

MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS INFORMATION NOTE

Date: April 29, 2014
CLIFF/tracking #: 206326

PREPARED FOR: Minister Steve Thomson, Ministry of Forests, Lands and Natural Resource Operations

ISSUE: Update on the transition of fish, wildlife and parks permitting responsibilities to FrontCounter BC.

BACKGROUND:

As part of meeting the Minister's mandate letter commitments number 6 and 12 to streamline permitting and reduce turnaround times, in March 2014, FLNRO announced a change to the responsibilities for the processing of fish, wildlife and park use permit applications. On April 1, 2014, the transition of these responsibilities from the Permit and Authorization Service Bureau (PASB) to FrontCounter BC was initiated. After April 1st, 2014, all new fish, wildlife and park use permit applications are being received and processed by FrontCounter BC offices. This transition is supported by the stakeholder groups who have been asking for enhanced local services.

DISCUSSION:

s.13

s.13

NEXT STEPS:

s.13

Contact:

*Rick Manwaring
Assistant Deputy Minister
South Area, FrontCounter BC and Range
(250) 828-4449*

Prepared by:

*Jamie Jeffreys
A/Director
FrontCounter BC
(250) 828-4417*

Reviewed by	Initials	Date
DM		
ADM - Reg.Ops, South	RM	May 6/14
A/ Director, FCBC	JJ	May 5/14

MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS

INFORMATION NOTE

Date: May 20, 2014

Date of previous note:

File:280-20

CLIFF/tracking #: 206702

PREPARED FOR: Honourable Steve Thomson, Minister of Forests Lands and Natural Resource Operations

ISSUE: Forestry Elements of a Strategic Response to Declining Caribou Populations in northeast BC

BACKGROUND:

- Boreal caribou were listed as threatened on Schedule 1 of the Federal *Species at Risk Act* (SARA) in 2003.
- There are six herds of boreal caribou in the northeast BC. Five of them are located within the Fort Nelson TSA and the sixth is located within the adjacent Fort St. John TSA. Some of the populations are trans boundary, meaning that they roam back and forth through adjacent jurisdictions (North West Territories and Alberta). The proposal in this paper is discreet to the area of the Fort Nelson TSA because there are no forest operations in the area at this time.
- In spite of the province's efforts and commitments over the last four years to support boreal caribou as per the province's boreal caribou implementation plan (BCIP), in 2012 the federal government released a pan Canadian recovery strategy entitled "Recovery Strategy for the Woodland Caribou, Boreal population (*Rangifer tarandus caribou*) in Canada".
- The federal strategy is not consistent with the BCIP. It proposes more habitat management actions and therefore strikes a different balance and weighting of risks than the province intended with its strategy.
- Under SARA, critical habitat is defined as "the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species".
- This recovery strategy identifies a minimum of 65% undisturbed habitat in a range as the disturbance management threshold, which provides a measurable probability (60%) for a local population to be self-sustaining.
- In ranges with less than 65% undisturbed habitat, initially, critical habitat is the existing habitat that over time would contribute to the attainment of 65% undisturbed habitat. This is the situation in BC and Alberta and this is the key driver of additional impact arising from the federal plan.
- Of critical note is that following the release of the federal plan; further research and population assessment work conducted in BC has noted a further, very significant, 25% decline in BC (and Alberta) boreal caribou populations over the last year. This information was released on May 15, 2014. It is noted that this decline may be

independent of factors that explain longer term declining trends and this is currently being investigated.

- Although much analysis work is ongoing, it is well understood that the objectives and requirements outlined in the current federal recovery plan (plus any future federal actions in response to population declines) will substantially constrain resource development activities, including petroleum and natural gas (PNG)/liquid natural gas (LNG) exploration and development if an acceptable, alternative cannot be found.
- Completing the ongoing modelling and assessment will help to answer key questions that arise from the strategic considerations and options that are referenced in this note.
- Given the inconsistency between the federal strategy and the BCIP, and the recent decline in the boreal population, it is timely and important for the province to reconsider its approach to managing boreal caribou and their habitat under the BCIP.

s.12,s.13

DISCUSSION:

s.13

Page 05

Withheld pursuant to/removed as

s.12;s.16;s.13

Page 06 to/à Page 08

Withheld pursuant to/removed as

s.13

Page 09

Withheld pursuant to/removed as

s.12;s.16;s.13

CONCLUSION:

s.13

Contact:

*ADM: Tom Ethier
Resource Stewardship Div.
Phone: 250-356-0972*

Alternate Contact:

*Chris Pasztor
Resource Mgmt Objectives Branch
Phone:250-356-7905*

Prepared by:

*Larry Pedersen
Phone:250-213-9902*

Reviewed by	Initials	Date
DM		
DMO		
ADM	TE	May 20, 2014
Dir./Mgr.		
Author	CP	May 20, 2014

**MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS
INFORMATION NOTE**

Date: August 29, 2014
Date of previous note: August 8, 2012
File: 280-20
CLIFF: 208886

PREPARED FOR: Honourable Steve Thomson, Minister of Forests, Lands and Natural Resource Operations

ISSUE: Federal Northern Goshawk Recovery Strategy and BC's Management Response

BACKGROUND:

The Northern Goshawk *laingi* subspecies (Goshawk) occurs in coastal forests of British Columbia, Alaska and Washington. The Canadian population was assessed as "Threatened" and listed under the federal *Species at Risk Act* (SARA) in 2003. A draft BC Recovery Strategy was posted on the provincial recovery planning website in 2008 and a provincial management plan with recommended actions was posted in 2013.

Parks Canada released a draft Goshawk Recovery Strategy for stakeholder review in 2012. SARA requires the federal Minister to identify critical habitat in a recovery strategy to "the extent possible, based on the best available information." The draft strategy for Goshawk was criticized by the forest industry for its high potential impacts. Significant revisions have been made to the draft strategy to address the forest industry's concerns. MFLNRO and MOE have consulted with Parks Canada on the proposed revisions. Parks Canada intends to release a revised federal recovery strategy for a 60-day public review period in late September 2014.

DISCUSSION:

The province has been promoting a "Made in BC" approach for species at risk management and is drafting a provincial Northern Goshawk Implementation Plan in anticipation of the federal Recovery Strategy. A cabinet-level decision will be required to set provincial management targets within the Implementation Plan, essentially translating the recommendations from the 2013 Management Plan and considering the federal Recovery Strategy into a government commitment to the management of this species' habitat.

The federal strategy will likely identify critical habitat polygons that include a significant amount of coastal forest. Once identified, critical habitat must be legally protected on federal lands or effectively protected on provincial lands. The federal strategy will also set a population objective for Goshawks across the subspecies range (Haida Gwaii, North Coast, South Coast, and Vancouver Island).

Significant gaps are anticipated between the critical habitat proposed by the federal government and existing provincial protection measures. SARA does not provide the discretion to consider

socio-economic factors in the recovery strategy at this stage. MOE and FLNRO, in cooperation with forest licensees and Private Managed Forest Land holders, have been conducting analyses to determine the socio-economic impact of managing different levels of Goshawk habitat retention.

Management of Goshawk habitat is complex, involving retention of breeding areas around nest sites and management of foraging habitat over a broader area. The province is engaging species experts to assist in preparing its response to the federal Recovery Strategy and our revised Implementation Plan; however, species experts have not reached consensus on the level of risk appropriate when managing for the persistence of the species or how breeding and foraging habitat should be managed.

Once the federal Recover Strategy is approved, the federal Minister must report every six months on steps being taken to protect the habitat if s/he is not satisfied that critical habitat on provincial lands is effectively protected. If the habitat remains unprotected, the federal Minister must recommend to the Governor in Council that an order be made applying the SARA prohibitions against destruction of critical habitat to provincial lands (a safety net order) with potentially significant socio-economic implications for the province.

A provincial team has been established to develop a decision-support package for the revised Implementation Plan that will outline the current scientific understanding of Goshawk habitat requirements, the different options for management based on varying levels of risk/ precaution and the potential socio-economic impacts of each option. This package is targeted for completion in October 2014.

NEXT STEPS:

- Conduct analysis of federal recovery strategy when available. Continue development of provincial decision package in support of an Implementation Plan with population objectives and management approaches.
- Continue liaison with forest sector to inform development of a "Made in BC" approach.
- Work with GCPE to prepare response to public release of federal Recovery Strategy

Attachments: 2013 Northern Goshawk Management Plan 189678 Briefing Note

Contact:
Tom Ethier, ADM
Resource Stewardship
250 356-0972

Alternate Contact:
Allan Lidstone, Director
Resource Management Objectives
250 356 6255

Prepared by:
Steve Gordon, Manager
Resource Management Objectives
250 751 7126

Reviewed by	Initials	Date
DM	DS	14.09.10
DMO		
ADM	TE	sep 9/14
PRGM Dir./Mgr.	AL	

Management Plan for the Northern Goshawk, *laingi* subspecies (*Accipiter gentilis laingi*) in British Columbia



Prepared by the Ministry of Forests, Lands, and Natural Resource Operations
and Ministry of Environment

June 2013



**Management Plan for the Northern Goshawk, *laingi*
subspecies (*Accipiter gentilis laingi*)
in British Columbia**

**Prepared by the Ministry of Forests, Lands, and Natural Resource Operations
and Ministry of Environment**

June 2013

Recommended citation

Ministry of Forests, Lands, and Natural Resource Operations and Ministry of Environment. 2013. Management plan for the Northern Goshawk, *laingi* subspecies (*Accipiter gentilis laingi*) in British Columbia. B.C. Ministry of Forests, Lands, and Natural Resource Operations and B.C. Ministry of Environment, Victoria, BC. 30 pp.

Cover photograph

Adult Northern Goshawk on a nest in the Cowichan Lake area of Vancouver Island. Photograph by Rory Hill, 2010.

Additional copies

Additional copies can be downloaded from the B.C. Ministry of Environment Recovery Planning webpage at:

<<http://www.env.gov.bc.ca/wld/recoveryplans/rcvry1.htm>>

Publication information

Library and Archives Canada Cataloguing in Publication

Management plan for the northern goshawk, *laingi* subspecies (*Accipiter gentilis laingi*) in British Columbia [electronic resource] / prepared by Ministry of Forests, Lands, and Natural Resource Operations and Ministry of Environment.

Includes bibliographical references.
Electronic monograph in PDF format.
Co-published by: B.C. Ministry of Environment.
ISBN 978-0-7726-6705-2

1. Goshawk--Conservation--British Columbia. 2. Goshawk--British Columbia. I. British Columbia. Ministry of Environment II. British Columbia. Ministry of Forests, Lands and Natural Resource Operations

QL696.F32 M36 2013

333.95'8944

Disclaimer

This plan was developed jointly by the Ministry of Environment, the agency responsible for species at risk policy and planning in British Columbia, and the Ministry of Forests, Lands and Natural Resource Operations, the agency charged with leading implementation activities for the management of Northern Goshawk, *laingi* subspecies.

This document identifies ongoing and recommended actions that are deemed necessary, based on the best available scientific information, to manage Northern Goshawk, *laingi* subspecies populations in British Columbia. Actions to achieve the goals and objectives identified herein are subject to the priorities and budgetary constraints of participatory agencies and organizations. These goals, objectives, and recovery approaches may be modified in the future to accommodate new objectives and findings.

Success in the management of this species depends on the commitment and cooperation of many different constituencies that may be involved in implementing the directions set out in this plan. The Province of British Columbia encourages all Canadians to participate in the conservation of the Northern Goshawk, *laingi* subspecies.

ACKNOWLEDGEMENTS

Steve Gordon (B.C. Ministry of Forests, Lands and Natural Resource Operations) and Leah Westereng (B.C. Ministry of Environment) compiled this document.

Tom Ethier, Craig Sutherland (B.C. Ministry of Forests, Lands and Natural Resource Operations), and Mark Zacharias (B.C. Ministry of Environment) provided guidance and oversight during the development and review of this plan.

Janice Anderson, Larry Barr, Scott Barret, Paul Bavis, Bob Craven, John Deal, Ron Diederichs, Dave Donald, Sharon Hadway, Jared Hobbs, Rick Jeffery, Les Kiss, Dave Lindsay, Heather MacKnight, Todd Manning, Dave Marquis, Erica McClaren, Kari Nelson, Chris Pasztor, Chris Ritchie, Jennifer Psyllakis, James Quayle, Louise Waterhouse, Kym Welstead, and Berry Wijdeven provided review comments.

Scott Allen, John Deal, Dave Donald, Christine Fletcher, Peter Kofoed, Atmo Prasad, Tim Salkeld, Dan Sirk, and John Sunde provided GIS and analytical assistance in support of the plan.

Linda Sinclair assisted the Northern Goshawk *Accipiter gentilis laingi* Recovery Team to produce range maps, which were modified for this report.

Many members of the Northern Goshawk *Accipiter gentilis laingi* Recovery Team (Carita Bergman, John Deal, Frank Doyle, Todd Mahon, Dave Marquis, Erica McClaren, Sean Muise, Nick Reynolds, Ross Vennesland, and Berry Wijdeven) provided input to the threats assessment. Doug Steventon provided technical information regarding population viability to inform the threats assessment and Dave Fraser led completion of the threats assessment to IUCN standards.

EXECUTIVE SUMMARY

The Northern Goshawk, *laingi* subspecies (*Accipiter gentilis laingi*) is a raven-sized predatory bird with short, rounded wings and a long tail. It is the largest accipiter in North America and nests in various forest types. Its nest site is typically in a large tree and is usually surrounded by mature forest types. It prefers to forage in forests that provide prey and hunting opportunities typically found in mature and old forests. It was designated as Threatened by the Committee on the Status of Endangered Wildlife in Canada. As a result, this subspecies was listed as Threatened in Canada on Schedule 1 of the *Species at Risk Act* (SARA). In British Columbia, Northern Goshawk, *laingi* subspecies is ranked S2B (imperiled) by the Conservation Data Centre and is on the provincial Red list.

The B.C. Conservation Framework ranks Northern Goshawk, *laingi* subspecies as a priority 1 species under goal 1 (contribute to global efforts for species and ecosystem conservation) and goal 3 (maintain the diversity of native species and ecosystems). It is protected from capture and killing, under the B.C. *Wildlife Act*. It is also listed as a species which requires special management attention to address the impacts of forest and range activities under the *Forest and Range Practices Act* (FRPA) and/or the impacts of oil and gas activities under the *Oil and Gas Activities Act* (OGAA) on crown land (as described in the Identified Wildlife Management Strategy).

There are currently 162 known Northern Goshawk, *laingi* territories (360 known nests; Northern Goshawk, *laingi* subspecies may build multiple nests within each territory) across the four conservation regions in British Columbia (18 territories in Haida Gwaii, 20 territories in North Coast, 25 territories in South Coast, and 99 territories in Vancouver Island). Based on recent modelling results, there is currently suitable habitat to support an estimated 682–764 potential Northern Goshawk, *laingi* territories within the four conservation regions in British Columbia if a forage supply threshold of 40% of suitable forage habitat within a territory is applied.

The most imminent threats to populations of Northern Goshawk, *laingi* subspecies within British Columbia are roads and forest harvesting that result in loss and fragmentation of nesting and foraging habitats. Ecosystem modification and subsequent reductions in prey diversity and abundance in Haida Gwaii due to introduced Black-tailed Deer (*Odocoileus hemionus columbianus*) are also a concern.

The following long-term recovery goal identified by the Northern Goshawk *Accipiter gentilis laingi* Recovery Team (2008) will guide management efforts within the province:

To ensure viable populations of Northern Goshawk, *laingi* subspecies persist in each conservation region in coastal British Columbia.

This management plan is informed by the objectives outlined in the 2008 B.C. Recovery Strategy:

1. To manage and, where necessary, conserve and recover habitat that meets the needs of Northern Goshawk, *laingi* subspecies through its annual cycle.

2. To conserve and, where necessary, recover a well-distributed and viable population of Northern Goshawk, *laingi* subspecies within coastal B.C.

The objectives of this management plan are intended to support conservation and ongoing recovery efforts for the Northern Goshawk, *laingi* subspecies while providing continued resource development opportunities.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	III
EXECUTIVE SUMMARY	IV
1 SCOPE OF THE PLAN	1
2 COSEWIC* SPECIES ASSESSMENT INFORMATION.....	1
3 SPECIES STATUS INFORMATION.....	2
4 SPECIES INFORMATION.....	2
4.1 Species Description.....	2
4.2 Populations and Distribution.....	3
5 THREATS.....	5
5.1.1 Threat Assessment	6
5.1.2 Description of Threats	8
6 CURRENT MANAGEMENT FRAMEWORK	9
6.1 Habitat Protection Measures and Management	9
6.1.1 Habitat Protection Tools on Crown Land.....	9
6.1.2 Guidance and Best Management Practices	10
6.1.3 Private Land Stewardship	11
6.2 Existing Habitat Protection Relative to Suitable Habitat	11
6.2.1 Suitable Habitat Analysis.....	11
6.2.2 Habitat Protection Analysis	13
6.3 Population Analysis	15
7 MANAGEMENT GOAL AND OBJECTIVES.....	16
7.1 Population and Distribution Goal	16
7.2 Objectives.....	16
8 APPROACHES TO MEET OBJECTIVES	17
8.1 Actions and Performance Measures	17
8.2 Narrative to Support Management Actions Table.....	21
8.2.1 Improving Scientific Information	21
8.2.2 Habitat Protection on Crown Land	21
8.2.3 Management of Forests	22
8.2.4 Monitoring.....	23
9 SOCIO-ECONOMIC IMPLICATIONS.....	23
10 REFERENCES.....	24
APPENDIX 1. HABITAT SUITABILITY MODEL OUTPUTS AND PROTECTION DATA	29

LIST OF TABLES

Table 1. Threat classification table for Northern Goshawk, <i>laingi</i> subspecies.	6
Table 2. Northern Goshawk, <i>laingi</i> breeding and foraging habitat protected or managed through Wildlife Habitat Area designations and General Wildlife Measures as of September 2012.	10
Table 3. Estimated number of potential Northern Goshawk, <i>laingi</i> subspecies territories based on current suitable habitat by conservation region using a 20% forage supply threshold (Smith 2012).	12
Table 4. Estimated number of potential Northern Goshawk, <i>laingi</i> subspecies territories based on current suitable habitat by conservation region using a 40% forage supply threshold (Smith 2012).	12
Table 5. Estimated number of potential Northern Goshawk, <i>laingi</i> subspecies territories based on current suitable habitat by conservation region using a 60% forage supply threshold (Smith 2012).	13
Table 6. Percent of total suitable Northern Goshawk, <i>laingi</i> subspecies nesting and foraging habitat currently protected by conservation region. ^a	14
Table 7. Amount of modelled moderate or high suitability Northern Goshawk, <i>laingi</i> subspecies nesting habitat currently protected within a 200-ha buffer area around all known nests (n = 346) a in all conservation regions. ^b	14
Table 8. Amount of modelled moderate or high suitability Northern Goshawk, <i>laingi</i> subspecies foraging habitat currently protected in all conservation regions. ^a	14
Table 9. Ongoing and recommended management actions for Northern Goshawk, <i>laingi</i> subspecies in British Columbia.	17

LIST OF FIGURES

Figure 1. Range map for Northern Goshawk, <i>laingi</i> subspecies showing the four conservation regions in British Columbia (adapted from the Northern Goshawk <i>Accipiter gentilis laingi</i> Recovery Team 2008).	4
Figure 2. Expected value of quasi-extinction probability, and its uncertainty, for varying number of potential territories, at 200-year time horizon (from Steventon 2012).	15

1 SCOPE OF THE PLAN

This plan is limited to the Northern Goshawk, *laingi* subspecies (*Accipiter gentilis laingi*) found in British Columbia (B.C.). Only basic species information is presented in this document. Please refer to the Recovery Strategy for the Northern Goshawk, *laingi* subspecies (*Accipiter gentilis laingi*) in British Columbia (hereafter “B.C. Recovery Strategy”; Northern Goshawk *Accipiter gentilis laingi* Recovery Team 2008) for more complete information about Northern Goshawk, *laingi* subspecies in British Columbia. This plan includes an updated threat assessment for Northern Goshawk, *laingi* subspecies as well as outlines B.C.’s current management framework and recommended actions to support ongoing conservation efforts for the Northern Goshawk, *laingi* subspecies.

2 COSEWIC* SPECIES ASSESSMENT INFORMATION¹

<p>Date of Assessment: November 2000</p> <p>Common Name: Northern Goshawk, <i>laingi</i> subspecies</p> <p>Scientific Name: <i>Accipiter gentilis laingi</i></p> <p>Status: Threatened</p> <p>Reason for Designation: This small, sedentary goshawk population has been negatively impacted by degradation of forested habitat.</p> <p>Last Examination and Change: November 2000 up-listed from Special Concern to Threatened</p> <p>Canadian Occurrence: British Columbia</p> <p>Status History: Designated Special Concern in April 1995. Status re-examined and designated Threatened in November 2000. Last assessment based on an updated status report.</p>
--

* Committee on the Status of Endangered Wildlife in Canada.

¹ Review of the COSEWIC designation of Northern Goshawk, *laingi* subspecies is expected to be re-assessed in April 2013.

3 SPECIES STATUS INFORMATION

Northern Goshawk, <i>laingi</i> subspecies ^a		
Legal Designation:		
FRPA: Species at Risk ^b (2004)	B.C. <i>Wildlife Act</i> : Schedule A ^c	SARA Schedule: 1–Threatened (2003)
OGAA: Species at Risk ^b (2004)		
Conservation Status^d		
B.C. List: Red	B.C. Rank: S2B (2010)	National Rank: N2 (2011)
		Global Rank: G5T2 (2008)
Other Subnational Ranks: ^e Alaska: S2		
B.C. Conservation Framework (CF)^f		
Goal 1: Contribute to global efforts for species and ecosystem conservation.		Priority: ^g 1 (2009)
Goal 2: Prevent species and ecosystems from becoming at risk.		Priority: 6 (2009)
Goal 3: Maintain the diversity of native species and ecosystems.		Priority: 1 (2009)

^a Data source: B.C. Conservation Data Centre (2012a) unless otherwise noted.

^b Species at Risk = a category of wildlife which require special management attention to address the impacts of forest and range activities on Crown land under the FRPA (Province of British Columbia 2002) and/or the OGAA (Province of British Columbia 2008a) as described in the Identified Wildlife Management Strategy (Province of British Columbia 2004).

^c Schedule A = designated as wildlife under the B.C. *Wildlife Act*, which offers it protection from direct persecution and mortality (Province of British Columbia 1982).

^d S = subnational; N = national; G = global; T = refers to the subspecies level; B = breeding; X = presumed extirpated; H = possibly extirpated; 1 = critically imperiled; 2 = imperiled; 3 = special concern, vulnerable to extirpation or extinction; 4 = apparently secure; 5 = demonstrably widespread, abundant, and secure; NA = not applicable; NR = unranked; U = unrankable. U.S. data from NatureServe (2012).

^e Data source: NatureServe (2012).

^f Data source: Ministry of Environment (2010).

^g Six-level scale: Priority 1 (highest priority) through to Priority 6 (lowest priority).

4 SPECIES INFORMATION

4.1 Species Description

The Northern Goshawk is the largest accipiter hawk in B.C., although the size varies widely between genders and between populations. Two subspecies, *A. gentilis laingi* and *A. gentilis atricapillus*, are recognized in B.C.

Discussion continues regarding the delineation of these subspecies' boundaries and current and future work will likely inform issues regarding conservation units for this species. Existing information, including recent unpublished genetic and morphological information, has resulted in a recommendation from the COSEWIC bird species specialists subcommittee members to retain the boundaries as shown in the B.C. Recovery Strategy (Northern Goshawk *Accipiter gentilis laingi* Recovery Team 2008), which includes Vancouver Island and the Mainland Coast as part of the Northern Goshawk, *laingi* subspecies distribution (D. Fraser, pers. comm., 2012). A review of the subspecies designation by COSEWIC is expected in April 2013.

The breeding home range or territory of Northern Goshawk, *laingi* subspecies is currently regarded as two areas: one or more breeding areas and a surrounding foraging area (McClaren *et al.* 2005; Stuart-Smith *et al.* 2012). The breeding area can include multiple nest trees, roost trees,

and prey plucking posts (often referred to as the “nesting area”), and a surrounding “post-fledging area” where fledglings spend time after leaving the nest but before they become independent (Reynolds *et al.* 1992). The larger foraging area makes up most of the territory, and is where the adults hunt (Squires and Reynolds 1997).

4.2 Populations and Distribution

In B.C., the Northern Goshawk, *laingi* subspecies inhabits Haida Gwaii, Vancouver Island, the coastal islands, and the coastal mainland west of the Coast Mountains (Campbell *et al.* 1990; COSEWIC 2000; McClaren 2005; Northern Goshawk *Accipiter gentilis laingi* Recovery Team 2008). The range of the *laingi* subspecies is thought to follow the distribution of the Coastal Western Hemlock and Coastal Douglas-fir biogeoclimatic zones (Green and Klinka 1994). Four conservation regions are currently recognized for Northern Goshawk, *laingi* subspecies in coastal B.C.: Haida Gwaii (HG), North Coast (NC), South Coast (SC), and Vancouver Island (VI) (Northern Goshawk *Accipiter gentilis laingi* Recovery Team 2008). There are currently 162 known Northern Goshawk, *laingi* territories across the four conservation regions (HG = 18; NC = 20; SC = 25; and VI = 99). Within these territories, there are currently 360 known nests (Northern Goshawk, *laingi* may build multiple nests within each territory) across all conservation regions in B.C. (B.C. Conservation Data Centre 2012b).

Range boundaries for Northern Goshawk, *laingi* subspecies are imprecise and may be revised as the genetics of this subspecies is reviewed; therefore, the exact percentage of the global population distribution within Canada is unknown (Talbot 2006; USFWS 2007; Bayard de Volo 2008; Talbot *et al.* 2011; Sonsthagen *et al.* 2012). Using the 2008 Northern Goshawk, *laingi* subspecies range map (Figure 1), it is estimated that approximately 50–60% of the total range occurs within Canada and 100% of Canada’s distribution of this subspecies is within B.C. (Northern Goshawk *Accipiter gentilis laingi* Recovery Team 2008).

Limited information on global, national, and regional population sizes and trends for Northern Goshawk, *laingi* subspecies exist due to difficulties in assessing productivity, survival, and recruitment.

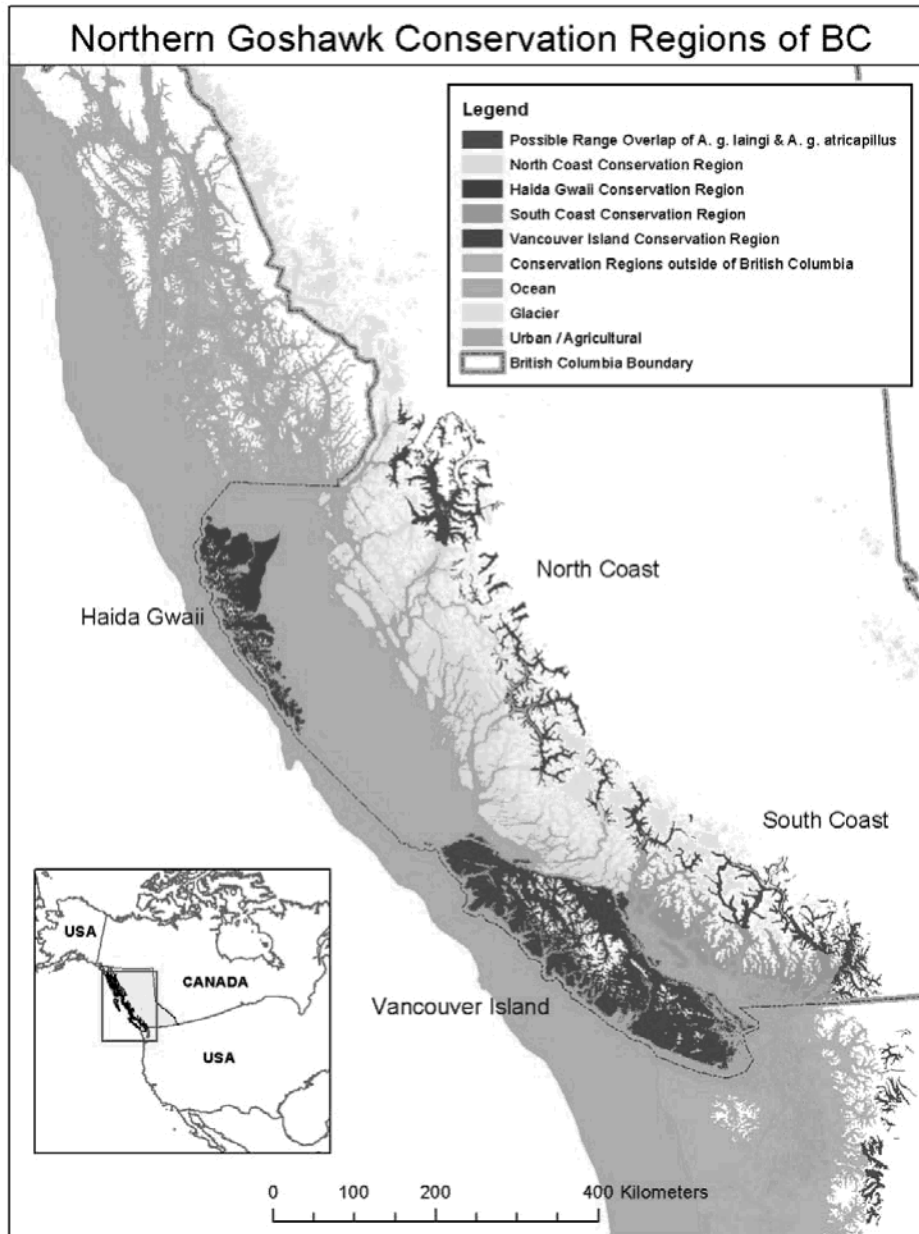


Figure 1. Range map for Northern Goshawk, *laingi* subspecies showing the four conservation regions in British Columbia (adapted from the Northern Goshawk *Accipiter gentilis laingi* Recovery Team 2008).

5 THREATS

Threats are defined as the proximate activities or processes that have caused, are causing, or may cause in the future the destruction, degradation, and/or impairment of the entity being assessed (population, species, community, or ecosystem) in the area of interest (global, national, or subnational) (Salafsky *et al.* 2008). For purposes of threat assessment, only present and future threats are considered.² Threats presented here do not include biological features of the species or population such as inbreeding depression, small population size, and genetic isolation; or the likelihood of regeneration or recolonization for ecosystems, which are considered limiting factors.³

For the most part, threats are related to human activities, but they can be natural. The impact of human activity may be direct (e.g., destruction of habitat) or indirect (e.g., invasive species introduction). Effects of natural phenomena (e.g., fire, hurricane, flooding) may be especially important when the species or ecosystem is concentrated in one location or has few occurrences, which may be a result of human activity (Master *et al.* 2009). As such, natural phenomena are included in the definition of a threat, though should be applied cautiously. These stochastic events should only be considered a threat if a species or habitat is damaged from other threats and has lost its resilience, and is thus vulnerable to the disturbance (Salafsky *et al.* 2008) so that this type of event would have a disproportionately large effect on the population/ecosystem, compared to the effect they would have had historically.

² Past threats may be recorded but are not used in the calculation of Threat Impact. Effects of past threats (if not continuing) are taken into consideration when determining long-term and/or short-term trend factors (Master *et al.* 2009).

³ It is important to distinguish between limiting factors and threats. Limiting factors are generally not human induced and include characteristics that make the species or ecosystem less likely to respond to recovery/conservation efforts.

5.1.1 Threat Assessment

The threat classification below is based on the IUCN-CMP (World Conservation Union–Conservation Measures Partnership) unified threats classification system and is consistent with methods used by the B.C. Conservation Data Centre and the B.C. Conservation Framework. For a detailed description of the threat classification system, see the [CMP website](#) (CMP 2010). Threats may be observed, inferred, or projected to occur in the near term (< 10 years or 3 generations). Threats are characterized here in terms of scope, severity, and timing. Threat “impact” is calculated from scope and severity. For information on how the values are assigned, see [Master *et al.* \(2009\)](#) and table footnotes for details. Threats for the Northern Goshawk, *laingi* subspecies were assessed for the entire province (Table 1).

Table 1. Threat classification table for Northern Goshawk, *laingi* subspecies.

Threat #	Threat description	Impact ^a	Scope ^b	Severity ^c	Timing ^d
1	Residential & commercial development	Negligible	Negligible (< 1%)	Extreme (71–100%)	High
1.1	Housing & urban areas	Negligible	Negligible (< 1%)	Extreme (71–100%)	High
1.2	Commercial & industrial areas	Negligible	Negligible (< 1%)	Extreme (71–100%)	High
1.3	Tourism & recreation areas	Negligible	Negligible (< 1%)	Moderate - Slight (1–30%)	High
2	Agriculture & aquaculture	Negligible	Negligible (< 1%)	Extreme (71–100%)	High
2.1	Annual & perennial non-timber crops	Negligible	Negligible (< 1%)	Extreme (71–100%)	High
2.2	Wood & pulp plantations	Negligible	Negligible (< 1%)	Extreme (71–100%)	High
2.3	Livestock farming & ranching	Negligible	Negligible (< 1%)	Negligible (< 1%)	High
3	Energy production & mining	Negligible	Negligible (< 1%)	Extreme (71–100%)	High
3.2	Mining & quarrying	Negligible	Negligible (< 1%)	Extreme (71–100%)	High
3.3	Renewable energy	Negligible	Negligible (< 1%)	Unknown	High
4	Transportation & service corridors	Low	Slight (1–10%)	Slight (1–10%)	High
4.1	Roads & railroads	Low	Small (1–10%)	Slight (1–10%)	High
4.2	Utility & service lines	Negligible	Negligible (< 1%)	Unknown	High
4.4	Flight paths	Negligible	Negligible (< 1%)	Unknown	High
5	Biological resource use	Low	Small (1–10%)	Serious - Moderate (11–70%)	High
5.1	Hunting & collecting terrestrial animals	Negligible	Negligible (< 1%)	Extreme (71–100%)	High
5.2	Gathering terrestrial plants	Negligible	Negligible (< 1%)	Negligible (< 1%)	High
5.3	Logging & wood harvesting	Low	Small (1–10%)	Serious - Moderate (11–70%)	High

Threat #	Threat description	Impact ^a	Scope ^b	Severity ^c	Timing ^d
6	Human intrusions & disturbance	Negligible	Negligible (< 1%)	Negligible (< 1%)	High
6.1	Recreational activities	Negligible	Negligible (< 1%)	Negligible (< 1%)	High
7	Natural system modifications	Low	Small (1–10%)	Serious (31–70%)	High
7.1	Fire & fire suppression	Negligible	Negligible (< 1%)	Extreme (71–100%)	High
7.3	Other ecosystem modifications	Low	Small (1–10%)	Serious (31–70%)	High
8	Invasive & other problematic species & genes	Negligible	Negligible (< 1%)	Slight (1–10%)	High
8.1	Invasive non-native/alien species	Negligible	Negligible (< 1%)	Slight (1–10%)	High
10	Geological events	Negligible	Negligible (< 1%)	Extreme (71–100%)	Moderate
10.2	Earthquakes/tsunamis	Negligible	Negligible (< 1%)	Extreme (71–100%)	Moderate
10.3	Avalanches/landslides	Negligible	Negligible (< 1%)	Serious (31–70%)	High
11	Climate change & severe weather	Negligible	Negligible (< 1%)	Slight (1–10%)	High
11.1	Habitat shifting & alteration	Negligible	Negligible (< 1%)	Negligible (< 1%)	High
11.3	Temperature extremes	Negligible	Negligible (< 1%)	Slight (1–10%)	High
11.4	Storms & flooding	Unknown	Pervasive (71–100%)	Unknown	High

^a **Impact** – The degree to which a species is observed, inferred, or suspected to be directly or indirectly threatened in the area of interest. The impact of each threat is based on Severity and Scope rating and considers only present and future threats. Threat impact reflects a reduction of a species population or decline/degradation of the area of an ecosystem. The median rate of population reduction or area decline for each combination of scope and severity corresponds to the following classes of threat impact: Very High (75% declines), High (40%), Medium (15%), and Low (3%). Unknown: used when impact cannot be determined (e.g., if values for either scope or severity are unknown); Not Calculated: impact not calculated as threat is outside the assessment timeframe (e.g., timing is insignificant/negligible or low as threat is only considered to be in the past); Negligible: when scope or severity is negligible; Not a Threat: when severity is scored as neutral or potential benefit.

^b **Scope** – Proportion of the species that can reasonably be expected to be affected by the threat within 10 years. Usually measured as a proportion of the species' population in the area of interest. (Pervasive = 71–100%; Large = 31–70%; Restricted = 11–30%; Small = 1–10%; Negligible < 1%).

^c **Severity** – Within the scope, the level of damage to the species from the threat that can reasonably be expected to be affected by the threat within a 10-year or 3-generation timeframe. Usually measured as the degree of reduction of the species' population. (Extreme = 71–100%; Serious = 31–70%; Moderate = 11–30%; Slight = 1–10%; Negligible < 1%; Neutral or Potential Benefit ≥ 0%).

^d **Timing** – High = continuing; Moderate = only in the future (could happen in the short term [< 10 years or 3 generations]) or now suspended (could come back in the short term); Low = only in the future (could happen in the long term) or now suspended (could come back in the long term); Insignificant/Negligible = only in the past and unlikely to return, or no direct effect but limiting.

5.1.2 Description of Threats

The overall province-wide Threat Impact for this species is Low.⁴ It is acknowledged that some threats are interrelated and compounding (Table 1) and although the overall threat is low, the small population present in B.C. continues to face steady habitat loss. Details are discussed below under the Threat Level 1 headings.⁵

IUCN-CMP Threat 4. Transportation and service corridors

New development on southern and northern Vancouver Island as well as Haida Gwaii continues to affect Northern Goshawk, *laingi* subspecies habitat.

IUCN-CMP Threat 5. Biological resource use

Timber harvesting impacts Northern Goshawk, *laingi* subspecies due to habitat loss and habitat fragmentation. Although the scope of this threat is small, current forest harvest rates may exceed recruitment of suitable habitat. Such recruitment from second growth within the Haida Gwaii and the North Coast Conservation Regions generally requires a longer period of time (Doyle 2006a; Mahon *et al.* 2012) compared to those farther south. The severity scoring for this threat accounts for the time it takes for the recruitment of young forest into suitable habitat. It reflects the likelihood that the small Northern Goshawk, *laingi* subspecies population present in B.C. will continue to face steady habitat loss as a result of forest harvest rates (Federal Register 2012). Better tracking of harvest and stand regeneration would improve the threats assessment and allow a better understanding of the type and scope of change in forest planning and practices that would be required to forecast stable Northern Goshawk, *laingi* subspecies populations across the four conservation regions.

IUCN-CMP Threat 7. Natural system modifications

Introduced Black-tailed Deer (*Odocoileus hemionus columbianus*) have modified the ecosystem (e.g., changes to the forest understory) in Haida Gwaii and some Gulf Islands (Martin *et al.* 2011) in such a way as to reduce prey abundance for the Northern Goshawk, *laingi* subspecies (Doyle 2003, 2005, 2006b; Mahon *et al.* 2012).

Other Factors Considered

Other threats were assessed but it was determined that the severity of such threats would result in less than a 1% reduction of the species' population in B.C. (e.g., residential and commercial

⁴ The overall threat impact was calculated following Master *et al.* (2009) using the number of Level 1 Threats assigned to this species where Timing = High or Moderate. This includes 3 Lows (Table 1). The overall threat considers the cumulative impacts of multiple threats.

⁵ Although the threat assessment presented in this document supercedes the one found in the B.C. Recovery Strategy (Northern Goshawk *Accipiter gentilis laingi* Recovery Team 2008), the threats section of the B.C. Recovery Strategy still provides relevant supporting information and references for the threats to the Northern Goshawk, *laingi* subspecies presented here.

development; agriculture; energy production and mining, including wind farms; recreational activities; invasive species; and geological events).

The Haida Gwaii population faces greater threat impacts than the remainder of the B.C. population (Doyle 2006a). Compiling a separate threats assessment for each conservation region would provide a more accurate accounting of the threats. For example, Haida Gwaii may have a higher than negligible threat for persecution (Threat #5.1); and introduced Raccoons (*Procyon lotor*) were recently suspected of predating a nest (K. Dhanwant, pers. comm. as cited in Cooper and Stevens 2000; Threat # 8.1).

Climate change (Threat #11) may exacerbate declines of the Northern Goshawk, *laingi* subspecies. Wetter springs are suspected already and this results in lower nesting activity and/or chick survival (Bloxtton 2002; Fairhurst and Bechard 2005; Manning *et al.* 2007; Doyle 2009). Wetter springs are being modelled for the area inhabited by the species on Haida Gwaii under most climate change scenarios. Cool springs may also have an impact on chick survival, however the scope of this threat is thought to be negligible over the next 10 years. In addition, there is an observed increase in storminess in the region due to increasing climate variability effects in the Northeast Pacific (Abeyirigunawardena and Walker, pers. comm., 2005 as cited in Connor 2003); however, the effect this may have on nesting success is not understood.

6 CURRENT MANAGEMENT FRAMEWORK

6.1 Habitat Protection Measures and Management

In B.C., threats are managed through a variety of measures aimed at protecting nesting (breeding) and foraging habitats for the Northern Goshawk, *laingi* subspecies.

6.1.1 Habitat Protection Tools on Crown Land

Northern Goshawk, *laingi* subspecies is listed as a species at risk under the *Forest and Range Practices Act* (FRPA; Province of British Columbia 2002), which enables habitat management tools such as Wildlife Habitat Areas (WHAs) and associated General Wildlife Measures (GWMs), as described in the Identified Wildlife Management Strategy (IWMS; Province of British Columbia 2004). The IWMS provides direction regarding the management of Northern Goshawk, *laingi* subspecies habitats, including a species account that outlines the taxonomy, distribution, habitat requirements, and management recommendations for forester practitioners working in the range of this subspecies.

Over 5200 hectares of core breeding habitat (i.e., suitable nesting and post-fledging habitats) and over 9500 ha of additional foraging habitat have been protected through WHA designations and GWMs established specifically for Northern Goshawk, *laingi* subspecies (Table 2).

The majority of WHAs established to date protect the breeding habitat area through a reserve (approximately 200 ha) around the nest tree or cluster of known nest sites. The two WHAs on

Haida Gwaii and two of those established on Vancouver Island protect the breeding habitat and also manage the foraging habitat through GWMs. Long-term monitoring of Northern Goshawk, *laingi* subspecies nesting and breeding will help determine the effectiveness of these WHAs. Work has been done under the Forest and Range Evaluation Program (FREP) monitoring program to develop indicators for this long-term monitoring; however, development of a sampling design and some field testing are still required (Ministry of Forests, Mines and Lands 2010).

Table 2. Northern Goshawk, *laingi* breeding and foraging habitat protected or managed through Wildlife Habitat Area designations and General Wildlife Measures as of September 2012.

Conservation region	Number of WHAs ^a	Breeding area (ha)	Foraging area (ha)	Total area (ha)
Haida Gwaii	2	468	4437	4905
North Coast	1	254	0	254
Vancouver Island	25	4521	5084	9605
South Coast	0 ^b	0	0	0
TOTALS	28	5244	9521	14,765

^a The WHA data presented is exclusive of 7 additional proposed WHAs currently in formal review for legal designation.

^b No WHAs established specifically for Northern Goshawk, *laingi* subspecies at this time.

Protection of Northern Goshawk, *laingi* subspecies breeding and foraging habitat is also achieved on Crown land within:

- parks and protected areas through the legal provisions of the B.C. *Park Act*;
- Ungulate Winter Ranges (UWR) through the legal provisions of the FRPA;
- Old Growth Management Areas (OGMA) through the legal provisions of the B.C. *Land Act* (Province of British Columbia 1996);
- Conservancies, Biodiversity, Mining and Tourism Areas (BMTAs) and Strategic Landscape Reserve Design (SLRD) polygons within the Ecosystem-based Management (EBM) planning area on the North and Central Coast (Horn *et al.* 2009; Integrated Land Management Bureau 2012); and
- Strategic Land Use Agreements (SLUAs) with protection under Land Use Objectives Orders under the B.C. *Land Act*.⁶

See Section 6.2.2 Habitat Protection Analysis for the amount of suitable Northern Goshawk, *laingi* subspecies nesting and foraging habitat currently protected in all conservation regions.

6.1.2 Guidance and Best Management Practices

In June 2012, forest industry members of the Coast Forest Conservation Initiative (CFCI) produced a document that provides guidance to forest professionals concerning the management of Northern Goshawk, *laingi* subspecies nesting areas and adjacent post-fledging area habitat (Coast Forest Conservation Initiative 2012) within the EBM planning area.

The Private Forest Landowners Association (2012) and the Federation of B.C. Woodlot Associations (2012) also have best management practices in place to manage Northern Goshawk

⁶ Northern Goshawk, *laingi* subspecies are managed through the designation of reserves under Schedule 12 of the Haida Gwaii SLUA (Province of British Columbia 2007).

nests during forestry operations and to promote sustainable management of foraging habitat through time (R. Bealing, pers. comm., 2012).

The Province is currently reviewing all existing guidance documents to develop comprehensive recommendations for the management of Northern Goshawk, *laingi* nesting and foraging habitats on Crown and private forest lands throughout the coastal B.C. range of Northern Goshawk, *laingi* habitat.

6.1.3 Private Land Stewardship

Approximately 23% of forests in the Vancouver Island Conservation Region are privately owned and managed. TimberWest Forest Corporation and Island Timberlands Ltd. are currently the main landowners in this area. Monitoring programs were developed by TimberWest Forest Corporation, which monitors 30–40 Northern Goshawk, *laingi* subspecies territories per year on average, most in second-growth forests (D. Lindsay, pers. comm., 2012).⁷

Management regimes for Northern Goshawk, *laingi* subspecies on private managed forest land were first applied in the mid-1990s when it appeared that Northern Goshawk, *laingi* subspecies were more abundant than previously thought in second-growth forests in the Vancouver Island Conservation Region. Large private managed forest landowners continue to carry out surveys, support applied research projects, and work cooperatively with the Province.

Landowners are engaged in management of Northern Goshawk, *laingi* subspecies through temporary forest land set-asides, and implementing best management practices to maintain breeding habitat viability while nests are active.

6.2 Existing Habitat Protection Relative to Suitable Habitat

6.2.1 Suitable Habitat Analysis

In support of development of this management plan, a habitat suitability model was run in August 2012 for the range of the Northern Goshawk, *laingi* subspecies in B.C. (Mahon *et al.* 2012; Smith 2012). This model run was based on a habitat suitability algorithm initially developed by the Habitat Recovery Implementation Group (RIG) of the Northern Goshawk *Accipiter gentilis laingi* Recovery Team and described by Smith and Sutherland (2008) and Mahon *et al.* (2008). The model parameters were updated in 2012 to generate nesting, foraging, and territory model outputs (Mahon *et al.* 2012; Smith 2012). In support of development of this management plan, B.C. Ministry of Forests, Lands and Natural Resource Operations used this territory model to estimate the number and distribution of potential Northern Goshawk, *laingi* subspecies territories in coastal B.C. that could be supported within available, suitable habitat.⁸

⁷ For the purpose of this document, second-growth forests are relatively young forests that have developed following a disturbance (e.g., wholesale cutting, extensive fire, insect attack) of the previous stand of old-growth forest (Ministry of Forests and Range 2008). Old-growth forests, for the purposes of this document, are simply defined by age criterion of 250 years or older (Parminter 1995; Province of British Columbia 2009a, 2009b).

⁸ “Suitable habitat” is considered to be modelled class 1 (High) and class 2 (Moderate) habitat.

Territories with more than 70%⁹ suitable foraging habitat have a high probability of Northern Goshawk, *laingi* subspecies occupancy and re-occupancy over time. The probability of occupancy diminishes as suitable habitat declines and is essentially zero below 20% suitable foraging habitat. Other habitat factors that have not been explicitly analyzed from Northern Goshawk, *laingi* subspecies territories may influence the probability of occupancy, such as the distribution of foraging habitat within territories, patch size, and connectivity (Daust *et al.* 2010).

The territory model (Smith 2012) was run using different forage habitat supply threshold scenarios within a given territory. Three scenarios were modelled: 20% suitable foraging habitat representing a “low” probability of occupancy; 40% suitable foraging habitat representing a “medium” probability of occupancy; and 60% suitable foraging habitat representing a “high” probability of occupancy within a territory (Tables 3–5).

Based on this 2012 modelling (Smith 2012), there is currently suitable habitat to support an estimated 682–764 potential Northern Goshawk, *laingi* subspecies territories in coastal B.C. if a forage supply threshold of 40% is applied (Table 4).

Table 3. Estimated number of potential Northern Goshawk, *laingi* subspecies territories based on current suitable habitat by conservation region using a 20% forage supply threshold (Smith 2012).

Estimated # of suitable territories (n = 5)	Haida Gwaii (HG)	North Coast (NC)	South Coast (SC)	Vancouver Island (VI)	Total for all conservation regions
Average ^a	75	466	254	437	1232
Range of five estimates	73–80	438–477	242–265	416–466	1169–1288

^aThis estimate is based on an average of 5 repeated measures estimates modelled for each conservation region.

Table 4. Estimated number of potential Northern Goshawk, *laingi* subspecies territories based on current suitable habitat by conservation region using a 40% forage supply threshold (Smith 2012).

Estimated # of suitable territories (n = 5)	Haida Gwaii (HG)	North Coast (NC)	South Coast (SC)	Vancouver Island (VI)	Total for all conservation regions
Average ^a	40	228	201	261	730
Range of five estimates	37–44	223–234	184–209	238–277	682–764

^aThis estimate is based on an average of 5 repeated measures estimates modelled for each conservation region.

⁹Percentage of suitable foraging habitat is equal to the area of suitable habitat in a territory divided by the total territory area. To calculate the area of suitable forage habitat, the area of each 1-ha cell is weighted by its Habitat Suitability Index (HSI) score (i.e., if a cell has a foraging HSI of 0.8, its area of suitable habitat is calculated as 1 * 0.8 = 0.8 ha).

Table 5. Estimated number of potential Northern Goshawk, *laingi* subspecies territories based on current suitable habitat by conservation region using a 60% forage supply threshold (Smith 2012).

Estimated # of suitable territories (n = 5)	Haida Gwaii (HG)	North Coast (NC)	South Coast (SC)	Vancouver Island (VI)	Total for all conservation regions
Average ^a	9	30	65	60	164
Range of five estimates	7–10	29–33	63–67	56–63	156–173

^aThis estimate is based on an average of 5 repeated measures estimates modelled for each conservation region.

Due to historic and continuing forest harvesting, there has been a reduction in the amount of available suitable forest habitat for Northern Goshawk, *laingi* subspecies in coastal B.C. (Federal Register 2012). It is unclear whether the overall balance of suitable habitat will be stable, positive, or negative in future years as second- and third-growth forests mature and become suitable habitat for this subspecies. The territory model (Smith 2012) demonstrates that the number of options in terms of suitable territories for Northern Goshawk, *laingi* subspecies has been reduced from historic times. The rate of coastal harvest and harvest rotation age are important considerations when planning for the maintenance of suitable breeding and foraging habitat for Northern Goshawk, *laingi* subspecies through time and space.

6.2.2 Habitat Protection Analysis

Model outputs were used to assess the relative level of current habitat protection of Northern Goshawk, *laingi* subspecies within suitable habitat in all conservation regions within B.C. (Table 6). In this protection analysis, the total nesting and foraging habitat protection results included patches of all sizes (i.e., any sized patch of suitable habitat was included in the total habitat protected). Future analyses will consider patch size and habitat functionality, specifically the spatial arrangement of suitable habitat relative to Northern Goshawk, *laingi* subspecies territoriality (i.e., size and inter-territory spread).

For this analysis, habitat considered “protected” includes national parks, provincial parks and protected areas, ecological reserves, recreation areas, conservancies, regional parks, forest recreation sites, heritage sites, UWRs, WHAs, OGMAs and wildlife management areas. It also includes habitat that has protection measures unique to specific areas of the coast. Biodiversity, Mining and Tourism Areas; Strategic Landscape Reserve Design polygons; and Class 1 Grizzly Bear habitat have protection measures through the Central and North Coast Order¹⁰ (Province of British Columbia 2009a) and the South Central Coast Order (Province of British Columbia 2009b). Wildlands have protection measures through the Sea-to-Sky Land Use Plan (Province of British Columbia 2008b). Clayoquot reserves have protection through Clayoquot Sound Watershed Plans (Province of British Columbia 2003, 2006). Haida Gwaii forest reserves, Northern Goshawk reserves and Northern Saw-whet Owl reserves all have protection measures through the Haida Gwaii Land Use Objectives Order (Province of British Columbia 2010).

¹⁰ Northern Goshawk, *laingi* subspecies are managed as a “focal species” under objective 14(7)c.

See Appendix 2 for information on the habitat model and associated caveats regarding the protection data presented in this document.

Table 6. Percent of total suitable Northern Goshawk, *laingi* subspecies nesting and foraging habitat currently protected by conservation region. ^a

	Total suitable habitat (% protected)			
	Haida Gwaii	North Coast	South Coast	Vancouver Island
Nesting	61	41	27	33
Foraging	53	41	24	27

^aAnalysis run April 2013. Data updated from September 2012 results.

Model outputs indicate that 51% of moderate or high suitability nesting habitat, within a 200-ha buffer area around all known nests in B.C. is currently protected (Table 7). As well, 36% of modelled moderate and high suitability foraging habitat is protected across all four conservation regions (Table 8).

Table 7. Amount of modelled moderate or high suitability Northern Goshawk, *laingi* subspecies nesting habitat currently protected within a 200-ha buffer area around all known nests (n = 346) in all conservation regions. ^b

Suitable nesting habitat	Total area (ha)	Protected area (ha)	Area protected (%)
Moderate	5665	2583	46
High	4193	2466	59
Total	9858	5049	51

^a Known nest sites and territory viability are not verified annually and the annual harvest depletion has not been considered in this analysis. In addition, this analysis was conducted on nest trees. There may be several nest trees within a single goshawk breeding area or territory. Therefore, the amount of protection represented within the table may be over-representative or under-representative at the breeding area or territory scale.

^bAnalysis run April 2013. Data updated from September 2012 results.

Table 8. Amount of modelled moderate or high suitability Northern Goshawk, *laingi* subspecies foraging habitat currently protected in all conservation regions. ^a

Foraging habitat	Total area (ha)	Protected area (ha)	Area protected (%)
Moderate	2,413,023	898,625	37
High	2,211,411	773,135	35
Total	4,624,434	1,671,760	36

^a Analysis run April 2013. Data updated from September 2012 results.

In addition to the protected habitats described above, timber harvest in B.C. is controlled by a regulated allowable annual cut (AAC) based on timber supply modelling. Over the long term, the projected outcome of this volume regulation on the timber harvesting landbase (THLB) is a steady state of balanced age-class structure/distribution so that the amount of area in old and mature age classes is intended to remain relatively constant in perpetuity.

6.3 Population Analysis

The quasi-extinction¹¹ probability estimates and their uncertainty for Northern Goshawk, *laingi* subspecies, for a 200-year time horizon (approximately 40 generations) is presented in Figure 2. The number of territories needed to maintain a given population level depends on how an acceptable extinction risk is defined and the time horizon used. The two vertical arrows (2008 and historic) are the estimated number of territories from Smith and Sutherland (2008) applying “moderate” territory requirement assumptions.

The quasi-extinction risk (and its inverse, the probability of persistence) for Northern Goshawk, *laingi* subspecies can help inform decisions regarding the number of territories that are desired to be maintained in a suitable condition. Different scenarios (i.e., using different numbers of desired territories) need to be considered along with the socio-economic implications of the various management options that would be required to maintain the territories in a suitable condition. The results of these analyses will help inform government decisions regarding the management of Northern Goshawk, *laingi* subspecies.

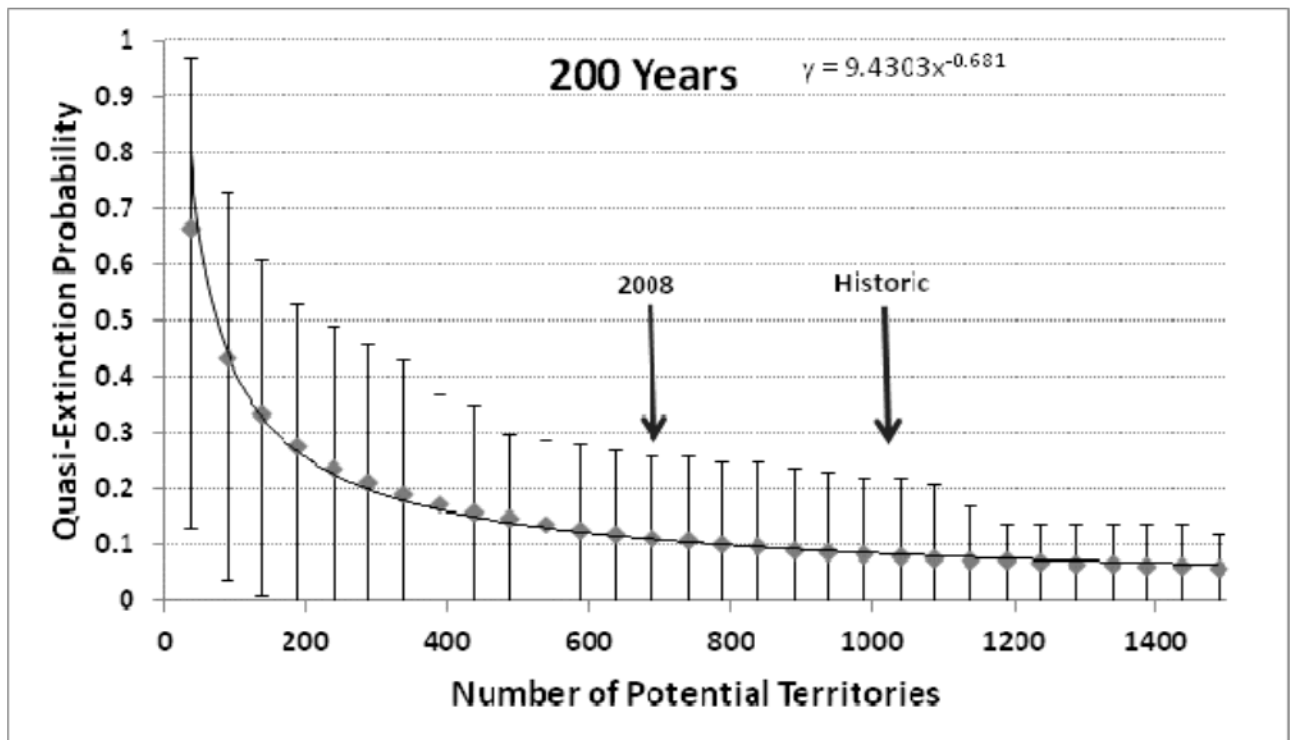


Figure 2. Expected value of quasi-extinction probability, and its uncertainty, for varying number of potential territories, at 200-year time horizon (from Steventon 2012).

¹¹ “Quasi-extinction” is defined as the population declining below 25 breeding females (Steventon 2012).

7 MANAGEMENT GOAL AND OBJECTIVES

7.1 Population and Distribution Goal

This management plan is guided by the recovery goal in the B.C. Recovery Strategy:

To ensure viable populations of Northern Goshawk, *laingi* subspecies persist in each conservation region in coastal British Columbia.

7.2 Objectives

This management plan is informed by the objectives outlined in the B.C. Recovery Strategy:

1. To manage and, where necessary, conserve and recover habitat that meets the needs of Northern Goshawk, *laingi* subspecies through its annual cycle.
2. To conserve and, where necessary, recover a well-distributed and viable population of Northern Goshawk, *laingi* subspecies within coastal B.C.

It is expected that these objectives will be refined and updated as more information becomes available and/or decisions are made by government.

8 APPROACHES TO MEET OBJECTIVES

8.1 Actions and Performance Measures

The following table contains recommendations arising from the development of this management plan that will help support Northern Goshawk, *laingi* subspecies recovery efforts.

Table 9. Ongoing and recommended management actions for Northern Goshawk, *laingi* subspecies in British Columbia.

Note: Actions and timelines in this table may be modified based on the priorities and budgetary constraints of participatory agencies and organizations.

Priority ^a	Threat ^b or concern addressed	Action	Performance measures ^c	Timeline	Status ^d
Essential	Knowledge Gap	Convene recovery team to conduct an IUCN threats assessment for Northern Goshawk, <i>laingi</i> subspecies in B.C.	Updated threats assessment for Northern Goshawk, <i>laingi</i> subspecies in B.C.	Oct. 2012	Completed
Necessary	Knowledge Gap	Convene expert team to conduct an IUCN threats assessment for each conservation region.	Threat assessment for Northern Goshawk, <i>laingi</i> subspecies in each conservation region completed.	2013	Not initiated
Essential	Knowledge Gap	Identify all potentially suitable nesting and foraging habitat coast-wide based on the habitat suitability model.	Potentially suitable nesting and foraging habitat identified for all conservation regions.	Sept. 2012	Completed
Beneficial	Knowledge Gap	Ongoing refinement of habitat suitability model through peer review and incorporation of latest science and nesting and foraging data.	Habitat model reflects variability between conservation regions/ecosystems to inform population targets and management strategies.	2013 onwards	Not initiated
Necessary	Knowledge Gap	Use telemetry to fill knowledge gaps around coastal Northern Goshawk, <i>laingi</i> subspecies breeding and annual home range sizes.	Incorporate knowledge gained on home range sizes into habitat suitability and territory models and habitat management recommendations.	TBD ^e	Not initiated

Priority ^a	Threat ^b or concern addressed	Action	Performance measures ^c	Timeline	Status ^d
Essential	Knowledge Gap	Expert Population Implementation Group to conduct risk of extinction population viability analysis to inform future establishment of population/management targets.	Risk curve developed and quasi-extinction probability defined for various population levels relative to number of potential territories.	Oct. 2012	Completed
Essential	Knowledge Gap	Peer review of heuristic population viability report (Steventon 2012).	Peer review of population viability report completed to determine if risk curve can be used to inform population targets and management objectives.	2013	Not initiated
Essential	All	B.C. government makes decisions re: population targets and management objectives.	Population targets and management objectives set by government.	2013–2014	In progress
Necessary	All	Develop an Implementation Plan.	Implementation Plan completed based on decisions made by government.	2013–2014	Not initiated
Beneficial	Knowledge Gap	Develop list of research topics, prioritize these topics, and initiate research partnerships.	Prioritized list of research needs available to government to focus future research efforts. Partnerships with academic institutions/industry established. Research initiated.	2013 onwards	In progress
Necessary	Knowledge Gap	Conduct taxonomy studies/review of the Northern Goshawk to help clarify <i>laingi</i> subspecies boundaries.	Published paper in refereed journal.	Unknown	Not initiated
Necessary	Knowledge Gap	Conduct a science review of all available information relevant to Northern Goshawk, <i>laingi</i> subspecies to inform management approaches and identify knowledge gaps.	Available science related to Northern Goshawk, <i>laingi</i> subspecies reviewed.	2013–2014	Initiated
Beneficial	All	Develop a Science Update document.	Science Update completed based on new information.	TBD (as required)	Not initiated
Essential	Knowledge Gap, 5.3	Review Northern Goshawk, <i>laingi</i> subspecies nesting data/reports in second growth.	Current data on second-growth nesting on private forest lands and Crown lands made available and published to inform management actions.	2013–2014	Not initiated

Priority ^a	Threat ^b or concern addressed	Action	Performance measures ^c	Timeline	Status ^d
Essential	5.3	Establish WHAs to protect known nest sites.	% (TBD ^e) of known nest sites on Crown land within WHAs.	2012–2013	Ongoing
Essential	5.3	Implement WHF policy requiring reporting of nest sites on Crown land.	WHF policy in place.	2012–2013	In progress
Necessary	5.3	Develop and implement reporting and tracking system for nest sites on Crown and private land.	Reporting and tracking system for nest sites created, in use, and up to date.	2013–2014	In progress
Necessary	5.3	Develop measures to ensure sufficient Northern Goshawk, <i>laingi</i> subspecies foraging habitat is conserved (including outside of WHAs).	TBD	2013–2014	In progress
Necessary	5.3	Implement measures to ensure sufficient Northern Goshawk, <i>laingi</i> subspecies foraging habitat is conserved.	% (TBD) of foraging habitats maintained in suitable condition.	2014 onwards	Not initiated
Necessary	5.3	Review available forestry operational guidance and develop provincial guidelines to promote consistency between all forest licensees.	Provincial science-based guidelines for forestry completed, available and in use.	2013–2014	In progress
Necessary	5.3	Review effectiveness of silviculture treatments (e.g., tree improvement, fertilization, stocking control, pruning, thinning) and analyze second-growth habitat to identify and quantify opportunities to improve habitat conditions for Northern Goshawk, <i>laingi</i> subspecies.	Review of effectiveness of silviculture treatments (e.g., tree improvement, fertilization, stocking control, pruning, thinning) to improve habitat conditions for Northern Goshawk, <i>laingi</i> subspecies completed.	2014 onwards	Not initiated
Necessary	5.3	Dependent on the review of silviculture treatments above, develop guidelines for silvicultural treatments that enhance forest attributes for Northern Goshawk, <i>laingi</i> subspecies breeding and foraging.	Completed guidelines for silviculture treatments that enhance forest attributes for Northern Goshawk, <i>laingi</i> subspecies breeding and foraging.	2013 onwards	Not initiated

Priority ^a	Threat ^b or concern addressed	Action	Performance measures ^c	Timeline	Status ^d
Necessary	7.3	Assess management options to mitigate destruction of understorey vegetation on Haida Gwaii by Black-tailed Deer (and the resulting decrease in forest-dwelling prey availability to Northern Goshawk, <i>laingi</i> subspecies).	Plan developed to reduce deer-induced damage to understorey vegetation and increase forest-dwelling prey availability.	2013–2014	Not initiated
Necessary	Knowledge Gap	Develop a biological effectiveness monitoring program to determine if management approaches are effective over time.	Biological effectiveness monitoring program developed.	2013 onwards	Not initiated
Necessary	Knowledge Gap	Implement a biological effectiveness monitoring program to determine if management approaches are effective over time.	TBD	2014 onwards	Not initiated
Necessary	Knowledge Gap	Maintain data warehouse/repository of information to support/monitor management implementation coast-wide.	Species occurrences available from the Conservation Data Centre for use by government and industry.	2012–2013	In progress
Beneficial	5.1, 5.3	Create an outreach strategy that identifies opportunities to enhance management, reduce persecution, and share knowledge.	Outreach actions identified in a stewardship outreach strategy available to inform and prioritize government and industry-led stewardship outreach efforts.	2014	Not initiated
Necessary	Knowledge Gap, 5.3	Establish a socio-economic impact analysis and monitoring program associated with B.C.'s proposed management regimes.	Monitoring program to track economic impacts are developed and implemented.	2013 onwards	Not initiated

^a Essential (urgent and important); Necessary (important but not urgent); or Beneficial.

^b Threats are based on the IUCN-CMP unified threats classification system. Threats identified for Northern Goshawk, *laingi* subspecies are listed by IUCN threat level numbers. See Table 1.

^c Performance measures for objectives and other implementation activities.

^d Status: Not initiated; In progress; Ongoing; Completed.

^e TBD = To be determined

8.2 Narrative to Support Management Actions Table

This section includes additional information to support the understanding of actions identified in Table 9 for Northern Goshawk, *laingi* subspecies management.

The Province intends to adopt a phased approach to enable ongoing refinement of the management regimes that benefit Northern Goshawk, *laingi* subspecies, and will continue to work with the forest industry to implement additional protection measures as necessary and support inventory, research, and monitoring. A substantial amount of work remains to understand the applicability of science published for *atricapillus* and other subspecies to the *laingi* subspecies and to improve the science related to the different habitat requirements and range boundaries of the *laingi* subspecies.

8.2.1 Improving Scientific Information

The Province is in the process of obtaining better information to inform the management of Northern Goshawk, *laingi* subspecies. Ongoing refinement and peer review of the habitat suitability model and actions to improve the knowledge base regarding habitat use and selection by Northern Goshawk, *laingi* subspecies are required.

Work is ongoing by species experts to determine the risk of extinction at varying population targets for the Northern Goshawk, *laingi* subspecies in B.C. and to develop population targets based on population viability analyses, habitat availability and the degree of protection provided through all existing protection measures. Once population targets are defined, additional analyses will occur to determine what proportion of suitable habitat is required to be maintained in perpetuity to achieve these targets. This information can then be used to inform management efforts in relation to the achievement of overall habitat conservation and population recovery goals for Northern Goshawk, *laingi* subspecies.

In the short-term, priority will be given to using the results of the coast-wide habitat suitability model outputs to stratify medium-term field inventory, and inform strategic scale habitat planning and conservation efforts (e.g., establishment of WHAs or other landscape scale reserve design products).

8.2.2 Habitat Protection on Crown Land

As outlined in Tables 3 through 6, a significant degree of habitat protection for Northern Goshawk, *laingi* subspecies has been achieved through B.C.'s land use planning efforts and designation of reserves for biodiversity, wildlife, and other resource values.

The Province intends to use legislation, policies, and guidelines to protect the species habitat. The Province also intends to continue to explore opportunities to maintain Northern Goshawk, *laingi* subspecies habitat through time by using habitat supply modelling to inform planning and management decisions. The degree of habitat protection provided through all enactments on

provincial Crown land and the contributions of management practices on managed private and Crown forest land across the Northern Goshawk, *laingi* range will also need to be monitored.

Additional WHAs will be established to protect known occurrences of Northern Goshawk, *laingi* subspecies, particularly in the South Coast Conservation Region as provided for in current policy and with due regard to the impact “tests” of the Government Actions Regulation (GAR). A review of existing policy and the degree of protection possible under the IWMS may be required to inform future habitat protection efforts. The results of habitat suitability/availability analyses and a review of existing habitat protection provided by all provincial management actions will inform any such policy review.

Work is underway by the B.C. Ministry of Environment on a GAR Order for Wildlife Habitat Features (WHF), which includes Northern Goshawk, *laingi* subspecies. Once enabled, the Order will trigger section 70 of the Forest Planning and Practices Regulation that requires all Northern Goshawk, *laingi* subspecies nest occurrences encountered by forest licensees not be damaged or rendered ineffective. All nests must also be reported on an annual basis (section 86 (3) (b)). A reporting and tracking system will be implemented in association with this Order.

8.2.3 Management of Forests

Substantial uncertainty remains related to the management approaches needed to effectively sustain the Northern Goshawk, *laingi* subspecies through time.

A work plan is being developed based on the outputs of the refined habitat suitability model (Smith 2012). Field inventories will be stratified and prioritized according to conservation region and conducted according to available funding. Due to the limited field work historically done on the South Coast, and the relatively limited amount of existing protection in this area, priority will be given to conducting inventories to supplement our knowledge of Northern Goshawk, *laingi* subspecies occurrences in the South Coast Conservation Region in the short term.

The degree to which this species uses second-growth forests is an important factor in addressing future management. For example, Northern Goshawk nesting in second-growth forests has been documented in several areas, particularly in the Vancouver Island Conservation Region (Northern Goshawk *Accipiter gentilis laingi* Recovery Team 2008; Mahon *et al.* 2012). Further assessment of the contribution of second-growth stands to Northern Goshawk, *laingi* subspecies nesting and foraging habitat supply and availability is required.

It is unclear how management of second- and third growth forests and habitat restoration efforts may benefit Northern Goshawk, *laingi* subspecies through time. Further assessment of habitat restoration opportunities for potentially accelerating development of suitable habitat is required. Publication of available nesting data for second growth in the Vancouver Island Conservation Region will help to inform future management of Northern Goshawk, *laingi* subspecies.

8.2.4 Monitoring

Northern Goshawk, *laingi* subspecies nesting success will be monitored as part of field inventory activities. A structured monitoring program will be developed to continually assess the effectiveness of habitat protection measures relative to surrounding development, and refine management approaches as required.

Assessment of the socio-economic implications of habitat protection measures and alternative management regimes will also be explored as part of ongoing management of the Northern Goshawk, *laingi* subspecies in B.C.

9 SOCIO-ECONOMIC IMPLICATIONS

Given the extent of the range of Northern Goshawk, *laingi* subspecies in coastal B.C., and the extensive foraging habitats thought to be required by this species, the implementation of site-specific management actions may have significant impacts on resource development activities in this area. As a result, B.C. is proposing an adaptive approach wherein the results of monitoring are used to inform management practices on the ground.

All existing protection measures have been accounted for through the various land use planning initiatives that have been implemented in B.C. and through Timber Supply Reviews conducted in the relevant resource districts; consideration of economic impacts are implicit in these government decisions.

There may be increased planning costs to forestry companies operating in Northern Goshawk, *laingi* subspecies habitat, such as identifying nest sites and implementing habitat protection measures or temporal restrictions. There will also be additional costs associated with the required investment in monitoring and inventory model refinements, science reviews, and development of an adaptive management approach to management of Northern Goshawk, *laingi* subspecies in B.C.

10 REFERENCES

- B.C. Conservation Data Centre. 2012a. BC Species and Ecosystems Explorer. B.C. Min. Environ., Victoria, BC. <<http://a100.gov.bc.ca/pub/eswp/>> [Accessed June 22, 2012]
- BC Conservation Data Centre. 2012b. Information obtained on [December 11, 2012]. Biodiversity Tracking and Conservation System (BIOTICS). B.C. Min. Environ., Victoria, BC.
- Bayard de Volo, S. 2008. Genetic studies of Northern Goshawks (*Accipiter gentilis*): genetic tagging and individual identification from feathers, and determining phylogeography, gene flow and population history for goshawks in North America. Ph.D. thesis. Colorado State University, Fort Collins, CO.
- Bloxton, T.D. 2002. Prey abundance, space use, demography, and foraging habitat of Northern Goshawks in western Washington. M.Sc. thesis. University of Washington, College of
- Campbell, R.W., N.K. Dawe, I. McTaggart-Cowan, J.M. Cooper, G.W. Kaiser, and M.C.E. McNall. 1990b. The birds of British Columbia. Vol. II: nonpasserines. Royal B.C. Museum, Victoria, BC.
- Coast Forest Conservation Initiative (CFCI). 2012. Maintaining the integrity of Northern Goshawk nesting and post-fledging areas in the ecosystem based management plan area of coastal British Columbia: guidance for forest professionals. Campbell River, BC. <http://www.coastforestconservationinitiative.com/pdfNS/CFCI_Goshawk%20GMAs-GuidanceforProfessionalsJune22,2012.pdf> [Accessed August 2, 2012]
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2000. COSEWIC assessment and update status report on the Northern Goshawk *laingi* subspecies *Accipiter gentilis laingi* in Canada. Ottawa, ON. <www.sararegistry.gc.ca/status/status_e.cfm>
- Connor, T.A. 2003. Social vulnerability and adaptive capacity to climate change impacts: identifying attributes in two remote coastal communities on Haida Gwaii, British Columbia. Masters thesis. Univ. Guelph, Department of Geography, Guelph, ON. <<http://dspace.library.uvic.ca:8080/bitstream/handle/1828/1248/FINAL%201.pdf?sequence=1>> [Accessed December 7, 2012]
- Conservation Measures Partnership. 2010. Threats taxonomy. <<http://www.conservationmeasures.org/initiatives/threats-actions-taxonomies/threats-taxonomy>> [Accessed September 6, 2012]
- Cooper, J.M. and V. Stevens. 2000. A review of the ecology, management and conservation of the Northern Goshawk in British Columbia. B.C. Min. Environ., Lands and Parks, Wildl. Branch, Victoria, BC. Wildl. Bull. No. B-101. <<http://www.env.gov.bc.ca/wld/documents/statusrpts/b101.pdf>> [Accessed December 7, 2012]
- Daust, D., L. Kremsater, C. Apps, K. Brunt, A. Burger, F. Doyle, K. Dunsworth, L. Dupuis, P. Friele, G. MacHutchon, T. Mahon, E. McClaren, V. Michelfelder, B. Pollard, D. Seip, J.D. Steventon, and L. Waterhouse. 2010. Focal species risk thresholds for BC's North and Central Coast. Report to the Joint Coastal Land and Resource Forum Technical Liaison Committee. Integrated Land Management Bureau, Nanaimo, BC.
- Doyle, F. 2003. Biological review and recommended interim strategy direction for Northern Goshawks on Haida Gwaii/Queen Charlotte Islands. Report to B.C. Ministry of Water, Land and Air Protection. Unpublished.

- Doyle, F. 2005. Breeding success of the goshawk (*A. g. laingi*) on Haida Gwaii/Queen Charlotte Islands: Is the population continuing to decline? Goshawk productivity and habitat requirements 2004–2005. Report to South Moresby Forest Replacement Account and Weyerhaeuser Ltd. Forest Investment Account FIA: 6453014. Unpublished.
- Doyle, F. 2006a. When do naturally regenerating and pre-commercially thinned second growth forests attain the attributes that will support Northern Goshawk (*laingi* subspecies) and Marbled Murrelet on Haida Gwaii. Report to Cascadia Forest Products Ltd. and Gwaii Haanas National Park Reserve and Haida Heritage Site. Unpublished.
- Doyle, F. 2006b. Blue grouse breeding habitat on Haida Gwaii. Report to Cascadia Forest Products Ltd. Unpublished.
- Doyle, F. 2009. Breeding success of the goshawk (*A. g. laingi*) on Haida Gwaii/Queen Charlotte Islands 2008. Report to Gwaii Forest Society and Western Forest Products Inc. Unpublished.
- Doyle, F., E.L. McClaren, and L. Waterhouse. 2010. Northern Goshawk (*Accipiter gentilis laingi*) habitat suitability model verification on Haida Gwaii. Unpublished report prepared for the Northern Goshawk Recovery Team, Nanaimo, BC.
- Fairhurst, D.G. and M.J. Bechard. 2005. Relationship between winter and spring weather and Northern Goshawk (*Accipiter gentilis*) reproduction in northern Nevada. *J. Raptor Res.* 39(3): 229–236.
- Federal Register. 2012. Department of the Interior, Fish and Wildlife Service, 50 CFR Part 17 [Docket No. FWS–R7–ES–2009–0049; MO 9221050083–B2] RIN 1018–AY 43 Endangered and threatened wildlife and plants; Listing the British Columbia distinct population segment of the Queen Charlotte Goshawk under the *Endangered Species Act*; Final Rule. Federal Register 77:148.
- Federation of B.C. Woodlot Associations. 2012. <<http://www.woodlot.bc.ca/>>
- Green, R.N. and K. Klinka. 1994. A field guide to site identification and interpretation for the Vancouver Forest Region. B.C. Min. For., Victoria, BC. Land Manage. Handb. No. 28.
- Horn, H.L., P. Arcese, K. Brunt, A. Burger, H. Davis, F. Doyle, K. Dunsworth, P. Friele, S. Gordon, T. Hamilton, G. MacHutchon, T. Mahon, E. McClaren, V. Michelfelder, B. Pollard, G. Sutherland, S. Taylor, and L. Waterhouse. 2009. Part 3: Knowledge Base for focal species and their habitats in coastal B.C. Report 3 of the EBM Working Group Focal Species Project. Integrated Land Management Bureau, Nanaimo, BC.
- Integrated Land Management Bureau. 2012. Coast land use decision implementation: Ecosystem-Based Management Working Group (EBM WG) project results. Nanaimo, BC. <http://archive.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/cencoast/plan/project_results.html>
- Mahon, T. 2010. Accuracy assessment of the Coastal Northern Goshawk Habitat Model – Central Coast. Unpublished report for the Habitat Recovery Implementation Group, Northern Goshawk Recovery Team, Nanaimo, BC.
- Mahon, T. 2011. Accuracy assessment of the Coastal Northern Goshawk Habitat Model – Vancouver Island. Unpublished report for the Habitat Recovery Implementation Group, Northern Goshawk Recovery Team, Nanaimo, BC and Parks Canada, Vancouver, BC.
- Mahon, T. 2012. Accuracy assessment of the Coastal Northern Goshawk Habitat Model – South Coast. Unpublished report for the Habitat Recovery Implementation Group, Northern Goshawk Recovery Team, Nanaimo, BC and Parks Canada, Vancouver, BC.

- Mahon, T., E.L. McClaren, and F.I. Doyle. 2008. Parameterization of the Northern Goshawk (*Accipiter gentilis laingi*) habitat model for coastal British Columbia. Nesting and foraging habitat suitability models and territory analysis model. Final draft. Unpublished report for B.C. Ministry of Environment, Nanaimo, BC.
- Mahon, T., E. McClaren, and F.I. Doyle. 2012. Northern Goshawk (*Accipiter gentilis laingi*) habitat model for coastal British Columbia. Nesting and foraging habitat suitability models and territory analysis model. Draft. Unpublished report prepared for the Habitat Recovery Implementation Group, Coastal Northern Goshawk Recovery Team, Nanaimo, BC.
- Manning, E.T., P. Chytyk, and J.M. Cooper. 2007. Queen Charlotte Goshawk monitoring and adaptive management in TFL 37, Woss, BC. Report prepared for Western Forest Products Inc., Englewood Div., Woss, BC.
- Martin, T.G., P. Arcese, and N. Scheerder. 2011. Browsing down our natural heritage: deer impacts on vegetation structure and songbird populations across an island archipelago. *Biological Conservation* 144: 459-469.
<<http://www.sciencedirect.com/science/article/pii/S0006320710004325>>
- Master, L., D. Faber-Langendoen, R. Bittman, G.A. Hammerson, B. Heide, J. Nichols, L. Ramsay, and A. Tomaino. 2009. NatureServe conservation status assessments: factors for assessing extinction risk. NatureServe, Arlington, VA.
<http://www.natureserve.org/publications/ConsStatusAssess_StatusFactors.pdf>
[Accessed June 22, 2012]
- McClaren, E.L. 2005. Northern Goshawk (*Accipiter gentilis laingi*) population inventory summary for Vancouver Island, British Columbia 1994–2002. B.C. Min. Environ., Victoria, BC. Wildlife Bulletin No. B-117.
- McClaren, E.L., P.L. Kennedy, and D.D. Doyle. 2005. Northern Goshawk (*Accipiter gentilis laingi*) post-fledging areas on Vancouver Island, British Columbia. *J. Raptor Res.* 39:253–263.
- Ministry of Environment. 2010. Conservation framework. B.C. Min. Environ., Victoria, BC.
<<http://www.env.gov.bc.ca/conservationframework/index.html>> [Accessed June 22, 2012]
- Ministry of Forests, Mines and Lands. 2010. Evaluating the effectiveness of wildlife habitat areas for Northern Goshawks (*Accipiter gentilis laingi*) in coastal British Columbia: selection of indicators. For. Prac. Invest. Br., Victoria, BC. FREP.
<<http://www.for.gov.bc.ca/hfp/frep/publications/index.htm>> [Accessed December 6, 2012]
- Ministry of Forests and Range. 2008. Glossary of forestry terms in British Columbia. Victoria, BC. <<http://www.for.gov.bc.ca/hfd/library/documents/glossary/Glossary.pdf>> [Accessed December 6, 2012]
- NatureServe. 2012. NatureServe explorer: an online encyclopedia of life [web application]. Version 7.1. Arlington, VA. <<http://www.natureserve.org/explorer>> [Accessed June 22, 2012]
- Northern Goshawk *Accipiter gentilis laingi* Recovery Team. 2008. Recovery strategy for the Northern Goshawk, *laingi* subspecies (*Accipiter gentilis laingi*) in British Columbia. Prepared for the B.C. Ministry of Environment, Victoria, BC.
<http://www.env.gov.bc.ca/wld/recoveryplans/recovery_doc_table.html>
- Parminter, J. 1995. Biodiversity guidebook. Forest Practices Code of British Columbia. B.C. Min. For. and B.C. Environ., Victoria, BC.
<<http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/biodiv/biotoc.htm>> [Accessed December 6, 2012]

- Private Forest Landowners Association. 2012. <<http://www.pfla.bc.ca/>>
- Province of British Columbia. 1982. Wildlife Act [RSBC 1996] c. 488. Queen's Printer, Victoria, BC.
<http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96488_01>
[Accessed June 22, 2012]
- Province of British Columbia. 1996. Land Act [RSBC 1996] CHAPTER 245 Queen's Printer, Victoria, BC.
http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96245_01
- Province of British Columbia. 2002. Forest and Range Practices Act [RSBC 2002] c. 69. Queen's Printer, Victoria, BC.
<http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_02069_01>
[Accessed June 22, 2012]
- Province of British Columbia 2003. Clayoquot Sound Watershed Plans.
<http://archive.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/clayoquot_sound/>
- Province of British Columbia. 2004. Identified wildlife management strategy. B.C. Min. Environ., Victoria, BC. <<http://www.env.gov.bc.ca/wld/frpa/iwms/index.html>> [Accessed August 3, 2012]
- Province of British Columbia 2006. Clayoquot Sound Watershed Plans.
<http://archive.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/clayoquot_sound/>
- Province of British Columbia. 2007. Haida Gwaii Strategic Land Use Agreement.
<<http://www.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/haidagwaii/index.html>> [Accessed September 3, 2012]
- Province of British Columbia. 2008a. Oil and Gas Activities Act [SBC 2008] c. 36. Queen's Printer, Victoria, BC.
<http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_08036_01>
[Accessed December 6, 2012]
- Province of British Columbia. 2008b. Sea to Sky Land and Resource Management Plan (LRMP). B.C. Min. Environ., Victoria, BC.
<<http://ilmbwww.gov.bc.ca/slrp/lrmp/surrey/s2s/plan/lrmp.html>> [Accessed September 12, 2012]
- Province of British Columbia. 2009a. Central and North Coast Order.
<<http://www.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/cencoast/plan/objectives/index.html>>
- Province of British Columbia. 2009b. South Central Coast Order.
<<http://www.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/cencoast/plan/objectives/index.html>>
- Province of British Columbia 2010. Haida Gwaii Land Use Objectives Order.
<<http://ilmbwww.gov.bc.ca/slrp/lrmp/nanaimo/haidagwaii/index.html>>
- Reynolds, R.T., R.T. Graham, M.H. Reiser, R.L. Bassett, P.L. Kennedy, D.A. Boyce Jr., G. Goodwind, R. Smith, and E.L. Fisher. 1992. Management recommendations for the Northern Goshawk in the southwestern United States. U.S. Dep. Agric. For. Serv., Fort Collins, CO. Gen. Tech. Rep. RM-217.
- Salafsky, N., D. Salzer, A.J. Stattersfield, C. Hilton-Taylor, R. Neugarten, S.H.M. Butchart, B. Collen, N. Cox, L.L. Master, S. O'Connor, and D. Wilkie. 2008. A standard lexicon for biodiversity conservation: unified classifications of threats and actions. *Conserv. Biol.* 22:897–911.

- Smith, J.R. 2012. Northern Goshawk habitat and territory modeling results. Unpublished model outputs prepared for the B.C. Ministry of Forests, Lands and Natural Resource Operations, Victoria, BC.
- Smith, J.R. and G. Sutherland. 2008. Northern Goshawk (*Accipiter gentilis laingi*) habitat and territory models/modelling methodology and implementation and scenario results for coastal British Columbia. March 2008. Prepared for The Northern Goshawk Habitat Recovery Implementation Group. Unpublished report.
<http://www.for.gov.bc.ca/hfd/library/FIA/2006/LBIPI_6443004a.pdf> [Accessed December 11, 2012]
- Sonsthagen, S.A., E.L. McClaren, F.I. Doyle, K. Titus, G.K. Sage, R.E. Wilson, J.R. Gust, and S.L. Talbot. 2012. Identification of metapopulation dynamics among Northern Goshawks of the Alexander Archipelago, Alaska, and Coastal British Columbia. Conservation Genetics. Published online. DOI:10.1007/s10592-012-0352-z.
- Squires, J.R. and R.T. Reynolds. 1997. Northern Goshawk (*Accipiter gentilis*). In A. Poole and F. Gill, eds. Birds of North America, No. 298. The Academy of Natural Sciences, Philadelphia, PA and Am. Ornithologists' Union, Washington, DC.
- Steventon, J.D. 2012. A heuristic population viability analysis for the Northern Goshawk (*Accipiter gentilis laingi*) of coastal British Columbia. B.C. Min. For., Lands and Natural Resource Operations, Smithers, BC. Unpublished report.
- Stuart-Smith, A.K., W.L. Harrower, T. Mahon, E.L. McClaren, and F.I. Doyle. 2012. A scientific basis for managing northern goshawk breeding areas in the Interior of British Columbia: best management practices. Forum for Research and Extension in Natural Resources, Kamloops, BC. FORREX Series 29.
<http://www.forrex.org/sites/default/files/forrex_series/176-goshawk-final.pdf>
- Talbot, S.L. 2006. Genetic characteristics of goshawks in northwest North America: testing subspecies and Pleistocene refugium hypothesis. Abstract, 4th N. Am. Ornithological Conference, Veracruz, Mexico.
- Talbot, S.L., S.A. Sonsthagen, and G.K. Sage. 2011. Genetic relationship among goshawks of British Columbia and Alaska. U.S. Geological Survey, Alaska Science Center, Anchorage, AK. Submitted to the COSEWIC bird specialist subcommittee and the Northern Goshawk (*Accipiter gentilis laingi*) Recovery Team. Unpublished.
- U.S. Fish and Wildlife Service (USFWS). 2007. Queen Charlotte goshawk status review. U.S. Fish and Wildlife Service, Alaska Region, Juneau Fish and Wildlife Field Office.

Personal Communications

- Rod Bealing, Private Forest Landowners Association, 2012.
- John Deal, Strategic Planning Biologist, Western Forest Products Inc., 2012.
- Dave Fraser, Species Specialist, Ministry of Environment, 2012.
- Dave Lindsay, Fish and Wildlife Specialist, TimberWest Forest Corp., 2012.

APPENDIX 1. HABITAT SUITABILITY MODEL OUTPUTS AND PROTECTION DATA

Between 2009 and 2012 a formal accuracy assessment of the nesting and foraging habitat model outputs was conducted in each conservation region by the Northern Goshawk *Accipiter gentilis laingi* Recovery Team and Habitat Recovery Implementation Group. In early 2012, the Province led a contract to provide a comprehensive review of the habitat suitability model. Where appropriate, model parameters were revised using the field verification data, new literature, and new local information. As a result of these initiatives, the Northern Goshawk, *laingi* subspecies suitability model has been revised and improved by adjusting several parameters, including optimal forest age and stand height (Mahon *et al.* 2012).

The habitat protection data presented in this document are derived from a revised/refined habitat suitability model that was run in August 2012 for the entire range of the Northern Goshawk, *laingi* subspecies (Mahon *et al.* 2012; Smith 2012).

The protection data in this report are presented with the following caveats:

- The habitat suitability model outputs are based primarily on forest cover data.
- Model errors appear to be largely driven by errors in the underlying forest cover data (Mahon *et al.* 2012).
- Formal field verification of the model has occurred at three scales. At the stand-level scale (10 ha), the average for the North Coast, South Coast, and Vancouver Island using the difference-based method is 82% accuracy for the nesting model and 85% accuracy for the foraging model (Mahon *et al.* 2012). For more detailed information about the accuracy assessment methodology and detailed results of each scoring method at each scale within each conservation region, refer to the project reports for each conservation region (North Coast: Mahon 2010; Vancouver Island: Mahon 2011; South Coast: Mahon 2012; Haida Gwaii: Doyle *et al.* 2010)
- Accuracy scores and patterns of bias were consistent across conservation regions. This suggests that the models are fairly robust and broadly applicable (Mahon *et al.* 2012)
- The protection analysis includes the habitat captured within strategic landscape reserves in the Ecosystem-based Management plan within the total area protected, although strategic landscape reserves are flexible and can be moved across the landscape over time and space. This may potentially overestimate available habitat protection if these reserves are moved from their current locations over time.
- In this protection analysis, the total nesting and foraging habitat protection results included patches of all sizes (i.e., any sized patch of suitable habitat was included in the total habitat protected). Future analyses will consider patch size and habitat functionality, specifically the spatial arrangement of suitable habitat relative to Northern Goshawk territoriality (i.e., size and inter-territory spread).
- In this protection analysis, all Ungulate Winter Ranges (UWRs) in all conservation regions were considered as 100% netdown, even though some UWRs allow for a rotational harvest over time.

- Some Parks and Protected Areas could not be analysed due to a lack of forest cover data for these areas (e.g., Kitlope Conservancy), so the actual degree of suitable habitat that is protected is likely underestimated.

MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS
INFORMATION NOTE

Date: August 9, 2012

File: 280 20 BN

CLIFF/tracking: 189678

PREPARED FOR: Honourable Steve Thomson, Minister of Forests, Lands and Natural Resource Operations

ISSUE: Release of the Federal Government's recovery Strategy for the Northern Goshawk *laingi* subspecies in Canada

BACKGROUND:

The Northern Goshawk *laingi* subspecies (*Accipiter gentilis laingi*) occurs in coastal forests of British Columbia, Alaska and Washington. The Canadian population of Northern Goshawks was assessed as "Threatened" in 2000 by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and listed under the Federal *Species at Risk Act* in 2003. A British Columbia Recovery Strategy was posted on the provincial recovery planning website in 2008. The federal government must post a federal recovery strategy within legislated timelines: it failed to meet an extended deadline for March 2012 and is under pressure to post as soon as possible.

The federal *Species at Risk Act* (SARA) requires the federal Minister to identify critical habitat in a Recovery Strategy "to the extent possible, based on the best available information." On June 26, 2012, Parks Canada released the draft federal "Recovery Strategy for the Northern Goshawk *laingi* subspecies in Canada" for 60-day stakeholder review. It is anticipated the strategy will then be posted for 60-day public review in October 2012. The federal strategy adopts the 2008 British Columbia strategy, but also identifies 99 critical habitat polygons that include a significant amount of provincial forest lands currently licenced to forest companies as well as private managed forest lands. Once identified, critical habitat must be "legally protected" on federal lands or "effectively protected" on provincial lands.

Several initiatives and projects are underway in British Columbia designed to improve the understanding of Northern Goshawk habitat use, including field inventory and monitoring, field verification and refinement of the habitat model, development of best practices/ guidance, and assessment of conservation benefits under Ecosystem-Based Management. Direct habitat protection is being pursued through legal designation of Wildlife Habitat Areas under the *Forest and Range Practices Act*. The degree of protection offered by Parks, Old Growth Management Areas and other measures is also being assessed; however, this information will not be available within the review timelines specified by Parks Canada.

If critical habitat on provincial lands is not "effectively protected," the federal Minister must, every six months, report on steps being taken to protect the habitat. If the habitat remains unprotected, the federal Minister must recommend to the Governor in Council that an order be made applying the SARA prohibitions against destruction of critical habitat to provincial lands (a "safety net" order).

DISCUSSION:

s.13

NEXT STEPS:

s.13

Attachments: 1. Approved Project Charter

Contact:

Craig Sutherland

ADM, Coast Area

Phone: (250) 387-9773

Alternate Contact:

Tom Ethier

Resource Stewardship Division

Phone: (250) 387 5657

Prepared by:

Steve Gordon

Resource Stewardship Division

(250) 751 7126

Reviewed by	Initials	Date
DM		
DMO		
ADM – Coast Area	CS	Aug 9/12
ADM – Resource Stewardship	TE	Aug 9/12
Author	SG	Aug 9/12



189678 IN APPENDIX
1 - NOGO Project Chz

