



VOLUME

3

MAPS

North Cascades and Pacific Ranges Ecoregional Assessment

November 2006

**North Cascades and Pacific Ranges
Ecoregional Assessment
Volume 3 – Maps**

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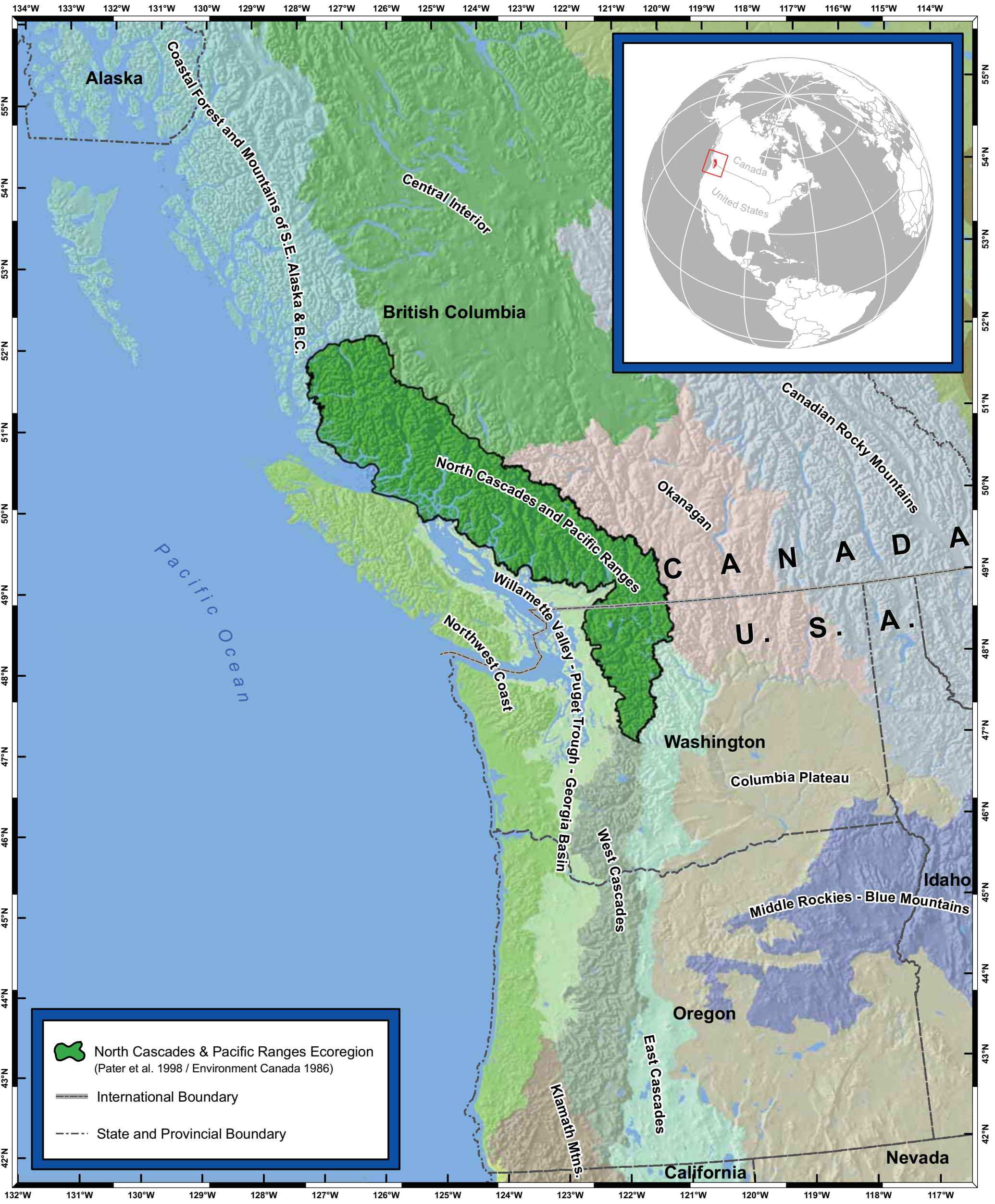
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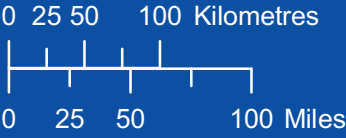


NORTH CASCADES and PACIFIC RANGES ECOREGION:

Map 1a: Ecoregions of the Pacific Northwest

Ecoregions are large areas of land or water defined by their distinct climate, geology and native species. The study area boundary corresponds with that of the North Cascades and Pacific Ranges Ecoregion as originally delineated by Bailey (1995) and Environment Canada (Wiken 1986) and then modified by TNC and NCC for use in their Ecoregional assessments in the continental United States, Alaska, Hawaii and Canada.

Scale 1:5,000,000

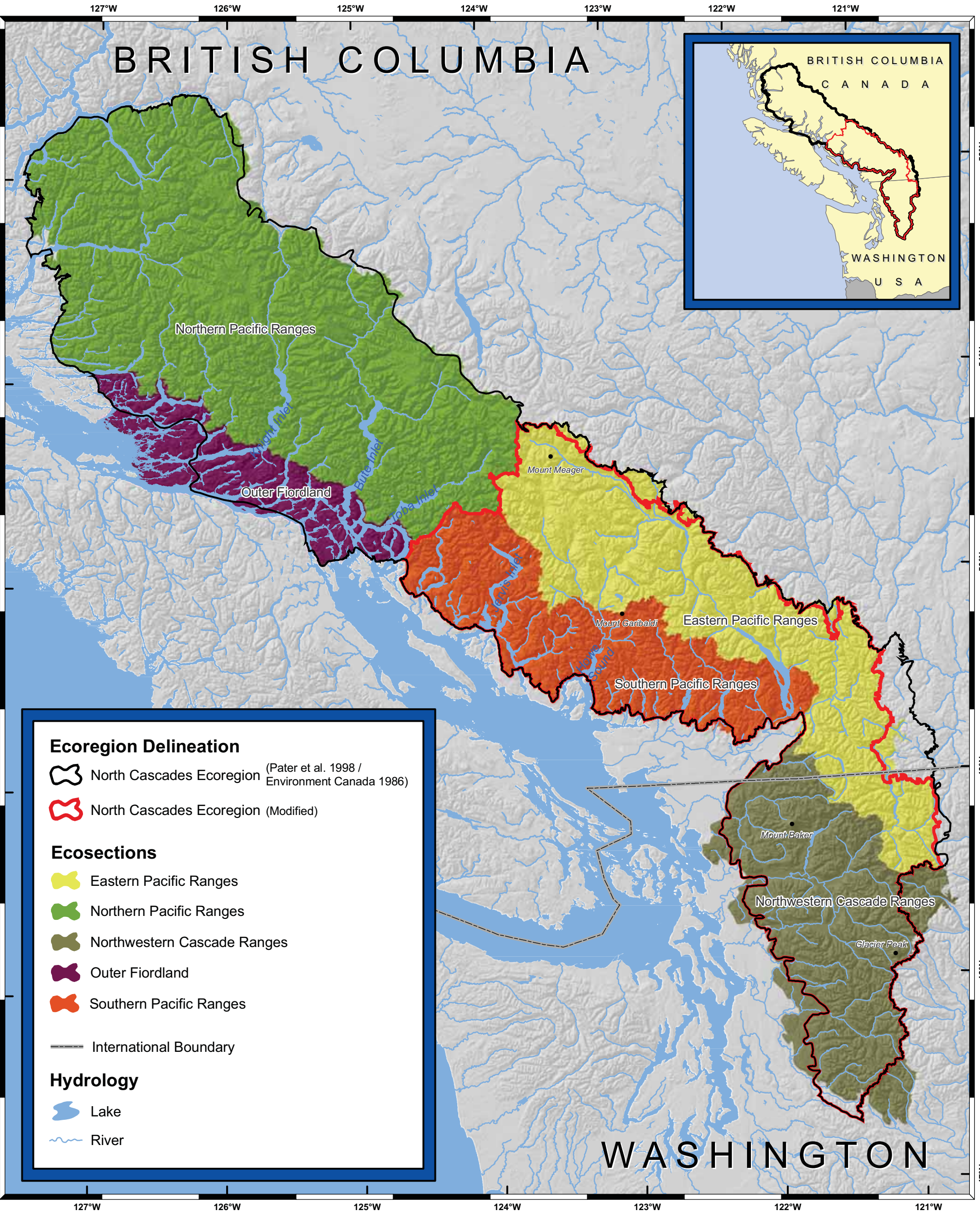


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NORTH CASCADES ECOREGION:

Map 1b: North Cascades Ecoregion

The North Cascades and Pacific Ranges Ecoregion boundary was modified from the original (as defined by Pater et al., 1998 and Environment Canada, [Wiken1986]) by the *Coastal Forests and Mountains of Southeast Alaska and British Columbia Conservation Area Design (RRCS et al. 2003) and the Coast Information Team Ecosystem Spatial Analysis of Haida Gwaii, Central Coast, and North Coast of British Columbia (Rumsey et al. 2004). By modifying their study area boundaries these two projects encompassed the top third of the original TNC/NCC North Cascades and Pacific Ranges Ecoregion boundary. These modifications used ecosection boundaries from the BC Ecoregional Classification scheme. Two ecosections -- Northern Pacific Ranges and Outer Fiordlands -- were included in these two previous analyses and were therefore not re-analyzed for this assessment. Sections of the eastern boundary of the ecoregion were also modified by the Okanagan Ecoregion Assessment based on updated vegetation mapping and review by ecologists with the Washington Natural Heritage Program and NatureServe (Pryce et al. 2006).

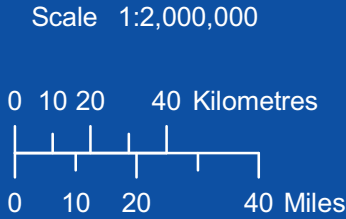
* Refer to Appendix 20 for citations of previous studies involving portions of the North Cascades and Pacific Ranges ecoregion.

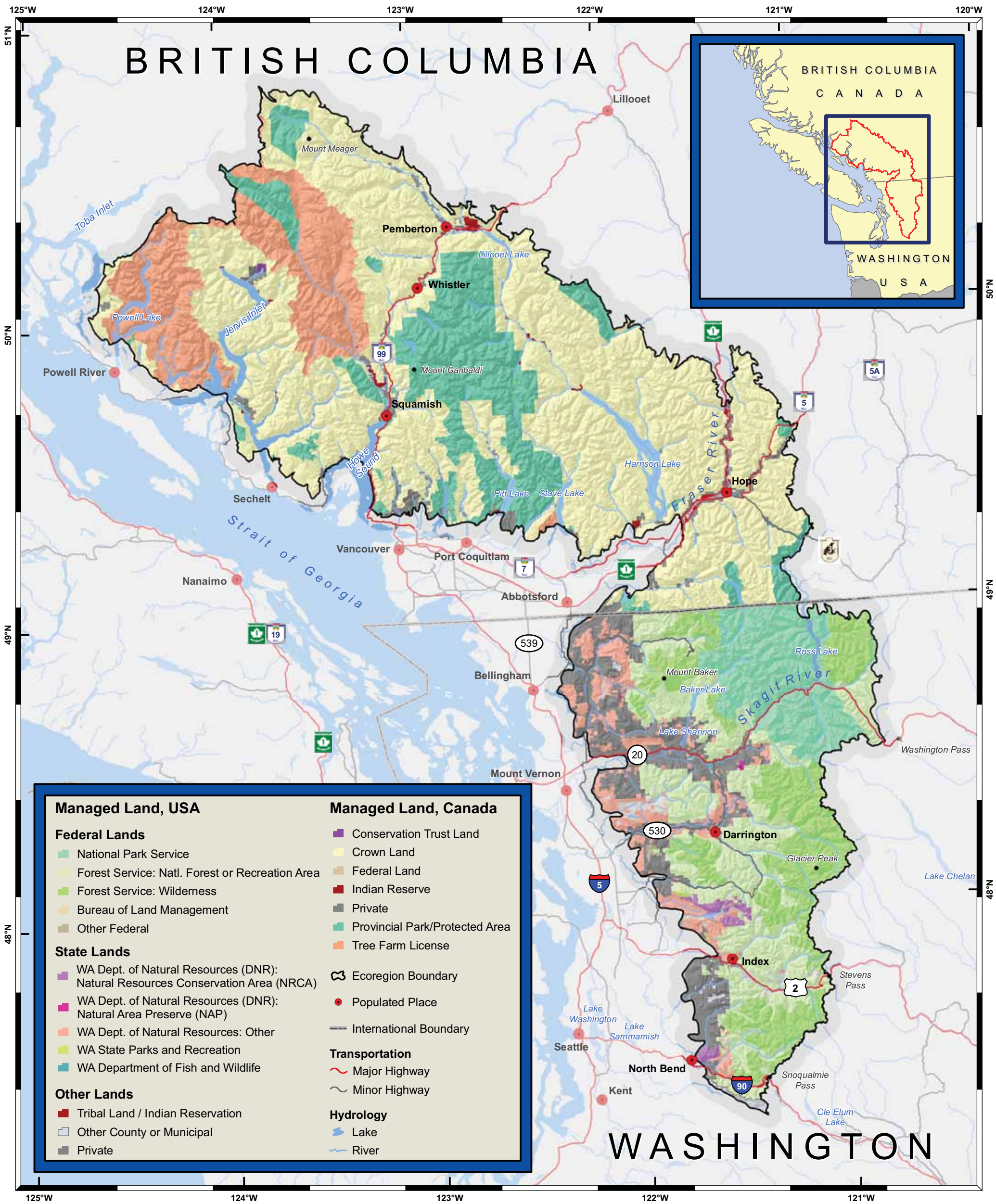
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NORTH CASCADES ECOREGION:

Map 2: Land Ownership and Management

The North Cascades Ecoregion spans 3,817,320 ha (9,432,787 ac) with approximately 65% in BC and 35% in Washington State. Land ownership and management patterns vary a great deal across British Columbia and Washington, creating the need for a coordinated regional approach to the conservation of the ecoregion's biodiversity.

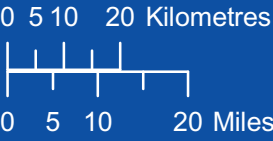
Managed Land - USA

Federal Lands	National Park Service.....16%
	Forest Service: National Forest.....29%
	Forest Service: Wilderness.....24%
	Bureau of Land Management.....<1%
State Lands	DNR: NRCA.....1%
	DNR: NAP.....<1%
	DNR: Other.....9%
	Parks and Recreation.....<1%
	Dept. of Fish and Wildlife.....<1%
Other Lands	Tribal Land.....<1%
	County or Municipal.....1%
	Private Land.....19%

Managed Land - Canada

Provincial Crown Land.....65%
Provincial Park / Protected Area.....17%
Indian Reserve.....<1%
Federal Land.....<1%
Private Land.....3%
Conservation Trust Land.....<1%
Tree Farm License.....14%

Scale 1:1,350,000



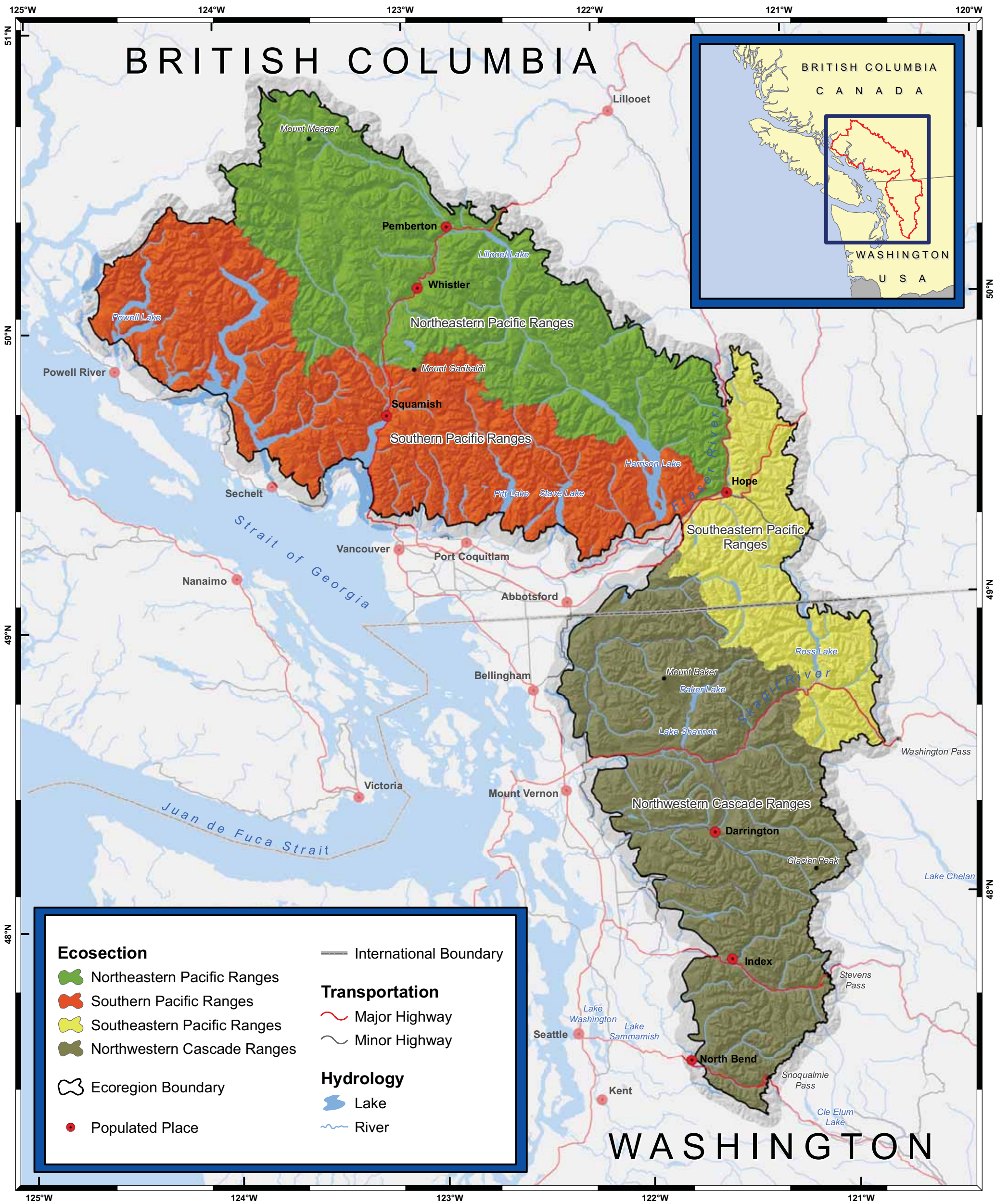
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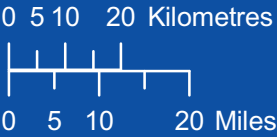


NORTH CASCADES ECOREGION:

Map 3: Terrestrial Ecosections

The boundary utilized for the North Cascades Ecoregional Assessment corresponds very closely with the southern portion of the British Columbia Ecoregion Classification system's delineation of the Coast and Mountains Ecoprovince. The North Cascades Ecoregion is divided into four sections that roughly match the BC Ecoregion Classification's ecosections in the Pacific Ranges ecoregion. For analytical purposes The Eastern Pacific Ranges ecosection was split along the middle of the Fraser River. The ecosections analysed through the North Cascades ERA were the Northeastern Pacific Ranges, Southeastern Pacific Ranges, Southern Pacific Ranges and Northwestern Cascade Ranges.

Scale 1:1,350,000

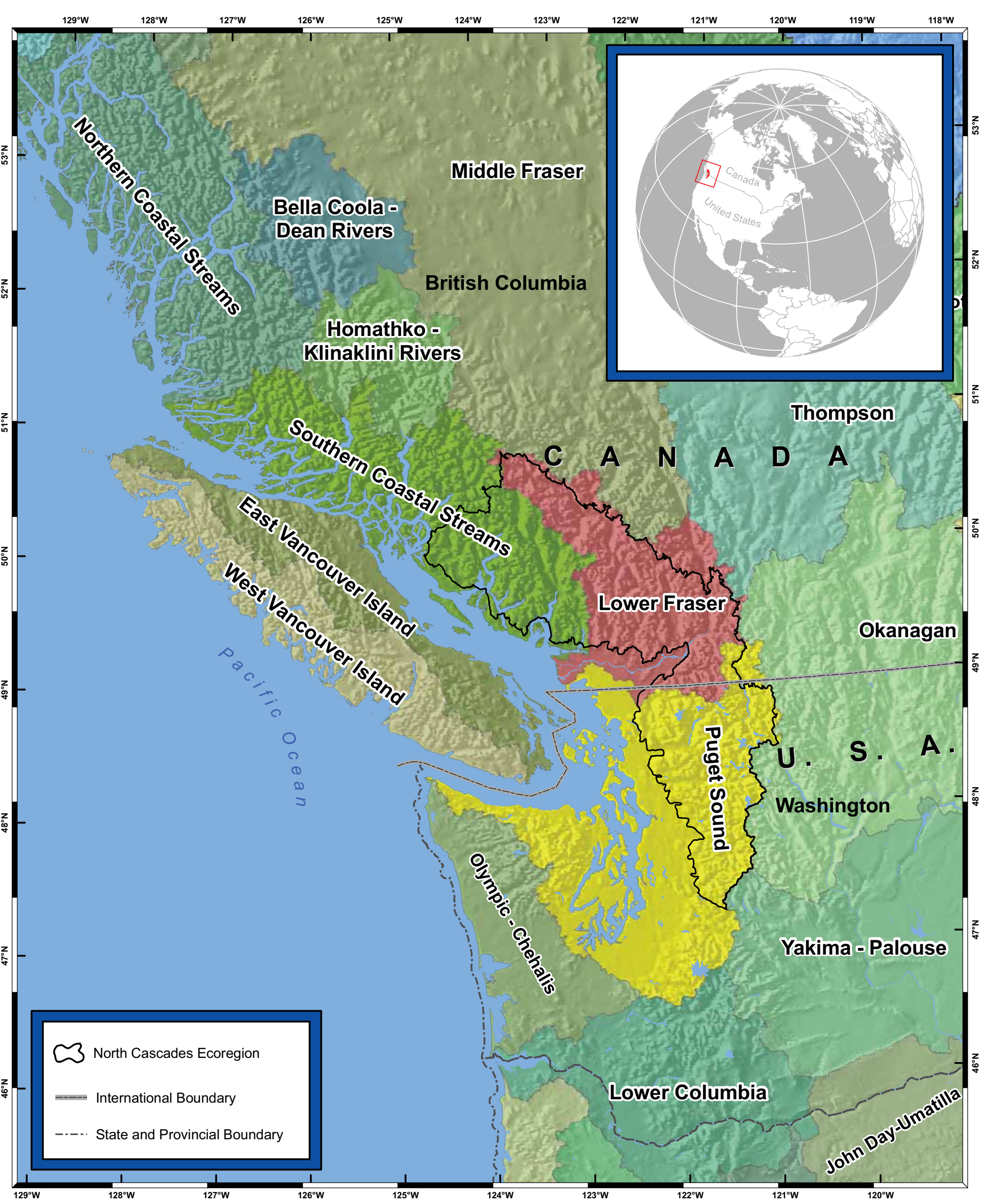


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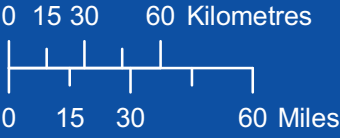


NORTH CASCADES ECOREGION:

**Map 4: Ecological Drainage Units
of the Pacific Northwest -
Southern British Columbia**

Ecological drainage units are comprised of river ecosystems that share a common zoogeographic history and therefore likely have a distinct set of freshwater assemblages and habitats. This map illustrates the ecological drainage units in the Pacific Northwest and southern British Columbia.

Scale 1:3,000,000



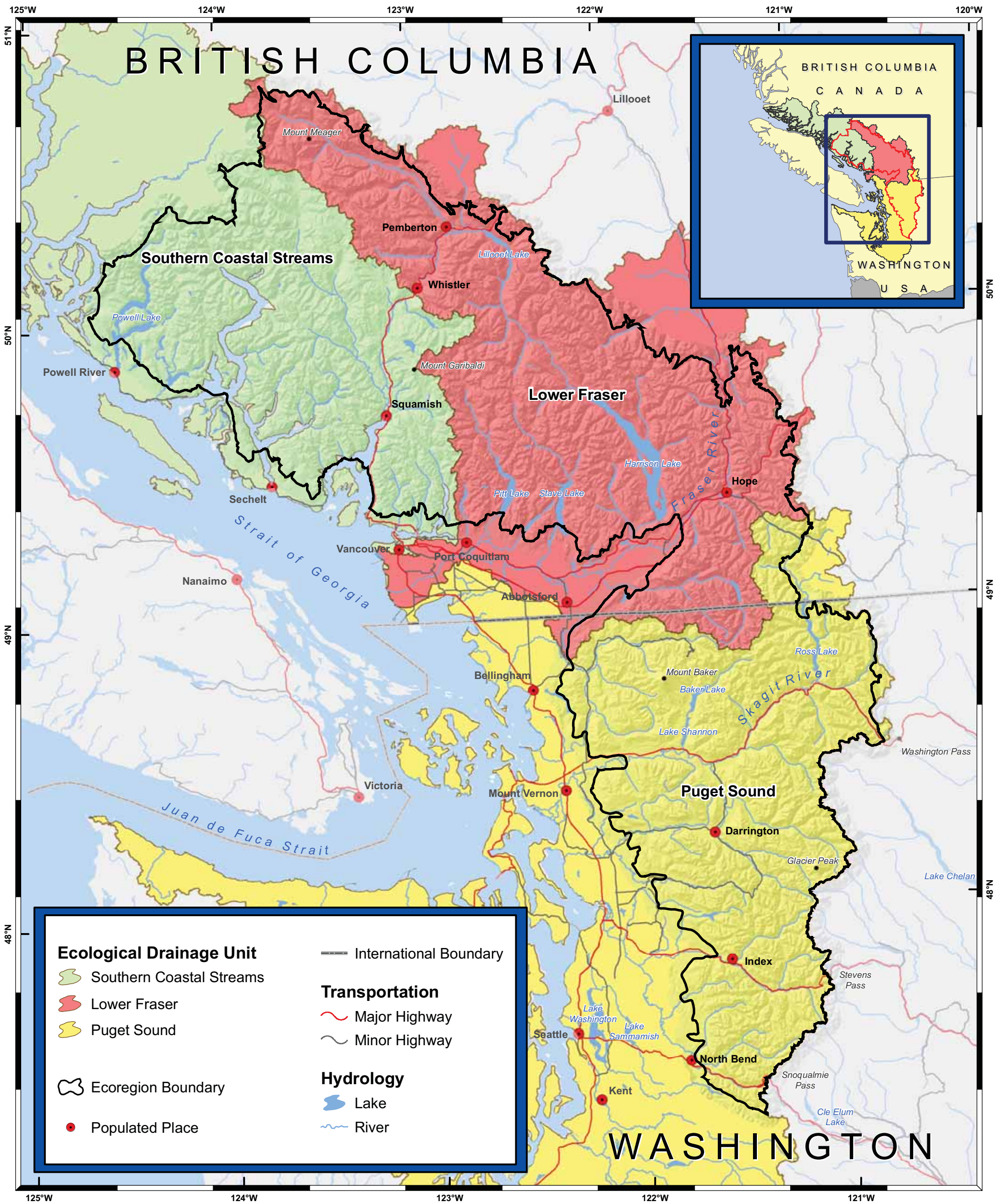
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NORTH CASCADES ECOREGION:

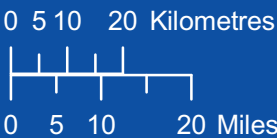
Map 5: Ecological Drainage Units of the North Cascades Ecoregion

Ecological drainage units are comprised of river ecosystems that share a common zoogeographic history and therefore likely have a distinct set of freshwater assemblages and habitats. The assessment of freshwater biodiversity for the North Cascades Ecoregion was conducted at the full extent of the Southern Coastal Streams, Lower Fraser and Puget Sound EDUs.

The Fraser Canyon EDU has been combined with the Lower Fraser EDU and as such, has been part of the analysis for this ecoregional assessment.

The Puget Sound EDU was analyzed as part of a previous ecoregional assessment (Floberg et al. 2004) and was therefore not re-analyzed for the North Cascades ERA. However, the results from the Puget Sound EDU analysis were included in the North Cascades ERA freshwater analysis.

Scale 1:1,350,000

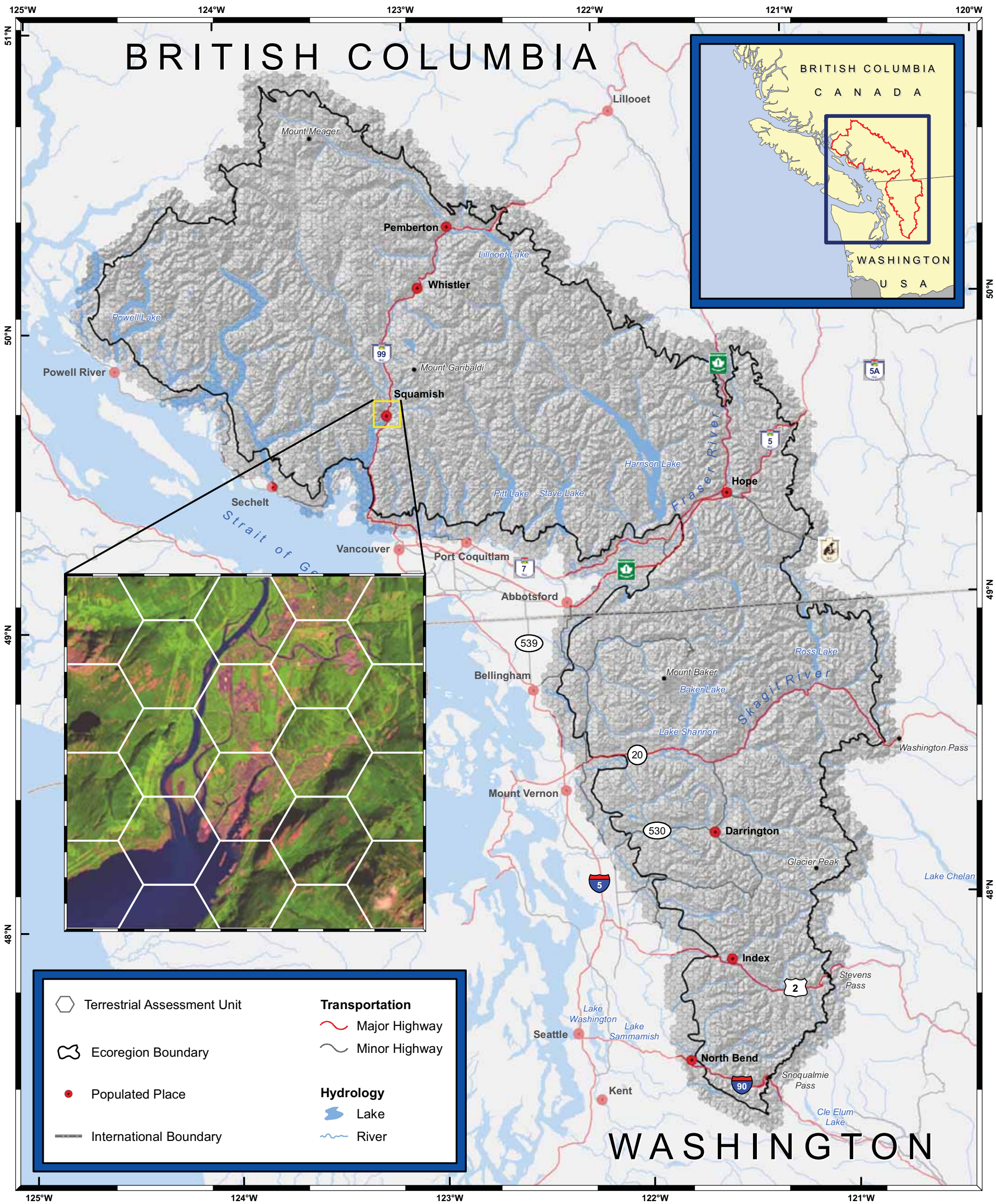


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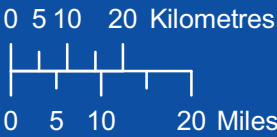


NORTH CASCADES ECOREGION:

Map 6: Terrestrial Assessment Units

For the terrestrial analyses, 500 hectare hexagons were used as the assessment units. There are a total of 9587 hexagons used in the assessment of the North Cascades Ecoregion. Using a consistently sized assessment unit eliminates one variable of uncertainty in the MARXAN algorithm. The rationale for this size was that it was "sufficient for efficiently representing local-scale targets in small functional sites while allowing for aggregation of ecological systems into extensive landscape scale conservation areas" (Neely et al. 2001).

Scale 1:1,350,000



Sources:
British Columbia Landsat mosaic (1999 to 2004), used in this map supplied by the Ministry of Forests and Range, Government of British Columbia.
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
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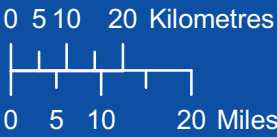
NORTH CASCADES ECOREGION:

Map 7: Terrestrial Ecological Systems

This map represents the predicted distribution of the 16 ecological systems, or "coarse filter" conservation targets, used to guide conservation area selection for the ecoregional assessment. Terrestrial ecological systems are groups of plant community types that tend to co-occur within landscapes with similar ecological processes, substrates, and/or environmental gradients. A variety of landcover datasets, DEM-derived topographic features, and delineated climate zones were combined, along with expert knowledge, as input for this predictive model.

Due to the limitations of the source data, it was not possible to map all of the ecoregion's characteristic systems. Alpine vegetation and ice fields were mapped as 2 composites: Rocky Mountain and North Pacific Alpine Composites. Montane small patch shrublands and meadows imbedded in matrix forests were also mapped as 2 composites: Rocky Mountain and North Pacific Montane Composites. In addition, small scale wetlands such as riparian areas, small grasslands, and woodlands peripheral to the ecoregion, were not mapped.

Scale 1:1,350,000

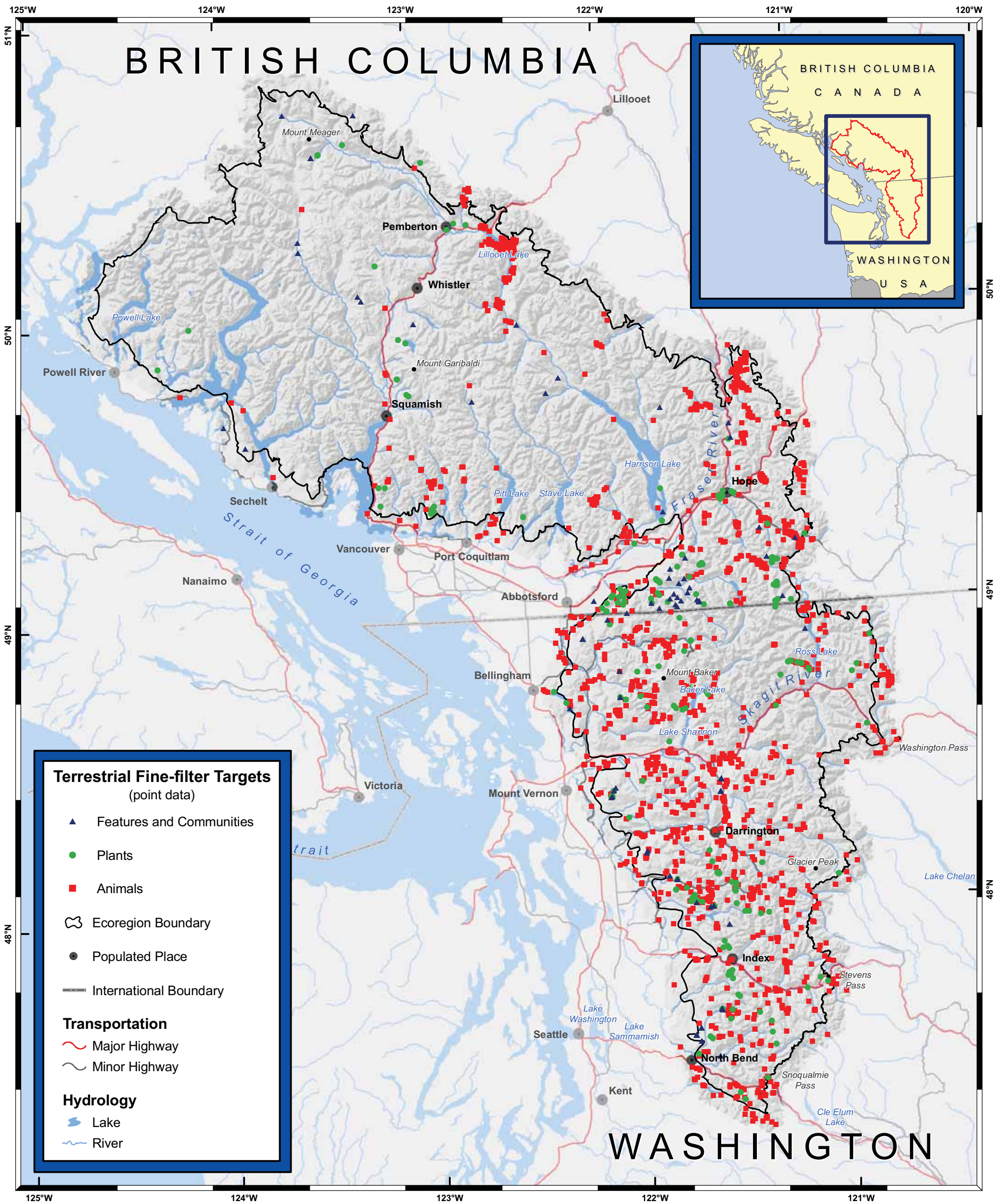


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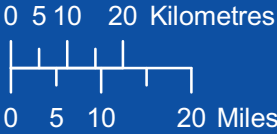


NORTH CASCADES ECOREGION:

Map 8a: Terrestrial Fine-filter Targets

This map represents the locations of individual terrestrial plant and animal target species and populations/sub-populations for the North Cascades ERA. Special features (e.g., karst, hot springs) and rare communities (e.g., Sitka Spruce/Salmonberry Dry) are also represented in this map. The terrestrial fine-filter data is derived from a number of sources including Natural Heritage Programs/Conservation Data Centres along with other agencies and individuals in British Columbia and Washington (Appendix 4).

Scale 1:1,350,000

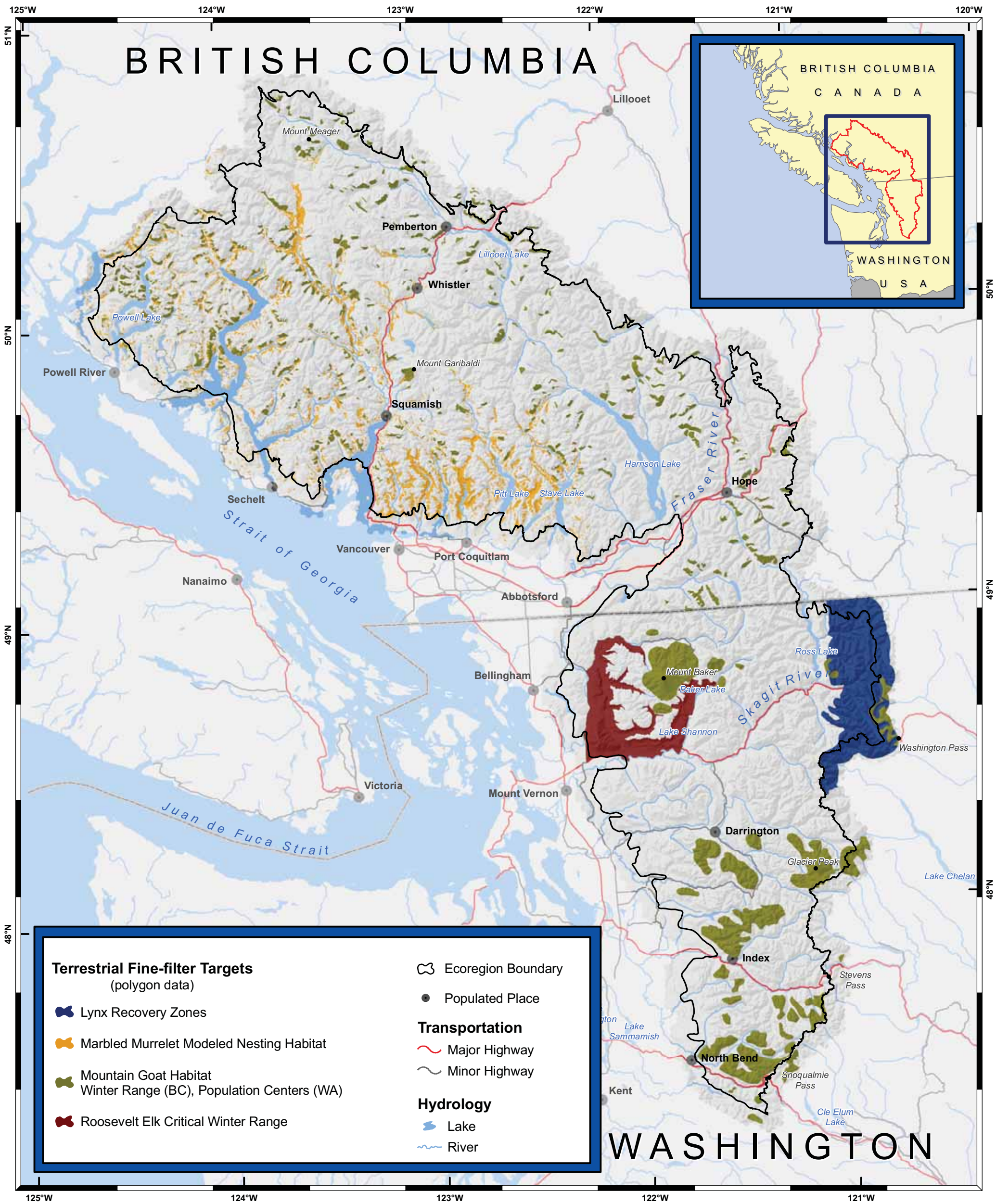


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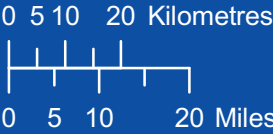


NORTH CASCADES ECOREGION:

Map 8b: Terrestrial Fine-filter Targets

This map represents habitat data for some terrestrial fine-filter animal target species for the North Cascades ERA. This data comes from a number of sources including Natural Heritage Programs/Conservation Data Centres along with other agencies and individuals in British Columbia and Washington (Appendix 4).

Scale 1:1,350,000

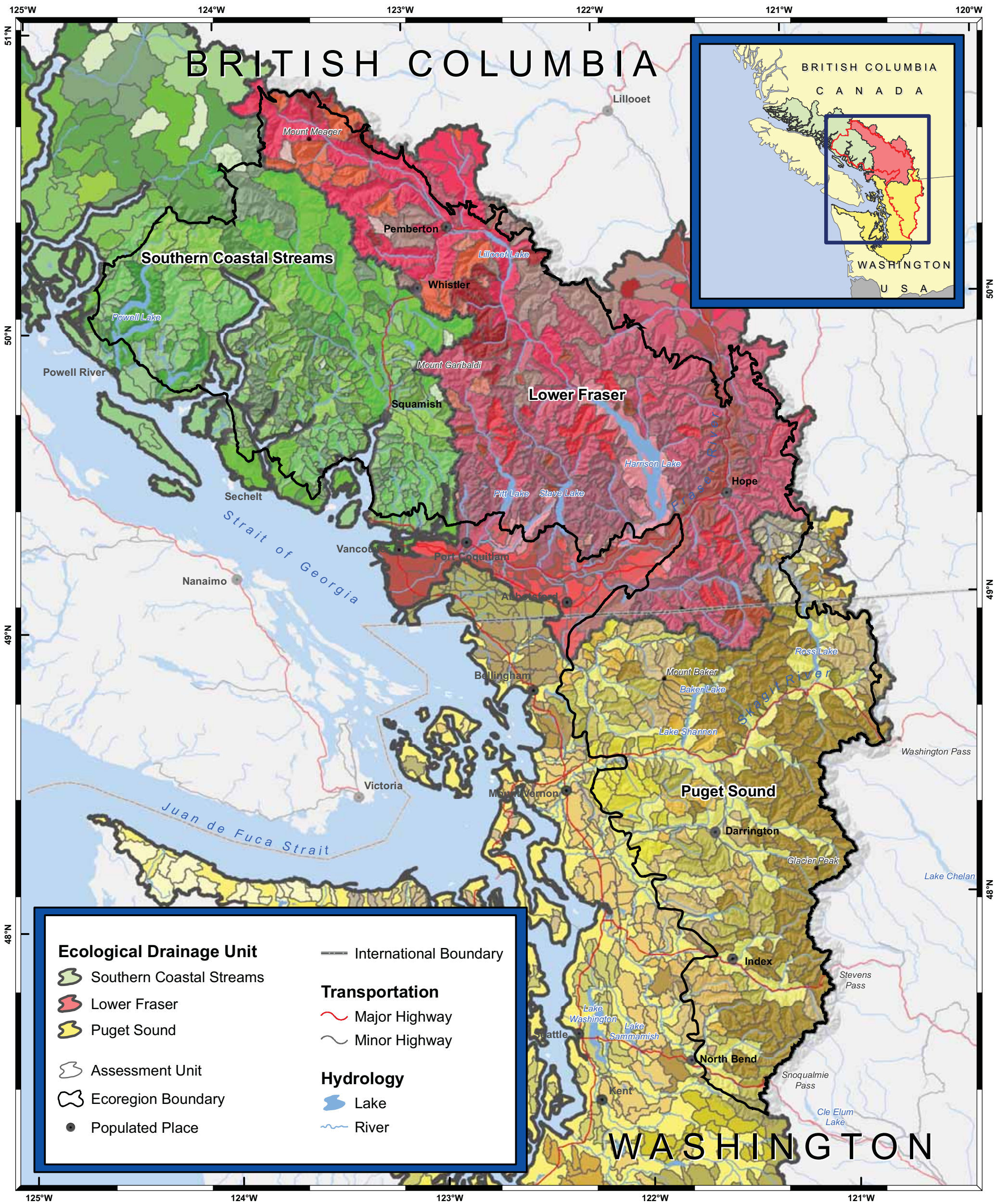


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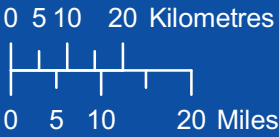
NORTH CASCADES ECOREGION:

Map 9: Freshwater Ecological Systems

This map represents the distribution of freshwater ecosystems across the three ecological drainage units (EDUs) that were part of the North Cascades Ecoregional assessment. Freshwater ecosystems are nested spatial units that are composed of stream and lake networks that are distinct in geomorphological patterns, tied together by similar ecological characteristics and processes. Freshwater ecosystems are used as "coarse-filter" conservation targets to guide conservation area selection for the freshwater component of the ecoregional assessment. Within an EDU, the different shades of a given colour represent distinct freshwater ecological systems.

Freshwater assessment units in British Columbia are third order watersheds from BC's watershed atlas. In Washington, freshwater assessment units are HUC 6s of USGS's stream catalogue.

Scale 1:1,350,000

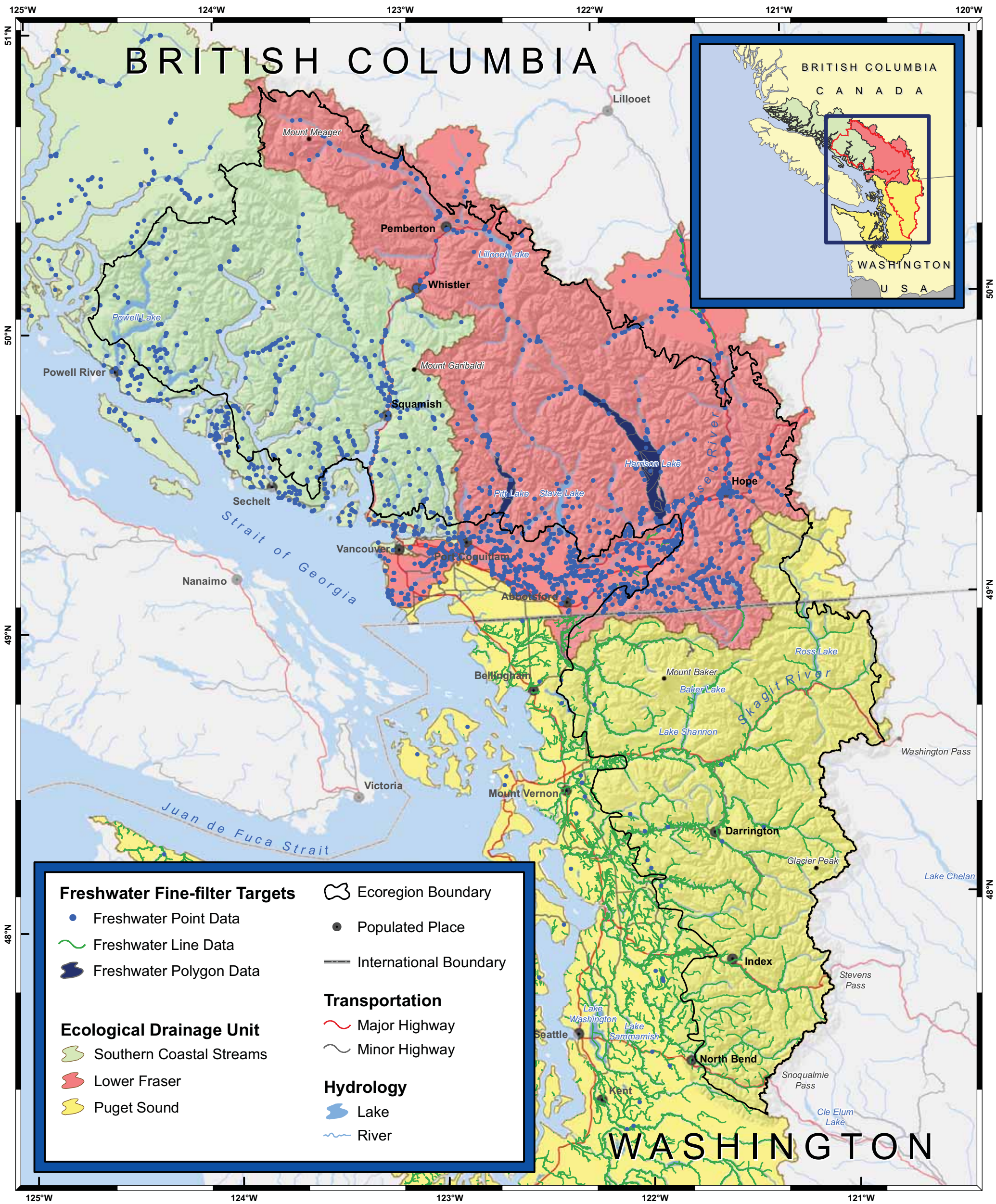


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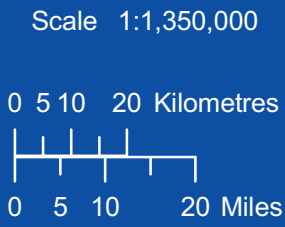
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NORTH CASCADES ECOREGION:

Map 10: Freshwater Fine-filter Targets

This map represents the distribution of freshwater fine-filter targets across the three EDUs that were part of the North Cascades Ecoregional Assessment. While coarse-filter targets capture ecological systems and their functions, fine-filter targets represent rare or vulnerable populations of species or habitats that may not be adequately represented within coarse-filter targets. Freshwater targets were selected at multiple spatial scales and levels of biological organization. Targets are generally defined as those species that are currently imperiled, threatened, or endangered; make up species aggregations or groups; or are of special concern due to endemic, disjunct, vulnerable, keystone, or wide-ranging status. These data are used in conjunction with coarse-filter ecosystem data to identify high-priority conservation areas (Map 23).

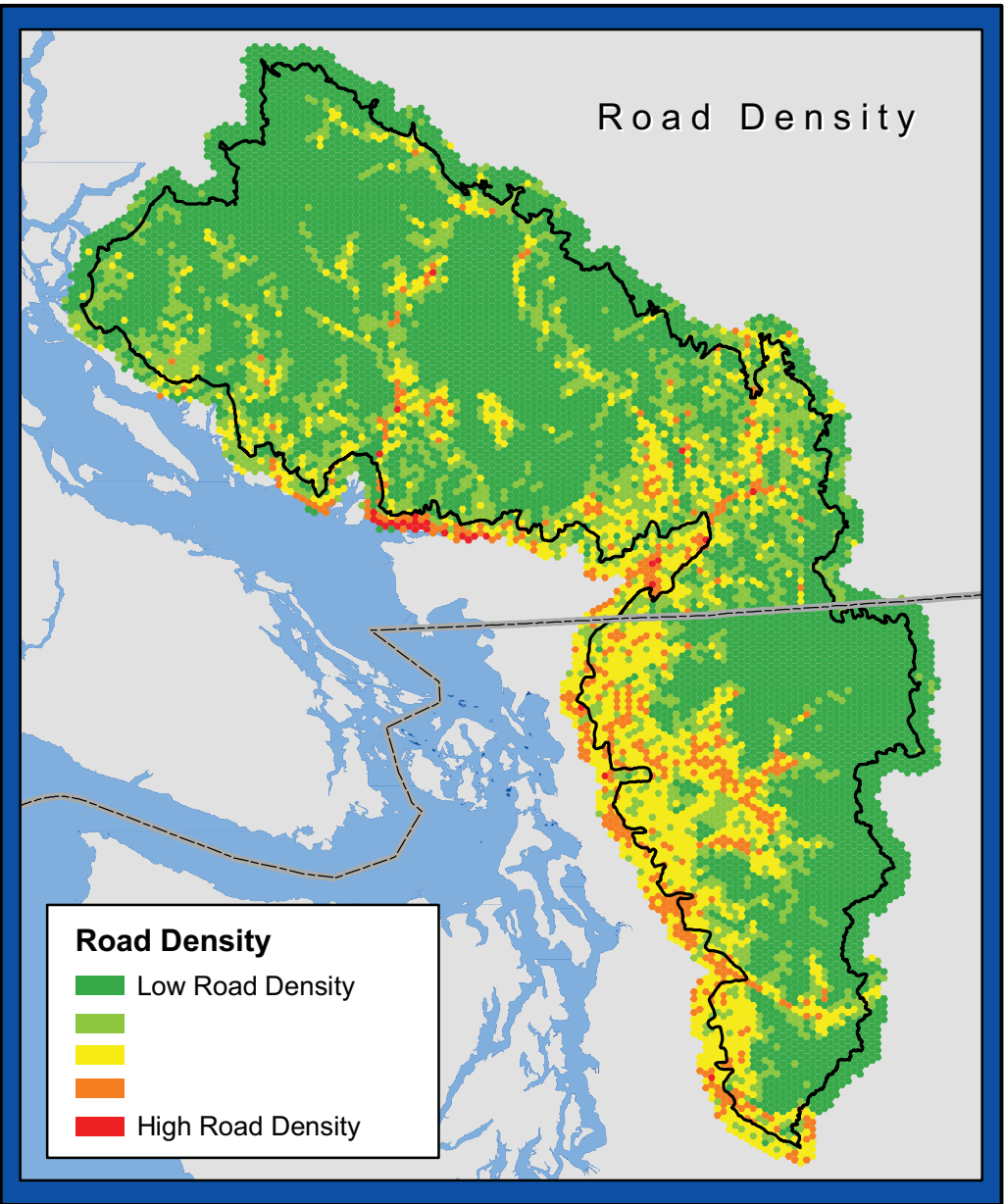
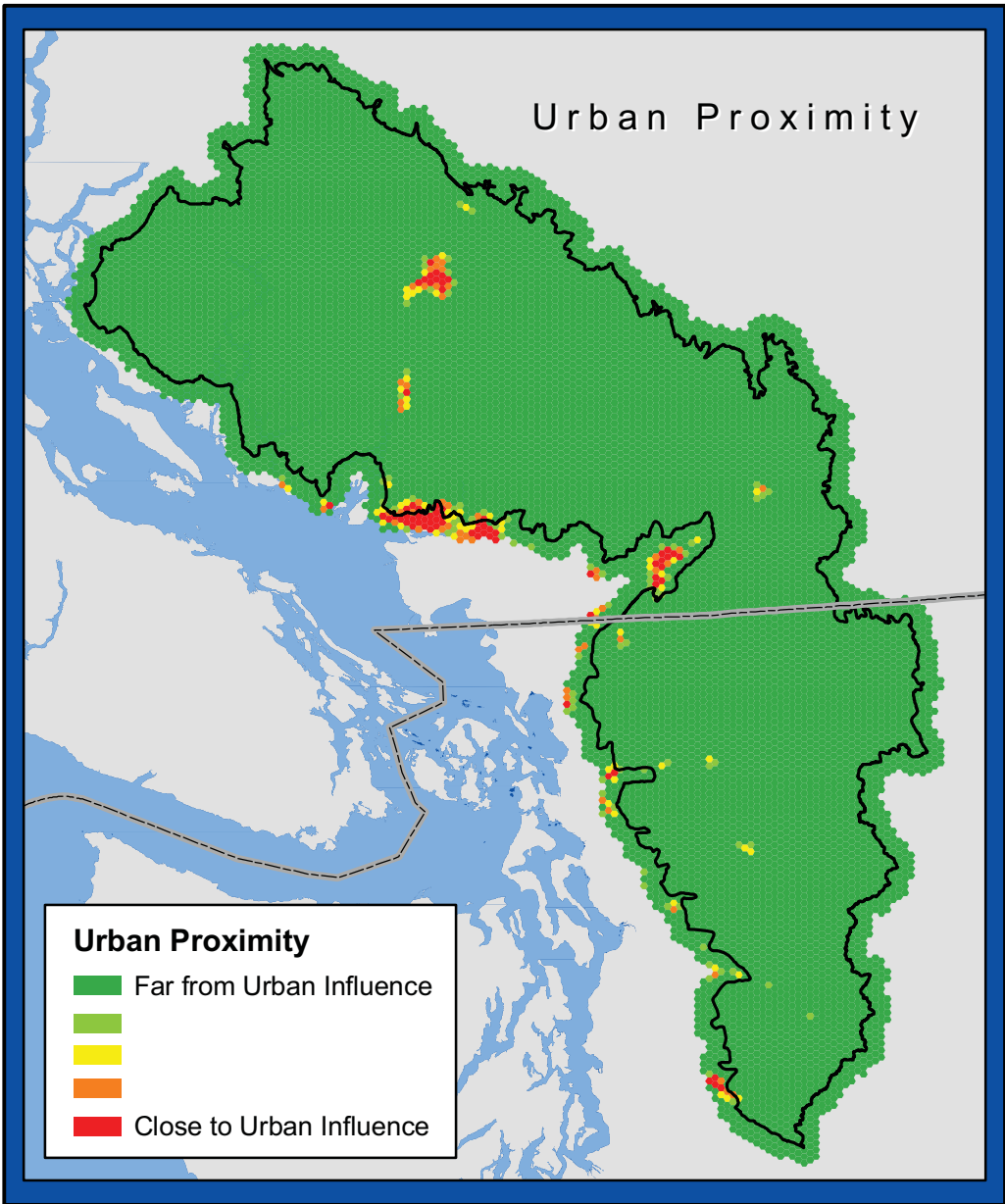
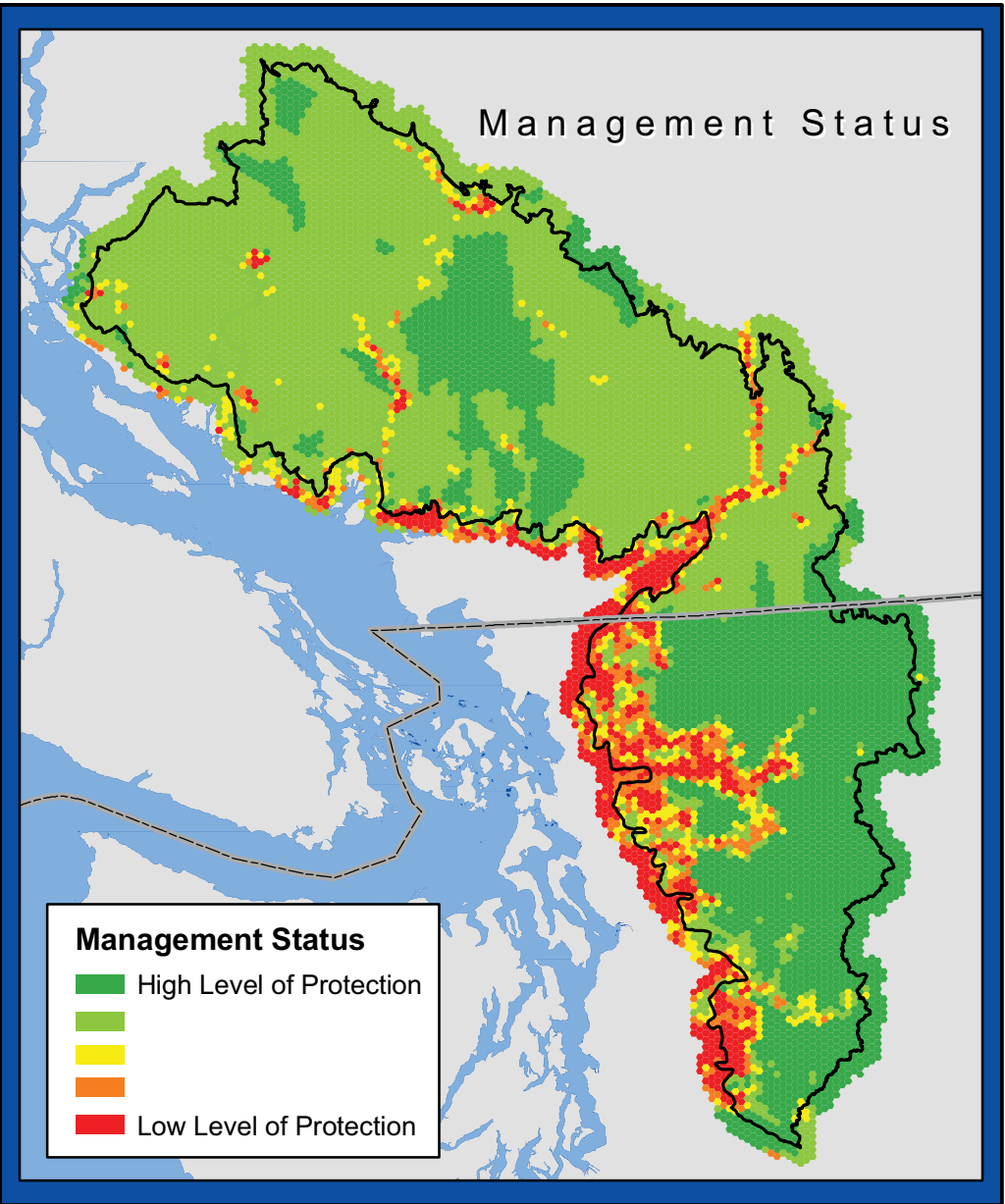
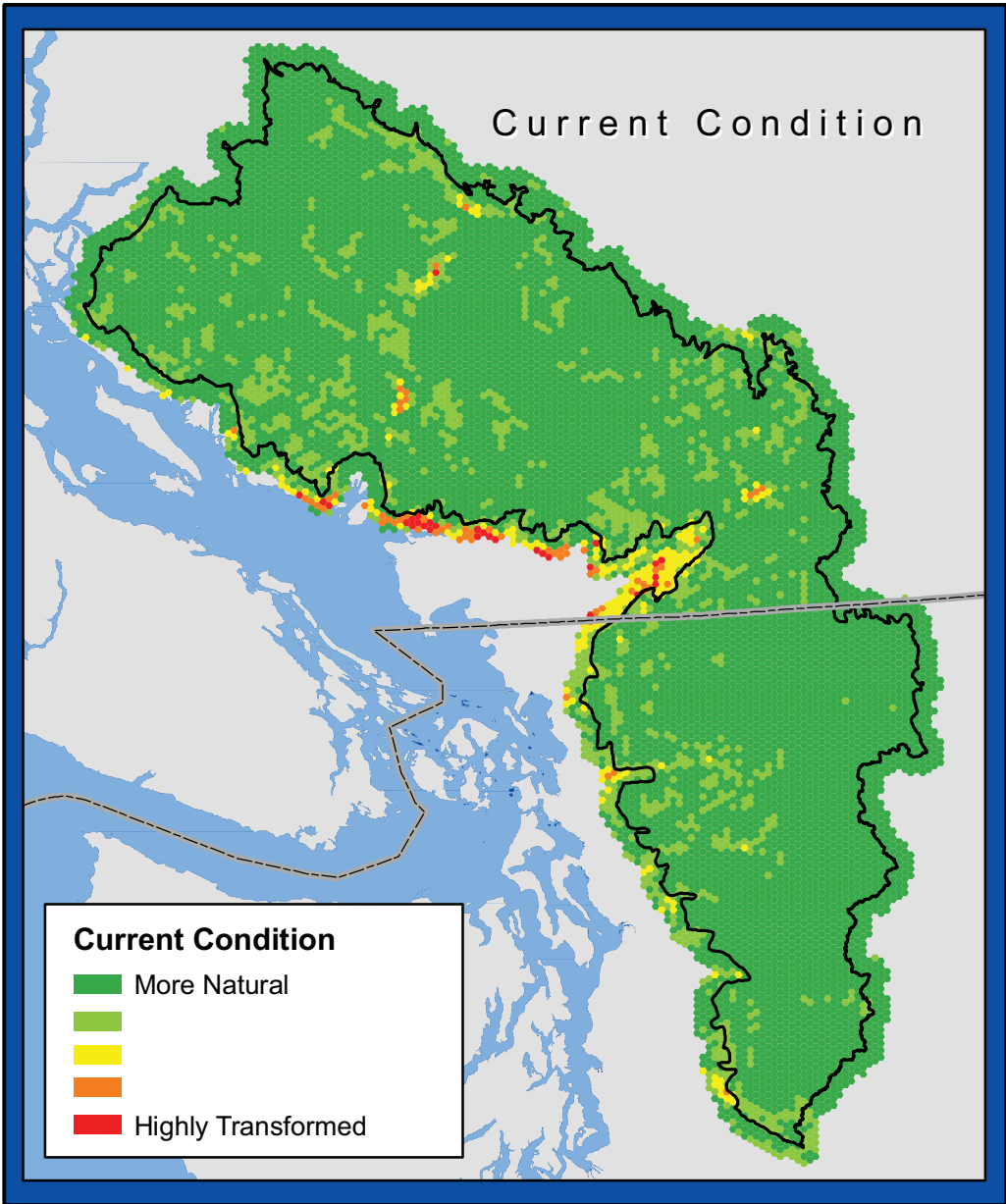


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NORTH CASCADES ECOREGION: Map 11: Terrestrial Suitability Index Assembly

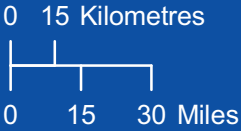
One input to MARXAN's optimal reserve selection process is a quantitative index related to a place's suitability for conservation. "Suitability" can be thought of as the "relative likelihood of successful conservation" at a given place. The suitability index can incorporate both biological and non-biological factors, integrates land use factors for a given geographic area, and is used to help select among analysis units that contain conservation targets.

- The four factors used in the terrestrial suitability index were current condition, management status, urban proximity and road density. Each factor is described below:
- Current condition: percent of area converted to urban, agricultural, and mine land uses.
 - Management status: level of protection given to biodiversity; based on all landowners or land managers within the area.
 - Urban proximity: future urban growth potential; based on distance from urban areas.
 - Road density: road km/km2 within area.

Refer to Appendix 4 for information on data sources. Appendix 13 describes the methods and provides further clarification of the definitions.



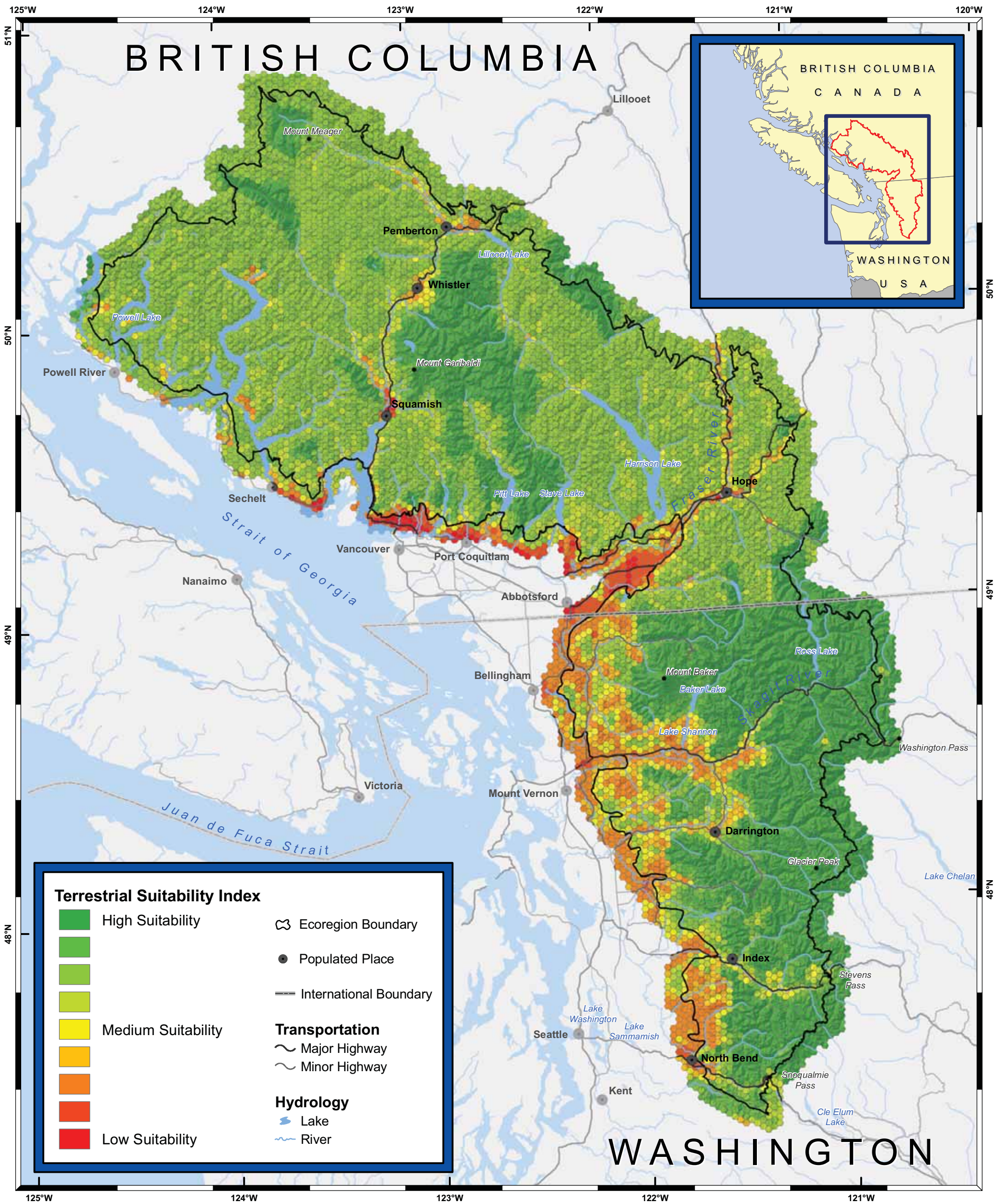
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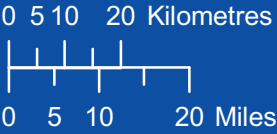
NORTH CASCADES ECOREGION:

Map 12: Terrestrial Suitability Index

The objective of a suitability index is to promote the MARXAN model to select more intact or viable areas when all other factors were equal, rather than randomly selecting less intact, fragmented, or less viable areas. A suitability index was developed using readily available spatial data sets representative of land use in the North Cascades, and was applied to each 500 ha assessment unit. Factors used included current condition, management status, urban proximity, and road density.

The values for each factor were determined through expert opinion using the methods of Saaty (1977). Experts were asked to assign relative weights to each of the four factors. We recognize that other variables influence the relative likelihood of successful conservation, but the terms in the index equation are limited to data readily available in GIS.

Scale 1:1,350,000

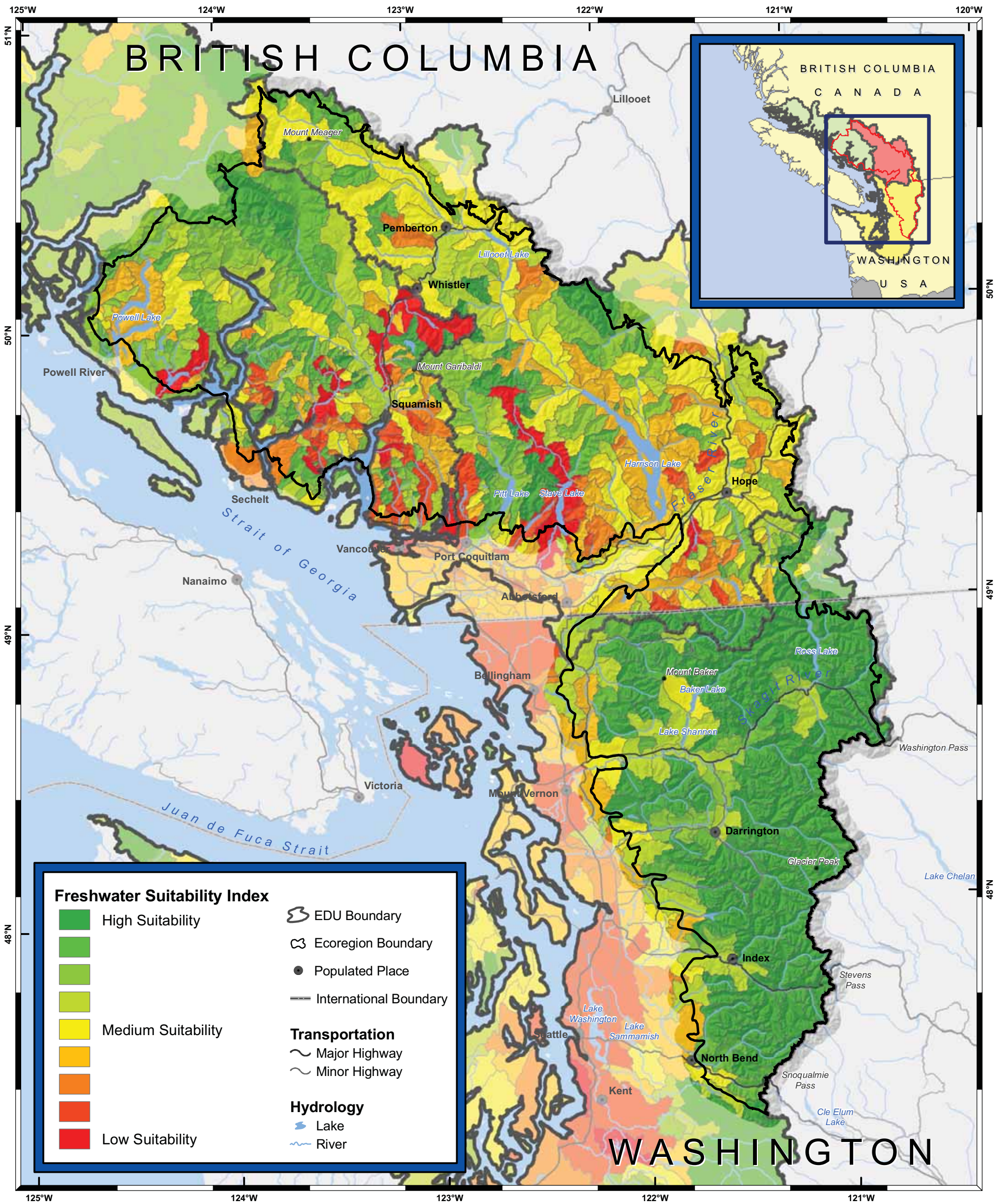


Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

November 2006

Projection: BC Albers Equal Area

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NORTH CASCADES ECOREGION: Map 13: Freshwater Suitability Index

The freshwater suitability index was generated in two stages. The BC portion of the study area (Southern Coastal Streams and Lower Fraser EDUs) were analysed as part of the North Cascades Ecoregional Assessment. The Washington portion of the study area (Puget Sound EDU) was processed separately (Floberg et al. 2004). Eight factors were used to calculate the BC portion of the freshwater suitability index:

- Management status
- Presence of dams
- Road/stream crossing
- Water extraction
- Current condition (land use)
- Riparian disturbance from logging
- Road density
- Presence of stocked fish

Three factors were used to calculate the Washington portion of the freshwater suitability index:

- Non-natural land use
- Dam density (number of dams/hectare)
- Normalized road density (total road length/total stream length)

The values for each factor were determined through expert opinion using the methods of Saaty (1977). Experts were asked to assign relative weights to each of the three factors. We recognize that other qualities influence the relative likelihood of successful conservation, but the terms in the index equation are limited to data readily available in GIS.

Scale 1:1,350,000

0 5 10 20 Kilometres

0 5 10 20 Miles

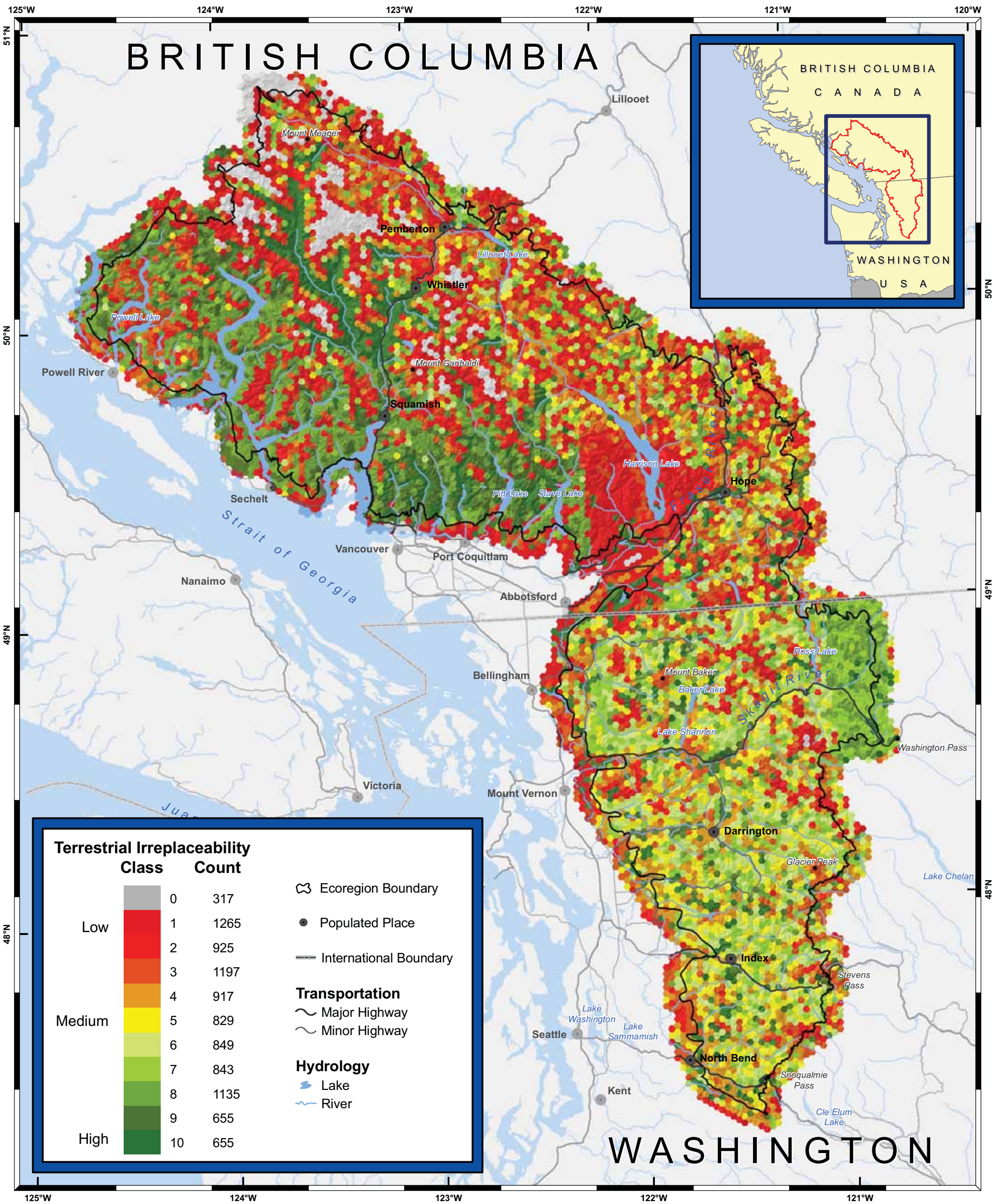
Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

November 2006

Projection: BC Albers Equal Area



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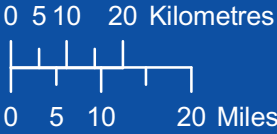


NORTH CASCADES ECOREGION:

Map 14: Terrestrial Irreplaceability Analysis

Irreplaceability scores indicate the relative biodiversity value of an assessment unit (AU). The scores are generated with MARXAN under the assumption that all AUs are equally suitable for conservation (i.e., the suitability index was not used). The algorithm assigns a high irreplaceability score to AUs that contain rare targets, contain a large amount of a target (i.e., has high representation of a target), or has a high number of targets (i.e., has high target richness). AUs with a score of 10 are either irreplaceable or are the most suitable place to conserve particular targets.

Scale 1:1,350,000

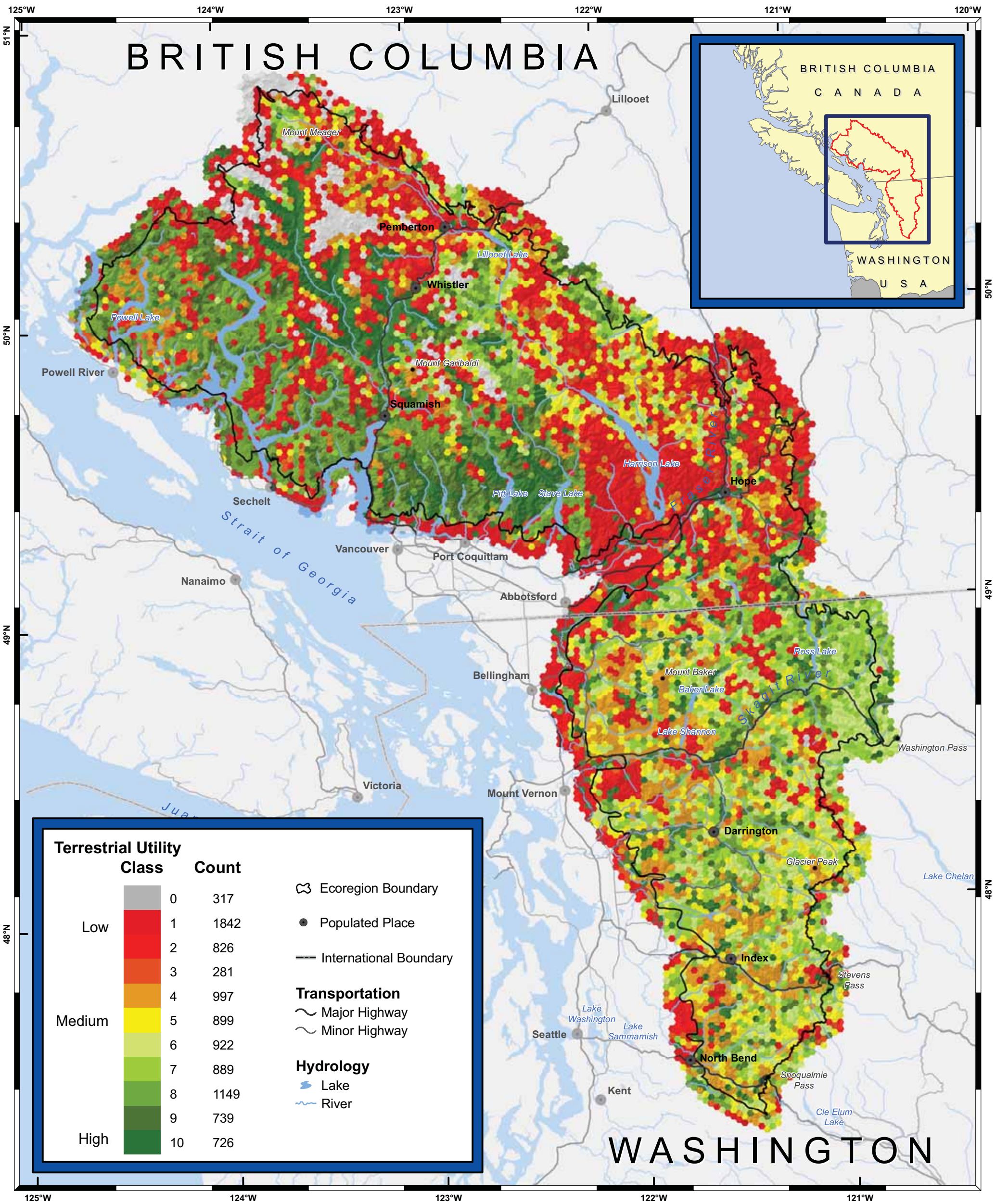


Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

November 2006

Projection: BC Albers Equal Area

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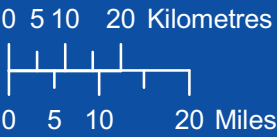


NORTH CASCADES ECOREGION:

Map 15: Terrestrial Utility Analysis

Utility scores indicate both the biodiversity value of an assessment unit (AU) and its suitability for conservation. The scores are generated with MARXAN under the assumption that all AUs are not equally suitable for conservation (i.e., the suitability index was used). For example, lands adjacent to intensive agriculture or residential development are considered less suitable for conservation than lands adjacent to undisturbed forest. The algorithm assigns a high utility score to AUs that contain rare targets, contain a large amount of a target (i.e., has high representation of a target), or has a high number of targets (i.e., has high target richness). When a set of AUs have similar biological contents, MARXAN uses the suitability index to choose the best AU from the set. AUs with a score of 10 have high utility or are the most suitable place to conserve particular targets.

Scale 1:1,350,000

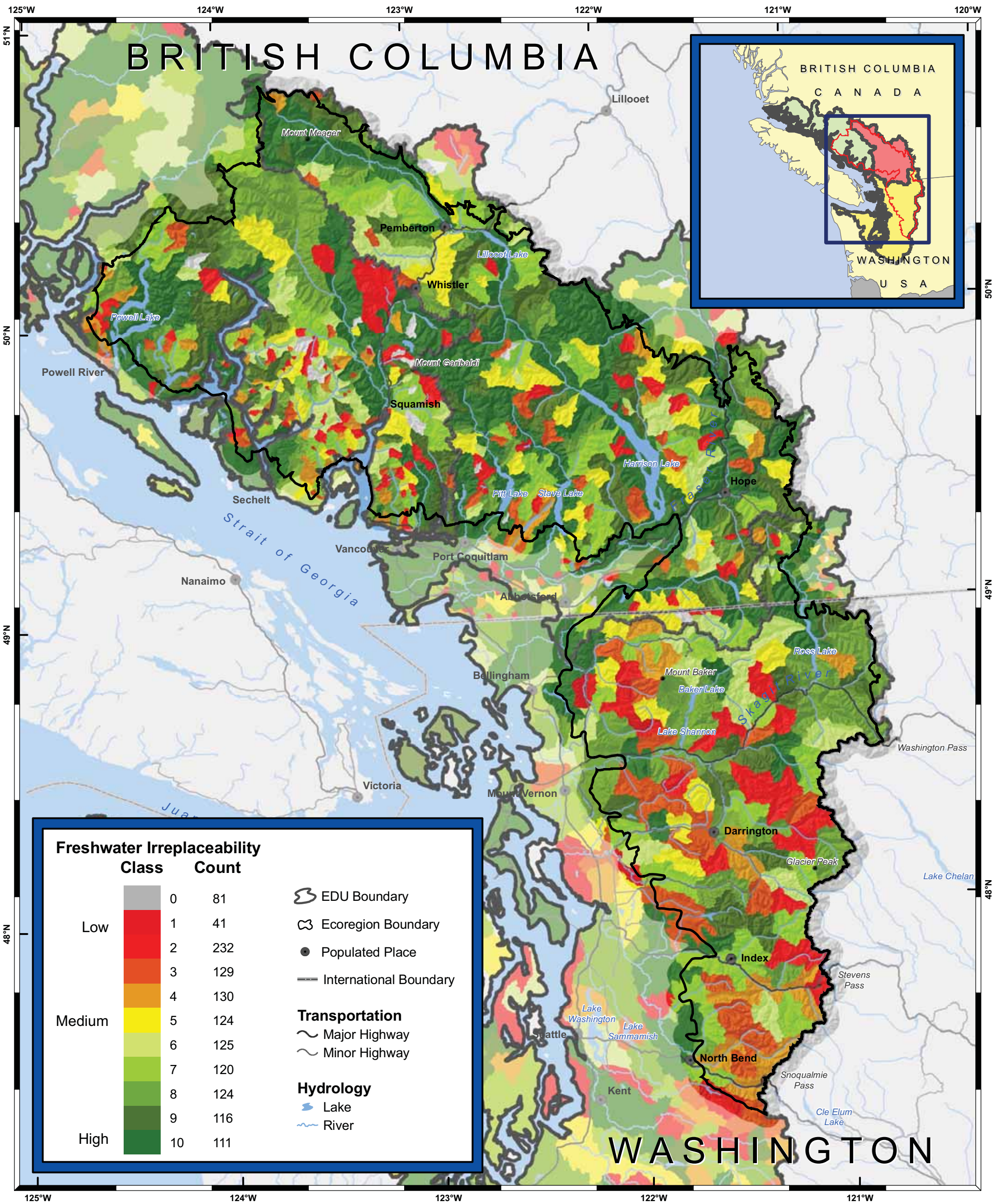


Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

November 2006

Projection: BC Albers Equal Area

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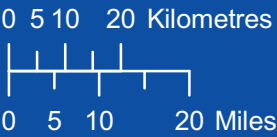


NORTH CASCADES ECOREGION:

Map 16: Freshwater Irreplaceability Analysis

Irreplaceability scores indicate the biodiversity value of an assessment unit (AU). The scores are generated with MARXAN under the assumption that all AUs are equally suitable for conservation (i.e., the suitability index was not used). The algorithm assigns a high utility score to AUs that contain rare targets, contain a large amount of a target (i.e., has high representation of a target), or has a high number of targets (i.e., has high target richness). AUs with a score of 10 are either irreplaceable or are the most suitable place to conserve particular targets.

Scale 1:1,350,000

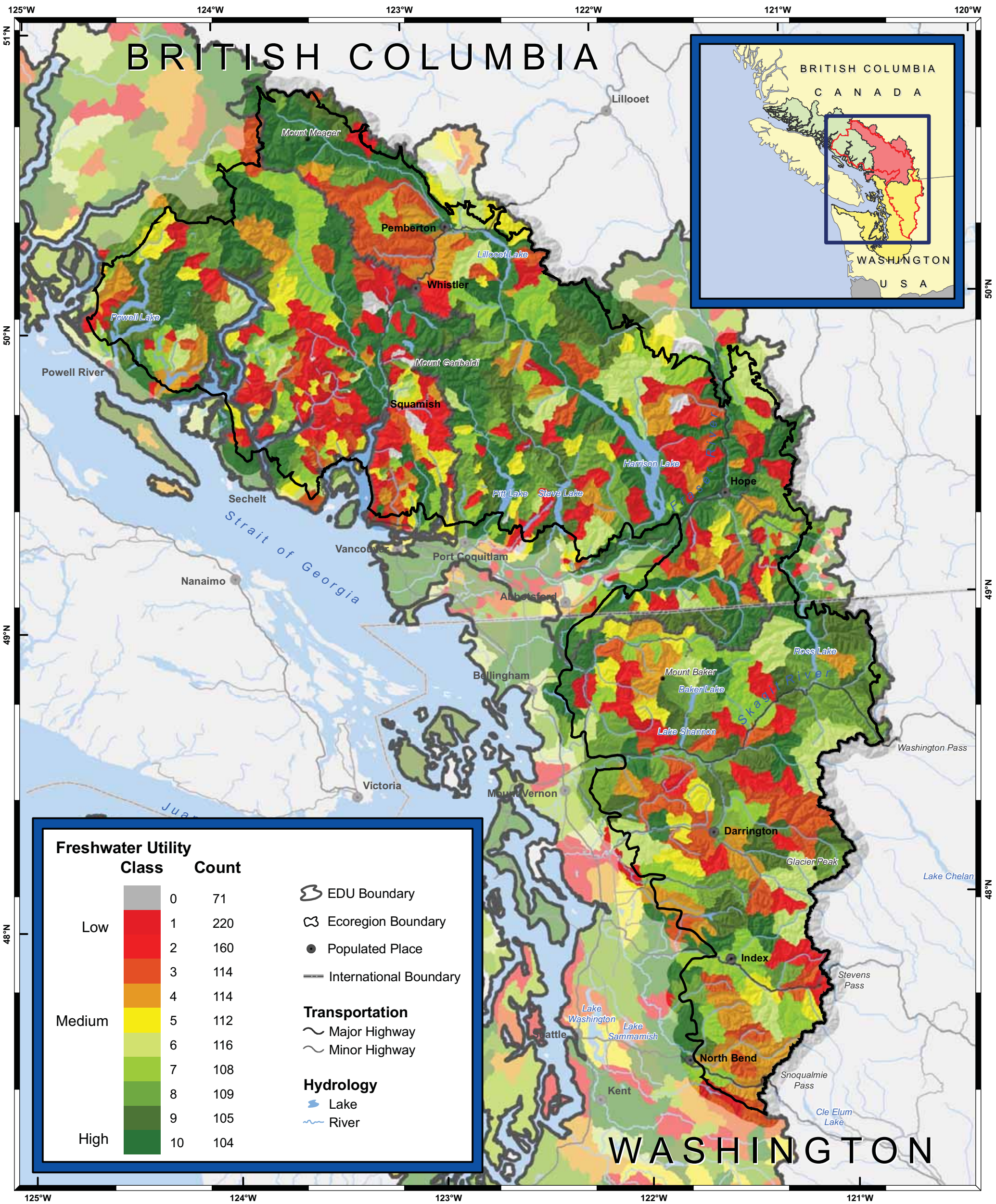


Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

November 2006

Projection: BC Albers Equal Area

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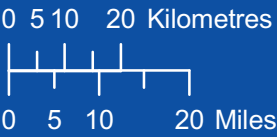


NORTH CASCADES ECOREGION:

Map 17: Freshwater Utility Analysis

Utility scores indicate both the biodiversity value of an assessment unit (AU) and its suitability for conservation. The scores are generated with MARXAN under the assumption that all AUs are not equally suitable for conservation (i.e., the suitability index was used). For example, lands adjacent to intensive agriculture or residential development are considered less suitable for conservation than lands adjacent to undisturbed forest. The algorithm assigns a high utility score to AUs that contain rare targets, contain a large amount of a target (i.e., has high representation of a target), or has a high number of targets (i.e., has high target richness). When a set of AUs have similar biological contents, MARXAN uses the suitability index to choose the best AU from the set. AUs with a score of 10 have high utility or are the most suitable place to conserve particular targets.

Scale 1:1,350,000

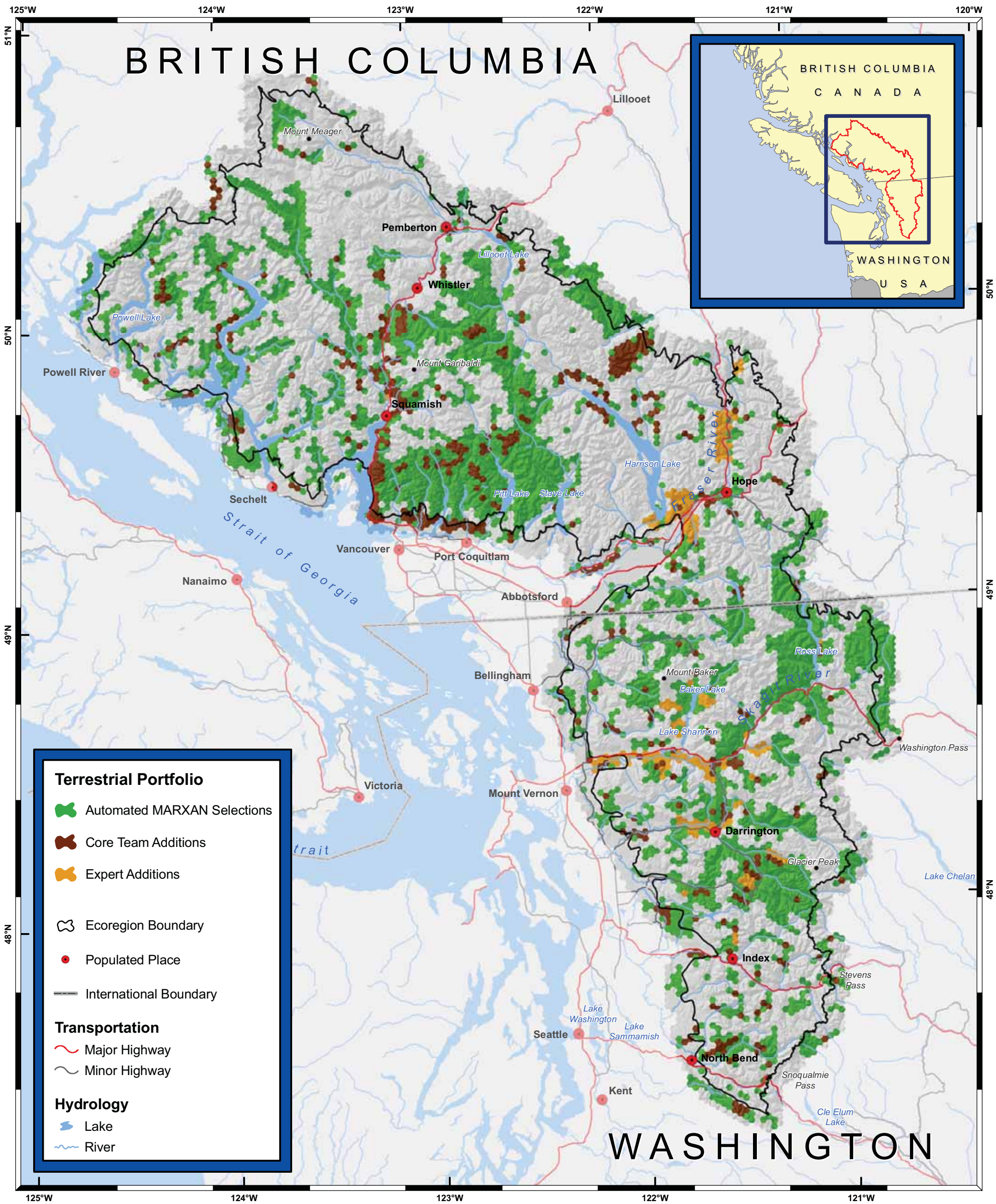


Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

November 2006

Projection: BC Albers Equal Area

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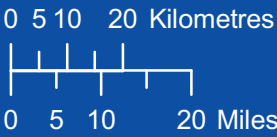


NORTH CASCADES ECOREGION:

Map 18: Automated Terrestrial Portfolio

This portfolio represents the automated solution generated by MARXAN along with Core Team additions and expert additions. No assessment units were "locked in" to the solution. Goals were the "mid-risk" goals, and the boundary length modifier was 0.0001. This portfolio includes 3374 assessment units, about 35% of the ecoregion.

Scale 1:1,350,000

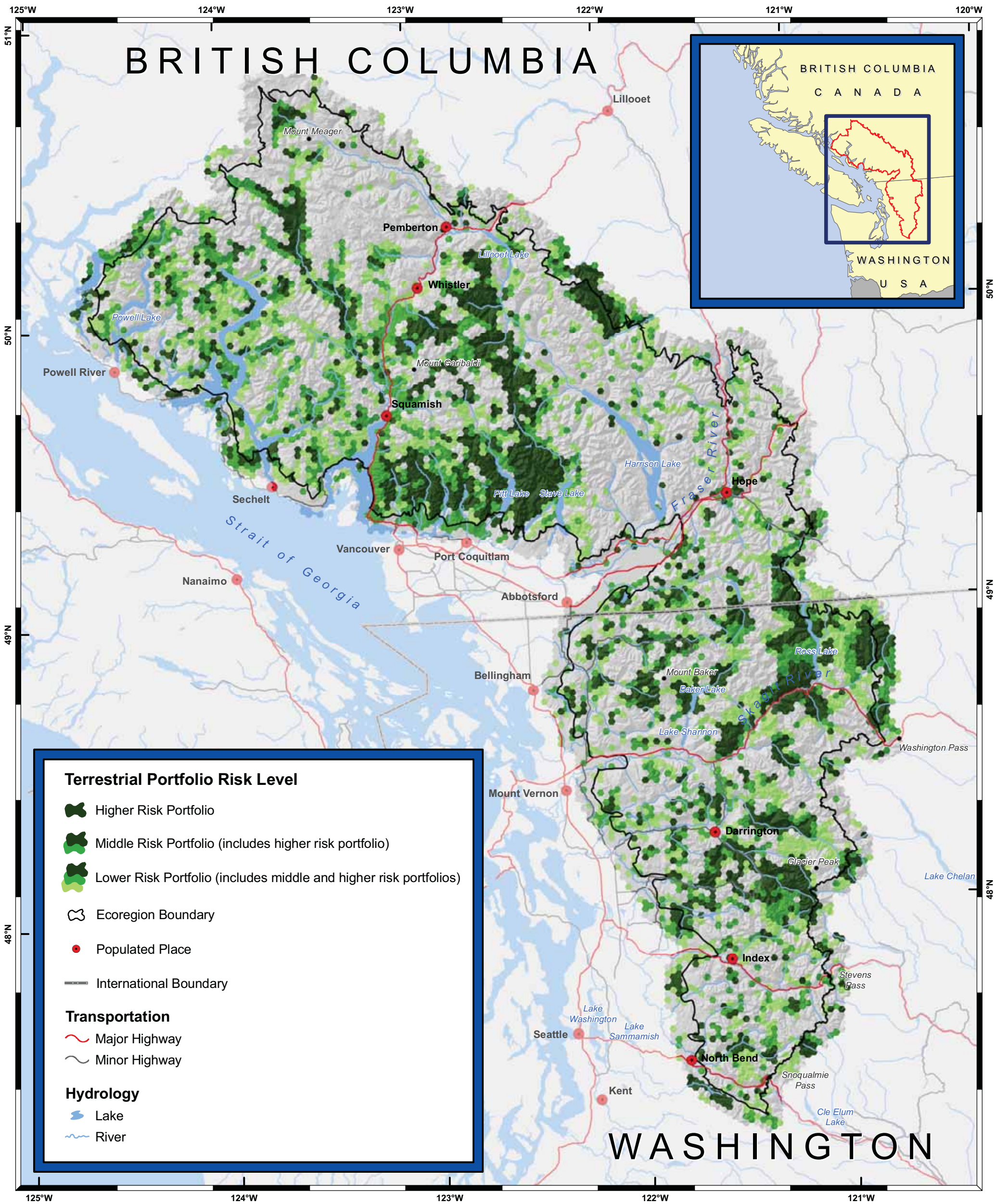


Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

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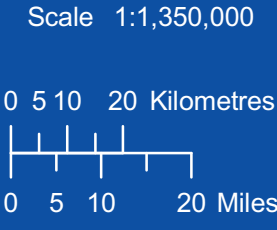


NORTH CASCADES ECOREGION:

Map 19: Alternative Terrestrial Portfolios: Higher, Middle and Lower Risk

By conserving larger areas, we reduce the risk to the loss of biodiversity, but potentially lose efficiency of the solution. This map illustrates how the size of the portfolio changes when the risk to biodiversity is decreased or increased. Lower risk encompasses more area; higher risk encompasses less. The lower, mid, and higher risk portfolios are nested.

Level of Risk to Biodiversity	Goal Level (% of historical)	Size of Portfolio (% of Ecoregion)
Higher	18%	16%
Middle	30%	30%
Lower	48%	47%

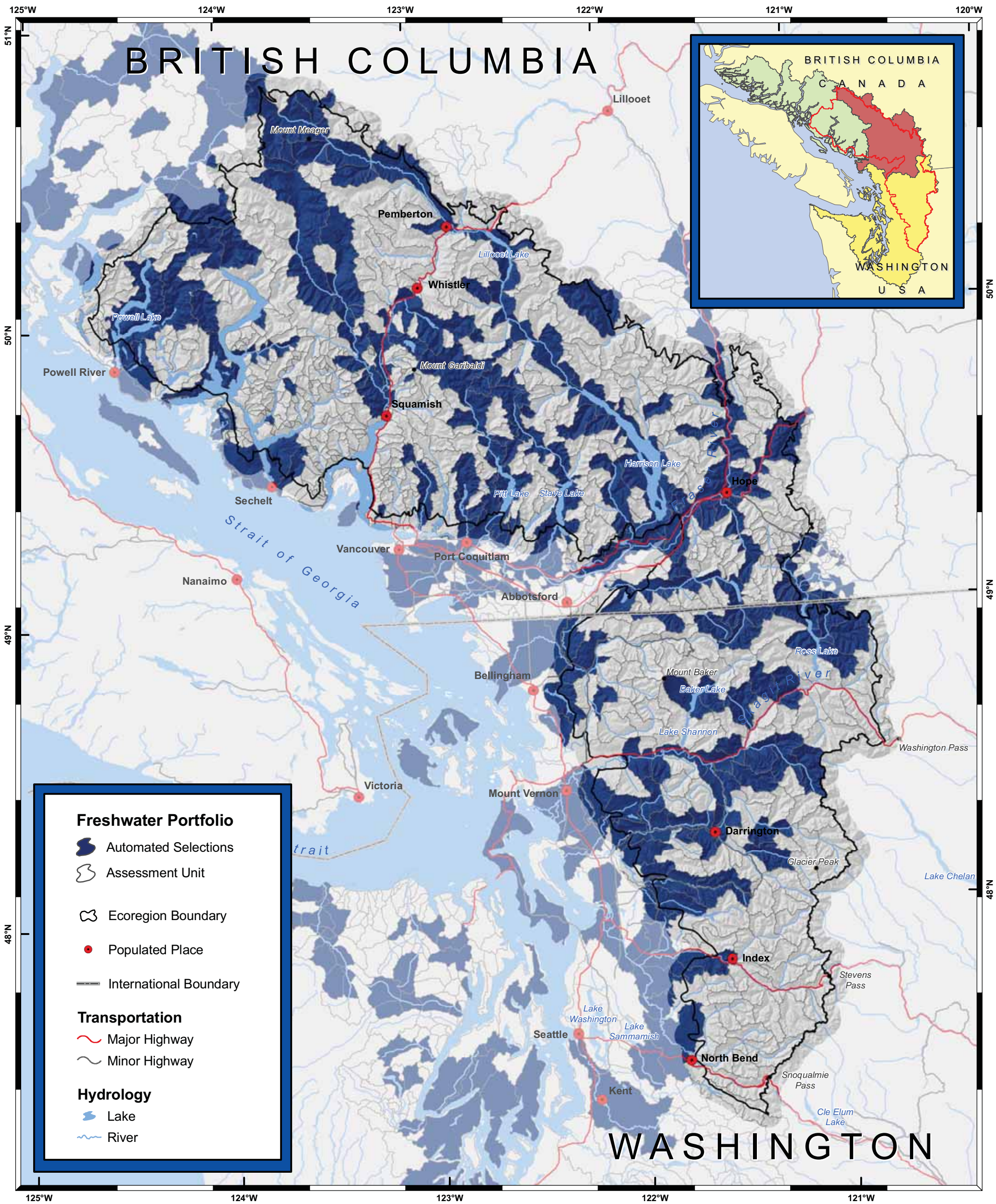


Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

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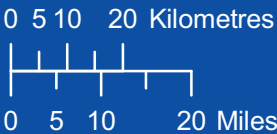


NORTH CASCADES ECOREGION:

Map 20: Automated Freshwater Portfolio

This portfolio was generated using MARXAN only. It has not been modified through expert review. No assessment units were "locked in" to the solution, goals were the "mid-risk" goals, and the boundary length modifier was 0.0001. This portfolio includes 1327 assessment units in three Ecological Drainage Units (EDUs), of which 645 fall either completely, or partially within the ecoregional boundary. The solution itself covers 39% of the ecoregion. The Puget Sound EDU was analyzed previously as part of the Willamette Valley-Puget Sound-Georgia Basin ERA (Floberg et al. 2004). However the Puget EDU results were included with the other two EDUs analyzed as part of the North Cascades ERA.

Scale 1:1,350,000



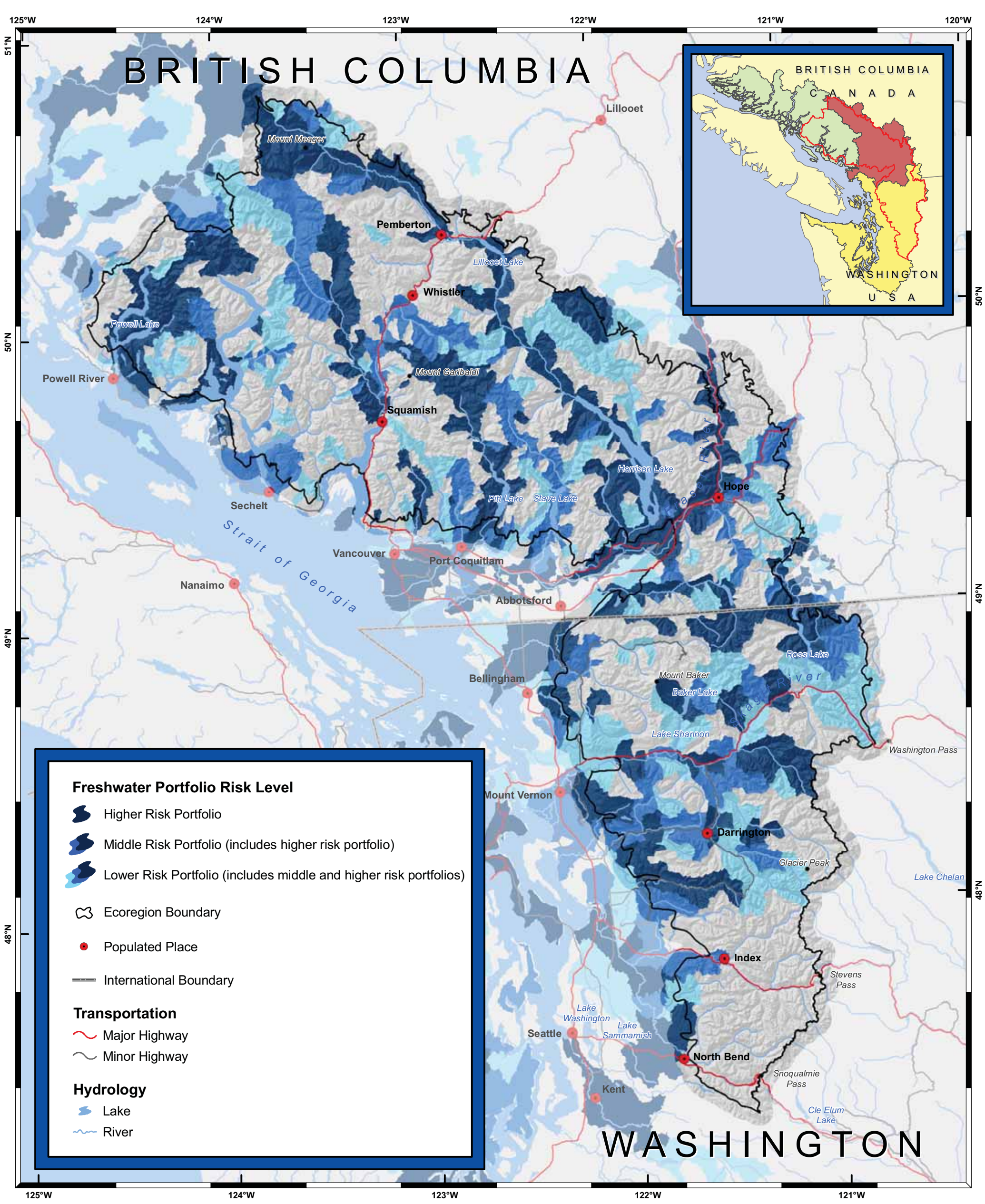
Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

November 2006

Projection: BC Albers Equal Area

Logos of partner organizations: NATURE CONSERVANCY, CONSERVATION NATURE, The Nature Conservancy, Washington Department of FISH and WILDLIFE, Washington's Natural Heritage Program, B.C. Conservation Data Centre, and NatureServe.

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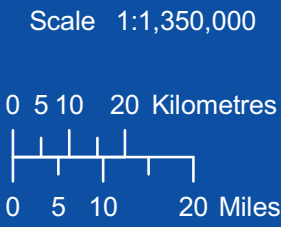


NORTH CASCADES ECOREGION:

Map 21: Alternative Freshwater Portfolios: Higher, Middle, and Lower Risk

By conserving larger areas, we reduce the risk to the loss of biodiversity, but potentially lose efficiency of the solution. This map illustrates how the size of the portfolio changes when the risk to biodiversity is decreased or increased. Lower risk encompasses more area; higher risk encompasses less. The lower, mid, and higher risk portfolios are nested.

Level of Risk to Biodiversity	Goal Level (% of historical)	Size of Portfolio (% of Ecoregion)
Higher	18%	26%
Middle	30%	40%
Lower	48%	56%

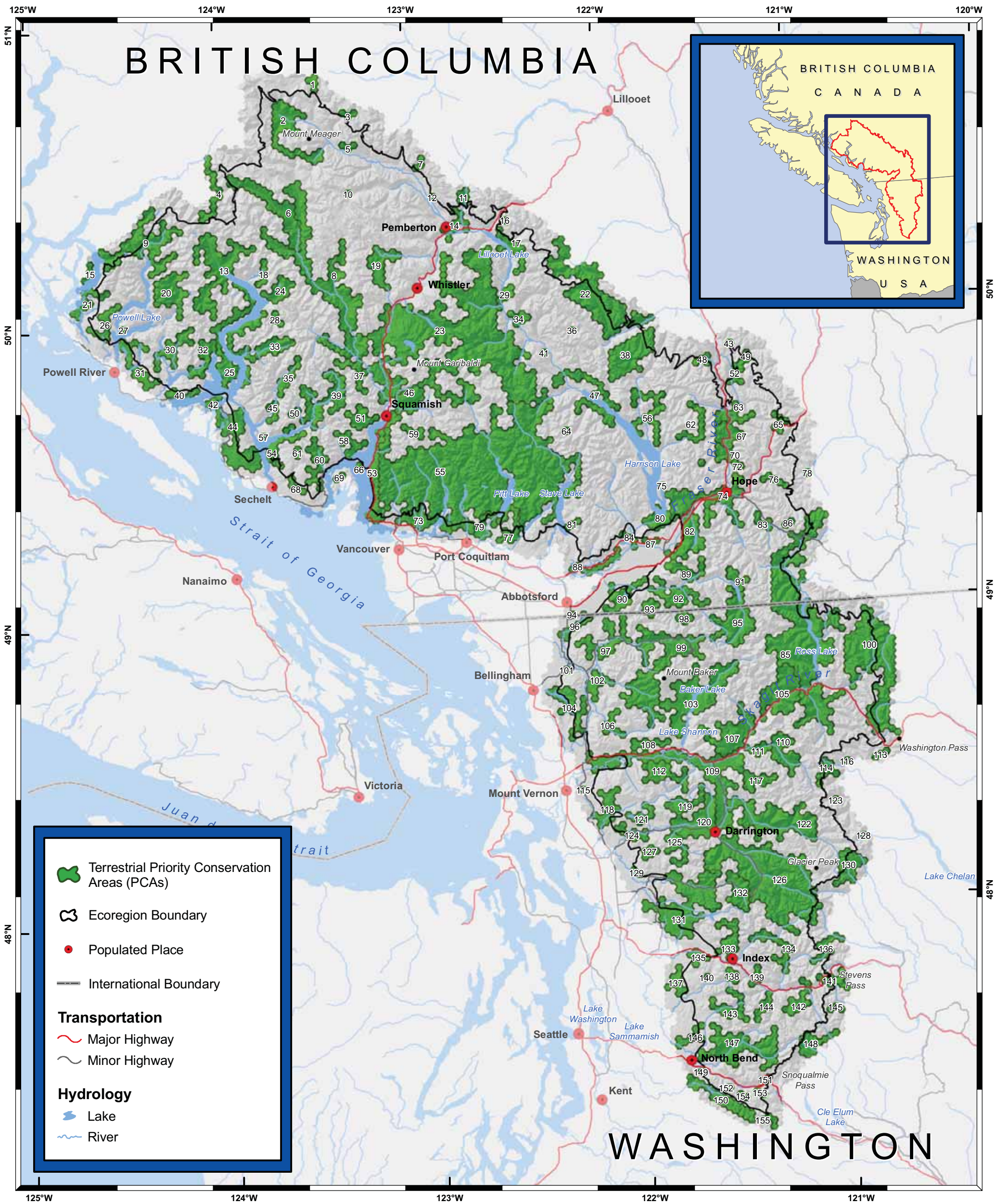


Sources: BC Ministry of Agriculture and Lands, Nature Conservancy of Canada, The Nature Conservancy, WA Dept. of Fish and Wildlife, WA Dept. of Natural Resources, USGS, ESRI

November 2006

Projection: BC Albers Equal Area

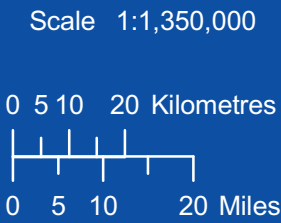
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NORTH CASCADES ECOREGION:
Map 22: Terrestrial Portfolio

The terrestrial portfolio depicted here is one solution which represents the biodiversity of an ecoregion in an efficient and effective manner. Portfolios are designed to optimize the achievement of goals based on the number and distribution of conservation targets in the smallest area possible. Current conservation and resource management practices, land ownership, levels of threats, and costs of implementing conservation actions are considered when selecting geographic priorities. Portfolios create a common focus to galvanise actions among partners on places that will make the greatest contribution to conserving the ecoregion's biodiversity. Data on the species, natural communities, ecological systems and other targets that reside in these biologically significant areas are included. Refer to chapter 6 in the report for more detailed information about priority conservation areas.

The final terrestrial conservation portfolio totals 1,687,001 ha (4,168,664 ac) and equals 35% of the ecoregion. Expert identified sites are shown separately in Map 18. Refer to the Alphabetical and Numerical Terrestrial Priority Conservation Areas Indices that follow this map.



Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

November 2006

Projection: BC Albers Equal Area

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Index Number	Priority Conservation Area (PCA) Name	HECTARES	ACRES
108	Alder Creek	4,500	11,120
148	Alpine Lakes East	7,000	17,297
147	Alpine Lakes West	24,000	59,305
52	Anderson	3,500	8,649
34	Angie's Well	3,000	7,413
106	Arlecho Creek	4,000	9,884
103	Baker Lake	30,500	75,367
29	Baptiste Smith	3,000	7,413
20	Beartooth - Eldred	13,000	32,124
38	Big Silver	19,000	46,950
11	Birkenhead	2,500	6,178
94	Blaine	500	1,236
110	Boston Glacier	10,000	24,711
3	Boulder - Pebble	1,500	3,707
125	Boulder River	6,000	14,826
1	Bridge	2,000	4,942
130	Buck Creek Pass	9,500	23,475
26	Bunster Hills	5,500	13,591
19	Callaghan - Soo	9,500	23,475
150	Cedar River	11,000	27,182
101	Cedarville (WPG #82)	500	1,236
82	Cheam Peak	12,500	30,888
89	Cheam Ridge	6,000	14,826
91	Chilliwack Lake	4,500	11,120
95	Chilliwack River	17,500	43,243
6	Clendinning	18,500	45,714
39	Clowhom	17,000	42,008
75	Cooks Cove	500	1,236
7	Copper Mound	1,500	3,707
65	Coquihala Summit	3,000	7,413
127	Cub Creek	2,500	6,178
90	Cultus - Vedder	8,500	21,004
81	Davis	1,500	3,707
24	Deserted River	6,500	16,062
21	Desolation Sound	5,500	13,591
140	Duffey Gap	500	1,236
70	Emery Creek	3,500	8,649
112	Finney O'Toole	9,500	23,475
41	Franks	500	1,236
145	French Ridge	1,500	3,707
113	Frisco Creek	1,500	3,707
69	Gambier	1,000	2,471
23	Garibaldi Complex	158,500	391,662
27	Goat Island	500	1,236
77	Golden Pitt	7,000	17,297
80	Harrison Hot Springs	6,000	14,826
47	Harrison Lake	14,500	35,830
84	Harrison Mills	2,000	4,942
128	Hart Lake	500	1,236
5	Hemionus	1,500	3,707
119	Higgins Creek	6,500	16,062
153	I 90 Four	1,000	2,471
149	I 90 One	500	1,236
154	I 90 Three	1,000	2,471
152	I 90 Two	500	1,236
123	Icy Creek	500	1,236
16	Joffre	500	1,236
129	Jordan Creek	1,000	2,471
139	Klinger Ridge	2,000	4,942
57	Kunechin Point	500	1,236
121	Lake Cavanaugh	4,000	9,884
136	Lake Creek	5,000	12,355
104	Lake Whatcom (WPG # 80)	11,500	28,417
31	Lakes	9,500	23,475
17	Lillooet Lake	7,000	17,297
32	Lois - Khartoume	7,000	17,297
124	Lower Stillaguamish	4,500	11,120
93	Lumchen Mountain	3,000	7,413
46	Mamquam	8,000	19,769
111	Marble Creek	3,500	8,649
58	McNab	6,000	14,826
51	Mill Creek	6,000	14,826
144	Miller River	3,500	8,649
50	Misty	1,000	2,471
99	Mount Baker	38,000	93,900
71	Mount Bard	500	1,236
138	Mount Index	2,000	4,942
92	Mount McGuire	11,000	27,182

Index Number	Priority Conservation Area (PCA) Name	HECTARES	ACRES
86	Mount Outram	1,000	2,471
87	Mount Woodside	1,500	3,707
115	Mountain View	500	1,236
36	Nahatlatch	500	1,236
45	Narrows Inlet	2,500	6,178
42	Nelson Island	2,000	4,942
88	Nicomen Slough	5,000	12,355
107	Noisy - Diobsud	17,000	42,008
55	North Shore Complex	204,000	504,094
117	Otter Creek	5,500	13,591
116	Park Creek	500	1,236
14	Pemberton - Mount Currie	5,000	12,355
12	Pemberton Meadows	500	1,236
132	Perry Creek	9,000	22,239
79	Pitt Macro Site	5,000	12,355
9	Powell - Daniels	26,000	64,247
18	Princess Louisa Inlet	2,500	6,178
133	Ragged Ridge	7,500	18,533
66	Ramillies	1,000	2,471
15	Redonda	2,000	4,942
85	Ross Lake Transition	94,000	232,278
25	Royal Reaches	27,500	67,954
10	Ryan	500	1,236
54	Salmon Inlet	7,500	18,533
40	Saltery	3,500	8,649
126	Sauk	75,000	185,329
48	Scuzzy Creek	2,000	4,942
53	Sea - To - Sky Vista	15,000	37,066
44	Sechelt Peninsula	19,500	48,185
73	Seymour Narrows	9,500	23,475
74	Silver - Hope	22,500	55,599
56	Silver River	11,000	27,181
109	Skagit - Sauk Riparian (Added to WPG Site)	38,000	93,900
13	Skwawka - Brittain	26,500	65,483
135	Skykomish Riparian (WPG Site # 183)	3,000	7,413
61	Smith Range	1,000	2,471
143	Snoqualmie - Tolt	7,500	18,533
137	Snoqualmie Foothill Forest (WPG Site # 177)	4,500	11,120
151	Snoqualmie Pass	1,000	2,471
68	South Sunshine	2,000	4,942
76	Sowaqua	2,500	6,178
63	Spuzzum	6,000	14,826
72	Squeah Mountain	1,000	2,471
28	Stakawus	1,500	3,707
59	Stawamus	2,500	6,178
22	Stein - Mehatl - Nahatlatch	41,000	101,313
141	Steven's Pass	4,500	11,120
118	Stillaguamish - Port Susan (WPG #129)	8,000	19,768
43	Stoyoma	500	1,236
122	Suiattle	27,500	67,954
131	Sultan Basin	34,000	84,016
97	Sumas	12,000	29,653
96	Sumas River	4,000	9,884
155	Sunday Creek	2,000	4,942
83	Sunshine Valley	2,500	6,178
37	Tantalus	5,000	12,355
60	Tetrahedon Extension	8,000	19,768
4	TFL 10	7,000	17,297
8	TFL 38	53,500	132,201
30	The Knuckles	8,500	21,004
146	Tokul Basin	4,000	9,884
98	Tomyhoi Lake	2,000	4,942
142	Tonga Ridge	6,500	16,062
64	Tretheway	500	1,236
35	Tzoonie	4,500	11,120
2	Upper Lillooet	16,500	40,772
120	Upper NF Stillaguamish	15,500	38,301
105	Upper Skagit	19,500	48,186
134	Upper Skykomish	7,500	18,533
62	Urquhart	5,500	13,591
49	Uztlus	1,000	2,471
102	Van Zandt Ridge	5,500	13,591
33	Vancouver River	7,000	17,297
78	Vuich	500	1,236
100	West Pasayten	50,000	123,553
67	Yale	7,000	17,297
114	Yawning Glacier	4,000	9,884

NORTH CASCADES ECOREGION:

22a: Alphabetical Index of Terrestrial Priority Conservation Areas

This index is intended to help the reader identify priority conservation areas (PCAs) in the terrestrial portfolio on Maps 22, 23 and 27. The conservation areas are not ranked on the previous map, nor here. Rankings can be found on Map 27. The conservation areas are listed in alphabetical order and are indexed as they fall geographically from north to south.

Area values are calculated as the sum of the area of all assessment units which make up a single site.

November 2006

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Index Number	Priority Conservation Area (PCA) Name	HECTARES	ACRES
1	Bridge	2,000	4,942
2	Upper Lillooet	16,500	40,772
3	Boulder - Pebble	1,500	3,707
4	TFL 10	7,000	17,297
5	Hemionus	1,500	3,707
6	Clendinning	18,500	45,714
7	Copper Mound	1,500	3,707
8	TFL 38	53,500	132,201
9	Powell - Daniels	26,000	64,247
10	Ryan	500	1,236
11	Birkenhead	2,500	6,178
12	Pemberton Meadows	500	1,236
13	Skwawka - Brittain	26,500	65,483
14	Pemberton - Mount Currie	5,000	12,355
15	Redonda	2,000	4,942
16	Joffre	500	1,236
17	Lillooet Lake	7,000	17,297
18	Princess Louisa Inlet	2,500	6,178
19	Callaghan - Soo	9,500	23,475
20	Beartooth - Eldred	13,000	32,124
21	Desolation Sound	5,500	13,591
22	Stein - Mehatl - Nahatlatch	41,000	101,313
23	Garibaldi Complex	158,500	391,662
24	Deserted River	6,500	16,062
25	Royal Reaches	27,500	67,954
26	Bunster Hills	5,500	13,591
27	Goat Island	500	1,236
28	Stakawus	1,500	3,707
29	Baptiste Smith	3,000	7,413
30	The Knuckles	8,500	21,004
31	Lakes	9,500	23,475
32	Lois - Khartoume	7,000	17,297
33	Vancouver River	7,000	17,297
34	Angie's Well	3,000	7,413
35	Tzoonie	4,500	11,120
36	Nahatlatch	500	1,236
37	Tantalus	5,000	12,355
38	Big Silver	19,000	46,950
39	Clowhom	17,000	42,008
40	Saltery	3,500	8,649
41	Franks	500	1,236
42	Nelson Island	2,000	4,942
43	Stoyoma	500	1,236
44	Sechelt Peninsula	19,500	48,185
45	Narrows Inlet	2,500	6,178
46	Mamquam	8,000	19,769
47	Harrison Lake	14,500	35,830
48	Scuzzy Creek	2,000	4,942
49	Uztlius	1,000	2,471
50	Misty	1,000	2,471
51	Mill Creek	6,000	14,826
52	Anderson	3,500	8,649
53	Sea - To - Sky Vista	15,000	37,066
54	Salmon Inlet	7,500	18,533
55	North Shore Complex	204,000	504,094
56	Silver River	11,000	27,182
57	Kunechin Point	500	1,236
58	McNab	6,000	14,826
59	Stawamus	2,500	6,178
60	Tetrahedon Extension	8,000	19,768
61	Smith Range	1,000	2,471
62	Urquhart	5,500	13,591
63	Spuzzum	6,000	14,826
64	Tretheway	500	1,236
65	Coquihala Summit	3,000	7,413
66	Ramillies	1,000	2,471
67	Yale	7,000	17,297
68	South Sunshine	2,000	4,942
69	Gambier	1,000	2,471
70	Emery Creek	3,500	8,649
71	Mount Bard	500	1,236
72	Squeah Mountain	1,000	2,471
73	Seymour Narrows	9,500	23,475
74	Silver - Hope	22,500	55,599
75	Cooks Cove	500	1,236
76	Sowaqua	2,500	6,178
77	Golden Pitt	7,000	17,297
78	Vuich	500	1,236

Index Number	Priority Conservation Area (PCA) Name	HECTARES	ACRES
79	Pitt Macro Site	5,000	12,355
80	Harrison Hot Springs	6,000	14,826
81	Davis	1,500	3,707
82	Cheam Peak	12,500	30,888
83	Sunshine Valley	2,500	6,178
84	Harrison Mills	2,000	4,942
85	Ross Lake Transition	94,000	232,278
86	Mount Outram	1,000	2,471
87	Mount Woodside	1,500	3,707
88	Nicomen Slough	5,000	12,355
89	Cheam Ridge	6,000	14,826
90	Cultus - Vedder	8,500	21,004
91	Chilliwack Lake	4,500	11,120
92	Mount McGuire	11,000	27,182
93	Lumchen Mountain	3,000	7,413
94	Blaine	500	1,236
95	Chilliwack River	17,500	43,243
96	Sumas River	4,000	9,884
97	Sumas	12,000	29,653
98	Tomyhoi Lake	2,000	4,942
99	Mount Baker	38,000	93,900
100	West Pasayten	50,000	123,553
101	Cedarville (WPG #82)	500	1,236
102	Van Zandt Ridge	5,500	13,591
103	Baker Lake	30,500	75,367
104	Lake Whatcom (WPG # 80)	11,500	28,417
105	Upper Skagit	19,500	48,186
106	Arlecho Creek	4,000	9,884
107	Noisy - Diobsud	17,000	42,008
108	Alder Creek	4,500	11,120
109	Skagit - Sauk Riparian (Added to WPG Site)	38,000	93,900
110	Boston Glacier	10,000	24,711
111	Marble Creek	3,500	8,649
112	Finney O'Toole	9,500	23,475
113	Frisco Creek	1,500	3,707
114	Yawning Glacier	4,000	9,884
115	Mountain View	500	1,236
116	Park Creek	500	1,236
117	Otter Creek	5,500	13,591
118	Stillaguamish - Port Susan (WPG #129)	8,000	19,768
119	Higgins Creek	6,500	16,062
120	Upper NF Stillaguamish	15,500	38,301
121	Lake Cavanaugh	4,000	9,884
122	Suiattle	27,500	67,954
123	Icy Creek	500	1,236
124	Lower Stillaguamish	4,500	11,120
125	Boulder River	6,000	14,826
126	Sauk	75,000	185,329
127	Cub Creek	2,500	6,178
128	Hart Lake	500	1,236
129	Jordan Creek	1,000	2,471
130	Buck Creek Pass	9,500	23,475
131	Sultan Basin	34,000	84,016
132	Perry Creek	9,000	22,239
133	Ragged Ridge	7,500	18,533
134	Upper Skykomish	7,500	18,533
135	Skykomish Riparian (WPG Site # 183)	3,000	7,413
136	Lake Creek	5,000	12,355
137	Snoqualmie Foothill Forest (WPG Site # 177)	4,500	11,120
138	Mount Index	2,000	4,942
139	Klinger Ridge	2,000	4,942
140	Duffey Gap	500	1,236
141	Steven's Pass	4,500	11,120
142	Tonga Ridge	6,500	16,062
143	Snoqualmie - Tolt	7,500	18,533
144	Miller River	3,500	8,649
145	French Ridge	1,500	3,707
146	Tokul Basin	4,000	9,884
147	Alpine Lakes West	24,000	59,305
148	Alpine Lakes East	7,000	17,297
149	I 90 One	500	1,236
150	Cedar River	11,000	27,182
151	Snoqualmie Pass	1,000	2,471
152	I 90 Two	500	1,236
153	I 90 Four	1,000	2,471
154	I 90 Three	1,000	2,471
155	Sunday Creek	2,000	4,942

NORTH CASCADES ECOREGION:

22b: Numerical Index of Terrestrial Priority Conservation Areas

This index is intended to help the reader identify priority conservation areas (PCAs) in the terrestrial portfolio on Maps 22, 23 and 27, using their PCA numbers. The conservation areas are not ranked on Maps 22 and 23, nor here. Rankings can be found on Map 27. The conservation areas are listed in numerical order and are indexed as they fall geographically from north to south.

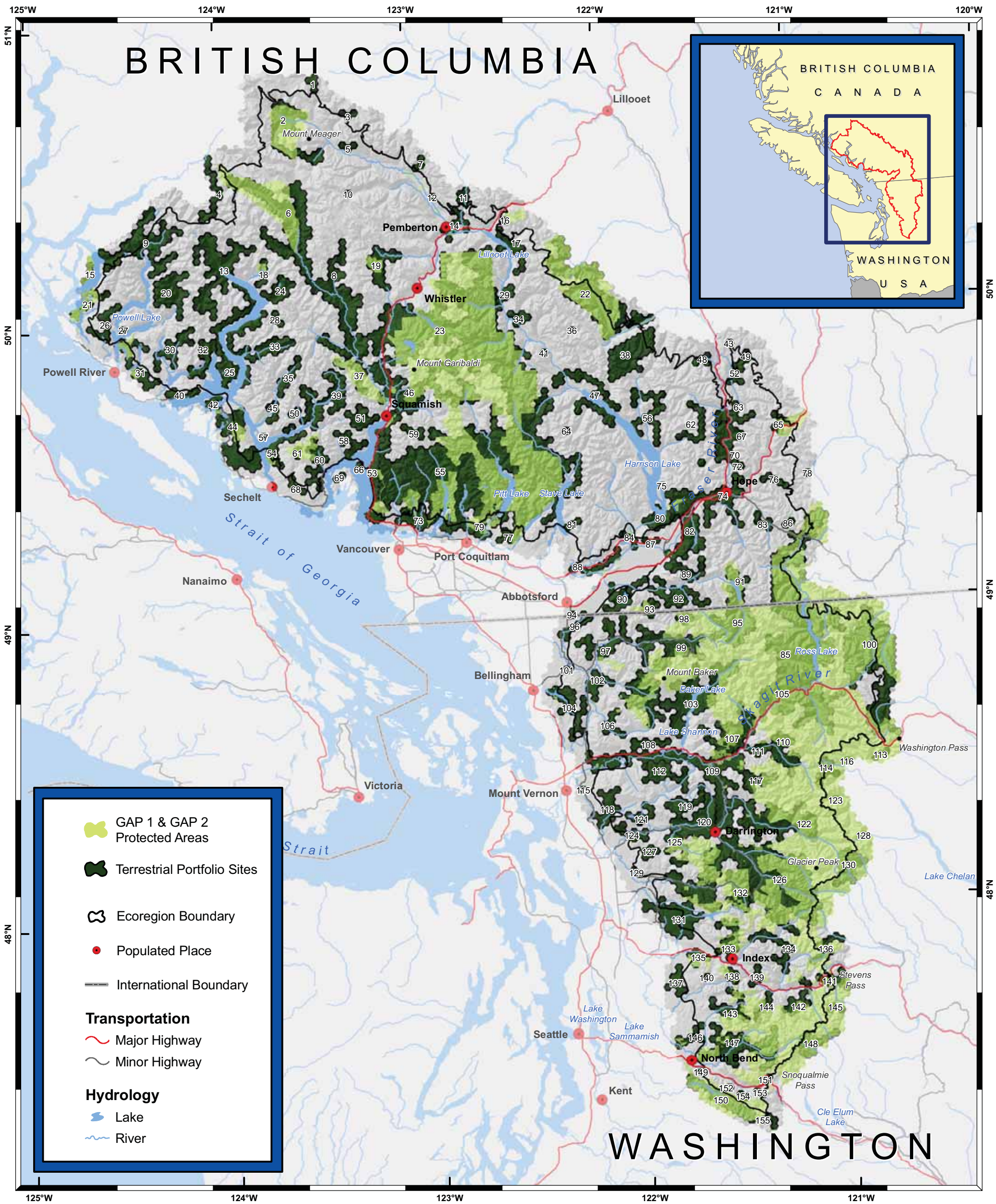
Area values are calculated as the sum of the area of all assessment units which make up a single site.

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NORTH CASCADES ECOREGION:

Map 23: Protected Areas and Terrestrial Portfolio Sites

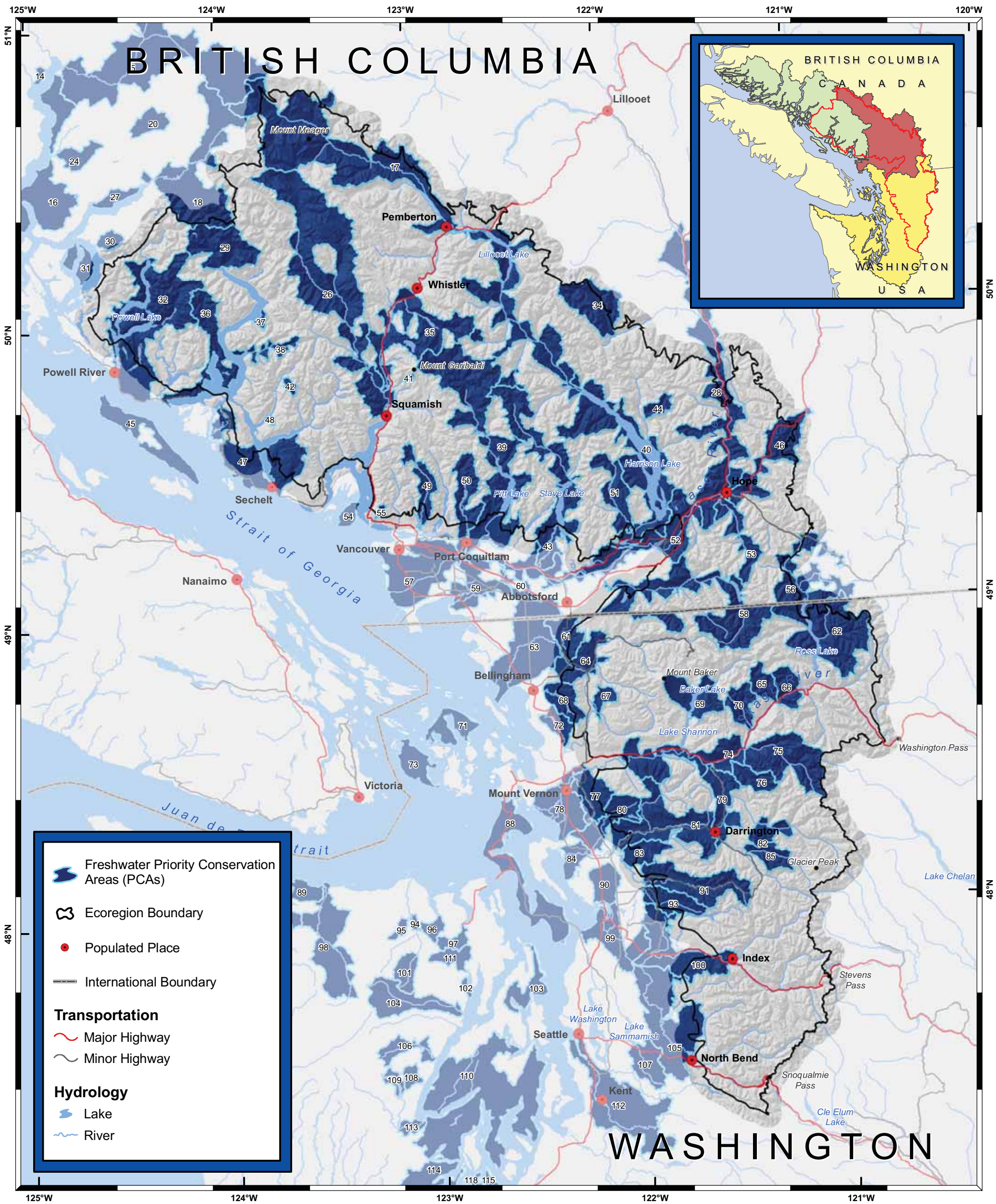
Designated parks and protected areas (classified as GAP status 1 and GAP status 2) overlap with terrestrial portfolio sites. Approximately 40%, or 672,930 ha (1,662,843 ac) of the terrestrial portfolio is currently in designated protected areas. MARXAN is predisposed to select analysis units that are within a protected area so that the "cost" of an area is minimized. Assuming the portion of the portfolio within GAP status 1 or GAP status 2 areas is already protected, an additional 21%, or 1,006,635 ha (2,487,445 ac) of the ecoregion requires some form of conservation action in order to conserve the full terrestrial portfolio. See Appendix 1-- Glossary for GAP status definitions.

Sources: BC Ministry of Agriculture and Lands, Nature Conservancy of Canada, The Nature Conservancy, WA Dept. of Fish and Wildlife, WA Dept. of Natural Resources, USGS, ESRI

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Projection: BC Albers Equal Area

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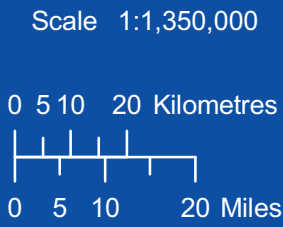


NORTH CASCADES ECOREGION:

Map 24: Freshwater Portfolio

The freshwater portfolio depicted here is one solution which represents the biodiversity of an ecoregion in an efficient and effective manner. Portfolios are designed to optimize the achievement of goals based on the number and distribution of conservation targets in the smallest area possible. Current conservation and resource management practices, land ownership, levels of threats, and costs of implementing conservation actions are considered when selecting geographic priorities. Portfolios create a common focus to galvanise actions among partners on places that will make the greatest contribution to conserving the ecoregion's biodiversity. Data on the species, natural communities, ecological systems and other targets that reside in these biologically significant areas are included. Refer to chapter 6 in the report for more detailed information about priority conservation areas.

The final freshwater conservation portfolio within the ecoregion totals 1,453,965 ha (3,592,821 ac) covering 39% of the ecoregion. Refer to the Alphabetical and Numerical Freshwater Priority Conservation Areas Indices that follow this map.



Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

November 2006

Projection: BC Albers Equal Area

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Index Number	Priority Conservation Area (PCA) Name	HECTARES	ACRES
15	Apple	17,086	42,221
3	Atwaykellesse - Wahpeet	19,884	49,133
70	Bacon Creek	13,227	32,685
69	Baker River	23,888	59,030
14	Bear	1,789	4,420
22	Blind Creek	4,167	10,297
57	Boundary	71,284	176,146
54	Bowen Island	5,009	12,377
16	Bute - Ramsay	52,269	129,159
95	Canyon Creek	3,005	7,425
117	Carbon River	19,761	48,830
75	Cascade River	41,874	103,473
10	Charles Creek	2,435	6,017
35	Cheekamus River	52,199	128,986
41	Cheekye	828	2,046
51	Chehalis River	21,562	53,281
58	Chilliwack River	78,100	192,989
46	Coquihalla River	32,874	81,233
50	Coquitlam River	24,598	60,782
55	Cypress	1,266	3,129
118	Deschutes River	45,196	111,682
104	Dosewallips River	27,817	68,737
112	Duwamish Green River	60,249	148,878
31	East Redonda Island	10,054	24,843
114	Eld Inlet Tributaries	28,342	70,034
98	Elwha River	43,037	106,347
2	Franklin	54,723	135,224
28	Fraser	92,629	228,891
52	Fraser Valley	41,368	102,223
21	Frederic	729	1,802
72	Friday Creek	9,219	22,780
25	Fulmore Lake	8,046	19,881
23	Glendale Creek	3,483	8,606
65	Goodell Creek	10,203	25,212
66	Gorge Lake Tributaries	12,597	31,128
106	Hamma Hamma River	11,607	28,682
40	Harrison Lake	85,491	211,252
20	Headwall Creek	9,878	24,408
30	Homfray Creek	5,205	12,861
36	Hotham Sound	30,612	75,644
67	Hutchinson Creek	6,333	15,649
76	Illabot Creek	11,167	27,594
107	Issaquah Creek	16,518	40,817
83	Jim Creek	12,247	30,263
96	Jimmy Come Lately Creek	4,985	12,318
86	Juan de Fuca Tributaries	22,609	55,867
7	Kakweiken River	13,920	34,396
1	Kingcome River	49,781	123,010
103	Kingston Poulso	13,897	34,340
110	Kitsap Peninsula	122,337	302,301
9	Knight Inlet	43,997	108,719
108	Lilliwaup Creek	4,620	11,417
17	Lillooet River	203,259	502,262
111	Little Quilcene River	16,367	40,444
116	Lower Nisqually River	24,881	61,482
92	Lyre River	17,581	43,444
33	Main Lake	4,502	11,126
120	Mashel River	22,667	56,012
94	Middle Dungeness River	1,819	4,495
27	Mount Barner	6,576	16,249
12	Mount Mathison	6,801	16,806

Index Number	Priority Conservation Area (PCA) Name	HECTARES	ACRES
34	Nahatlatch	28,976	71,600
48	Narrows	899	2,220
121	Nisqually Headwaters	42,129	104,104
115	Nisqually Reach Tributaries	12,990	32,100
77	Nookachamps Creek	18,976	46,891
64	Nooksack Confluence	19,629	48,504
63	Nooksack Delta	56,923	140,658
109	North Fork Skokomish	4,690	11,589
81	North Fork Stilliguamish	50,519	124,834
71	Orcas Island	14,705	36,337
24	Orford	9,733	24,051
19	Phillips River	30,825	76,169
80	Pilchuck Creek	21,463	53,036
93	Pilchuck River	16,930	41,835
39	Pitt River	105,071	259,636
32	Powell Lake	97,992	242,143
90	Quilceda Creek	13,349	32,986
102	Quilcene Bay	1,598	3,948
60	Salmon River	4,643	11,473
73	San Juan Island	14,085	34,805
79	Sauk River	22,000	54,363
47	Sechelt Peninsula	50,554	124,921
59	Serpentine - Nicomekl	20,858	51,541
4	Seymour Inlet	102,116	252,335
49	Seymour River	15,896	39,280
53	Silverhope Creek	17,823	44,043
78	Skagit Delta	28,395	70,166
62	Skagit Headwaters US	62,154	153,586
74	Skagit Mainstem	41,065	101,475
56	Skagit River	37,143	91,782
29	Skawkwa River	32,514	80,343
113	Skokomish River	4,555	11,255
100	Skykomish River	42,614	105,302
89	Slat Coville Creeks	8,051	19,896
11	Smyth Cove	6,474	15,997
99	Snohomish Delta	27,761	68,598
105	Snoqualmie River	60,627	149,811
97	Snow Creek	5,826	14,397
91	South Fork Stilliguamish	37,454	92,552
5	Southgate River	126,723	313,140
26	Squamish River	136,867	338,205
13	Stafford	6,849	16,924
37	Stakawus Creek	1,826	4,511
43	Stave River	62,066	153,369
84	Stilliguamish Delta	9,232	22,813
82	Suiattle Headwaters	10,119	25,005
61	Sumas	13,869	34,270
119	Tanwax Creek	7,327	18,106
45	Texada	26,476	65,424
18	Toba River	71,336	176,274
42	Tzoonie	2,117	5,232
101	Upper Dungeness River	10,037	24,801
87	Upper Hoko River	11,062	27,334
44	Urquhart	5,798	14,328
38	Vancouver River	8,495	20,992
6	Wahkash Creek	11,152	27,557
8	Wakeman Sound	2,494	6,164
68	Whatcom Creek	14,538	35,925
88	Whidbey Island	42,943	106,115
85	White Chuck River	12,120	29,949

NORTH CASCADES ECOREGION:

24a: Alphabetical Index of Freshwater Priority Conservation Areas

This index is intended to help the reader identify priority conservation areas (PCAs) in the freshwater portfolio on Maps 24, 25 and 28. The conservation areas are not ranked on the previous map, nor here. Rankings can be found on Map 28. The conservation areas are listed in alphabetical order and are indexed as they fall geographically from north to south.

Area values are calculated as the sum of the area of all assessment units which make up a single site.

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Index Number	Priority Conservation Area (PCA) Name	HECTARES	ACRES
1	Kingcome River	49,781	123,010
2	Franklin	54,723	135,224
3	Atwaykellesse - Wahpeet	19,884	49,133
4	Seymour Inlet	102,116	252,335
5	Southgate River	126,723	313,140
6	Wahkash Creek	11,152	27,557
7	Kakweiken River	13,920	34,396
8	Wakeman Sound	2,494	6,164
9	Knight Inlet	43,997	108,719
10	Charles Creek	2,435	6,017
11	Smyth Cove	6,474	15,997
12	Mount Mathison	6,801	16,806
13	Stafford	6,849	16,924
14	Bear	1,789	4,420
15	Apple	17,086	42,221
16	Bute - Ramsay	52,269	129,159
17	Lillooet River	203,259	502,262
18	Toba River	71,336	176,274
19	Phillips River	30,825	76,169
20	Headwall Creek	9,878	24,408
21	Frederic	729	1,802
22	Blind Creek	4,167	10,297
23	Glendale Creek	3,483	8,606
24	Orford	9,733	24,051
25	Fulmore Lake	8,046	19,881
26	Squamish River	136,867	338,205
27	Mount Barner	6,576	16,249
28	Fraser	92,629	228,891
29	Skawkwa River	32,514	80,343
30	Homfray Creek	5,205	12,861
31	East Redonda Island	10,054	24,843
32	Powell Lake	97,992	242,143
33	Main Lake	4,502	11,126
34	Nahatlatch	28,976	71,600
35	Cheekamus River	52,199	128,986
36	Hotham Sound	30,612	75,644
37	Stakawus Creek	1,826	4,511
38	Vancouver River	8,495	20,992
39	Pitt River	105,071	259,636
40	Harrison Lake	85,491	211,252
41	Cheekye	828	2,046
42	Tzoonie	2,117	5,232
43	Stave River	62,066	153,369
44	Urquhart	5,798	14,328
45	Texada	26,476	65,424
46	Coquihalla River	32,874	81,233
47	Sechelt Peninsula	50,554	124,921
48	Narrows	899	2,220
49	Seymour River	15,896	39,280
50	Coquitlam River	24,598	60,782
51	Chehalis River	21,562	53,281
52	Fraser Valley	41,368	102,223
53	Silverhope Creek	17,823	44,043
54	Bowen Island	5,009	12,377
55	Cypress	1,266	3,129
56	Skagit River	37,143	91,782
57	Boundary	71,284	176,146
58	Chilliwack River	78,100	192,989
59	Serpentine - Nicomekl	20,858	51,541
60	Salmon River	4,643	11,473
61	Sumas	13,869	34,270

Index Number	Priority Conservation Area (PCA) Name	HECTARES	ACRES
62	Skagit Headwaters US	62,154	153,586
63	Nooksack Delta	56,923	140,658
64	Nooksack Confluence	19,629	48,504
65	Goodell Creek	10,203	25,212
66	Gorge Lake Tributaries	12,597	31,128
67	Hutchinson Creek	6,333	15,649
68	Whatcom Creek	14,538	35,925
69	Baker River	23,888	59,030
70	Bacon Creek	13,227	32,685
71	Orcas Island	14,705	36,337
72	Friday Creek	9,219	22,780
73	San Juan Island	14,085	34,805
74	Skagit Mainstem	41,065	101,475
75	Cascade River	41,874	103,473
76	Illabot Creek	11,167	27,594
77	Nookachamps Creek	18,976	46,891
78	Skagit Delta	28,395	70,166
79	Sauk River	22,000	54,363
80	Pilchuck Creek	21,463	53,036
81	North Fork Stilliguamish	50,519	124,834
82	Suiattle Headwaters	10,119	25,005
83	Jim Creek	12,247	30,263
84	Stilliguamish Delta	9,232	22,813
85	White Chuck River	12,120	29,949
86	Juan de Fuca Tributaries	22,609	55,867
87	Upper Hoko River	11,062	27,334
88	Whidbey Island	42,943	106,115
89	Slat Coville Creeks	8,051	19,896
90	Quilceda Creek	13,349	32,986
91	South Fork Stilliguamish	37,454	92,552
92	Lyre River	17,581	43,444
93	Pilchuck River	16,930	41,835
94	Middle Dungeness River	1,819	4,495
95	Canyon Creek	3,005	7,425
96	Jimmy Come Lately Creek	4,985	12,318
97	Snow Creek	5,826	14,397
98	Elwha River	43,037	106,347
99	Snohomish Delta	27,761	68,598
100	Skykomish River	42,614	105,302
101	Upper Dungeness River	10,037	24,801
102	Quilcene Bay	1,598	3,948
103	Kingston Poulsbo	13,897	34,340
104	Dosewallips River	27,817	68,737
105	Snoqualmie River	60,627	149,811
106	Hamma Hamma River	11,607	28,682
107	Issaquah Creek	16,518	40,817
108	Lilliwaup Creek	4,620	11,417
109	North Fork Skokomish	4,690	11,589
110	Kitsap Peninsula	122,337	302,301
111	Little Quilcene River	16,367	40,444
112	Duwamish Green River	60,249	148,878
113	Skokomish River	4,555	11,255
114	Eld Inlet Tributaries	28,342	70,034
115	Nisqually Reach Tributaries	12,990	32,100
116	Lower Nisqually River	24,881	61,482
117	Carbon River	19,761	48,830
118	Deschutes River	45,196	111,682
119	Tanwax Creek	7,327	18,106
120	Mashel River	22,667	56,012
121	Nisqually Headwaters	42,129	104,104

NORTH CASCADES ECOREGION:

24b: Numerical Index of Freshwater Priority Conservation Areas

This index is intended to help the reader identify priority conservation areas (PCAs) in the freshwater portfolio on Maps 24, 25 and 28, using their PCA numbers. The conservation areas are not ranked on Maps 24 and 25, nor here. Rankings can be found on Map 28. The conservation areas are listed in numerical order and are indexed as they fall geographically from north to south.

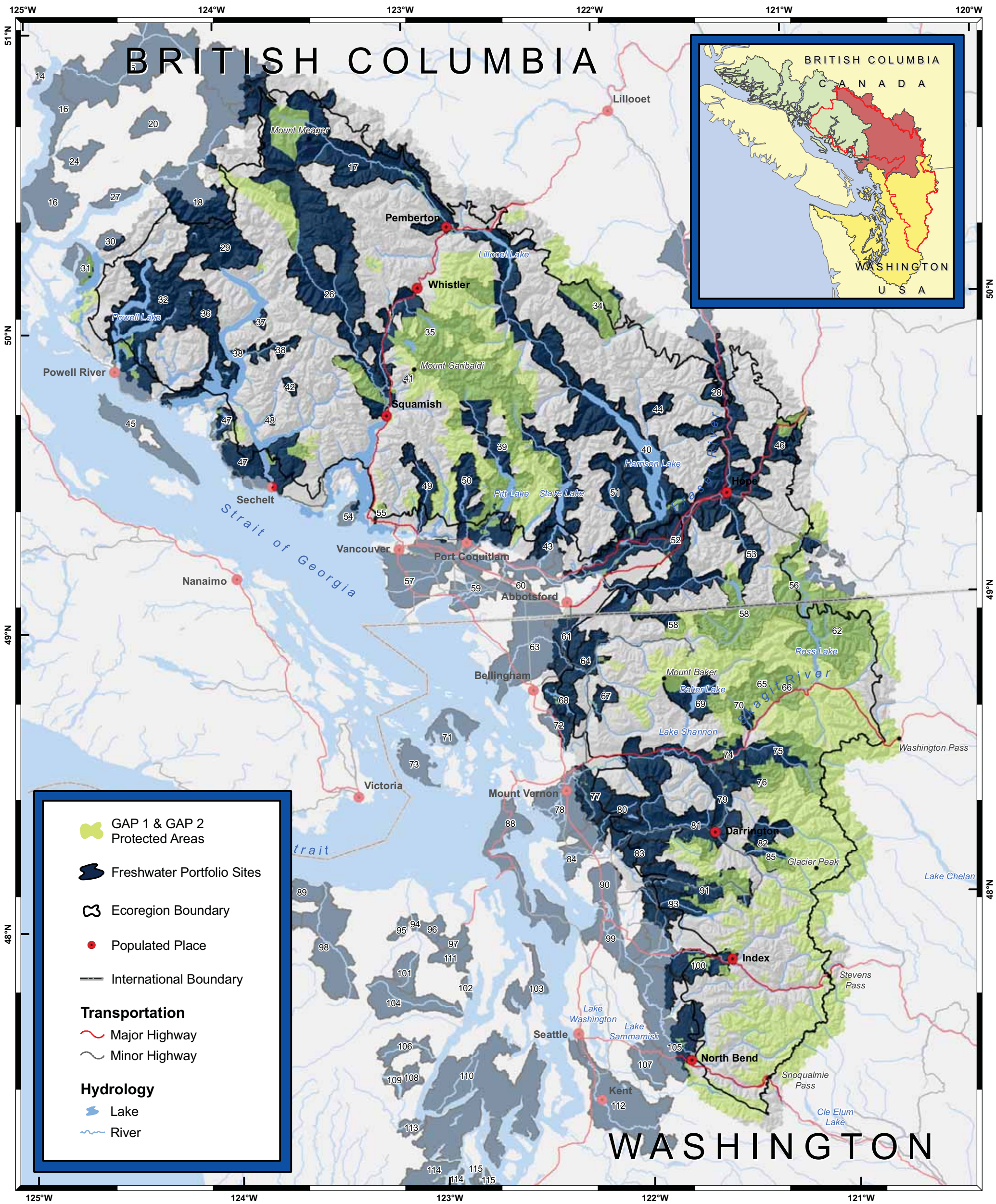
Area values are calculated as the sum of the area of all assessment units which make up a single site.

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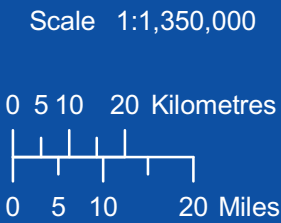


NORTH CASCADES ECOREGION:

Map 25: Protected Areas and Freshwater Portfolio Sites

Designated parks and protected areas (classified as GAP status 1 and GAP status 2) overlap with freshwater portfolio sites. Approximately 26%, or 45,412 ha (1,122,157 ac) of the freshwater portfolio is currently in designated protected areas (to the extent of the terrestrial assessment units, not Ecological Drainage Units). MARXAN is predisposed to select analysis units that are within a protected area so that the "cost" of an area is minimized. Assuming the portion of the portfolio within GAP status 1 or GAP status 2 areas is already protected, an additional 27%, or 1,308,324 ha (3,232,935 ac) of the ecoregion (to the extent of the terrestrial assessment units) requires some form of conservation action in order to conserve the full freshwater portfolio.

Approximately 19%, or 672,575 ha (1,661,967 ac) of the freshwater portfolio (to the extent of Ecological Drainage Units), fully or partially in the North Cascades Ecoregion, are currently in designated protected areas. See Appendix 1 -- Glossary for GAP status definitions.

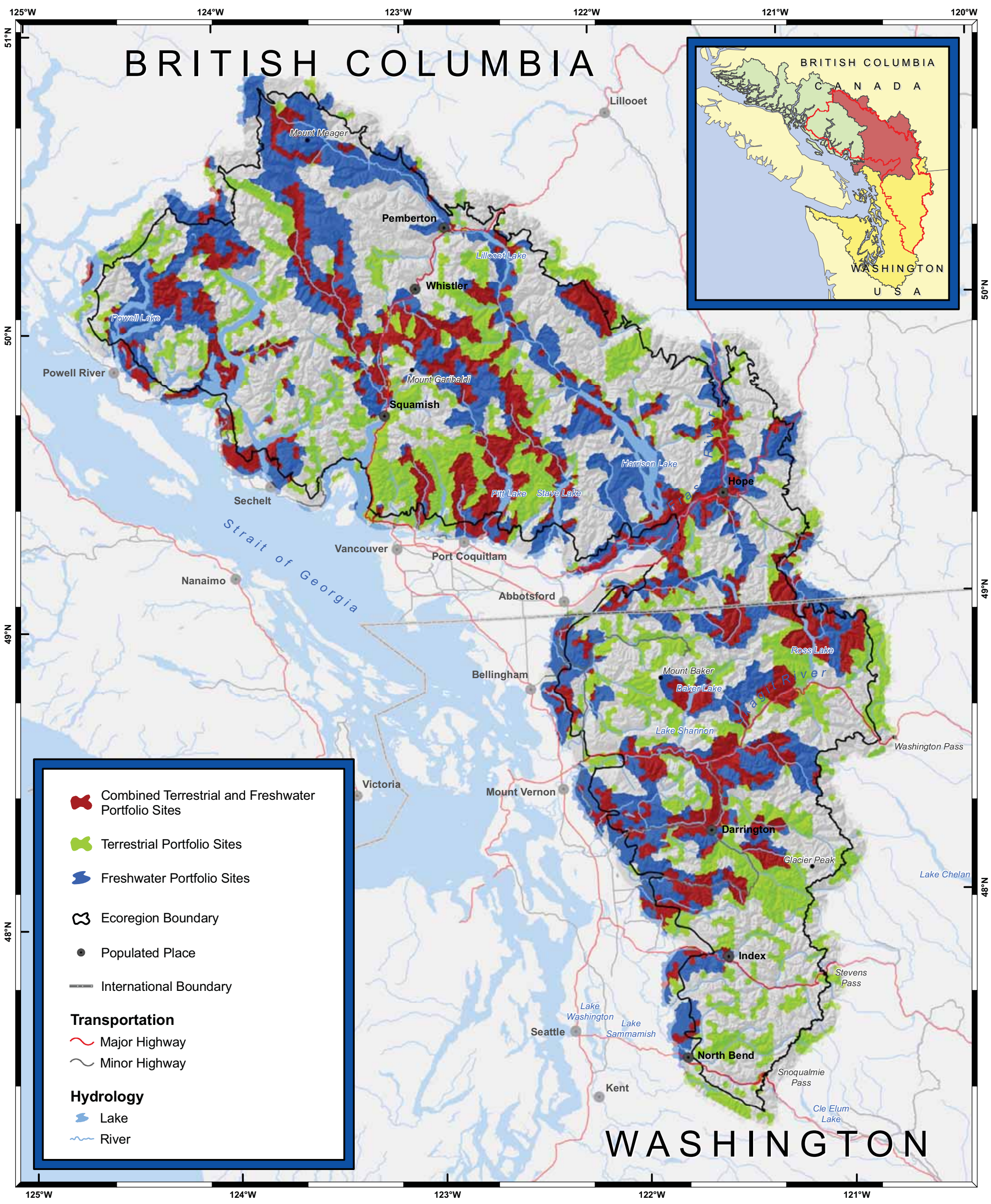


Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

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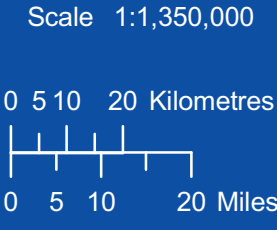


NORTH CASCADES ECOREGION:

Map 26: Combined Porfolio

The overlap between the terrestrial and freshwater portfolios is portrayed on this map. When combined, 2,721,813 ha (6,725,736 ac) or 57% of the ecoregion is found within the resulting portfolio area. Of this, 15% of the ecoregion, or 727,634 ha (1,798,021 ac) is identified in both the terrestrial and freshwater portfolios. Some possible reasons for the relatively little overlap between the two realms include:

- Different analysis units (watersheds vs hexagons)
- Landscape characteristics
- Terrestrial portfolio sites tend to be in areas with the least impact whereas freshwater portfolio sites include main stream reaches, where most of the region's development occurs
- Freshwater systems targets require all larger reaches in that system be selected in a portfolio for that target goal to be achieved, without consideration of landscape fragmentation

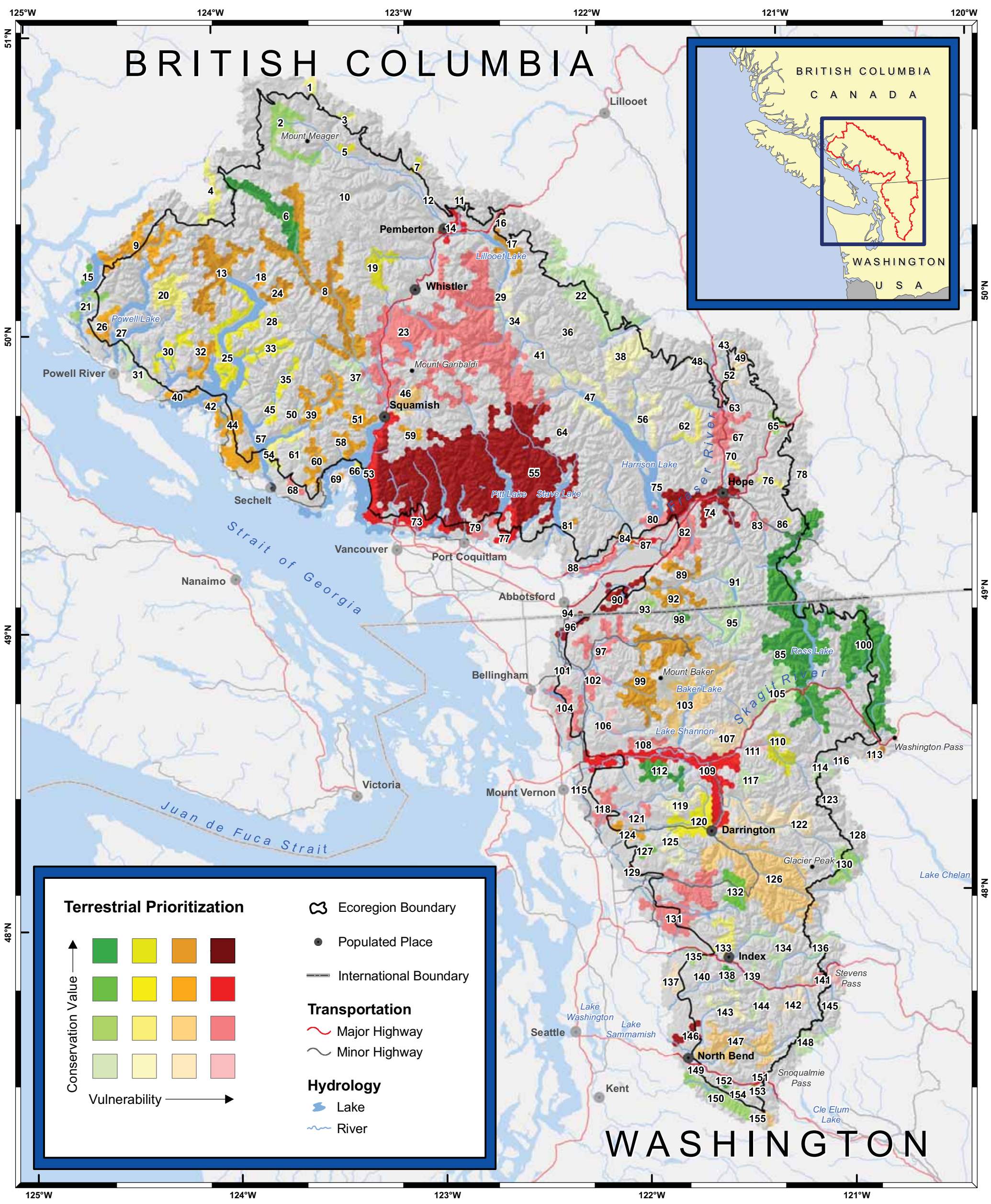


Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

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Projection: BC Albers Equal Area

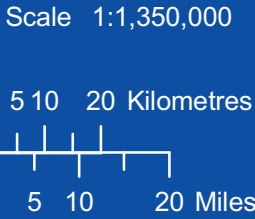
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NORTH CASCADES ECOREGION:

Map 27: Terrestrial Priority Conservation Areas by Relative Importance

Every area in the portfolio is worthy of conservation action, however not all areas are of equal value or in need of attention with the same degree of urgency. Through a practical approach to priority setting, the challenge of conserving identified areas can be focused down to an ambitious set of objectives, which if undertaken by the conservation community as a whole, is within our collective reach (Groves, 2003). We prioritized the 155 terrestrial sites identified in the North Cascades Ecoregion. Prioritization evaluated the relative importance among sites using criteria for measuring conservation value and vulnerability (Pressey et al., 1994; Noss et al., 2001; Rumsey et al., 2003). For more information on the definition of conservation value and vulnerability refer to Map 27a.



Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

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Conservation Value

I 90 Two (152)
Mount Index (138)
Frisco Creek (113)
Park Creek (116)
West Pasayten (100)
Ross Lake Transition (85)
Tomyhoi Lake (98)
Clendeinning (6)

I 90 Four (153)
Steven's Pass (141)
Perry Creek (132)
Redonda (15)
Joffre (16)

Cedar River (150)
Tonga Ridge (142)
Buck Creek Pass (130)
Lumchen Mountain (93)
Coquihala Summit (65)
Desolation Sound (21)
Upper Lillooet (2)

Alpine Lakes East (148)
French Ridge (145)
Klinger Ridge (139)
Upper Skykomish (134)
Lake Creek (136)
Yawning Glacier (114)
Otter Creek (117)
Boston Glacier (110)
Upper Skagit (105)
Chilliwack River (95)
Chilliwack Lake (91)
Smith Range (61)
Pemberton Meadows (12)
Stein - Mehatl - Nahatlatch (22)

Tantalus (37)
Hart Lake (128)
Icy Creek (123)
Lakes (31)
Sauk (126)

I 90 Three (154)
Ragged Ridge (133)
Cooks Cove (75)
Tretheway (64)
Stoyoma (43)
Franks (41)
Callaghan - Soo (19)
Copper Mound (7)

Mount Outram (86)
Vuich (78)
Ramillies (66)
Narrows Inlet (45)
Misty (50)
Tzoonie (35)
Royal Reaches (25)
Nahatlatch (36)
The Knuckles (30)
Vancouver River (33)
Stakawus (28)
Goat Island (27)
Hemionus (5)

Sowaqua (76)
Squeah Mountain (72)
Urquhart (62)
Salmon Inlet (54)
Beartooth - Eldred (20)
TFL 10 (4)
Boulder - Pebble (3)
Bridge (1)

Boulder River (125)
Higgins Creek (119)
Mount Bard (71)
Silver River (56)
Harrison Lake (47)
Big Silver (38)
Scuzzy Creek (48)
Angie's Well (34)
Baptiste Smith (29)
Ryan (10)

Snoqualmie Pass (151)
Cub Creek (127)
Mount Baker (99)
Mount McGuire (92)
Cheam Ridge (89)
Harrison Mills (84)
Davis (81)
Uztlus (49)
TFL 38 (8)
Skwawka - Brittain (13)
Deserted River (24)
Lillooet Lake (17)

Tetrahedon Extension (60)
Gambier (69)
McNab (58)
Sechelt Peninsula (44)
Stawamus (59)
Kunechin Point (57)
Mill Creek (51)
Clowhom (39)
Nelson Island (42)
Saltery (40)
Lois - Khartoume (32)
Bunster Hills (26)
Princess Louisa Inlet (18)
Powell - Daniels (9)

Sunday Creek (155)
Alpine Lakes West (147)
Miller River (144)
Sultan Basin (131)
Baker Lake (103)
Mamquam (46)

Snoqualmie Foothill forest (WPG Site #177) (137)
Suiattle (122)
Finney O'Toole (112)
Noisy - Diobsud (107)
Anderson (52)
Birkenhead (11)

I 90 One (149)
Tokul Basin (146)
Duffey Gap (140)
Jordan Creek (129)
Mountain View (115)
Cedarville (WPG #82) (101)
Sumas River (96)
Cultus - Vedder (90)
Blaine (94)
Silver - Hope (74)
North Shore Complex (55)

Snoqualmie - Tolt (143)
Mount Woodside (87)
Golden Pitt (77)
Seymour Narrows (73)
Sea - To - Sky Vista (53)
Pemberton - Mount Currie (14)

Cheam Peak (82)
Garibaldi Complex (23)
South Sunshine (68)
Pitt Macro Site (79)
Sunshine Valley (83)
Harrison Hot Springs (80)
Nicomen Slough (88)
Van Zandt Ridge (102)
Lake Cavanaugh (121)
Lower Stillaguamish (124)
Lake Whatcom (WPG #80) (104)
Stillaguamish - Port Susan (WPG #129) (118)
Skagit - Sauk Riparian (Added to WPG Site) (109)
Skykomish Riparian (WPG Site #183) (135)

Alder Creek (108)
Yale (67)
Spuzzum (63)
Sumas (97)

Upper NF Stillaguamish (120)
Marble Creek (111)
Arlecho Creek (106)
Emery Creek (70)

NORTH CASCADES ECOREGION:

Map 27a: Terrestrial Priority Conservation Areas by Relative Importance

This table identifies the relative importance of 155 Terrestrial Priority Conservation Areas (PCAs) across the ecoregion using criteria for measuring conservation value and vulnerability, as depicted in Map 27. We based conservation value on irreplaceability measures, one of the MARXAN model outputs. Vulnerability was based on the suitability index which was an input to the model (Chapter 4).

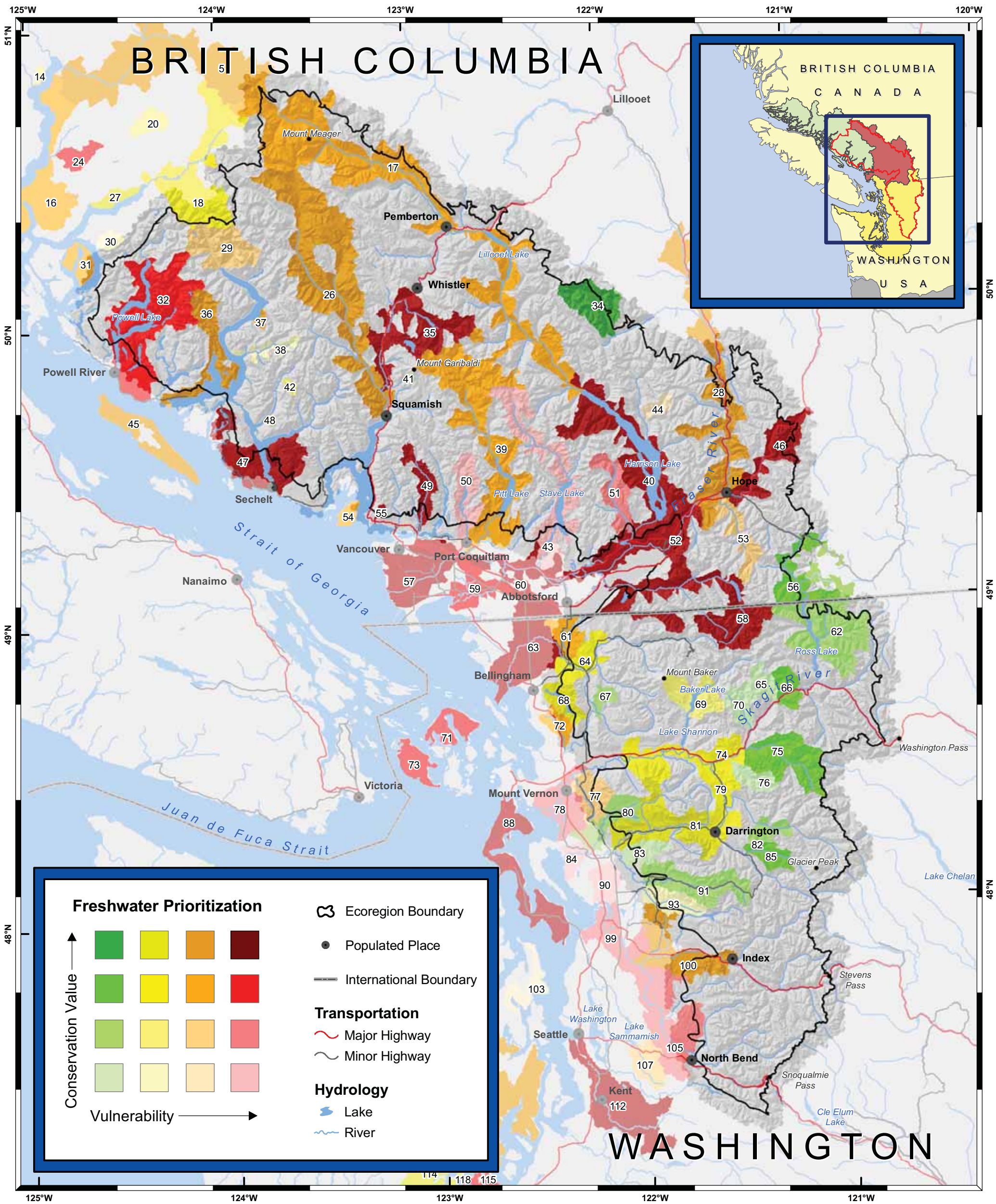
PCAs are sorted in the table according to factors important for biodiversity value as well as those that pose threats. The Priority Conservation Area names are listed according to their relative ranking, followed by the index number for ease of reference to Map 27.

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Vulnerability

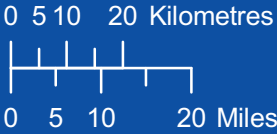


NORTH CASCADES ECOREGION:

Map 28: Freshwater Priority Conservation Areas by Relative Importance

Every area in the portfolio is worthy of conservation action, however not all areas are of equal value or in need of attention with the same degree of urgency. Through a practical approach to priority setting, the challenge of conserving identified areas can be focused down to an ambitious set of objectives, which if undertaken by the conservation community as a whole, is within our collective reach (Groves, 2003). We prioritized the 121 Freshwater sites identified in the North Cascades Ecoregion. Prioritization evaluated the relative importance among sites using criteria for measuring conservation value and vulnerability (Pressey et al., 1994; Noss et al., 2001; Rumsey et al., 2003). For more information on the definition of conservation value and vulnerability refer to Map 28a.

Scale 1:1,350,000



Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

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Projection: BC Albers Equal Area

Logos of partner organizations: NATURE CONSERVANCY, CONSERVATION NATURE, The Nature Conservancy, Washington Department of FISH and WILDLIFE, B.C. Conservation Data Centre, NatureServe.

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Conservation Value

<div>Carbon River (117) Nahatlatch (34) Upper Hoko River (87)</div>	<div>Eld Inlet Tributaries (114) Mount Barner (27) North Fork Stilliguamish (81) Skokomish River (113) Whatcom Creek (68)</div>	<div>Fraser (28) Hotham Sound (36) Kitsap Peninsula (110) Skykomish River (100) Southgate River (5) Squamish River (26) Stakawus Creek (37) Texada (45)</div>	<div>Boundary (57) Cheekamus River (35) Chilliwack River (58) Coquihalla River (46) Cypress (55) Duwamish Green River (112) Fraser Valley (52) Harrison Lake (40) Nooksack Delta (63) Phillips River (19) Salmon River (60) Sechelt Peninsula (47) Seymour River (49) Whidbey Island (88)</div>
<div>Cascade River (75) Gorge Lake Tributaries (66) Mashel River (120) Skagit River (56) Snow Creek (97) White Chuck River (85)</div>	<div>Jimmy Come Lately Creek (96) Kingcome River (1) Nooksack Confluence (64) Sauk River (79) Skagit Mainstem (74) Slat Coville Creeks (89) Toba River (18) Wahkash Creek (6) Wakeman Sound (8)</div>	<div>Bowen Island (54) Bute - Ramsay (16) East Redonda Island (31) Friday Creek (72) Lillooet River (17) Pitt River (39) Seymour Inlet (4) Sumas (61)</div>	<div>Deschutes River (118) Nisqually Reach Tributaries (115) Orcas Island (71) Orford (24) Powell Lake (32) San Juan Island (73) Serpentine - Nicomekl (59)</div>
<div>Hamma Hamma River (106) Hutchinson Creek (67) Knight Inlet (9) Pilchuck Creek (80) Skagit Headwaters US (62) South Fork Stilliguamish (91) Suiattle Headwaters (82) Upper Dungeness River (101)</div>	<div>Baker River (69) Bear (14) Charles Creek (10) Franklin (2) Frederic (21) Headwall Creek (20) Little Quilcene River (111) Mount Mathison (12) Narrows (48) Stafford (13) Tzoonie (42)</div>	<div>Apple (15) Fulmore Lake (25) Issaquah Creek (107) Nookachamps Creek (77) North Fork Skokomish (109) Silverhope Creek (53) Skawkwa River (29)</div>	<div>Chehalis River (51) Skagit Delta (78) Snohomish Delta (99) Snoqualmie River (105)</div>
<div>Bacon Creek (70) Canyon Creek (95) Cheekye (41) Dosewallips River (104) Goodell Creek (65) Illabot Creek (76) Jim Creek (83) Juan de Fuca Tributaries (86) Lilliwaup Creek (108) Lyre River (92) Middle Dungeness River (94) Nisqually Headwaters (121) Quilcene Bay (102) Smyth Cove (11)</div>	<div>Blind Creek (22) Homfray Creek (30) Main Lake (33) Pilchuck River (93) Vancouver River (38)</div>	<div>Atwaykellesse - Wahpeet (3) Elwha River (98) Kakweiken River (7) Kingston Poulsbo (103) Lower Nisqually River (116) Tanwax Creek (119) Urquhart (44)</div>	<div>Coquitlam River (50) Glendale Creek (23) Quilceda Creek (90) Stave River (43) Stilliguamish Delta (84)</div>

Vulnerability

NORTH CASCADES ECOREGION:

Map 28a: Freshwater Priority Conservation Areas by Relative Importance

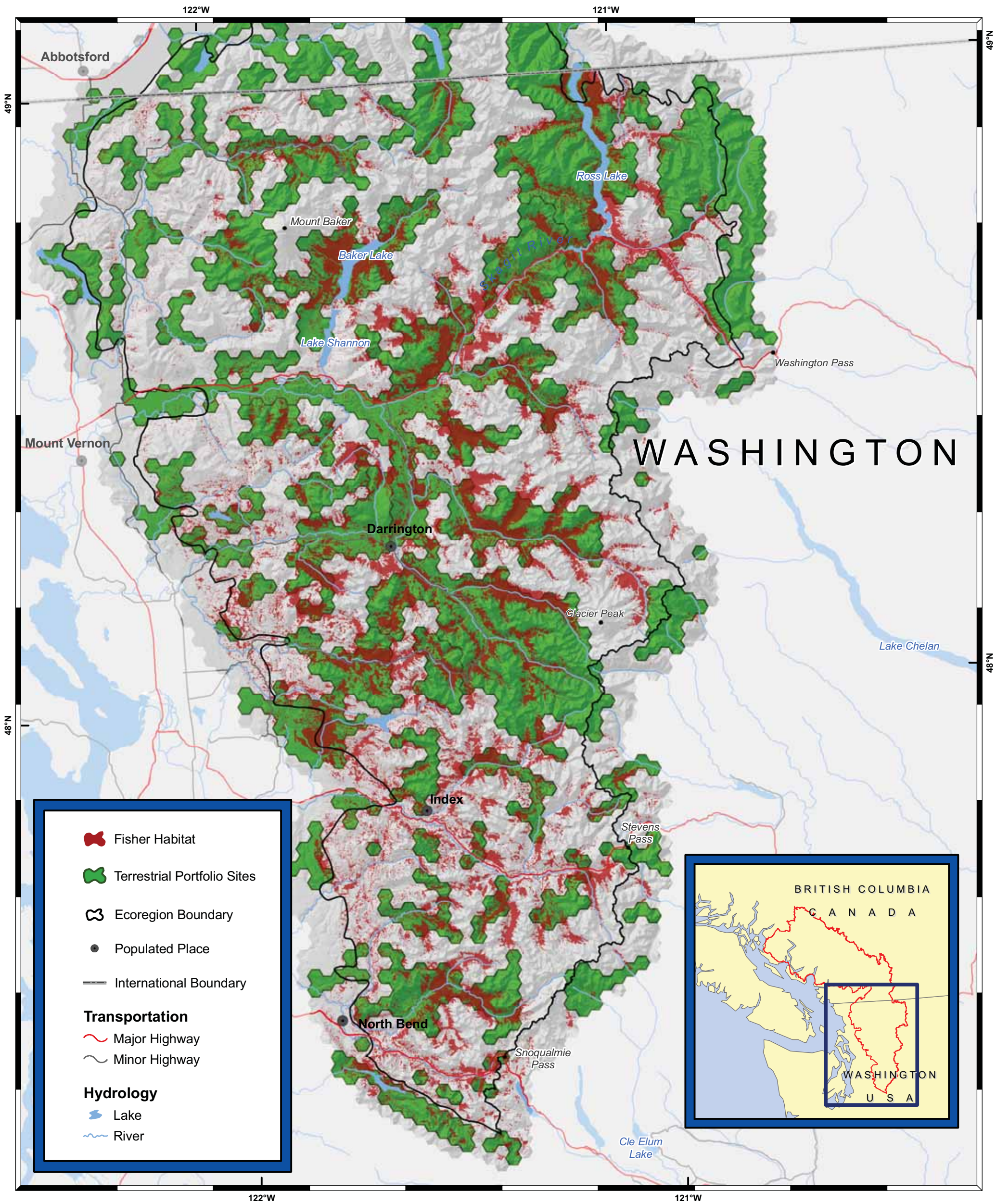
This table identifies the relative importance of 121 Freshwater Priority Conservation Areas (PCAs) across the ecoregion using criteria for measuring conservation value and vulnerability, as depicted in Map 28. We based conservation value on irreplaceability measures, one of the MARXAN model outputs. Vulnerability was based on the suitability index which was an input to the model (Chapter 4).

PCAs are sorted in the table according to factors important for biodiversity value as well as those that pose threats. The Priority Conservation Area names are listed according to their relative ranking, followed by the index number for ease of reference to Map 28.

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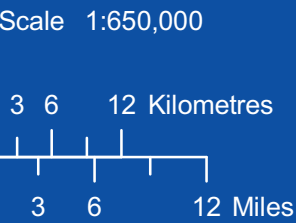
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NORTH CASCADES ECOREGION:

Map 29: Comparative Analysis: Fisher Habitat

A comparative analysis was made between the terrestrial portfolio and extent of fisher habitat in Washington state*. There are 255,799 ha (632,092 ac) of fisher habitat in the Washington portion of the ecoregion. The results of this analysis show that 54%, or 138,603 ha (342,495 ac) of the fisher habitat fall within the terrestrial portfolio.



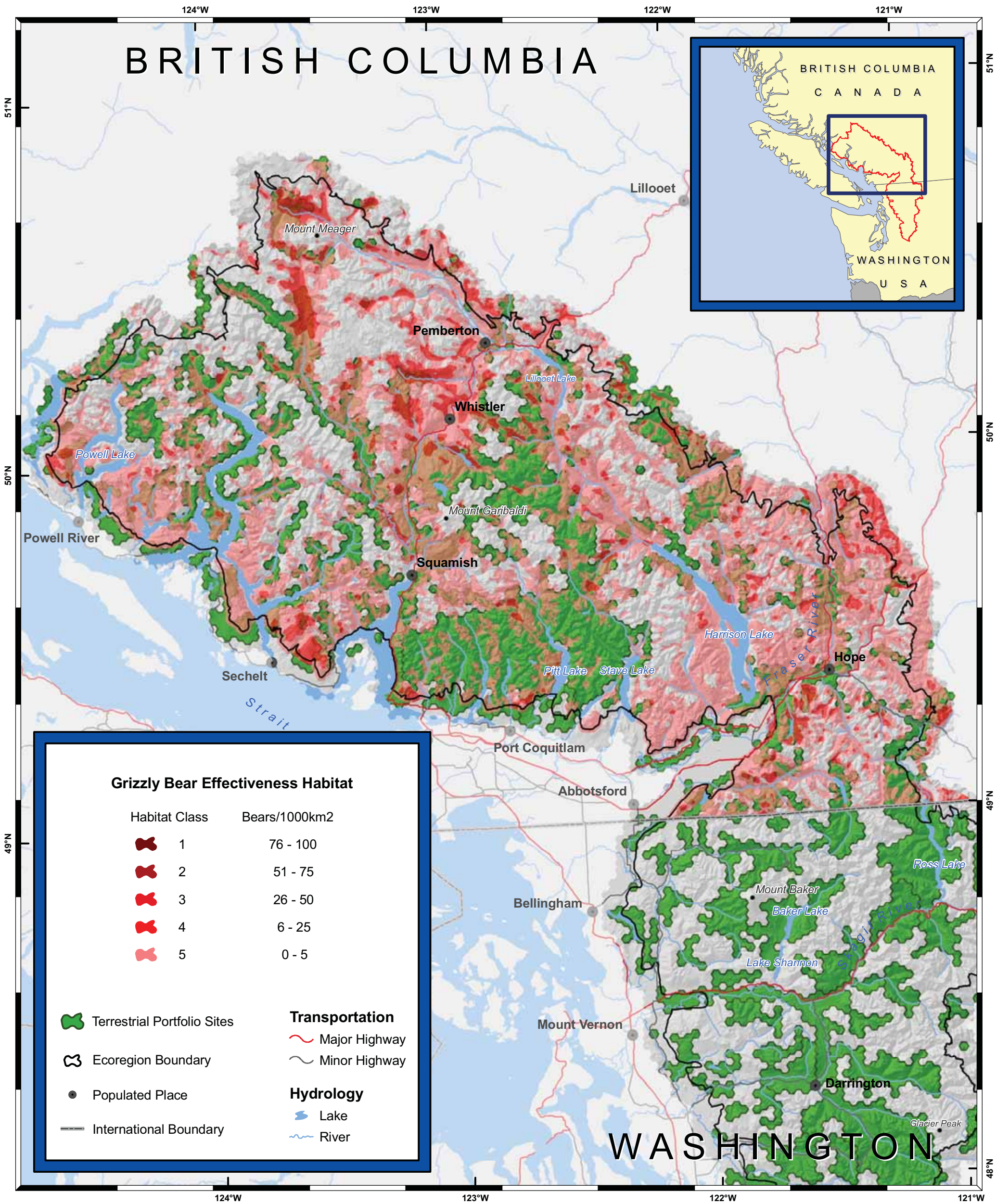
*Fisher are not a conservation target in British Columbia.

Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

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Projection: BC Albers Equal Area

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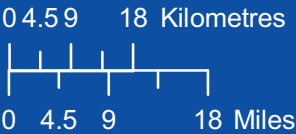
NORTH CASCADES ECOREGION:

Map 30a: Comparative Analysis:
Grizzly Bear Habitat BC

A comparative analysis was made between the terrestrial portfolio and extent of grizzly bear effectiveness habitat in British Columbia. There are 1,484,514 ha (3,668,308 ac) of grizzly bear effectiveness habitat in the British Columbia portion of the ecoregion. The results of this analysis show that 35%, or 514,076 ha (1,270,308 ac) of the grizzly bear effectiveness habitat falls within the BC portion of the terrestrial portfolio. The grizzly bear effectiveness habitat is further broken down into 5 classes. The table below illustrates what each class represents, and the percentage of available effectiveness habitat class captured by the terrestrial portfolio.

	Bears/1000km2	% Captured
Class 1	76 - 100	0
Class 2	51 - 75	55
Class 3	26 - 50	42
Class 4	6 - 25	33
Class 5	0 - 5	35

Scale 1:1,100,000



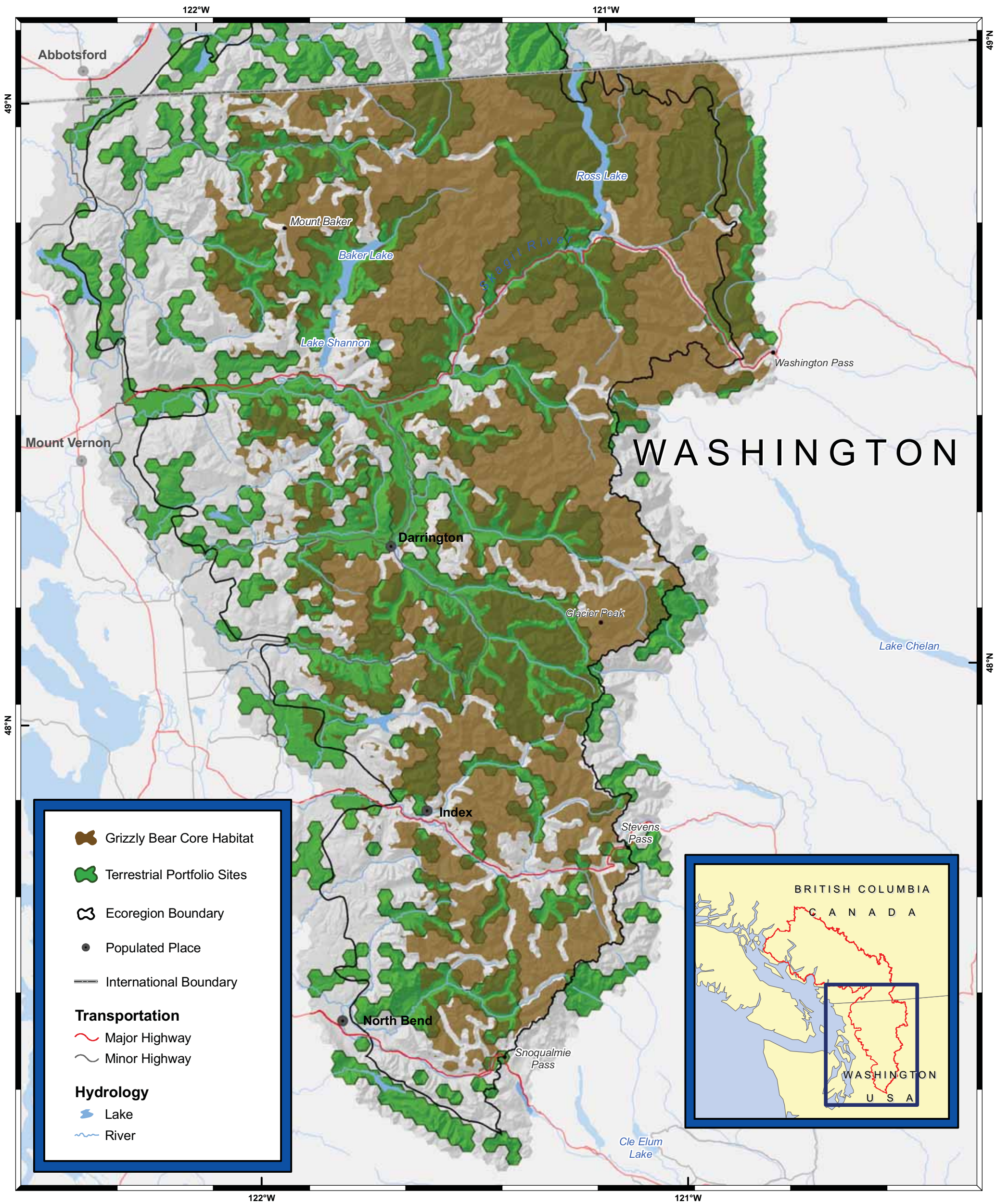
Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

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Projection: BC Albers Equal Area



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NORTH CASCADES ECOREGION:

Map 30b: Comparative Analysis: Grizzly Bear Habitat Washington

A comparative analysis was made between the terrestrial portfolio and extent of core grizzly bear habitat in Washington state. There are 807,686 ha (1,995,832 ac) of core grizzly bear habitat in the Washington portion of the ecoregion. The results of this analysis show that 42%, or 336,921 ha (832,550ac) of the core grizzly bear habitat falls within the Washington portion of the terrestrial portfolio.



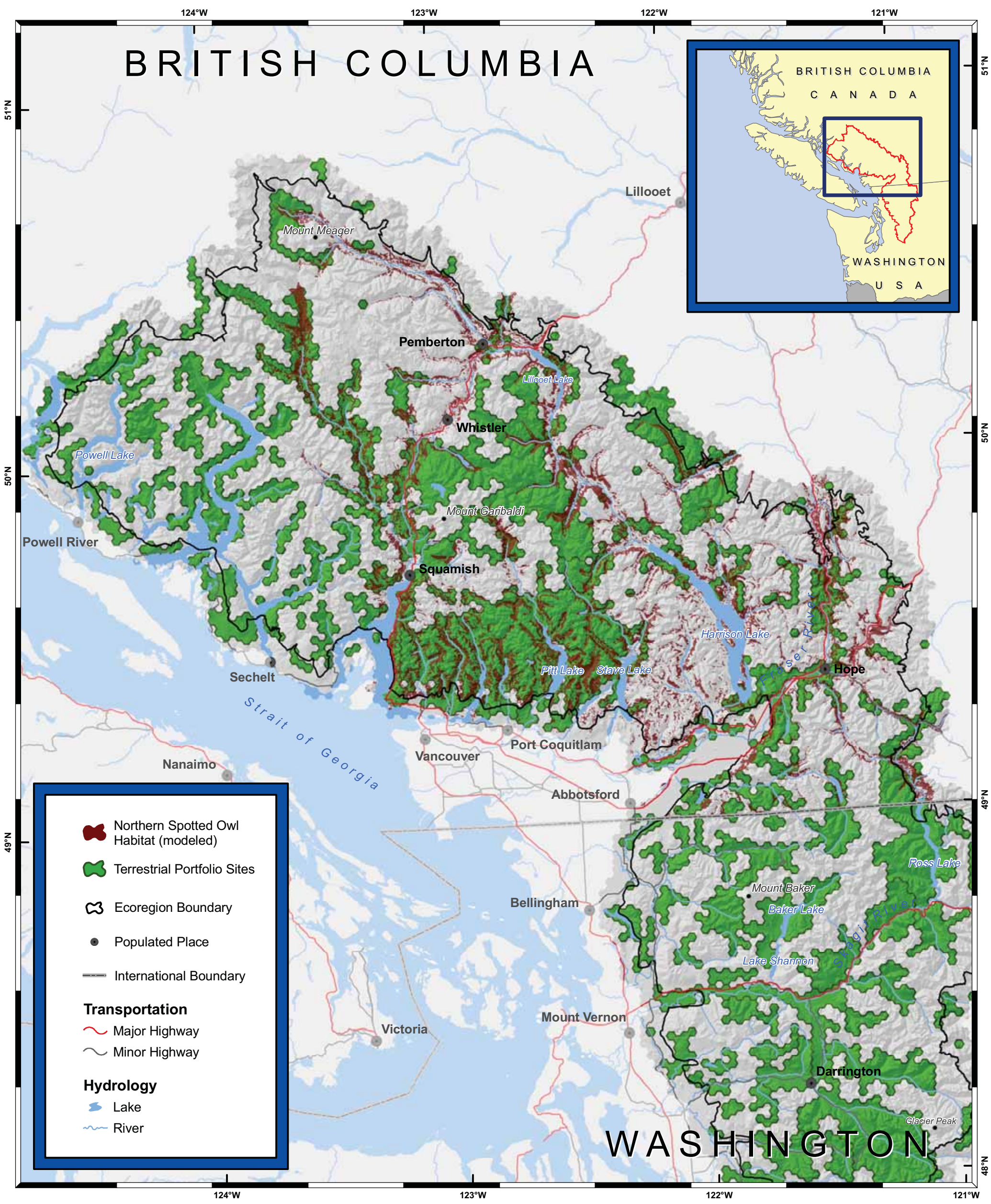
Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

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Projection: BC Albers Equal Area

Logos of partner organizations: NATURE CONSERVANCY, CONSERVATION NATURE, The Nature Conservancy, Washington Department of FISH and WILDLIFE, B.C. Conservation Data Centre, and NatureServe.

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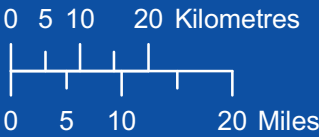


NORTH CASCADES ECOREGION:

**Map 31: Comparative Analysis:
Northern Spotted Owl Habitat**

A comparative analysis was made between the terrestrial portfolio and extent of northern spotted owl habitat in British Columbia. The northern spotted owl habitat was modeled from old growth forest mapping in the Chilliwack and Squamish forest districts. There are 308,654 ha (762,700 ac) of northern spotted owl habitat in the British Columbia portion of the ecoregion. The results of this analysis show that 54%, or 165,997 ha (410,186 ac) of the northern spotted owl habitat falls within the BC portion of the terrestrial portfolio.

Scale 1:1,100,000



Sources:
BC Ministry of Agriculture and Lands,
Nature Conservancy of Canada,
The Nature Conservancy,
WA Dept. of Fish and Wildlife,
WA Dept. of Natural Resources,
USGS, ESRI

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