiting habitat, such as a hibernaculum, may not safeguard a population if the surrounding habitat is not managed appropriately. Similarly, protection of a portion of a species' range may not contribute to the maintenance of populations if surrounding areas are not managed to permit continued dispersal and gene flow. This section outlines suggestions for habitat connectivity where applicable, both within and between landscape units. These should be considered when establishing landscape unit biodiversity objectives.

Higher level plan recommendations (RMZ objectives)

For those species whose requirements have the potential to exceed the provincial impact targets for Identified Wildlife, recommendations to planning tables that have the ability to exceed Code impact limits (e.g., land and resource management tables) have been provided here. Higher level plans that may exceed Code impact limits must be approved by three ministers (MELP, MOF, MEM). These recommendations are not mandatory, should not be inferred as government direction and are not intended to have application across an entire planning area; rather they outline the best technical information on the species at this time. Respective government agencies will provide information on appropriate areas for application of these recommendations, or a subset of them, as well as the resulting impacts on timber, range, mines and petroleum industries. A range of options may be presented for varying amounts of area and impacts. Planning tables are expected to consider these recommendations along with other proposed timber and non-timber resource objectives.

Cross references

This section lists other Identified Wildlife whose ecological requirements and management prescriptions overlap with the species or plant community in question. The intent is to indicate how the application of a GWM for one species may reduce or eliminate the need to address others. By examining the potentially overlapping species or communities listed here, it may be possible to design a single WHA that will meet the needs of more than one Identified Wildlife in a given area.

Fish

BULL TROUT (*Salvelinus confluentus*)

WHA planning objectives

Retain functioning riparian areas around critical habitats.

Minimize problems associated with access.

Wildlife habitat area

When considering a proposed WHA, consult with regional fisheries section heads over staging, spawning and over-wintering congregations or where obstructions to upstream migration cause bull trout to collect.

A congregation is defined as a significant portion of a run. A significant portion will be between 20 and 80% of the adult population of a run, depending on professional judgment. True congregations will be intuitively obvious at critical times of the year. They should be based on a ground survey or aerial redd count that identifies a significant portion of the run accumulating at a specific location/habitat. A fairly quick survey of a system that looks at key probable habitats but only identifies a 'significant' congregation at one or two locations should be sufficient. For example, in a river system you may find a few individuals or pairs of bull trout scattered over a long stretch of river but also find a school of 20+ individuals at a barrier falls or likely spawning area. In this case, it is the 20+ concentration that is considered significant.

The WHA should extend 500 m around the congregation on all sides. Where the congregation is occupying a single pool, the WHA will be more or less circular with a radius of 500 m. Where the congregation is spread out along a stream reach, the WHA can be elongated up to 2 km.

GWM management objectives

Avoid creating access to the congregation.

Maintain stream channel integrity, groundwater flow, substrate composition, cover and natural temperature regimes.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not construct roads and excavated or bladed trails unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager. Where there is no alternative to road or trail development, close to public during staging and spawning times and rehabilitate as soon as possible.
- Do not build stream crossings within the WHA.

Range

- Maintain or rehabilitate riparian and aquatic habitat to a properly functioning condition.

Recreation

- Do not develop recreational trails, facilities or structures.

Silviculture

- Ensure large woody debris (LWD) recruitment based on life expectancy and decay periods of naturally occurring adjacent tree species in LWD dependent streams.

Management considerations (not mandatory)

Harvesting and road development adjacent to WHAs may increase storm volume and peak flows in streams. In addition, poaching is a serious problem in remote areas and roads provide access to anglers and poachers.

Minimize cattle access to aquatic and riparian habitats in areas occupied by bull trout.

Minimize road development within 500 m of stream and stream crossings.

Ensure that sedimentation and erosion are controlled.

Minimize upstream and upslope impacts to prevent siltation, temperature and hydrologic problems in reaches supporting bull trout.

Ensure LWD recruitment over time.

Avoid development of recreational trails, facilities or structures immediately adjacent to WHAs.

Landscape unit planning considerations (not mandatory)

Retain habitat in an interconnected mosaic that prevents fragmentation and the subsequent isolation of populations. Except for populations upstream of migration barriers, subpopulations that occur in the same watershed likely exchange individuals and re-establish each other following catastrophic events. Studies on these clusters of subpopulations (metapopulations), indicate that the likelihood of persistence decreases as local populations become isolated from each other through the creation of barriers to movement. Obstructions to bull trout movement can be fairly obvious (e.g., jump height and water velocity), more subtle, such as degraded habitats (e.g., water temperatures and pool depth), or in-stream structures such as culverts. The risk of extirpation rises whenever migration barriers increase habitat fragmentation.

HIGHER LEVEL PLAN RECOMMENDATIONS (RMZ OBJECTIVES)

Wildlife habitat areas will provide some protection of critical concentrations, such as spawning sites, but they cannot address all aspects of the bull trout's life history requirements. Because this species is especially sensitive to overfishing and habitat degradation and some life forms migrate and use a variety of sparsely distributed habitats, its requirements must be addressed at the forest level in order to effectively manage for populations.

The following recommendations are not mandatory, are not to be inferred as government direction and are not intended to have application across the entire planning area. Instead, they should be considered for areas upstream and upslope of the lowest reach occupied by bull trout, where 1) streams are sensitive to disturbance, 2) fry and juvenile densities are higher than average based on literature, 3) habitat is high quality, or 4) population or habitat is regionally or provincially significant. These recommendations are based on the best technical information on the species at this time and some or all of them should be considered for application in localized portions of a planning area where the planning table intends to propose a conservation objective for the species. Planning tables are expected to consider these recommendations along with other proposed timber and non-timber resource objectives. If necessary to accommodate other objectives, planning tables should consider restricting the distribution of the recommended management practices, rather than modifying the practices themselves.

Objectives

To prevent habitat fragmentation and degradation by minimizing access and maintaining natural channel morphology, substrate composition, cover and temperatures in watersheds where bull trout occur.

Recommendations

- In sub-basins where bull trout spawning or rearing is known to occur or may occur (either from existing records or from the results of fish stream identification activities) and forest development is planned within the next five-year period, any of the following criteria are recommended as supplemental triggers for the watershed assessment procedure (WAP):
  - sub-basins where a significant number of mass wasting events have occurred (i.e., more than one landslide/km^2 and more than two mass wasting events entering the mainstem river)
  - sub-basins where there is either high road density (i.e., more than 150 m of road/km^2) or high stream density (i.e., more than one km of stream/km^2) on unstable or erodible soils
  - sub-basins with a significant number of stream crossings (i.e., more than 0.6/km^2 in the interior or more than 1.4/km^2 on the coast)
- If the WAP determines that the watershed is sensitive to disturbance (a rating of medium or high in the hazard category), bull trout populations are at risk. Where bull trout populations are at risk, the temporal and spatial layout of cutblocks, hydrologic, green-up and recovery standards, and road layout and design must be considered.

Cross references

Grizzly bear

Amphibians

TAILED FROG (*Ascaphus truei*)

WHA planning objectives

Maintain water quality and natural flow regime.

Maintain structural elements of mature forest adjacent to tailed frog streams.

Wildlife habitat area

Establish WHAs on key natal streams/gullies. These streams will be perennial headwater creeks or gullies containing tadpoles. Key natal areas are characterized by:

1. year round water flow
2. stable channel beds
3. coarse rocky substrates
4. forest cover
5. lack of fish

The WHA should cover a minimum of 500 m along the length of the stream. It should extend 50 m from the stream edge on both sides including a 20 m riparian core and a 30 m buffer. It is recommended that WHAs be established on several creeks in a drainage to contribute to the maintenance of viable subpopulations.

Where several streams with these characteristics occur, priority should be given to sites adjacent to mature or old forest, sites with the greatest potential to establish and maintain mature forest connectivity (e.g., near forest ecosystem networks [FENs]), or sites with the highest density of tadpoles.

GWM management objectives

Maintain sediment free, undisturbed breeding areas.

Maintain adjacent mature forest cover to maintain microclimatic conditions for foraging adults.

Maintain coarse woody debris.

General wildlife measures

These practices must be applied within a WHA approved for the species.

Access

- Do not construct roads within 30 m of stream unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager. When variance is approved, do not place stream crossing in WHA.
- Rehabilitate sites with temporary access structures.

Silviculture

- Do not harvest in the core area.
- Use partial harvesting systems in the buffer that maintain 80% basal area unless variance is approved by the district manager and regional fish and wildlife manager. Partial harvest should be oriented towards the creation of old forest characteristics such as large diameter trees, multilayered canopies, snags and coarse woody debris.
- No salvage should be carried out unless variance is approved by the district manager and regional fish and wildlife manager.
- Minimize risk of windthrow (see *Windthrow Handbook for B.C. Forests*).
- Avoid the use of pesticides. Spot treatments with herbicides may be used in exceptional circumstances (e.g., noxious weeds) where it can be demonstrated that the herbicide will not be harmful to the species or habitat being managed.

Management considerations (not mandatory)

In order to facilitate dispersal of tadpoles and adults, headwater creeks should be kept slash-free and forested riparian buffers should be maintained and restored, especially within fragmented areas (e.g., lower mainland).

Stream reaches adjacent to WHA should be managed according to the recommended “best management practices” from the *Riparian Management Area Guidebook*.

It is also important to prevent fish introductions and rechannelization of areas supporting tailed frog populations.

Landscape unit planning considerations (not mandatory)

Wildlife habitat areas should be included within areas that provide connectivity of riparian forested habitat particularly between WHAs and adjacent stream reaches.

Cross references

Northern goshawk, mountain beaver, marbled murrelet

Reptiles

GOPHER SNAKE (*Pituophis catenifer deserticola*)[3]

NIGHT SNAKE (*Hypsiglena torquata*)

RACER (*Coluber constrictor*)[4]

WHA planning objectives

Maintain denning habitat and dispersal routes.

Wildlife habitat area

Wildlife habitat areas (~1000 m radius) should be established over communal dens. The placement of WHAs should be based on local topography and snake dispersal routes. It is possible that in some locations a communal den may not exist. Instead, the snakes may hibernate in small, isolated groups. Where this occurs, any talus slopes, rock outcrops or cliff habitats identified to be important for the conservation of these species should be considered for WHA designation. Design should try to include suitable egg laying (sandy soils) and foraging (riparian) areas.

GWM management objectives

Minimize disturbance and mortality, particularly road mortality, near snake hibernacula.

Maintain critical structural elements such as wildlife trees, coarse woody debris, rock outcrops and concentrations of boulders.

Minimize disturbance to riparian areas to maintain foraging opportunities.

Maintain microclimatic conditions of hibernacula.

[3] Gopher snake – species has been split resulting in a change in scientific name.

[4] Racer – common name changed.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Place roads as far as practicable from hibernacula and known snake dispersal routes. Avoid construction between April and October when snakes are active unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.
- Rehabilitate temporary access roads immediately after use.
- Where determined to be necessary by MELP, use snake drift fences and drainage culverts where known dispersal routes cross roads to divert snakes from high mortality areas. Drift fences should be approximately 50 cm high. Length will vary by site depending on area used by snakes. Consult MELP for more information. Seasonal use restrictions may be appropriate for some roads.
- Do not remove rock or talus.

Range

- Do not allow cattle to concentrate (i.e., do not use water troughs, salt blocks, or corrals or drive cattle through WHA) during spring dispersal (March/April) and fall aggregations as specified by MELP.
- When hay cutting or prescribed burning is planned, consult with MELP for the preferable times (i.e., after snakes have returned to dens).
- Avoid soil compaction and maintain understorey vegetative structure in riparian areas.

Recreation

- Do not establish recreation sites within WHA.

Management considerations (not mandatory)

Where migration routes from denning locations to summer habitats have been transected by roadways, use methods such as drift fences, culverts or seasonal road restrictions, to allow the safe passage of snakes.

Where possible, provide a 1 km buffer between WHAs and residential development or proposed developments to minimize disturbances. Rock climbing should be considered a disturbance at sensitive sites.

Riparian areas adjacent to WHA should be managed or restored to ensure range foraging habitat is maintained.

Avoid converting areas adjacent to WHA to an early seral grassland condition.

Landscape unit planning considerations (not mandatory)

Follow the seral stage objectives for rangelands as described in *Biodiversity Guidebook*.

Cross references

Water birch–red-osier dogwood, Ponderosa pine–black cottonwood–Nootka rose–poison-ivy

RUBBER BOA (*Charina bottae*)

WHA planning objectives

Maintain denning habitat and dispersal routes.

Wildlife habitat area

Wildlife habitat areas (~1000 m radius) should be established over communal dens. A WHA should include a core area and a buffer. The core area consists of the den plus 30 m radius. The placement of WHAs should be based on local topography and snake dispersal routes. It is possible that in some locations a communal den may not exist. Instead, the snakes may hibernate in small, isolated groups. Where this occurs, any habitats identified to be important for the conservation of these species should be considered for WHA designation.

GWM management objectives

Minimize disturbance and mortality, particularly road mortality, near snake hibernacula.

Maintain critical structural elements such as wildlife trees, coarse woody debris, rock outcrops and concentrations of boulders.

Minimize disturbance to riparian areas to maintain foraging opportunities.

Maintain microclimatic conditions of hibernacula.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not develop roads or trails within the core area.
- Place roads as far as practicable from hibernacula and known snake dispersal routes. Avoid construction between April and October when snakes are active unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.
- Rehabilitate temporary access roads immediately after use.
- Where determined to be necessary by MELP, use snake drift fences and drainage culverts where known dispersal routes cross roads to divert snakes from high mortality areas. Drift fences should be approximately 50 cm high. Length will vary by site depending on area used by snakes. Consult MELP for more information. Seasonal use restrictions may be appropriate for some roads.
- Do not remove rock or talus.

Range

- Do not allow cattle to concentrate (i.e., do not use water troughs, salt blocks, or corrals or drive cattle through WHA) during spring dispersal (March/April) and fall aggregations as specified by MELP.
- When hay cutting or prescribed burning is planned, consult with MELP to specify the preferable times (i.e., after snakes have returned to dens).
- Avoid soil compaction and maintain understorey vegetative structure in riparian areas.

Recreation

- Do not establish recreation sites within WHA.

Silviculture

- Do not harvest or salvage core area. Where possible, incorporate the core area into a wildlife tree patch as per the stand level *Biodiversity Guidebook* recommendations.
- Harvest between November and March to minimize disturbance to nesting snakes unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.
- Maintain wildlife trees where safe to do so.

Management considerations (not mandatory)

Where migration routes from denning locations to summer habitats have been transected by roadways, use methods such as drift fences, culverts or seasonal road restrictions, to allow the safe passage of snakes.

Where possible, provide a 1 km buffer between WHAs and residential development or proposed developments to minimize disturbances. Rock climbing should be considered a disturbance at sensitive sites.

Riparian areas adjacent to WHA should be managed or restored to ensure foraging habitat is maintained.

Landscape unit planning considerations (not mandatory)

Follow the seral stage objectives for rangelands as described in *Biodiversity Guidebook*.

Cross references

Water birch–red-osier dogwood, Ponderosa pine–black cottonwood–Nootka rose–poison-ivy

Birds

AMERICAN WHITE PELICAN (*Pelecanus erythrorhynchos*)

WHA planning objectives

Maintain the quality and isolation of feeding habitats.

Wildlife habitat area

Important feeding lakes within 165 km of Stum Lake should be considered for WHA designation. This should include, but not be limited to, Pantage, Chilcotin, Rosita-Tautri, Abuntlet, Owen, Martin, Natsy, Kluskus, Puntzi, Anahim, Martin, Knox, Meldrum, Tzenzaicut, Alex Graham, Palmer and Tanikul. The WHA should include the entire area of each major feeding lake and a one km buffer around the lake.

GWM management objectives

Maintain the isolation of feeding lakes by minimizing access during the breeding season (April 1 through August 31).

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not develop any new permanent roads unless variance is approved by the district manager and regional fish and wildlife manager. Deactivate or gate all current and future temporary roads after use.

Recreation

- Do not develop recreational sites.

Silviculture

- Do not harvest during breeding season unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.
- Do not salvage during the breeding season unless variance is approved by the district manager and regional fish and wildlife manager.

Management considerations (not mandatory)

Disturbance of pelicans at their feeding sites can have negative consequences for breeding success. The education of boaters, float plane operators, lodge owners and visitors to these lakes is an important management tool. Activities that alter the natural condition of feeding lakes or encourage recreational use (e.g., stocking with recreational fish, use that causes fluctuations in water levels during the feeding season, alienation of Crown land along the perimeter of feeding lakes) should be discouraged. Where activities cannot be subdued in active feeding and loafing areas, alternate sites can be encouraged with anchored logs.

Cross references

American bittern

AMERICAN BITTERN (*Botaurus lentiginosus*)

WHA planning objectives

Maintain nesting wetlands that are not already protected or adequately managed through the *Riparian Management Area Guidebook*.

Wildlife habitat area

Establish WHAs for nesting wetlands that are less than 5 ha in size. The WHA should extend a minimum of 50 m beyond the entire stand of emergent vegetation known to be used for nesting.

GWM management objectives

Ensure that the structural integrity of emergent vegetation is retained in and around nesting areas to provide cover and nesting habitat.

Maintain adequate cover around nesting wetlands.

Minimize access during the breeding season to prevent disturbance.

General wildlife measures

These measures must be applied within a WHA approved for the species.

As a general rule, the breeding season extends from April through August. However, breeding times vary by location. MELP should be consulted for site-specific breeding times.

Access

- Do not develop any permanent access structures as defined in the *Operational Planning Regulations*.
- Avoid road construction and use during the breeding season unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Range

- Plan grazing to ensure that the structural integrity of stands of emergent vegetation is maintained and nests are protected from trampling. Fencing may be required.
- Do not mow hay meadows until after August 15 to prevent mortality of young.

Recreation

- Limit recreational access during the breeding period by deactivating or gating roads.
- Do not establish recreational facilities.

Silviculture

- Retain as many of the understorey trees, shrubs and herbaceous plants as is practicable.
- Do not harvest during the breeding season unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.
- Do not salvage during the breeding season unless variance is approved by the district manager and regional fish and wildlife manager.

Management considerations (not mandatory)

Consideration should be given to maintaining water level fluctuations within natural limits and avoiding siltation, eutrophication and chemical pollution.

On lakes, do not use power boats during the breeding season.

Cross references

Sandhill crane

SANDHILL CRANE (*Grus canadensis*)

WHA planning objectives

Maintain nesting wetlands that are not already protected or adequately managed through the *Riparian Management Area Guidebook.*

Wildlife habitat area

A WHA is recommended for breeding wetlands of less than 5 ha and for traditional foraging areas. The WHA consists of the entire stand of emergent vegetation around the wetland or the traditional foraging area, and a 50 m buffer.

GWM management objectives

Ensure that the structural integrity of emergent vegetation is retained in and around nesting areas to provide cover and nesting habitat.

Maintain adequate cover around nesting wetlands.

Minimize access during the breeding season to prevent disturbance.

General wildlife measures

These measures must be applied within a WHA approved for the species.

As a general rule, the breeding season extends from April through August. However, breeding times vary by location. MELP should be consulted for site-specific breeding times.

Access

- Do not develop any permanent access structures as defined in the *Operational Planning Regulations*.
- Avoid road construction and use during the breeding season unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Range

- Plan grazing to ensure that the structural integrity of stands of emergent vegetation is maintained and nests are protected from trampling. Fencing may be required.
- Do not mow hay meadows until after August 15 to prevent mortality of young.

Recreation

- Limit recreational access during the breeding period by deactivating or gating roads.
- Do not establish recreational facilities.

Silviculture

- Retain at least 40% of the dominant and co-dominant trees within 50 m of the wetland or lake edge.
- Retain as much of the understorey trees, shrubs and herbaceous vegetation as is practicable.
- Do not harvest during the breeding season unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.
- Do not salvage during the breeding season unless variance is approved by the district manager and regional fish and wildlife manager.

Management considerations (not mandatory)

For wetlands >5 ha, riparian management zones should be managed to the best management practices prescribed in the *Riparian Management Area Guidebook*.

Areas used by cranes for staging prior to migration are sensitive to disturbance.

On lakes, do not use power boats during the breeding season.

Cross references

American bittern

WESTERN GREBE (*Aechmophorus occidentalis*)

WHA planning objectives

Maintain the structural integrity of nesting marshes.

Wildlife habitat area

Establish WHAs at currently occupied and historical high capability breeding sites. Historical sites are those where the species was once known to breed, but at which there has been no verified breeding in the last 20 years. The WHA should include the entire colony and the area between the colony and the near shoreline, and 50 m around this entire area.

GWM management objectives

Ensure that the structural integrity of emergent vegetation is retained in and around nesting areas to provide cover and nesting habitat.

Maintain adequate cover around nesting wetlands.

Minimize access during the breeding season to prevent disturbance.

General wildlife measures

These measures must be applied within a WHA approved for the species.

As a general rule, the breeding season extends from April through August. However, breeding times vary by location. MELP should be consulted for site-specific breeding times.

Access

- Do not develop any permanent access structures as defined in the *Operational Planning Regulations*.
- Avoid road construction and use during the breeding season unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Range

- Plan grazing to ensure that the structural integrity of stands of emergent vegetation is maintained and nests are protected from trampling. Fencing may be required.

Recreation

- Limit recreational access during the breeding period by deactivating or gating roads.
- Do not establish recreational facilities.

Silviculture

- Retain at least 40% of the dominant and co-dominant trees within 50 m of the wetland or lake edge.
- Retain as many of the understorey trees, shrubs and herbaceous plants as is practicable.
- Do not harvest during the breeding season unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.
- Do not salvage during the breeding season unless variance is approved by the district manager and regional fish and wildlife manager.

Management considerations (not mandatory)

Sewage and agricultural or industrial run-off into nesting wetlands can cause damage to emergent vegetation and decrease prey availability. Fluctuating water levels can reduce breeding success.

On lakes, do not use power boats during the breeding season.

Cross references

American bittern

TRUMPETER SWAN (*Cygnus buccinator*)

WHA planning objectives

Avoid disturbance of breeding areas.

Wildlife habitat area

Establish WHAs at nest sites in wetlands or lakes where there is potential for disturbance. The WHA includes a core area and a 300 m buffer. The core area includes the entire nesting wetland or lake (up to a maximum of 80 ha) and extends 200 m from the edge of the wetland.

GWM management objectives

Ensure that the structural integrity of emergent vegetation is retained in and around nesting areas to provide cover and nesting habitat.

Maintain adequate cover around nesting wetlands.

Minimize access during sensitive breeding times to prevent disturbance (April through July 31).

General wildlife measures

These measures must be applied within a WHA approved for the species.

The breeding season is generally from April through September. However, breeding times vary by location. MELP should be consulted for site-specific breeding times.

Access

- Do not develop roads or trails within the core area.
- Avoid road construction and use in the buffer during the breeding season unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Recreation

- Limit recreational access during the breeding season by deactivating or gating roads.
- Do not establish recreational facilities.

Silviculture

- Do not harvest or salvage within core area.
- Do not harvest buffer during the breeding season unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and variance is approved by the district manager and regional fish and wildlife manager.
- Do not salvage during the breeding season unless variance is approved by the district manager and regional fish and wildlife manager.

Management considerations (not mandatory)

Any disruptive activity on a nesting lake, including boating, can cause nest abandonment.

In order to ensure the integrity of the WHA is maintained, note location of possible road locations prior to establishing WHA boundaries.

Avoid drilling or gas exploration within the WHA during the breeding season.

On lakes, do not use power boats during the breeding season.

Cross references

Sandhill crane, American bittern

LONG-BILLED CURLEW (*Numenius americanus*)

WHA planning objectives

Maintain breeding areas throughout their range.

Wildlife habitat area

WHAs should be applied over breeding areas as defined by MELP. The WHA should include openings of low profile vegetation (<30 cm) for curlew nesting. Openings should have a radius of at least 125 m and preferably ≥250 m.

GWM management objectives

Provide low profile vegetation (less than 30 cm) for nesting.

Minimize disturbance to nesting curlews.

Maintain native bunchgrass.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not construct roads unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager. Limit road use during the breeding season (March 15–July 15).

Range

- Areas can be grazed to a level that produces low profile vegetation (less than 30 cm) very early in the spring (before April 15) or in summer and fall (after June 15). However, fall grazing is the preferable strategy, thereby avoiding the range damage that may result from turning cattle out too early.
- Do not seed with crested wheatgrass. Where such areas already occur, they should be managed by grazing to maintain low profile vegetation.
- Do not use fire in nesting areas.

Recreation

- Do not establish recreational trails.

Restoration and enhancement

- Manage the forest grassland fringe to minimize or reverse forest encroachment using slashing or other suitable methods.

Management considerations (not mandatory)

Forest encroachment resulting from fire suppression is decreasing available habitat and should be monitored.

Where appropriate, and the habitat capability is high, revegetate crested wheatgrass to native bunchgrass.

Landscape unit planning considerations (not mandatory)

A mosaic of grassland conditions is required to maintain curlews within a landscape unit.

Cross references

Grasshopper sparrow, sage thrasher

FERRUGINOUS HAWK (*Buteo regalis*)

PRAIRIE FALCON (*Falco mexicanus*)

TURKEY VULTURE (*Cathartes aura*)

During the 1998 review of the Wildlife Branch red and blue lists, the turkey vulture was down-listed to the yellow list (not at risk). Further analysis indicates they do not qualify for regionally important status. Therefore, the turkey vulture has not been designated as Identified Wildlife.

WHA planning objectives

Reduce disturbance near nest sites.

Maintain foraging habitat within the immediate vicinity of nests.

Reduce likelihood of secondary impacts from insecticide use.

Wildlife habitat area

Establish WHAs at nest sites. The WHA should include a 150 m radius no activity core area centred on the nest and an 850 m buffer area.

GWM management objectives

Protect nesting areas from disturbance and habitat alteration.

Maintain foraging habitat within the immediate vicinity of nests.

General wildlife measures

These measures must be applied within a WHA approved for the species.

The breeding season is generally from March through September. However, breeding times vary for each species and by location. MELP should be consulted for species-specific breeding times.

Access

- Do not construct roads within the core area.
- Do not construct roads or blast in the buffer during the breeding season unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Range

- Manage rangelands to a late seral stage.
- Avoid the use of pesticides, particularly rodenticides within the WHA. Spot treatments with herbicides may be used in exceptional circumstances (e.g., noxious weeds) where it can be demonstrated that the herbicide will not be harmful to the species or habitat being managed.

Recreation

- Do not establish recreation sites within WHA.

Silviculture

- Do not harvest or salvage in core area.
- Do not harvest buffer during the breeding season (March to September 15) unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.
- Do not salvage during the breeding season (March to September 15) unless variance is approved by the district manager and regional fish and wildlife manager.
- Maintain a selection of mature trees (age class 6–9) and/or large snags (e.g., largest within the stand; preferably decay class 2–4) and shrubs in the buffer.
- Avoid the use of pesticides in the WHA. Spot treatments with herbicides may be used in exceptional circumstances (e.g., noxious weeds) where it can be demonstrated that the herbicide will not be harmful to the species or habitat being managed.

Management considerations (not mandatory)

In order to ensure the integrity of the WHA is maintained, note location of possible road locations prior to establishing WHA boundaries.

Landscape unit planning considerations (not mandatory)

It is important to maintain an adequate prey base adjacent to WHAs. Consider managing nest areas and primary foraging areas to a late seral condition.

Cross references

Ponderosa pine–black cottonwood–Nootka rose–poison-ivy, Ponderosa pine–black cottonwood–snowberry

NORTHERN GOSHAWK (*Accipiter gentilis atricapillus*)

WHA planning objectives

Maintain nesting and foraging habitat for known nest sites.

Wildlife habitat area

Establish a "two-tiered" WHA at breeding sites. The entire WHA should be approximately 240 ha and include nest areas and post-fledging area (PFA). The PFA (240 ha) should include three 12 ha nest areas. One of the nest areas should include the active nest; the other two nest areas will provide alternate nesting sites. If alternate nest areas cannot be identified based on the presence of inactive nests, appropriate 12 ha areas should be selected. Include as much suitable habitat (i.e., large trees with an open understorey, a closed canopy (60% or greater), and low ground vegetation) as possible within the WHA.

Known breeding sites may be defined as any nest site that is active, or has been active within the past five years; repeated observations of territorial behaviour from March 15 through September 1 within 500 m of each other may be interpreted as evidence of breeding.

When drafting boundaries, every effort should be made to incorporate areas that are suitable for goshawks but that will also minimize reductions in timber supply and impacts on other industrial activities. Consider opportunities to incorporate protected areas, ecological reserves, riparian reserves, parks, ungulate winter range, economically inaccessible areas, other WHAs, and environmentally sensitive areas that may have been netted out of the productive forest landbase. It is also important to consider potential disturbance due to road construction and logging activities and design boundaries to minimize the effects of disturbance or select WHAs that, to the extent possible, avoid essential access routes.

GWM management objectives

Maintain blocks of mature and old forest (see *Biodiversity Guidebook* for definition of mature and old forest) to provide nesting and foraging opportunities.

General wildlife measures

These measures must be applied within a WHA approved for the species.

The breeding season is generally from March 15 through September 1. However, breeding times may vary yearly and by site. MELP should be consulted for site-specific breeding times. Activity restrictions may be removed after June 30 for inactive or unsuccessful nests.

Nest Areas

Access

- Do not construct roads within nest areas (12 ha) unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Silviculture

- Do not harvest or salvage within nest areas, except for treatments aimed at maintaining or improving stand structure for nesting (i.e., understorey thinning to maintain or promote desired stand structure: single storied, crown closure ≥60%, and uniform trees ≥60 cm dbh). If these practices are planned, avoid breeding period (March 15–September 1).

Post-fledging Area (PFA)

Access

- No blasting should occur within the post-fledging area during courtship and nest establishment (i.e., March 15–June 30). Actual times may vary by site and year. Consult MELP for site-specific times or variances.
- No road construction or modification should occur within 200 m of an active nest from March 15 to September 1.

Silviculture

- Plan the harvest sequence to create a mosaic of successional stages interspersed in patches, with at least 20% in closed-canopy old growth and 40% in mature forest (or old if mature is unavailable). The remaining 40% should be managed with no more than 20% in young forest.
- Restrict harvest to less important goshawk habitat (i.e., stands with an open canopy and multiple-storied stands). Moderately important stands are those with a closed canopy, but moderate amounts of intermediate canopy. The most important stands are those with dense canopy cover and an open understorey.
- No prolonged (i.e., >3 days) hauling on existing roads should occur within 200 m of an active nest between March 15 and September 1 unless variance is approved by the district manager and regional fish and wildlife manager.

- No logging or salvage should occur within a WHA with an active nest from March 15 to September 1 unless variance is approved by the district manager and regional fish and wildlife manager.
- No silviculture treatments should be conducted between March 15 and June 30 within 500 m unless variance is approved by the district manager and regional fish and wildlife manager.
- Activity restrictions are removed after June 30 for inactive or unsuccessful nests.

Landscape unit planning considerations (not mandatory)

Conservation measures are centred on known nest sites because of this species' tendency to re-occupy active and alternate nests for many years. In the absence of detailed information on the number and location of breeding pairs, however, identification and conservation of habitat at the landscape level is critical to preventing the decline of populations or the isolation of individuals**.** When determining the 10% of each sub-regional planning area that will be assigned a higher biodiversity emphasis, consideration should be given to assigning some or all of this 10% to watersheds where goshawk management is a high priority. This consideration has been provided for planning purposes but is not mandatory and should not be interpreted as chief forester direction. Furthermore, it must be considered within the context of chief forester policy for establishing landscape unit biodiversity objectives.

Cross references

Marbled murrelet, grizzly bear

QUEEN CHARLOTTE GOSHAWK (*Accipiter gentilis laingi*)

WHA planning objectives

Maintain nesting and foraging habitat for known nest sites.

Wildlife habitat area

Establish a "three-tiered" WHA at breeding sites. The entire WHA should be approximately 2400 ha and include nest areas, post-fledging area (PFA), and foraging area. The PFA (240 ha) should include six 12 ha nest areas. One of the nest areas should include the active nest; the other five nest areas will provide alternate nesting sites. If alternate nest areas cannot be identified based on the presence of inactive nests, appropriate 12 ha areas should be selected. Include as much suitable habitat (i.e., large trees with an open understorey, a closed canopy (60% or greater), and low ground vegetation) as possible within the WHA.

Known breeding sites may be defined as any nest site that is active, or has been active within the past five years; repeated observations of territorial behaviour from March 15 through September 1 within 500 m of each other may be interpreted as evidence of breeding.

When drafting boundaries, every effort should be made to incorporate areas that are suitable for goshawks, but will also minimize reductions in timber supply and impacts on other industrial activities. Consider opportunities to incorporate protected areas, ecological reserves, riparian reserves, parks, ungulate winter ranges, economically inaccessible areas, other WHAs, and environmentally sensitive areas that have been netted out of the productive forest landbase. It is also important to consider potential disturbance due to road construction and logging activities and design boundaries to minimize the effects of disturbance or select WHAs that, to the extent possible, avoid essential access routes.

GWM management objectives

Maintain blocks of mature and old forest (see *Biodiversity Guidebook* for definition of mature and old forest) to provide nesting and foraging opportunities.

General wildlife measures

These measures must be applied within a WHA approved for the species.

The breeding season is generally from March 15 through September 1. However, breeding times may vary yearly and by site. MELP should be consulted for site-specific breeding times. Activity restrictions may be removed after June 30 for inactive or unsuccessful nests.

Nest Areas

Access

- Do not construct roads within nest areas (12 ha) unless the district manager and regional fish and wildlife manager are satisfied there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Silviculture

- Do not harvest or salvage within nest areas, except for treatments aimed at maintaining or improving stand structure for nesting (i.e., understorey thinning to maintain or promote desired stand structure: single storied, crown closure ≥60%, and uniform trees ≥60 cm dbh). If these practices are planned, avoid breeding period (March 15–September 1).

Post-fledging area (PFA)

Access

- No blasting should occur within 1 km of an active nest during courtship and nest establishment (i.e., March 15–June 30). Actual times may vary by site and year. Consult MELP for site-specific times or variances.
- No road construction or modification should occur within 200 m of an active nest from March 15 through September 1.

Silviculture

- Plan the harvest sequence to create a mosaic of successional stages interspersed in patches, with at least 20% in closed-canopy old growth and 40% in mature forest (or old if mature is unavailable). The remaining 40% should be managed with no more than 20% in young forest.
- Restrict harvest to less important goshawk habitat (i.e., stands with an open canopy and multiple-storied stands). Moderately important stands are those with a closed canopy, but moderate amounts of intermediate canopy. The most important stands are those with dense canopy cover and an open understorey.
- No prolonged (i.e., >3 days) hauling on existing roads should occur within 200 m of an active nest between March 15 and September 1 unless variance is approved by the district manager and regional fish and wildlife manager.

- No logging or salvage should occur within the PFA or 500 m (whichever is the greater area) of an active nest from March 15 through September 1 unless variance is approved by the district manager and regional fish and wildlife manager.
- No silviculture treatments should be conducted from March 15 through June 30 within 500 m unless variance is approved by the district manager and regional fish and wildlife manager.
- Activity restrictions are removed after June 30 for inactive or unsuccessful nests.

Foraging Area (FA)

Silviculture

- Use a harvest system that will minimize road density.
- Plan the harvest sequence to create a mosaic of successional stages interspersed in patches, with at least 20% in closed-canopy old growth and 40% in mature forest (or old if mature is unavailable). The remaining 40% should be managed with no more than 20% in young forest.
- Maintain coarse woody debris.
- Leave stands with dense canopy cover and an open understorey.
- When harvesting within mature and old seral stages, leave snags and mature, old live trees in clumps.
- When harvesting within mature and old seral stages, use silviculture techniques (including harvesting methods) that will reduce the density of shrubs, saplings and small poles, while maintaining or enhancing the canopy of large trees.

Landscape unit planning considerations (not mandatory)

Conservation measures are centred on known nest sites because of this species' tendency to re-occupy active and alternate nests for many years. In the absence of detailed information on the number and location of breeding pairs, however, identification and conservation of habitat at the landscape level is critical to preventing the decline of populations and the isolation of individuals. When determining the 10% of each sub-regional planning area that will be assigned a higher biodiversity emphasis, consideration should be given to assigning some or all of this 10% to watersheds where goshawk management is a high priority. This will provide a sustainable mix of forest age classes, so that both established and dispersing goshawks will have the opportunity to find and settle into favourable habitats. This consideration has been provided for planning purposes but is not mandatory and should not be interpreted as chief forester direction. Furthermore it must be considered within the context of chief forester policy for establishing landscape unit biodiversity objectives.

Cross references

Marbled murrelet

Douglas-fir/Garry oak–oniongrass

ANCIENT MURRELET (*Synthliboramphus antiquus*)

CASSIN'S AUKLET (*Ptychoramphus aleuticus*)

WHA planning objectives

Protect breeding colonies.

Wildlife habitat area

Establish WHAs on islands where breeding colonies are not already protected with some other designation. For small islands, this should include the entire island.

GWM management objectives

Complete protection of breeding colonies.

Maintain intact forest structure and forest floor.

Prevent disturbance to breeding birds.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Management practice

Access/Recreation/Silviculture

- No harvest, salvage or development of any form can occur in WHAs.

MARBLED MURRELET (*Brachyramphus marmoratus*)

WHA planning objectives

Maintain nesting habitat with interior forest conditions throughout the range of the species. A primary objective for marbled murrelet WHAs is to maintain suitable habitat in an unfragmented condition. Prior to WHA selection, road locations should be identified in order to avoid potential conflict regarding fragmentation of the WHA and access to operable timber. Habitat hereafter refers to marbled murrelet nesting habitat.

WHAs for marbled murrelets must be composed of some or all of the old seral retention requirements recommended in the *Guide to Landscape Unit Planning* (In prep.) and designated as objectives under landscape unit plans (i.e., overlap old-growth management areas [OGMAs] or recruitment areas and marbled murrelet WHAs during landscape unit planning). This will ensure that old seral objectives are met and marbled murrelet habitat is maintained without requiring additional timber impacts. It is recommended that in every landscape unit with suitable or originally suitable marbled murrelet habitat (see definitions under WHA location) that 10–12% of the combined total area of suitable and originally suitable marbled murrelet habitat should be set aside as described in the WHA criteria below. WHAs or other areas managed to meet marbled murrelet requirements should be comprised of currently suitable habitat where possible. However, where sufficient currently suitable habitat does not exist in the landscape unit, originally suitable habitat should be used to meet the 10–12% recommendation. Marbled murrelet WHAs cannot be designated in areas that are not either designated or scheduled to be designated as part of the landscape unit old seral stage retention area.

Wildlife habitat area

WHA size

WHAs should be a minimum of 200 ha but may be smaller where 200 ha of suitable habitat is not available. In the latter case, size will vary depending on options available. Larger WHAs are preferred in order to provide interior forest conditions. WHAs should be a minimum of 600 m in width. If the actual nesting habitat itself is narrower than 500 m, a buffer of approximately 100 m of old forest or advanced second growth (>60 years) should be included around the nesting habitat. WHAs with less than 200 ha of suitable habitat should also include a 100 m buffer, and wherever possible, no more than 50% of the WHA boundary should be exposed to early seral stages (<40 years). Also, consider windfirmness of WHA when drafting boundaries.

WHA location

Ideally inventory information and habitat information should be used to select WHA sites. It is preferred that inventory be conducted prior to establishing WHAs to confirm presence of marbled murrelets and locate areas with evidence of nesting behaviour. However, where this information is not available when landscape unit plans are being developed, MELP staff will use the best information available to identify the component of the old seral stage retention areas that will also be designated as marbled murrelet WHAs.

The following steps outline inventory procedures for determining the most appropriate locations for WHAs. “General Surveys” should be used to survey broad areas whereas “Intensive Surveys” should be used to survey specific areas.

a) When marbled murrelets are not known to occur in the landscape unit, use General Surveys within 30 km of salt water according to established RIC protocol. If there is no evidence of marbled murrelet activity in the landscape unit (visual or auditory detections) by a qualified observer from at least four surveys made at intervals of at least one week between 1 May–31 July, with two of the surveys in June or July, in two consecutive years, then the area is not appropriate for establishment of a WHA; however, in some cases additional General Surveys may be required. If marbled murrelets are detected in a stand during General Surveys, further Intensive Surveys should be conducted within that watershed.

b) When marbled murrelets are known to occur in the landscape unit or were detected during General Surveys, areas of suitable habitat >30 km from salt water should be surveyed.

c) Once detected, use Intensive Surveys according to the Resources Inventory Committee protocol, to inventory suitable marbled murrelet habitat to confirm presence and occupancy, to locate areas with the greatest number of occupied detections, evidence of nesting and possible nest sites.

When selecting candidate sites for WHAs, areas with the highest nesting activity (i.e., the highest number of occupied behaviours or where nests, eggshells or downy young are found) should be the highest priority for selection. Where there is no evidence of nesting activity but presence has been detected, areas with the greatest number of detections and in the most suitable habitat (see below) should be selected as candidates.

If inventory has not been conducted but a decision to establish WHAs in the landscape unit must be made, use knowledge of habitat suitability (described below) to select sites for WHAs or to prioritize specific areas for inventory. Suitable areas may be determined using air photos, biophysical mapping and timber inventory mapping.

For the purpose of this account, *suitable habitat is defined as forest in the Coastal Western Hemlock (CWH), Coastal Douglas-fir (CDF) and Mountain Hemlock (MH) biogeoclimatic zones within 85 km of saltwater in age class 9 and 8 (structural stage 7).* Selection of sites will depend on what is available in the landscape unit. When selecting WHAs, choose sites most suitable as indicated below.

- CWH and CDF are preferred over MH
- in CWH and CDF, tree height classes 5–6 are preferred over lesser classes
- in MH, tree height classes 4 are preferred over lesser classes
- lower elevations are preferred
- sites closer to saltwater are preferred (i.e., within 30 km is optimum)
- age class 9 is preferred but 8 is acceptable if older forest is not available
- larger contiguous areas are preferred over smaller contiguous area and fragmented areas.

In addition the presence of the following features is preferred:

- large limbs higher than 15 m above ground with platforms >18 cm across
- dwarf mistletoe, growth deformities and moss covered branches
- Sitka spruce, Douglas-fir, western hemlock, western redcedar >50 m in height
- yellow-cedar and mountain hemlock >30 m in height (if above tree species are unavailable).

Where sufficient suitable habitat is not available, consider establishing WHAs incorporating originally suitable habitats to recruit habitat. *Originally suitable habitats are areas that were suitable prior to timber harvest (i.e., have been cut within 200 years).* Advanced second growth is generally preferred over younger stands and should be selected where no suitable habitat exists.

In the event that 10–12% of suitable habitat is available in all biogeoclimatic zones represented in the landscape unit, consideration should be given to the original distribution of nesting habitat in both distance from the ocean and in elevation. For example, if 70% of a watershed falls within the CWH biogeoclimatic zone and 30% is in the MH zone, then roughly 70% of the WHAs should be in CWH and 30% in MH. However, when 10–12% of suitable habitat is not available within all biogeoclimatic zones present in the landscape unit, an assessment must be made to determine what is the best distribution for marbled murrelet conservation. The criteria listed above should be used when making such an assessment. The best distribution of WHAs for marbled murrelets may conflict with the *Biodiversity Guidebook* and *Guide to Landscape Unit Planning* (In prep.) recommendations for ecosystem representation. When this occurs, the district manager and regional fish and wildlife manager must determine which will take precedence.

GWM management objectives

Maintain blocks of old growth (as defined in the *Biodiversity Guidebook)* with interior forest conditions for nesting habitat.

Minimize nest predation.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not build roads unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.
- Seasonal constraints on the use of the road may be required. Consult MELP so any seasonal constraints can be specified.

Recreation

- Do not establish recreation sites.

Silviculture

- Do not harvest except for salvage when a variance is approved by the district manager and regional fish and wildlife manager.
- Identify WHAs on forest district fire protection maps and consider them a priority for protection from fires.

Restoration and enhancement

- In second growth stands use silvicultural techniques to encourage old-growth characteristics.

Management considerations (not mandatory)

Consider the following during operational planning:

- Schedule timber harvesting operations adjacent to WHAs between September 15 and April 15 to minimize disturbance of nesting birds.
- If a WHA is <200 ha, no more than 50% of the WHA should be bounded by forests of young seral stages.
- If prescribed burning is required for site preparation adjacent to a WHA, it should be restricted to between September 15 and April 15 to minimize the impacts on nesting marbled murrelets. An extremely high level of fire protection during slash burning is required for burns adjacent to WHAs.

Landscape unit planning considerations (not mandatory)

Marbled murrelet nesting habitat in the Georgia Depression Ecoprovince is severely depleted. Habitat conservation within this ecoprovince is critical in order to maintain populations in this part of the marbled murrelet's range. When applying biodiversity emphasis options within the

Georgia Depression, areas with sufficient suitable marbled murrelet habitat (see WHA description above) should be considered for placement of the higher biodiversity emphasis (no more than 10% of subregional planning area) and intermediate biodiversity emphasis (45% of subregional planning area).

In landscape units where 10–12% of suitable marbled murrelet habitat is not available, conflict may occur between ecosystem representation and the best distribution of marbled murrelet WHAs. In these cases, the district manager and regional fish and wildlife manager must consider whether or not marbled murrelet conservation should take precedence over ecosystem representation. Exceeding the *Guide to Landscape Unit Planning* (In prep.) old forest retention is not an option until such time as a conservation assessment has determined that additional habitat conservation is required and the strategy is revised to include higher level plan recommendations for marbled murrelets.

Cross references

Northern goshawk, Queen Charlotte goshawk, grizzly bear

LEWIS'S WOODPECKER (*Melanerpes lewis*)

WHA planning objectives

Maintain concentrations of nest and storage trees.

Wildlife habitat area

Establish WHAs where an aggregation of nesting woodpeckers occurs. An aggregation is defined as five or more nesting pairs, each within 250 m of another. The WHA will include all the nest sites plus a 100 m buffer.

GWM management objectives

Maintain the integrity of nesting areas.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not construct roads unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Recreation

- Do not develop recreation trails or sites.

Silviculture

- Do not harvest or salvage timber.

Management considerations (not mandatory)

Wildlife tree patches can be used to protect individual nests.

Landscape unit planning considerations (not mandatory)

Maintenance of semi-open forest with some large snags and green recruitment trees is recommended (ponderosa pine, black cottonwood, Douglas-fir preferred). Open forested linkages between riparian areas, semi-open forest and reserve areas of similar quality is necessary. The relative location and proximity of other preferred habitats (e.g., recent burns; partially logged areas showing low crown closures, and desirable habitat attributes such as snags and large hardwoods; orchards, crop fields or pastures), should also be considered when planning at the landscape level.

Cross references

White-headed woodpecker

WHITE-HEADED WOODPECKER (*Picoides albolarvatus*)

WHA planning objectives

Provide adequate supplies of suitable live and dead wildlife trees for foraging and nesting.

Wildlife habitat area

Two types of WHAs are required for this species corresponding to foraging areas and nest sites. Nest WHAs may occur within foraging WHAs.

Foraging WHAs should be established over remaining high suitability forests throughout the breeding range of the species (i.e., ponderosa pine or Douglas-fir age classes 6 to 9; structural stages 6 or 7).

Nest WHAs are 20–40 ha located at breeding sites, either historical or currently occupied. These should contain a mix of large (≥60 cm dbh) live and standing dead trees (ponderosa pine, Douglas-fir preferred). If a high suitability habitat no longer exists at the site, locate the WHA within a 1 km radius of the site at (in order of preference):

- a previously constrained area containing appropriate structural stages and habitat features (i.e., an OGMA)
- a high suitability site
- a high capability area managed to produce a high suitability habitat.

One recruitment WHA should be established in the vicinity of every historical breeding site unless a previously constrained area within 1 km provides adequate white-headed woodpecker nesting and foraging habitat.

GWM management objectives

Provide adequate supplies of suitable live and dead wildlife trees for foraging and nesting.

Maintain stand structure.

Maintain mature cone-producing ponderosa pine to ensure winter food supplies.

Minimize access to prevent habitat fragmentation and firewood cutting.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Nest WHAs

Access

- Do not construct roads unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager. Deactivate temporary roads immediately after logging.

Silviculture

- Do not salvage timber unless variance is approved by the district manager and regional fish and wildlife manager.
- Protect and retain all ponderosa pine and Douglas-fir live and dead trees ≥60 cm dbh for nesting and insect foraging. Maintain at least six dead standing trees per ha. Where it is not possible to retain six ≥60 cm, use the largest available. The highest practical density of snags is preferred. Hazardous snags or trees can be incorporated into group reserves (plan as no work zones if appropriate); otherwise maintain snags within the operational setting as described in the *Wildlife/Danger Tree Assessor's Course Workbook*. Where hazard trees or snags must be removed, leave high-cut (5 m) stumps wherever possible.
- Use partial cutting silvicultural systems to maintain widely spaced (40–70% canopy cover) late seral ponderosa pine and Douglas-fir. Group selection (openings ≤0.5 ha), with group reserves, or single tree selection with group reserves are the recommended silvicultural systems.
- Maintain sufficient understorey ponderosa pine across the natural variation of diameter classes in order to provide eventual recruitment of trees into the larger (≥60 cm) diameter classes. Extend the rotation as necessary. Within this constraint, minimize the risk of stand-replacing fire.

Restoration and enhancement

- Topping and "planting" large diameter snags with an excavator may be appropriate in areas where standing dead trees are few.
- Additional potential nest sites in intensely managed stands may be provided by leaving some high-cut (5 m in height) stumps of large (≥60 cm dbh) ponderosa pine and Douglas-fir.

Foraging WHA

Access

- Do not construct roads in stands of late seral ponderosa pine and Douglas-fir unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager. Wherever practicable, retain >100 ha areas as unroaded, including inoperable areas.

Silviculture

- Retain at least 25 of the largest ponderosa pine trees per hectare. Trees ≥50 cm dbh are preferred. Retain at least three large snags per hectare. Snags ≥60 cm dbh are preferred. Where hazard trees or snags must be removed, leave high-cut (5 m) stumps wherever possible.
- Use partial cutting silvicultural systems to maintain uneven-aged stands, a full range of diameter classes, and an open canopy (40–70%). Plan for the recruitment of ponderosa pine and Douglas-fir into the larger (>60 cm) diameter class.
- Do not salvage timber.
- Implement protection measures to reduce the risk of stand-replacing fire.
- Use biological control methods to prevent and control insect infestations. Do not use insecticides.

Landscape unit planning considerations (not mandatory)

Because of this species' potentially large home range size (100–200 ha in continuous old forest and 300–350 ha in fragmented forests), WHAs should be connected by forested linkages to other areas with similar structural features. Linkages should be composed of large areas of connecting habitats, rather than merely corridors (e.g., relatively large reserve areas containing drier, open-canopied mature and old growth ponderosa pine). A landscape objective for the range of this species is to maintain and restore the historical distribution and complexity of late seral ponderosa pine habitats.

Reductions of mature, cone-producing ponderosa pine stands could jeopardize critical winter food supplies. Ponderosa pine only produce heavy cone crops beginning at 60–100 years of age and at 4–5 year intervals.

Cross references

Lewis's woodpecker

Ponderosa pine–black cottonwood–Nootka rose–poison-ivy

BOBOLINK (*Dolichonyx oryzivorus*)

WHA planning objectives

Maintain breeding habitat throughout the range of the species.

Wildlife habitat area

Establish a WHA (~10–15 ha) within meadows occupied by at least one breeding pair.

GWM management objectives

Prevent destruction of nests and nest abandonment.

Maintain dense clumps of grass used for nesting and hiding.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Range

- Do not mow hayfields during the breeding season. Generally, the breeding season extends from April through August; however, consult MELP for site-specific times. Mowing in autumn is preferable.
- Avoid grazing during the breeding season by providing alternate water, forage and salt licks. If there is no other practicable option to avoid grazing, fencing may be required. Consult MELP for fencing arrangements.
- Avoid the use of pesticides. Spot treatments with herbicides may be used in exceptional circumstances (e.g., noxious weeds) where it can be demonstrated that the herbicide will not be harmful to the species or habitat being managed.

Management considerations (not mandatory)

Pesticide spraying should be limited in areas immediately adjacent to WHAs in order to maintain food sources and reduce likelihood of secondary impacts.

Cross references

Long-billed curlew

GRASSHOPPER SPARROW (*Ammodramus savannarum*)

WHA planning objectives

Provide suitable nesting habitat.

Wildlife habitat area

Establish WHAs on known breeding sites and areas with high breeding capability. WHAs should be 10–15 ha to allow several pairs to establish territories.

GWM management objectives

Prevent destruction of nests and nest abandonment.

Maintain dense clumps of grass used for nesting and hiding.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Range

- Do not mow hayfields during the breeding season. Generally the breeding season extends from April through August; however, consult MELP for site-specific times. Mowing in autumn is preferable.
- Avoid grazing during the breeding season by providing alternate water, forage and salt licks. If there is no other practicable option to avoid grazing, fencing may be required. Consult MELP for fencing arrangements.
- Plan grazing for autumn in order to avoid disturbance and damage to nests. Only light grazing should occur.
- Avoid the use of pesticides. Spot treatments with herbicides may be used in exceptional circumstances (e.g., noxious weeds) where it can be demonstrated that the herbicide will not be harmful to the species or habitat being managed.

Landscape unit planning considerations (not mandatory)

Maintain a variety of seral stages in rangeland communities.

Cross references

Racer, night snake, gopher snake, long-billed curlew

BREWER'S SPARROW (*Spizella breweri breweri*)

WHA planning objectives

Maintain the integrity of nesting habitat within the current and historic occupied range.

Wildlife habitat area

Establish WHAs over breeding aggregations of >5 pairs and selected high suitability historic breeding aggregations. The WHA should be based on Brewer's sparrow polygons as delineated by the Conservation Data Centre.

GWM management objectives

Maintain the integrity of nesting habitat by retaining density and structure of sagebrush habitat.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not construct roads unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Range

- Limited thinning of dense (>50% foliar cover) stands of sagebrush may be appropriate as long as the primary objective is the improvement of nesting habitat. Grazing should be carried out in a manner that will not lead to crown breakage, but is sufficiently intensive to maintain the desired density of sage, and prevent succession to climax bunchgrass.
- Protect large sagebrush during weed control operations.
- Maintain clumps of large (>1 m tall) sage.

Other

- Do not conduct range burning or shrub clearing.

Landscape unit planning considerations (not mandatory)

Brewer's sparrow WHAs, adjacent wetlands, moist gullies and remaining late seral sagebrush communities should be managed to a late seral grassland stage.

Cross references

Racer, gopher snake, night snake, sage thrasher

Requirements of the long-billed curlew and the grasshopper sparrow may conflict with the management prescription for Brewer’s sparrows. The long-billed curlew requires more open grassland, and the grasshopper sparrow requires grassland with few or no shrubs.

SAGE THRASHER (*Oreoscoptes montanus*)

WHA planning objectives

Maintain big sage nesting habitat.

Wildlife habitat area

Establish WHAs at breeding locations and areas where habitat capability is high. WHAs should be 200–250 ha; this reflects the current size of occupied areas in BC. WHAs should have at least 16% cover of sage, clumps of 2–10 big sage, preferably 1 m in height for nesting, minimal cover of annual grass or rock, but good cover of perennial grasses (~15–35%). Location of WHAs in habitat adjacent to Washington State breeding habitat might be most successful.

GWM management objectives

Maintain the integrity of nesting habitat by retaining density and structure of sagebrush habitat.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not construct roads unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Range

- Limited thinning of dense (>50% foliar cover) stands of sagebrush may be appropriate as long as the primary objective is the improvement of nesting habitat. Grazing should be carried out in a manner that will not lead to crown breakage, but is intensive enough to maintain the desired density of sage, and prevent succession to climax bunchgrass.
- Protect large sagebrush during weed control operations.
- Maintain clumps of large (>1 m) sage.

Other

- Do not conduct range burning or shrub clearing.

Landscape unit planning considerations (not mandatory)

The most important feature affecting habitat selection by this species appears to be proximity to historical nest sites. Reproductive success in Washington seems to affect abundance in BC. Links to populations in Washington seem to be along valleys with bunchgrass habitat. At the landscape level, maintenance of dispersed, large, fully crowned sagebrush clumps is desirable. WHAs should be managed to maintain and restore late seral/climax grassland communities.

Cross references

Brewer’s sparrow

YELLOW-BREASTED CHAT (*Icteria virens*)

WHA planning objectives

Maintain breeding and foraging habitats.

Wildlife habitat area

Establish WHAs at sites of current breeding concentrations and historical breeding concentrations in high capability or high suitability habitat. Sites of historical breeding concentrations are where the species was once known to breed, but at which there has been no verified breeding in the last 20 years. WHAs should provide 1–1.5 ha per pair and should include the entire area of thickets that may potentially be used by the chats.

GWM management objectives

Maintain riparian thicket habitat for breeding and foraging habitat.

Ensure cattle do not fragment thicket habitat.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not build new roads, stream crossings and fenceline rights-of-way unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Range

- Avoid cattle use by providing alternate water, forage and salt licks. If there is no other practicable option to avoid use, fencing may be required. Consult MELP for fencing arrangements.

Management considerations (not mandatory)

Maintain or restore riparian habitat in rangelands. Riparian thickets damaged by cattle can be rehabilitated by excluding cattle. Areas completely cleared may be revegetated by planting new wild rose thickets.

Cross references

Lewis’s woodpecker, bobolink, water birch–red-osier dogwood

Mammals

PACIFIC WATER SHREW (*Sorex bendirii*)

WHA planning objectives

Protect current and historical habitat. Historical habitat is habitat where the species was once known to occur but at which there has been no verified sighting in the last 20 years.

Maintain microclimatic condition within occupied riparian area.

Wildlife habitat area

Establish WHAs along occupied watercourses and at historical sites in high capability or high suitability habitat. WHAs should extend the entire length of the stream reach and contain a 30 m core area and a 45 m buffer on each side of the stream.

GWM management objectives

Maintain the physical integrity of the riparian area around occupied streams.

Maintain or create the microclimate and old forest structural elements within riparian areas.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not construct roads through the WHA unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Recreation

- Do not establish recreational trails or sites.

Silviculture

- Do not harvest or salvage in core area.
- Use partial harvesting systems in the buffer that maintain 80% basal area unless variance is approved by the district manager and regional fish and wildlife manager. Partial harvest should be oriented towards the creation of old forest characteristics such as large diameter trees, multilayered canopies, snags and coarse woody debris.
- Restrict activities that may alter the vegetation, hydrology, stream structure or soils, particularly the upper soil layers.

Management considerations (not mandatory)

Consider the following during operational planning:

- Where operationally feasible, harvest one side of the stream at a time (i.e., do not position blocks on both sides of the stream when they are immediately across from each other).
- Extending green-up specifications may be beneficial.
- Partial cutting systems may reduce edge effects.
- In urban areas, larger buffers (e.g., 100–200 m) may be necessary.
- When logging immediately adjacent to WHAs consider maintaining the forest litter layer and coarse woody debris.

Landscape unit planning considerations (not mandatory)

Due to the high degree of fragmentation within the range of this species, forest habitat along watercourses and wetlands should be restored to connect populations. These linkage requirements should be considered during landscape unit planning.

Cross references

Rubber boa, American bittern, Keen’s long-eared myotis, mountain beaver

KEEN'S LONG-EARED MYOTIS (*Myotis keenii*)

WHA planning objectives

Protect known hibernacula, maternity colonies and roosting sites, and adjacent foraging areas and movement corridors.

Wildlife habitat area

Establish a WHA around hibernacula, maternity colonies and roosting sites. The WHA will include a 100 m radius core area and a 200 m buffer. It also includes a minimum 20 m on either side of any stream, wetland or lake within 500 m of the occurrence. This riparian area should be treated as a core area.

GWM management objectives

Maintain microclimate conditions of the colony site.

Minimize disturbance to colonies.

Maintain forage opportunities and night roosting habitat near colonies.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- No road construction should be carried out within the core area unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.
- Do not remove rock or talus.

Silviculture

- Do not harvest or salvage in core area.
- Harvesting within the buffer is subject to timing constraints. For maternity colonies, harvesting should not be carried out from June to July. Around hibernacula, harvesting beyond the core area may need to be limited during select winter months. Consult MELP for specific timing information.
- Use partial harvesting systems in the buffer that maintain 80% basal area unless variance is approved by the district manager and regional fish and wildlife manager.

- Retain a selection of stand structural elements, such as large green trees, snags, logs on the forest floor, and canopy gaps. Older green trees should have structural characteristics such as cracks and crevices in thick bark, bark pulling away from the trunk forming crevices, and holes in the bole where limbs have been shed. Snags should have cracks, peeling bark, bird holes and hollow interiors.
- Avoid the use of pesticides. Spot treatments with herbicides may be used in exceptional circumstances (e.g., noxious weeds) where it can be demonstrated that the herbicide will not be harmful to the species or habitat being managed.

Landscape unit planning considerations (not mandatory)

Keen's long-eared myotis requires mature and old, low elevation, coastal western hemlock forest for foraging and roosting habitat. Treed linkage corridors should be maintained to ensure connectivity between roosting habitat and riparian foraging habitat, because most bat species take advantage of forest edges as movement corridors. These linkage requirements should be considered and accommodated within any forest ecosystem networks that are established through a landscape unit plan.

MOUNTAIN BEAVER (*Aplodontia rufa rufa* and *Aplodontia rufa rainieri*)

WHA planning objectives

Maintain known colonies.

Wildlife habitat area

Establish a WHA around currently occupied colonies. WHAs should include the colony plus 50 m.

GWM management objectives

Protect existing burrows and denning animals.

Ensure integrity of burrow system.

Maintain soil and drainage characteristics suitable for burrowing.

Maintain coarse woody debris.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not construct roads, skid trails or landings unless variance is approved by the district manager and regional fish and wildlife manager. Consult MELP when road maintenance, deactivation or rehabilitation activities on existing roads are required to ensure species requirements are adequately addressed.
- If skidding is unavoidable, lay out trails before snowfall when burrows are visible.

Silviculture

- Do not use harvest methods that cause damage to burrows.
- Do not use mechanical site preparation techniques that will cause damage to burrows.
- Do not slash burn unless variance is approved by the district manager and regional fish and wildlife manager.
- Avoid the use of pesticides. Spot treatments with herbicides may be used in exceptional circumstances (e.g., noxious weeds) where it can be demonstrated that the herbicide will not be harmful to the species or habitat being managed.

Landscape unit planning considerations (not mandatory)

Riparian connectivity is expected to provide the principal dispersal avenue, and for *A. r. rainieri,* retention of forested habitat, regardless of successional stage, may be adequate to preserve populations. For *A. r. rufa*, threatened by the loss of large blocks of habitat to urbanization, managers should consider the limited dispersal distances noted for the species to date, and ensure that WHAs are not isolated within extensive areas (>500 m) of little or no cover.

Cross references

Tailed frog

VANCOUVER ISLAND MARMOT (*Marmota vancouverensis*)

WHA planning objectives

Maintain occupied habitat.

Wildlife habitat area

Establish a WHA over colonies. The WHA should include a core delineated by the outer perimeter of the colony and a buffer area of a width sufficient to maintain the microclimatic regime of the colony area. Consult the Vancouver Island Marmot Recovery Team to determine this width.

GWM management objectives

Complete protection of existing burrows and denning animals.

Ensure integrity of burrow systems.

Maintain soil and drainage characteristics suitable for burrowing.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not construct roads or landings. Consult MELP when road maintenance, deactivation or rehabilitation activities are required to ensure species requirements are adequately addressed.

Silviculture

- Do not harvest or salvage in core area.
- Single tree or group selection systems may be appropriate in the buffer. The district manager in consultation with the regional fish and wildlife manager will determine whether or not these systems are suitable.
- Where timber harvesting with ground-based equipment is approved, it should only be conducted with low ground pressure equipment, to avoid causing damage to burrows.
- Do not use mechanical site preparation techniques that will cause damage to burrows.

FISHER (*Martes pennanti*)

HIGHER LEVEL PLAN RECOMMENDATIONS (RMZ OBJECTIVES)

The following recommendations are not mandatory, are not to be inferred as government direction and are not intended to have application across the entire planning area. Instead, they should be considered in areas of high management priority for fishers such as the biogeoclimatic subzones of natural disturbance type (NDT) 3. Fisher populations in NDT3 are the highest in BC because of the abundance of prey, favourable climate and structurally complex forests with continuous overhead cover. Although the following recommendations have been developed for NDT3 (except for CWH, ICHdw, MSdk, MSdm and SBSmc subzones) they may also be considered in other areas determined to be of high value to fishers such as the drier interior subzones of NDT2 and more northerly subzones of NDT4. These recommendations are based on the best technical information on the species at this time and some or all of them should be considered for application in localized portions of a planning area where the planning table intends to propose a conservation objective for the species. Planning tables are expected to consider these recommendations along with other proposed timber and non-timber resource objectives. If necessary to accommodate other objectives, planning tables should consider restricting the distribution of the recommended management practices, rather than modifying the practices themselves.

Objectives

Maintain stand structure and mature and old forest connectivity, particularly along riparian systems.

Landscape unit planning direction

NOTE: These landscape unit planning requirements do not apply until they have been incorporated into approved resource management zone objectives.

- Areas managed for fisher should contain 30–45% mature and old forest, depending on the diversity of habitat available and prey abundance, and be suitable for fishers. Suitable habitat is characterized by shrub cover, coniferous canopy cover, sub-hygric or wetter moisture regime, patches of large, declining trees (particularly black cottonwood), and greater than average amounts of coarse woody debris for the zone (>200 m^3/ha).
- Landscape connectivity should be maintained through the use of corridors of mature and old seral forests. Ideally, connectivity should be centred on stream systems and can be achieved by maintaining riparian buffers of 100 m on each side of a stream.
- The distribution of cutblock sizes should focus on the small and large sizes of the patch size recommendations described in the *Guide to Landscape Unit Planning* (In prep.). Fishers will use small cutblocks but also require larger habitat areas. Over the long term, larger cutblocks will develop into these larger habitat areas.

Stand level planning

- To provide denning and resting habitat within the harvested landbase, wildlife tree patch requirements should exceed Code requirements in that wildlife tree patches should be 2 ha or greater. Large diameter spruce (>40 cm dbh), cottonwood (>75 cm dbh) or fir in decay classes 2 and 3 are preferred. Select trees with cavities, broom rust or witches broom.
- Maintain natural levels, decay and size characteristics and dispersion of coarse woody debris.
- Maintain windfirm mature cover within riparian management zones (i.e., at least 30% canopy closure).

GRIZZLY BEAR (*Ursus arctos*)

WHA planning objectives

There are two categories of WHAs for grizzly bears: security and foraging. The name refers to one of the primary functions of the WHA but does not limit them to these functions. Security WHAs are intended to maintain the ecological integrity of critical habitat patches and to ensure the security of the bears using these patches. Patches are defined as a single occurrence of a unique grizzly bear habitat type (see step 1 below).

Foraging WHAs attempt to compensate for habitat alienation, degradation or loss of important areas in landscape units by maintaining habitat values in other areas. They may also be established to maintain security, thermal cover or linkage among important habitats.

Wildlife habitat area

WHAs will be established based on grizzly bear population and habitat objectives consistent with the Grizzly Bear Conservation Strategy and higher level plans approved by three ministers (MELP, MOF, MEM).

Priority for WHAs will be in the portions of the following forest districts that are within threatened Grizzly Bear Population Units: Sunshine Coast, Squamish, Lillooet, Chilcotin, Williams Lake, Chilliwack, Merritt, Penticton, Vernon, Boundary, Arrow, Kootenay Lake, Cranbrook and Quesnel and Grizzly Bear Management Areas (GBMAs) designated under the *Wildlife Act*.

Security WHAs

A security WHA consists of a core area and a buffer. The core area is an entire patch of critical habitat. The buffer should generally be about 50 m but its width will vary with patch characteristics and objectives. Security WHAs will range in size from 1 to 500 ha. The majority of WHAs will be less than 10 ha. Critical habitat patches include salmon spawning areas where grizzly bears feed and herb-dominated avalanche tracks and run-out zones on southerly and westerly aspects. On the coast, critical habitats include estuaries, skunk cabbage swamps and non-forested fen/marsh complexes. In the interior, critical units include herbaceous riparian meadow/wetland complexes, post-fire stands dominated by *Vaccinium* species, subalpine parkland meadows and *Hedysarum* and glacier lily complexes.

Foraging WHAs

Foraging WHAs will generally range in size from 5 to 250 ha. Most of them will be about 10 ha. The number, location and size of foraging WHAs should ideally be determined through formal landscape unit planning but, failing this, should be determined through an informal process that has a landscape level perspective. The planning must be guided by the specific grizzly bear population and habitat objectives established for the landscape unit during higher level planning.

Foraging WHAs should be established to maintain or restore habitat value in landscapes that have extensive areas of mid-seral forest characterized by closed canopies, conifer dominance and high stocking levels. Such stands have little grizzly bear habitat value. Foraging WHAs should also be established where security, thermal cover and linkage are inadequate. The following six-step process will help determine if foraging WHAs are required and, if so, their size, location and objectives. This process should be used in conjunction with regional grizzly bear guidelines that contain more detail than is present here.

Step 1. Classify and map grizzly bear habitat

Grizzly bear habitat types are units in a bear-specific interpretive classification derived from existing terrestrial ecosystem unit, bioterrain, and biogeoclimatic (site) classifications. Typically, bear habitat types are classified using structural stages of individual ecosystem units although ecosystem units may be combined when bear values are similar. Bear habitat types can be identified on an *ad hoc* basis using other ecological and resource inventories (e.g., terrain, forest cover, air photographs, surrogate terrestrial ecosystem mapping). Terrestrial ecosystem unit classification and mapping is preferred.

Step 2. Evaluate seasonal habitats and develop seasonal capability and suitability ratings

Bear habitat types within natural disturbance types (defined in the *Biodiversity Guidebook*) can be ranked according to simple models of seasonal habitat value using a standard six-class ranking system for habitat suitability (see Wildlife Interpretations Subcommittee, 1996). Stratification by natural disturbance types is essential because of the strong relationship between natural disturbance regime and grizzly bear habitat value. In general, the amount and quality of foods that are produced in a bear habitat type is proportional to its seasonal value. This simple approach ranks all occurrences of a bear habitat type (all patches) the same for any one season.

Step 3. Modify capability/suitability ratings for habitat alteration

Each bear habitat type should be re-evaluated according to the kind of disturbance that has occurred. The terrestrial ecosystem mapping classification and its subsequent simplification into interpretive bear habitat types does not distinguish between natural and post-logging or post-grazing succession. This step makes such evaluations explicit. For example, a particular bear habitat type may have high habitat suitability for summer and fall forage; the same unit after conifer planting and vegetation management, however, will have lower value.

Step 4. Modify habitat suitability ratings for patch-specific attributes

Field assessment is required to determine the unique value of each polygon or patch. Patches of habitat within the same bear habitat type differ in value to bears. Some patches or polygons may contain important seasonal requisites such as winter den sites, bedding areas, or secure linkage and travel areas not normally associated with each bear habitat type.

Step 5. Develop habitat effectiveness ratings to account for polygon and patch context and total landscape unit habitat supply

Grizzly bears across BC often use groups or complexes of patches that meet several life requisites. The location, size, configuration, overall landscape supply, availability of seasonal alternatives, degree of human disturbance and connectivity of any polygon or patch ultimately determine grizzly bear habitat value. For example, a forested patch adjacent to a salmon spawning stream may be very important for bears to rest in and avoid other bears that are actively catching fish. That same forested type growing among rock outcrops may have no value to bears. Adequate habitat evaluation must therefore put patches in their landscape context. Habitat effectiveness classes are adjustments of generically assigned habitat suitability ratings for each patch that reflect patch and landscape characteristics. Table 5 is an example of suitability adjustment factors and possible adjustment ratings. Other suitability adjustment factors include patch fragmentation and isolation, size or seasonal supply of an important bear habitat type.

Table 5. An example of suitability adjustment factors and possible adjustment ratings for grizzly bears

	Adjustments for habitat effectiveness class					
	Within zone of influence			Landscape habitat supply/context		
Habitat suitability*	Human settlement	Major transportation corridor	Intensive agriculture	Beside critical habitat	Essential linkage	Landscape shortage
1	+2	+2	+1			
2	+2	+2	+1	-1	-1	-1
3	+3	+3	+2	-2	-2	-2
4			+2	-3	-3	
5				-4	-4	
6				-5	-5	

* Assignments of habitat suitability and adjustments for habitat effectiveness class are for individual patches. Suitability rankings of 1 are for the best habitats. Habitat suitability value of 6 is nil.

Step 6. Foraging WHA decision

Ideally, foraging WHAs should be designated according to cumulative effects analysis. In the absence of a formal cumulative effects analysis, managers should try to consider the full range of potential impacts, their spatial distribution and relation to other developments in the landscape unit, and the timeframe of these effects. Where there is grizzly bear habitat and there are RMZ objectives to manage for grizzly, the goal is no net loss of habitat effectiveness over time. Therefore, where developments reduce the effectiveness of habitat within a landscape, foraging WHAs should be established. WHAs should be of similar size and effectiveness class as the developed habitats prior to alienation, alteration, fragmentation or loss. Alternatively, where restoration is an objective, foraging WHAs should be established to recover effectiveness lost to historic development.

GWM management objectives

Security WHAs are intended to fully protect a patch of critical grizzly bear habitat by maintaining the ecological integrity of the unit and ensuring the security of the bears using the site.

Foraging WHAs are intended to maintain forage, security and thermal cover while allowing some degree of forest development. For example, stands could be managed to maintain mature and old forest structural characteristics (e.g., open canopies, greater amounts of understorey forage, larger trees, coarse woody debris) through extended rotations or appropriate silviculture practices.

Development around security and foraging WHAs should be managed to prevent disruption of natural influences of above- and below-surface drainage, shade, wind and snow movement within the WHA.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Security WHA

Access

- Do not construct roads, trails or landings unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Range

- Do not exceed current authorized livestock use levels.
- Do not allow for new opportunities (including filling vacancies) for cattle and sheep use.
- Minimize conflicts (e.g., displacement, direct contact and habitat alteration) between livestock and grizzly bears through management as spelled out in the range use plan for the range agreement area. Management strategies should include, but are not limited to, salt placement, alternate water development, drift fencing, herding or altering periods of livestock use.
- Range use plans should indicate that any conflicts between grizzly bears and livestock are to be reported to a conservation officer within 24 hours.

Silviculture

- No forestry practices should be carried out with the exception of treatments approved by the district manager and regional fish and wildlife manager to restore or enhance degraded habitat or to ensure windfirmness of buffer.

Foraging WHA

Access

Choose the most appropriate practices for the site that meet the management objectives.

- Harvest without roading (e.g., skyline, helicopter) during winter, unless there is no other practicable option. Where roads are necessary, provide windfirm visual screening for security (i.e., do not conduct stand tending or vegetation management within visual screen) provided Workers' Compensation Board requirements can be met.
- Deactivate non-permanent roads after basic silviculture obligations have been met.

Range

- Do not exceed current authorized livestock use levels.
- Do not allow for new opportunities (including vacancies) for cattle and sheep use.
- Minimize conflicts (e.g., displacement, direct contact and habitat alteration) between livestock and grizzly bears through management as spelled out in the range use plan for the range agreement area. Management strategies should include, but are not limited to, salt placement, alternate water development, drift fencing, herding or altering periods of livestock use.
- Range use plans should indicate that any conflicts between grizzly bears and livestock are to be reported to a conservation officer within 24 hours.

Silviculture

Choose the most appropriate practices for the site that meet the management objectives.

- Use silvicultural systems other than clearcutting, with carefully considered timing of entries and volume removals set at levels to optimize forage production.
- Do not use mechanical site preparation unless necessary to regenerate a site or achieve free growing.
- Avoid hot burns during prescribed fire.
- Required wildlife tree patches should be located entirely within blocks rather than on the cutblock edge. Wildlife tree patches should be at least 1 ha and be structurally and floristically diverse to provide effective visual screening and escape cover (e.g., climb trees for cubs).
- Establish pure hardwood or mixed wood stands to maintain forage production for a longer proportion of the rotation than pure softwood.
- Where vegetation management is required for conifer release, selective methods should be applied. Where vegetation management is required for crop establishment or re-establishment, broadcast methods are acceptable. In either case, manual brushing is preferred over herbicide application. Do not use sheep, domestic goats or cattle for vegetation management purposes.
- Lower stocking standards and alter normal crop distribution at planting (e.g., *Guidelines for Integrating Grizzly Bear Habitat and Silviculture in Coastal British Columbia*).
- Control stand density through juvenile spacing using guidelines agreed upon for the biogeoclimatic zone (e.g., *Guidelines for Integrating Coastal Grizzly Bear Habitat and Silviculture in Coastal British Columbia*).
- Control light regimes through pruning prior to canopy closure using guidelines agreed upon for the biogeoclimatic zone.

Management considerations (not mandatory)

Ensure that grizzly bears do not have access to unnatural food sources (garbage) because of the consequent mortality risk.

Landscape unit planning considerations (not mandatory)

These recommendations may only be applied within the chief forester's policy direction for establishing landscape unit biodiversity objectives.

Habitat management for grizzly bears within landscapes should be designed to ensure that: a) adequate amounts of well-distributed, seasonally important habitats are available across the landscape and through time, b) these habitats are not isolated by "fracture zones" of high human activity or extensive areas of ineffective habitat; c) bears are not displaced from preferred habitat; and, d) mortality risks are minimized.

HIGHER LEVEL PLAN RECOMMENDATIONS (RMZ OBJECTIVES)

A successful conservation strategy for grizzly bears must acknowledge the large home ranges, low population densities, and wide range of habitat requirements of grizzly bears across British Columbia. Although the creation of WHAs will assist with the protection of important habitats at the stand level, broader requirements should also be considered during higher level planning.

Higher level planning for grizzly bears begins with the recognition of Grizzly Bear Population Unit (GBPU) boundaries, their conservation status (Threatened or Viable), and their *initial* population objectives proposed by government. After receiving recommendations from the planning table government will ultimately need to establish a *final* population objective for the GBPU that incorporates social, economic and biological considerations.

Setting population objectives will require a detailed assessment by government of habitat effectiveness and an assessment of current population status that includes evaluating the impacts of current human activities. This conservation assessment will include careful examination of effectiveness and status in existing protected areas and other land use categories outside of the timber harvesting landbase, as well as the contribution of smaller areas such as riparian reserves, ungulate winter ranges, environmentally sensitive areas and non-commercial cover. A clear understanding for table members of how these areas contribute to the effective habitat in the plan area will result from the assessment.

After the conservation assessment is complete government will develop a series of options for the management of grizzly bear habitat for the planning table's consideration. Options will differ in degrees of conservation risk. Scenarios will indicate a potential for population increase, maintenance or decrease. These options will not include a scenario that results in a population becoming or remaining threatened throughout the population unit. Population objectives should be directed, as a first priority, to the non-contributing landbase, the constrained lands within the timber harvesting landbase and lower value mineral lands. An economic analysis of the potential impact on the allowable annual cut, mineral or recreational development or other important economic considerations will be undertaken for each option and presented to the table. Specific habitat objectives and strategies to meet the range of population objectives in the various options will be proposed and also presented to the table.

The options presented to the table may apply to localized areas within the GBPU and/or may include the potential to establish Grizzly Bear Management Areas (GBMAs). Grizzly Bear Management Areas will be proposed to identify lands with key habitat attributes that further the population objective. Grizzly Bear Management Areas may be proposed to serve one or more of the following:

- to assist with population recovery
- to ensure linkage across major "fracture zones"
- to function as representative benchmarks.

Where population units are threatened with extirpation, a Recovery Plan and its Terms of Reference may be developed and approved by the Forest Practices Code ministries (MELP, MOF, MEM) in consultation with local stakeholders. Recovery Plans are not land use plans but rather will use a variety of techniques to enhance threatened populations within the existing agreed upon land and resource allocations. These techniques may include the temporary prohibition of hunting where it is currently practiced, public education, reduction of bear/human conflicts and

other measures. Where it is determined by government that additional effort may be required to recover populations, the process for conservation assessment and option development as suggested for viable populations will be developed through land use planning tables as new tables are created for the population unit in question or when existing plans are revised.

The proposed broad objectives of the GBPUs and GBMAs should be considered for translation into specific land and resource management objectives, strategies and general guidelines by the higher level plan and they must be clearly defined geographically at an appropriate map scale. Planning tables should translate grizzly bear habitat and population objectives into recommended RMZ objectives and strategies.

In summary, the following recommendations are not mandatory, are not to be inferred as government direction and are not intended to have application across the entire planning area. Instead, they should be considered as guidance to the planning table according to the:

1. inherent capability of the land to support grizzly bears
2. current condition or effectiveness of the capable habitat, its distribution and status (e.g., if it is already protected or otherwise constrained)
3. the status and distribution of the grizzly bear population
4. all other potential timber and non-timber resource objectives.

These recommendations are based on the best technical information on the species at this time and some or all of them should be considered for application in localized areas of a GBPU where the planning table intends to propose a conservation objective for the species. Planning tables are expected to consider this information along with other potential timber and non-timber resource objectives. If necessary to accommodate other objectives, and to ensure consistency across tables, planning tables should consider restricting the geographic distribution of the recommended management practices strategies and objectives, rather than modifying the practices, strategies and objectives themselves.

Access

- Where planning tables propose a conservation objective for grizzly bears, they should consider application of a variety of access management measures designed to ensure habitat security, minimize displacement from preferred habitat and minimize mortality risk. Access management regimes should be applied over areas roughly equivalent to an average adult female home range, and the practices directed at ensuring adult female security and survival.
- Minimize road densities and road use. Limit the amount of open roads accessible to two-wheel drive vehicles to 0.6 km/km^2 within highly capable watersheds. Discourage use where possible.
- Promote one-side development (i.e., road construction and harvesting on one side of a valley at a time) to minimize displacement and ensure connectivity.
- Remove ballast from roads across avalanche chutes. Close permanent roads by removing bridges. Remove bridges when permanently deactiviting roads. Revegetate temporary access (e.g., excavated or bladed trails), roads and landings with non-forage species to minimize mortality risk of attracted bears.
- Consider closing access in sub-basins of important grizzly bear river valleys for 50 years after stands reach the free to grow stage (rotate forest activity among several sub-basins).

- Provide windfirm visual screening along roads to provide security (i.e., do not conduct vegetation management or stand tending adjacent to roads).
- Schedule forestry activities to avoid displacing bears from preferred habitat during periods of seasonal use.

Seral stage distribution and silviculture

Where planning tables propose a conservation objective for grizzly bears, they should consider application of management practices designed to ensure adequate forage is maintained across landscapes and through time. Grizzly bear forage supply in wetter biogeoclimatic units is strongly affected by the seral stage distribution on the forested landbase and conifer stocking densities. Mid-seral forest characterized by closed canopies, conifer dominance and high stocking levels have little grizzly bear habitat value because understorey vegetation (e.g., berry producing shrubs) are significantly reduced once the canopies begin to close. Two approaches to maintaining a stable forage supply are recommended: 1) setting specific seral stage objectives for the most capable watersheds within specific landscape units of concern; and 2) varying post-logging silvicultural regimes (e.g., lower stocking) to ensure forage supply throughout the timber rotation.

Table 6 identifies approximate targets for closed-canopy forests in capable watersheds. Values have been interpolated from the seral stage targets for intermediate biodiversity emphasis outlined in the *Biodiversity Guidebook*. Table 6 is meant to apply to undeveloped or partially developed watersheds. Planning tables should consider recommending these targets as long-term objectives in fully developed watersheds, recognizing that they may not be attainable in the short term because of development history and current timber supply requirements.

Table 6. Mid-seral forest objectives (% of forest area within a landscape unit) for the intermediate biodiversity emphasis option

Biogeoclimatic unit		Mid-seral age (years)	% Closed canopy*
NDT1			
	CWH	40–80	<34
	ICH	40–100	<36
	ESSF	40–120	<42
	MH	40–120	<42
NDT2			
	CWH	40–80	<30
	CDF	40–80	<30
	ICH	40–100	<33
	SBS	40–100	<33
	ESSF	40–120	<36
	SWB	40–120	<36

* Closed canopy forests are characterized by the lack of productive herb and shrub understories. They do not include hardwood or mixed-wood stands.

- In NDTs 1–3, retain 50% of the largest pieces (top 20% diameter and length) of coarse woody debris in decay classes 1–2.
- Do not use broadcast vegetation management methods in capable watersheds, except where stand establishment or re-establishment is the objective and broadcast methods are required. Vegetation management methods, listed in increasing order of impact on grizzly bear forage are: manual, chemical, cover crops and sheep grazing.
- Do not use sheep, domestic goats or cattle for vegetation management in occupied grizzly bear habitat to reduce direct and indirect conflicts with bears.

Range

- Consider establishing zones where range permits will be gradually removed and no new permits issued to reduce direct and indirect conflicts with grizzly bears. Use the effectiveness classes to decide where to limit grazing.

Restoration

- Conduct controlled burning to improve berry production (e.g., ESSF).
- Plan for extended rotations to recover mature and old-growth characteristics such as more open canopies, greater amounts of understorey forage and/or large trees (e.g., for rain interception in bedding habitat on coastal floodplains).
- Implement thinning and/or pruning to maintain open stands.
- Commercially thin to re-open closed canopies and recover productive shrub understories. Consider uneven spacing to maximize forage benefit.

Preventing human–bear conflict

- Maintain “attractant” free main and fly camps (e.g., camps for tree planters, cruisers, engineers). Ensure adequate food storage and garbage management.

Cross references

Bull trout, marbled murrelet, northern goshawk, mountain goat

MOUNTAIN GOAT (*Oreamnos americanus*)

WHA planning objectives

Maintain limiting habitats, other than winter range, such as natal areas and escape terrain.

Wildlife habitat area

WHAs should be established in critical habitat areas such as natal areas and escape terrain. These areas are expected to be primarily upper slope areas. WHAs will generally be 50 ha or smaller.

GWM management objectives

Maintain WHA in a natural state.

Minimize access to control and prevent human disturbance, and to avoid invasions of non-indigenous plants into grassland communities.

Avoid disturbance to natal area.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Natal times are generally between April 15 and July 15. However, times may vary by location. MELP should be consulted for location-specific times.

Access

- Do not construct roads unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager. Deactivate new non-permanent roads after use.
- Limit road use within natal WHAs during natal times unless variance is approved by the district manager and regional fish and wildlife manager.

Range

- Maintain grassland seral stage distribution as specified by regional wildlife and range staff.

Silviculture

- Do not use helicopters in the WHA to remove timber during critical times. Consult MELP for appropriate times.

Management considerations (not mandatory)

Winter range is an important aspect of mountain goat habitat; however, it is not considered in the *Identified Wildlife Management Strategy* because it is covered by a specific regulation (Section 69) in the *Operational Planning Regulations*.

Landscape unit planning considerations (not mandatory)

Most herds move from high elevation summer ranges to low elevation forested winter ranges. Each herd will use a system of rocky, rough, escape terrain; summer foraging sites; winter forest cover and kidding areas. Connectivity should be maintained between these areas by providing travel corridors in habitats with suitable forage and escape terrain. These linkage requirements should be considered and accommodated within any forest ecosystem networks that are established through a landscape unit plan.

BIGHORN SHEEP (*Ovis canadensis californiana*, *Ovis canadensis canadensis*)

WHA planning objectives

Maintain sensitive ranges other than winter range.

Wildlife habitat area

WHAs should be established on some critical ranges such as lambing areas, transitional ranges and certain alpine forage and escape habitat. WHAs will generally be 50 ha or smaller.

GWM management objectives

Maintain WHA in a natural state.

Minimize access to prevent human disturbance and to avoid invasions of non-indigenous plants into grassland communities.

Avoid disturbance to lambing area.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Lambing season is generally between April and July 15. However, times may vary by location. MELP should be consulted for site-specific times.

Access

- Do not construct roads unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager. Deactivate new non-permanent roads after use.
- Limit road use within lambing WHAs during the lambing season unless variance is approved by the district manager and regional fish and wildlife manager.

Range

- Maintain grassland seral stage distribution as specified by regional wildlife and range staff.
- Exclude domestic sheep.

Silviculture

- Do not use helicopters in the WHA to remove timber during critical times. Consult MELP for appropriate times.
- Avoid use of domestic sheep for vegetation management purposes to minimize epizootics, predators and competition for forage.

Management considerations (not mandatory)

Winter range is an important aspect of bighorn sheep habitat; however, it is not considered in the *Identified Wildlife Management Strategy* because it is covered by a specific regulation (Section 69) in the *Operational Planning Regulations*.

Landscape unit planning considerations (not mandatory)

Migratory bighorn sheep must be managed on an ecosystem basis, incorporating low-elevation winter ranges, transitional ranges and high-elevation summer ranges. Connectivity between seasonal ranges should be maintained. Additional recognition and protection of certain lower grasslands and alpine habitat within higher level plans will ensure the retention of year-round bighorn ranges.

Plant communities

DOUGLAS-FIR/GARRY OAK–ONIONGRASS
(*Pseudotsuga menziesii/Quercus garryana–Melica subulata*)

WHA planning objectives

Maintain 30% of the original extent of this plant community type in a natural state. In this context, "natural" means that the plant community has few non-native plants, has not been disturbed by human activity, and cycles freely through successional stages in response to natural disturbances such as fire.

Wildlife habitat area

Establish WHAs for old forest occurrences. WHAs should include the entire community occurrence and a 250 m buffer.

Since it is not likely that enough old forest occurrences remain to meet the 30% objective, use the next seral stage until 30% is obtained.

Preference should be given to sites in the following order:

- community occurrences that are relatively undamaged and can be expected to mature into healthy examples of this community
- community occurrences that could become part of an area used for connectivity at the landscape level
- community occurrences in areas where this plant community (at an old forest structural stage) is under-represented
- community occurrences that are adjacent to mature and old forest occurrences of another community.

GWM management objectives

Maintain WHAs in a natural state. In this context, "natural" means that the plant community has very few non-native plant species, has not been disturbed by human activity, and cycles freely through successional stages in response to natural disturbances such as fire. The Ministry of Forests' plant association classification can be used as an approximation of the expected natural species composition of ecosystems (at climax), with the exception of non-native plants.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not develop roads or trails unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Recreation

- Do not develop recreational sites or trails.

Silviculture

- No forest practices should be carried out other than those silviculture treatments and prescribed fire activities that fulfill the management objectives.

Management considerations (not mandatory)

Manage around WHAs in a manner that has the least effect on the vegetation, soils and hydrology within the WHA.

Landscape unit planning considerations (not mandatory)

Wildlife habitat areas will serve the dual purpose of providing over-representation of rare ecosystems in the portion of a landscape unit set aside for representation, and contributing to old forest retention objectives in a landscape unit, as recommended in the *Biodiversity Guidebook*. It is not necessary for every WHA to be part of the connecting fabric of a landscape unit, but every attempt should be made to connect WHAs with other reserved areas.

PONDEROSA PINE–BLACK COTTONWOOD–SNOWBERRY (*Pinus ponderosa–Populus balsamifera* ssp. *trichocarpa–Symphoricarpos albus*)

WHA planning objectives

Maintain 30% of the original extent of this plant community type in a natural state. In this context, "natural" means that the plant community has few non-native plants, has not been disturbed by human activity, and cycles freely through successional stages in response to natural disturbances such as flooding.

Wildlife habitat area

Thirty percent of the original extent of this community should be designated as WHAs, including all remaining occurrences. Since it is not likely that enough mature and old structural stage occurrences exist to meet the 30% objective, WHAs made up of younger community occurrences should be designated in order to make up the remainder of the 30%. WHAs should include the entire community occurrence and a 250 m buffer zone around the occurrence.

Preference should be given to sites in the following order:

- community occurrences that are relatively undamaged and can be expected to mature into healthy examples of this community
- community occurrences that could become part of an area used for connectivity at the landscape level
- community occurrences in areas where this plant community (at climax) is under-represented
- community occurrences that are adjacent to mature and old forest occurrences of another community.

GWM management objectives

Maintain WHAs in a natural state. In this context, "natural" means that the plant community has very few non-native plant species, has not been disturbed by human activity, and cycles freely through successional stages in response to natural disturbances such as flooding. The Ministry of Forests' plant association classification can be used as an approximation of the expected natural species composition of ecosystems (at climax), with the exception of non-native plants.

The natural hydrological regime of these WHAs is fundamental to their ecology, and should be maintained or restored to its natural state.

Prevent soil compacting and overgrazing.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not develop roads or trails unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Range

- Avoid grazing within WHAs by providing alternative water, forage and salt licks. If there is no other practicable option to avoid grazing, fencing may be required. Consult MELP for appropriate fencing arrangements.
- Do not seed WHAs with agricultural mixes unless the mix is entirely composed of species native to the area.

Recreation

- Do not develop recreational sites or trails.

Silviculture

- Do not conduct any forest practices.

Management considerations (not mandatory)

Efforts should be made to preserve and restore natural flood cycles that have historically maintained this community. Manage around WHAs in a manner that has the least effect on the vegetation, soils and hydrology within the WHA.

Landscape unit planning considerations (not mandatory)

Wildlife habitat areas will serve the dual purpose of providing over-representation of rare ecosystems in the portion of a landscape unit set aside for representation, and contributing to old forest retention objectives in a landscape unit, as recommended in the *Biodiversity Guidebook*. It is not necessary for every WHA to be part of the connecting fabric of a landscape unit, but every attempt should be made to connect WHAs with other reserved areas.

Cross references

Yellow-bellied racer, gopher snake, ferruginous hawk, Lewis’s woodpecker

PONDEROSA PINE–BLACK COTTONWOOD–NOOTKA ROSE–POISON IVY (*Pinus ponderosa–Populus balsamifera* ssp. *trichocarpa–Rhus radicans*)

WHA planning objectives

Maintain 30% of the original extent of this plant community type in a natural state. In this context, "natural" means that the plant community has few non-native plants, has not been disturbed by human activity, and cycles freely through successional stages in response to natural disturbances such as flooding.

Wildlife habitat area

Thirty percent of the original extent of this community should be designated as WHAs, including the following:

- all remaining community occurrences along the Okanagan and Similkameen rivers
- all mature and old structural stage community occurrences along other rivers or creeks in the BGxh1 and PPxh1 variants.

Since it is not likely that enough mature and old structural stage occurrences exist to meet the 30% objective, WHAs made up of younger community occurrences should be designated in order to make up the remainder of the 30%. WHAs should include the entire community occurrence and a 250 m buffer zone around the occurrence.

Preference should be given to sites in the following order:

- community occurrences that are relatively undamaged and can be expected to mature into healthy examples of this community
- community occurrences that could become part of an area used for connectivity at the landscape level
- community occurrences in areas where this plant community (at climax) is under-represented
- community occurrences that are adjacent to mature and old forest occurrences of another community.

GWM management objectives

Maintain WHAs in a natural state. In this context, "natural" means that the plant community has very few non-native plant species, has not been disturbed by human activity, and cycles freely through successional stages in response to natural disturbances such as flooding. The Ministry of Forests' plant association classification can be used as an approximation of the expected natural species composition of ecosystems (at climax), with the exception of non-native plants.

The natural hydrological regime of these WHAs is fundamental to their ecology, and should be maintained or restored to its natural state.

Prevent soil compacting and overgrazing.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not develop roads or trails unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Range

- Avoid grazing within WHAs by providing alternative water, forage and salt licks. If there is no other practicable option to avoid grazing, fencing may be required. Consult MELP for appropriate fencing arrangements.
- Do not seed WHAs with agricultural mixes unless the mix is entirely composed of species native to the area.

Recreation

- Do not develop recreational sites or trails.

Silviculture

- Do not conduct any forest practices.

Management considerations (not mandatory)

Efforts should be made to preserve and restore natural flood cycles that have historically maintained this community. Areas adjacent to a WHA should be managed in a manner that has the least effect on the vegetation, soils and hydrology within the WHA.

Landscape unit planning considerations (not mandatory)

Wildlife habitat areas will serve the dual purpose of providing over-representation of rare ecosystems in the portion of a landscape unit set aside for representation, and contributing to old forest retention objectives in a landscape unit, as recommended in the *Biodiversity Guidebook*. It is not necessary for every WHA to be part of the connecting fabric of a landscape unit, but every attempt should be made to connect WHAs with other reserved areas.

Cross references

Rubber boa, yellow-bellied racer, night snake, gopher snake, ferruginous hawk, Lewis’s woodpecker

WATER BIRCH–RED-OSIER DOGWOOD (*Betula occidentalis–Cornus stolonifera*)

WHA planning objectives

Maintain 30% of the original extent of this plant community type in a natural state. In this context, "natural" means that the plant community has few non-native plants, has not been disturbed by human activity, and cycles freely through successional stages in response to natural disturbances such as flooding.

Wildlife habitat area

Thirty percent of the original extent of this community should be designated as WHAs, including all remaining occurrences. WHAs should include the entire community occurrence and a 250 m buffer zone around the occurrence.

Preference should be given to sites in the following order:

- sites that contain remnants of this plant community and have the same physical characteristics as sites where this community currently exists
- sites in areas where this plant community type has been severely depleted
- sites that are adjacent to natural occurrences of this (or another) community
- sites that could become part of an area used for connectivity at the landscape level.

GWM management objectives

Maintain WHAs in a natural state. In this context, "natural" means that the plant community has very few non-native plant species, has not been disturbed by human activity, and cycles freely through successional stages in response to natural disturbances such as flooding. The Ministry of Forests' plant association classification can be used as an approximation of the expected natural species composition of ecosystems (at climax), with the exception of non-native plants.

The natural hydrological regime of these WHAs is fundamental to their ecology, and should be maintained or restored to its natural state.

Prevent soil compacting and overgrazing.

General wildlife measures

These measures must be applied within a WHA approved for the species.

Access

- Do not develop roads or trails unless the district manager and regional fish and wildlife manager are satisifed there is no other practicable option and the variance is approved by the district manager and regional fish and wildlife manager.

Range

- Avoid grazing within WHAs by providing alternative water, forage and salt licks. If there is no other practicable option to avoid grazing, fencing may be required. Consult MELP for appropriate fencing arrangements.
- Do not seed WHAs with agricultural mixes unless the mix is entirely composed of species native to the area.

Recreation

- Do not develop recreational sites or trails.

Silviculture

- Do not conduct any forest practices.

Management considerations (not mandatory)

Efforts should be made to preserve and restore natural flood cycles that have historically maintained this community. Manage around WHAs in a manner that has the least effect on the vegetation, soils and hydrology within the WHA.

Landscape unit planning considerations (not mandatory)

Wildlife habitat areas will serve the dual purpose of providing over-representation of rare ecosystems in the portion of a landscape unit set aside for representation, and contributing to old forest retention objectives in a landscape unit, as recommended in the *Biodiversity Guidebook*. It is not necessary for every WHA to be part of the connecting fabric of a landscape unit, but every attempt should be made to connect WHAs with other reserved areas.

Cross references

Rubber boa, yellow-bellied racer, gopher snake, yellow-breasted chat

Glossary

age class: Any interval into which the age ranges of trees, forests, stands or forest types is divided for classification and use; forest inventories commonly group trees into 20-year age class groups.

Biodiversity Guidebook: A Forest Practices Code guidebook that describes strategies for maintaining or restoring biodiversity.

biological diversity: The diversity of plants, animals and other living organisms in all their forms and levels of organization, including the diversity of genes, species, ecosystems, and the evolutionary and functional processes that link them.

blue-listed species: Taxa considered to be vulnerable in British Columbia. Vulnerable taxa are of special concern because of characteristics that make them particularly sensitive to human activities or natural events. Blue-listed taxa are at a lower level of risk than red-listed taxa.

coarse filter: An approach to protecting biological diversity which is habitat driven and relies on habitat representation and connectivity to maintain most species diversity and processes. This is usually used in conjunction with a fine filter approach.

coarse woody debris (CWD): Decaying wood, of a minimum diameter, on the forest floor that provides special micro-climates and breeding habitat for a wide variety of organisms. Size is variable, but larger size pieces are preferable as they provide the greatest longevity and potential for site productivity and wildlife use.

critical wildlife habitat: A feature or area occupied by a species that is recognized as being essential for the maintenance of the species.

diameter at breast height (dbh): A measurement taken at approximately 1.5 m (breast height) and used as the standard for describing the diameter of a tree.

ecosection: An area with minor physiographic and macroclimatic or oceanographic variation.

fine filter: An approach to conservation that works in conjunction with a coarse filter approach. The fine filter is species or site driven and is designated to protect those species and plant communities that are not protected by the ecosystem level measures of the coarse filter.

landscape unit: A planning area, generally up to about 100 000 ha in size, based on topographic or geographic features such as a watershed or series of watersheds.

large woody debris (LWD): Woody debris in a stream, lake or wetland setting, with a diameter of 10 cm or greater and a length of 2 m or greater. LWD is important in these habitats for streambank stability and fish cover.

limiting habitat: A habitat that is scarce relative to the demand for it.

noxious weeds: Any weed designated by the provincial *Weed Control Regulation* to be a noxious weed, including the seeds of the noxious weed. Typically, they are difficult to control and have significant impacts on agricultural production, forest regeneration and forage for livestock and wildlife. They also threaten the biodiversity of native plant communities.

pesticide: A micro-organism or substance that is represented, sold, used or intended to be used to prevent, destroy, repel or mitigate a pest (e.g., plant, insect, rodent) and includes: a) a plant growth regulator, plant defoliator or plant desiccant; b) a control product under the *Pest Control Products Act* (Canada), other than a device that is a control product; and c) a substance that is classified as a pesticide by regulation.

plant community: The plant community element, used by the Conservation Data Centre and this document, is based on the plant association concept (V.J. Krajina and students): an abstract unit based on sample plots of climax vegetation that possess similar vegetation structure and native species composition, and occur repeatedly on similar habitats.

potential natural community (PNC): The plant community that would be established by allowing succession to be completed without further human interference.

prescription: For the purposes of this document, a prescription is a set of detailed directions for managing habitat for Identified Wildlife.

properly functioning condition (PFC): The naturally occurring functioning of a habitat unit (from the *Riparian Management Area Guidebook*).

red-listed species: Taxa being considered for or already designated Extirpated, Endangered or Threatened. Extirpated taxa no longer exist in the wild in British Columbia, but occur elsewhere. Endangered taxa are facing imminent extirpation or extinction. Threatened taxa are likely to become endangered if limiting factors are not reversed.

regionally important wildlife: Native, regularly occurring taxa that are not considered at risk provincially, but are affected by forest practices (includes range practices) and require specific habitat management in order to maintain regional populations.

riparian habitat: The area adjacent to a watercourse, lake, swamp or spring that is influenced by the availability of water and is generally critical for wildlife cover, fish food organisms and stream nutrients.

Riparian Management Area Guidebook: A guidebook that addresses the establishment of Riparian Management Areas (RMAs) under the Forest Practices Code.

seral stages: The stages of ecological succession of a plant community (e.g., from young stage to old stage). The characteristic sequence of biotic communities that successively occupy and replace each other by which some components of the physical environment become altered over time.

structural stage: Structural stage describes the existing dominant stand appearance or physiognomy for a land area. Factors such as disturbance history, stand age, species composition and chance all influence structural stage. Structural stages range from non-vegetated to old forests.

wildlife tree (WT): A tree or group of trees that are identified in an operational plan to provide present or future wildlife habitat. Generally, a standing live or dead tree with special characteristics that provide valuable habitat for the conservation or enhancement of wildlife. Characteristics include large diameter and height for the site, current use by wildlife, declining or dead condition, value as a species, valuable location and relative scarcity.

wildlife tree patch (WTP): An area specifically identified for the retention and recruitment of suitable wildlife trees. It can contain a single wildlife tree or many.