



Taking Nature's Pulse

– The Patient is Showing Signs of Heat Stress

Matt Austin

July 16, 2009

Who is Biodiversity BC?

- Ducks Unlimited Canada
- Environment Canada (Canadian Wildlife Service)
- Government of British Columbia (Ministry of Environment, Ministry of Agriculture and Lands)
- Habitat Conservation Trust Foundation
- The Land Conservancy of British Columbia
- Nature Conservancy Canada
- The Nature Trust of British Columbia
- Pacific Salmon Foundation
- Public Land ENGOS (represented by Canadian Parks and Wilderness Society)
- Union of British Columbia Municipalities (represented by Metro Vancouver)



www.biodiversitybc.org

What is Biodiversity?

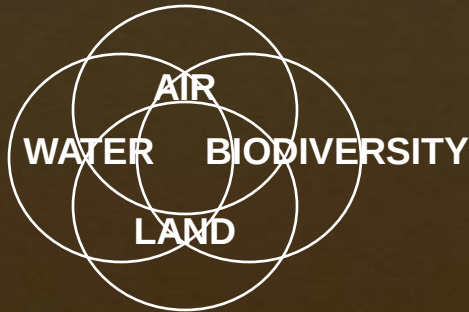
*...all living things
and the elements
and processes
that sustain
them...*



Benefits of Biodiversity

ECOSYSTEM OUTPUTS & BENEFITS

Natural Capital



Goods:

- wood and fibers
- food
- fuel
- genetic resources
- pharmaceuticals
- drinking water
- minerals

Services:

- climate regulation
- water purification
- waste treatment
- erosion control
- pest and disease control
- pollination
- soil formation
- photosynthesis

Status Report

Taking Nature's Pulse: The Status of Biodiversity in British Columbia

*"As a state of biodiversity report it is as good
as any I have seen around the world."*

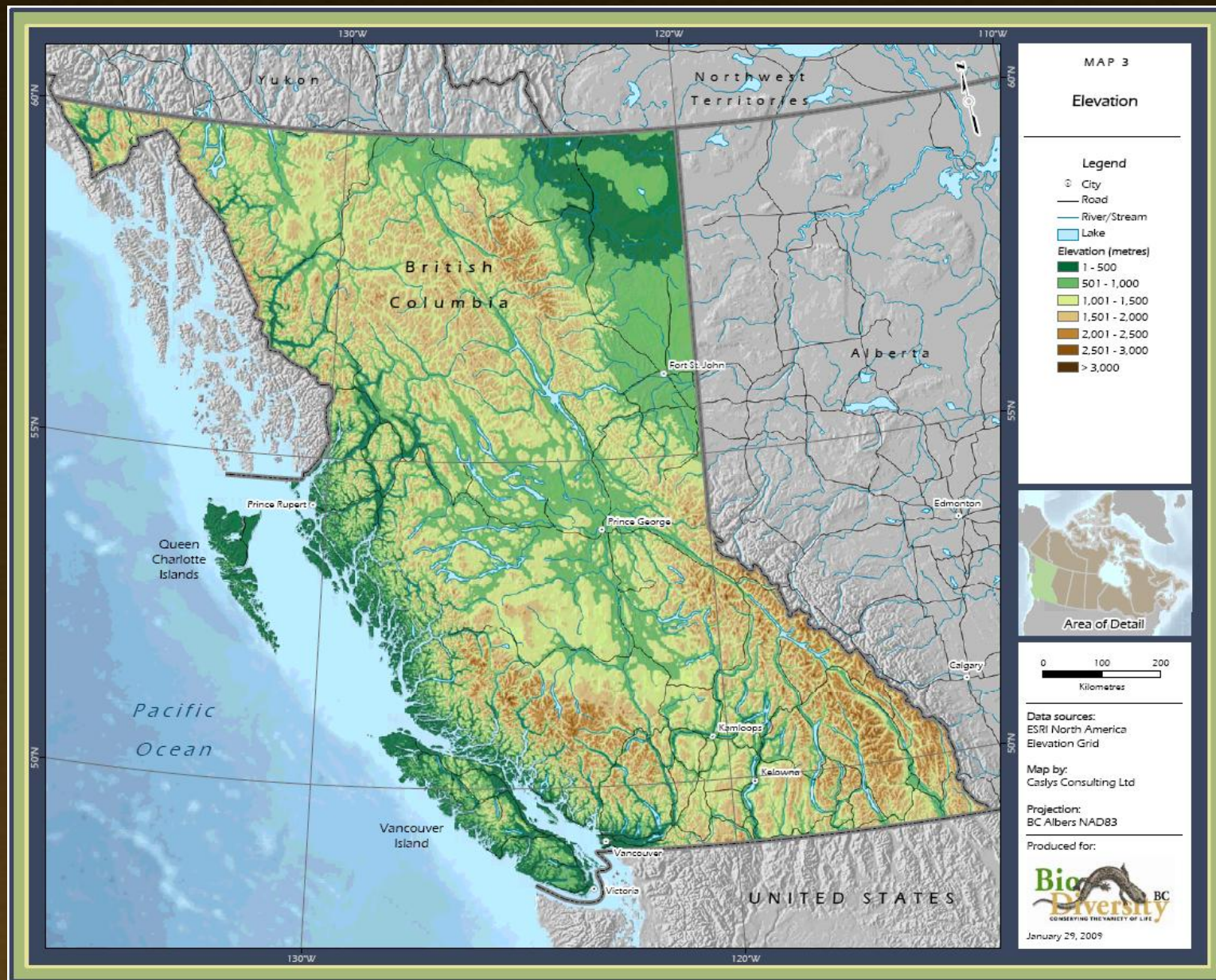
Dr Hugh Possingham, University of Queensland

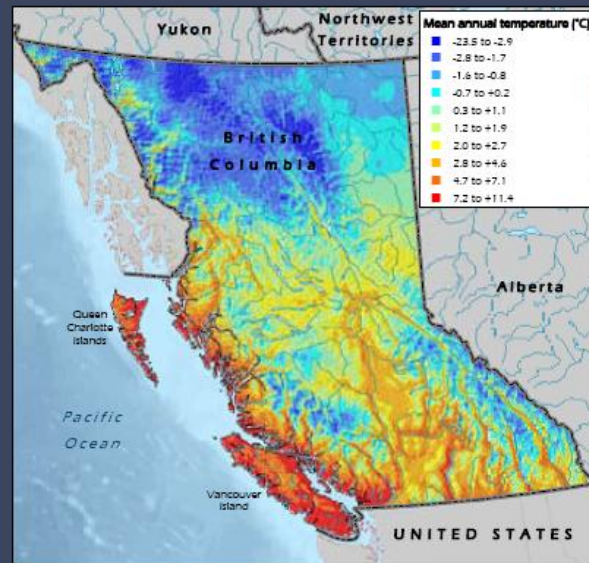
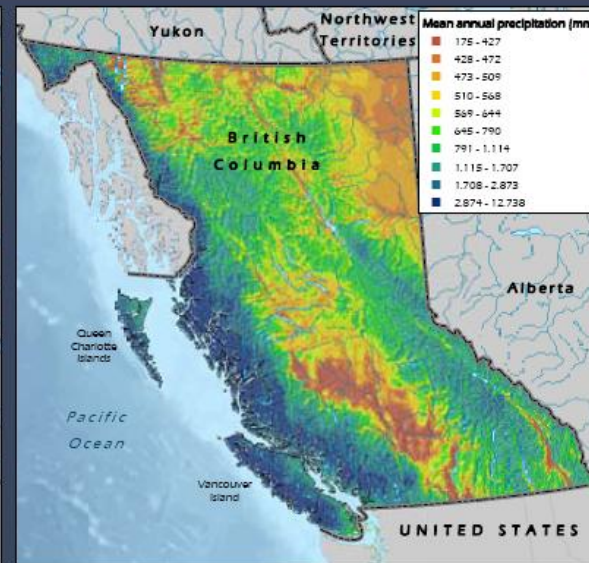
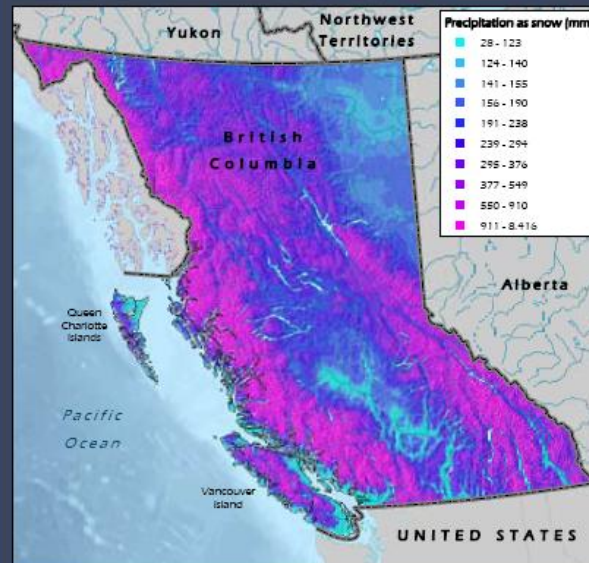


Status Report Summary Statement

B.C.'s biodiversity is globally significant because of its variety and integrity, but without immediate action it is vulnerable to rapid deterioration, especially in light of climate change







MAP 4
Standard climate variables

Legend
— River/Stream
□ Lake



0 250 500
Kilometres

Data sources:
Pacific Climate Impacts Consortium (University of Victoria): 1961 - 1990 averages

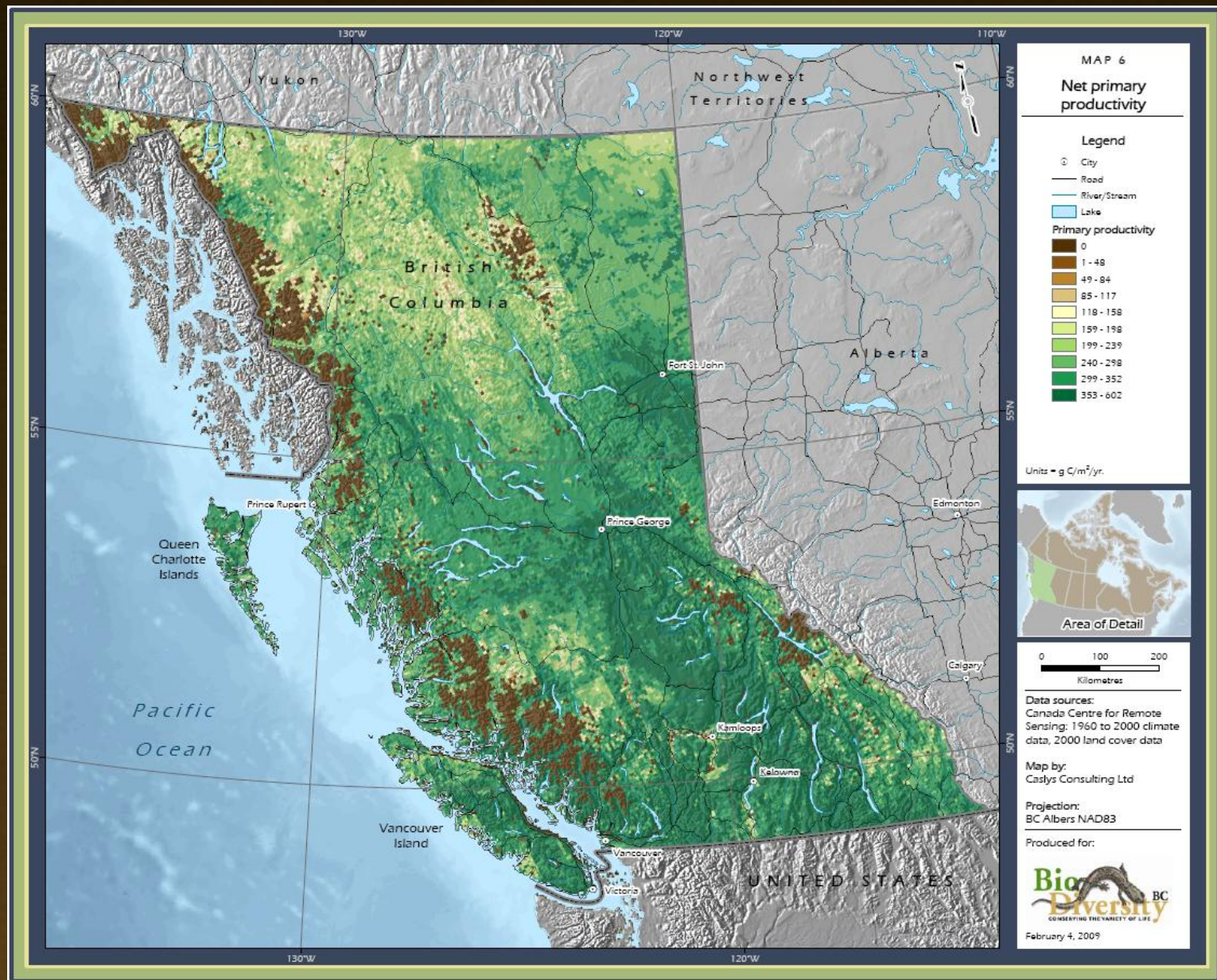
Map by:
Casiys Consulting Ltd

Projection:
BC Albers NAD83

Produced for:



February 5, 2009



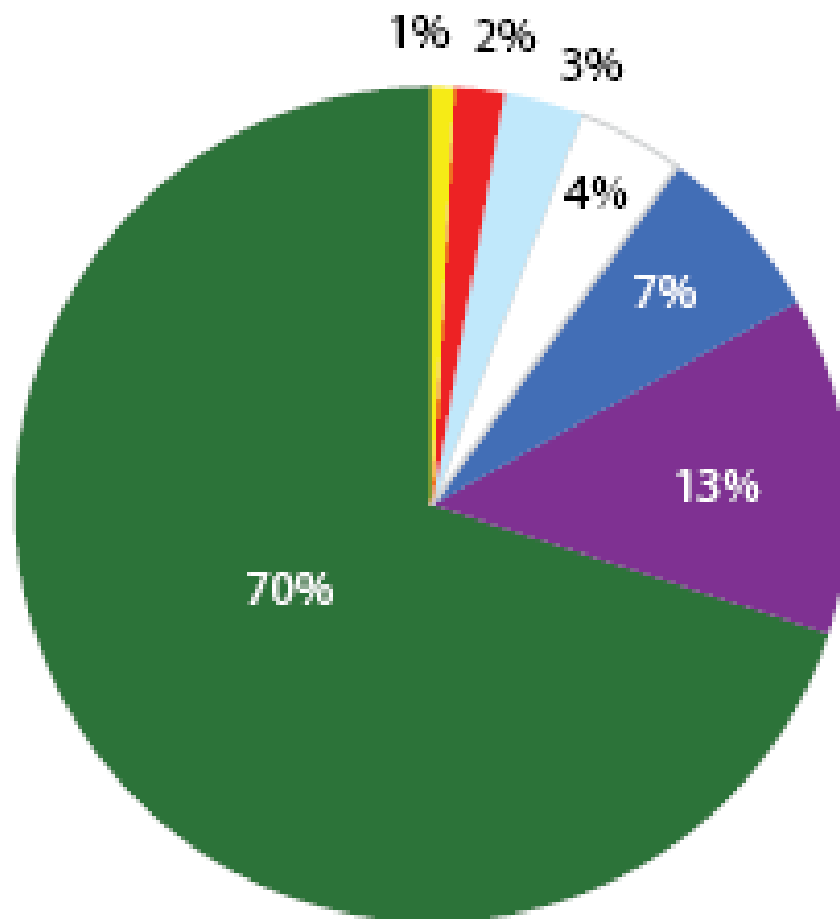
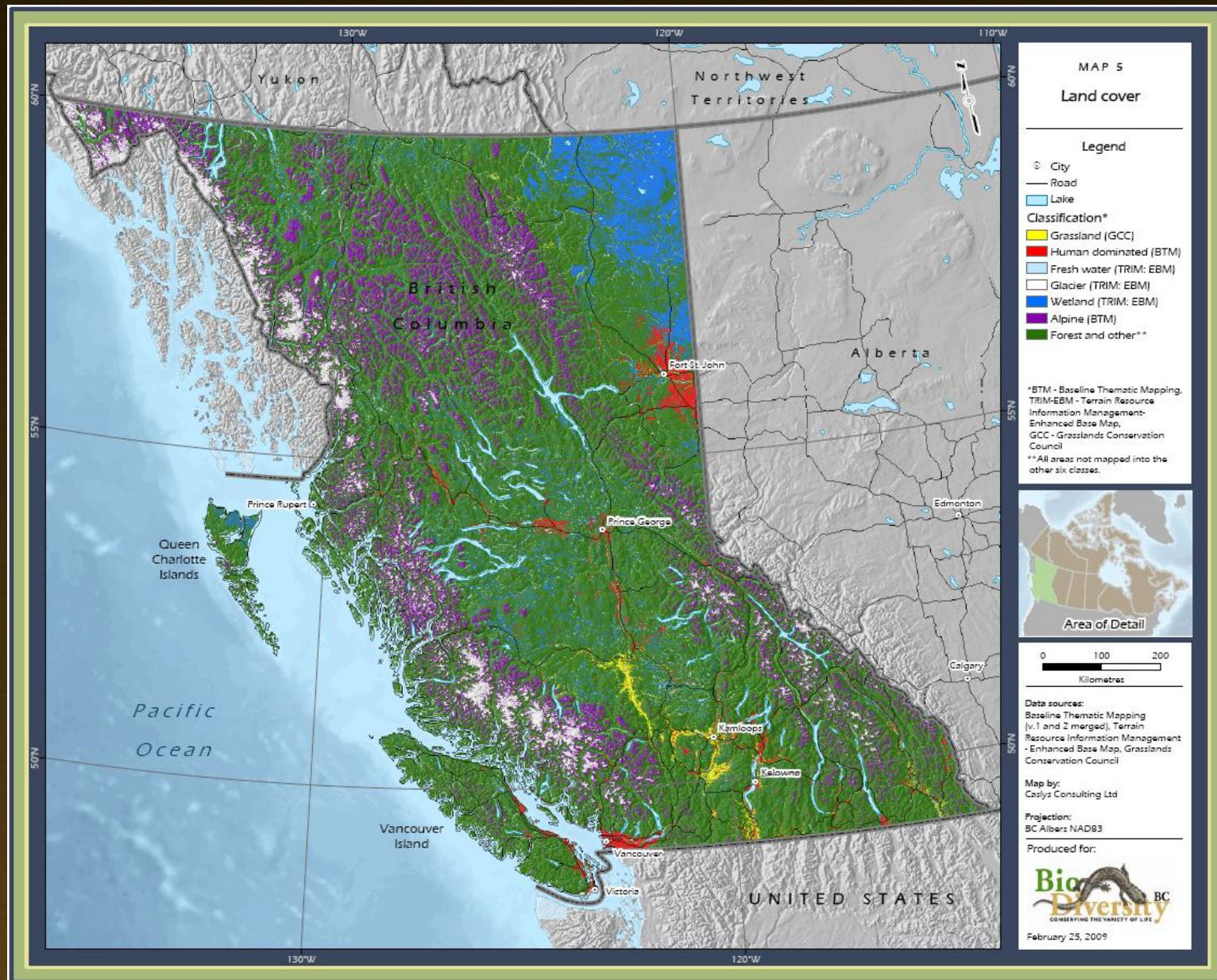


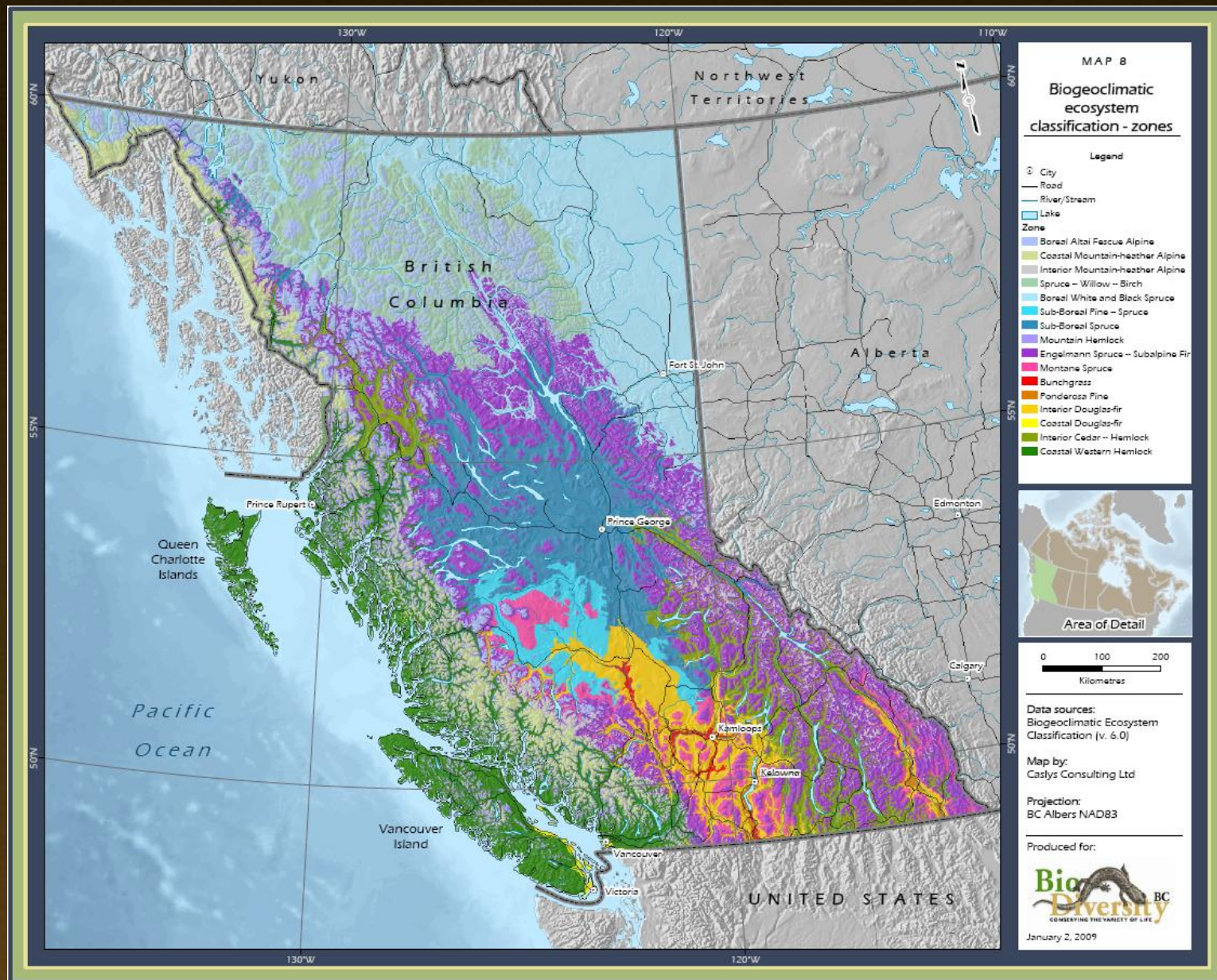
FIGURE 3: Land cover types in B.C. as percentage of total area of province.

SOURCE: Produced for this report.

*Areas mapped as urban, agriculture, recreation (e.g., golf courses) or mining.

**Forest and other=All areas not mapped into the other six categories; the vast majority is forest.





Major Findings – Ecosystem Diversity

- 4 of 16 BEC zones of conservation concern
- 6 of 16 BEC zones have majority of global range in B.C.
- CDF is both and is the rarest BEC zone
- >50% of 611 ecological communities are of conservation concern
- Significant areas of wetlands converted or degraded
- Low elevation grassland communities are the rarest land cover type in B.C.
- Estuaries are of concern due to their rarity and human impacts



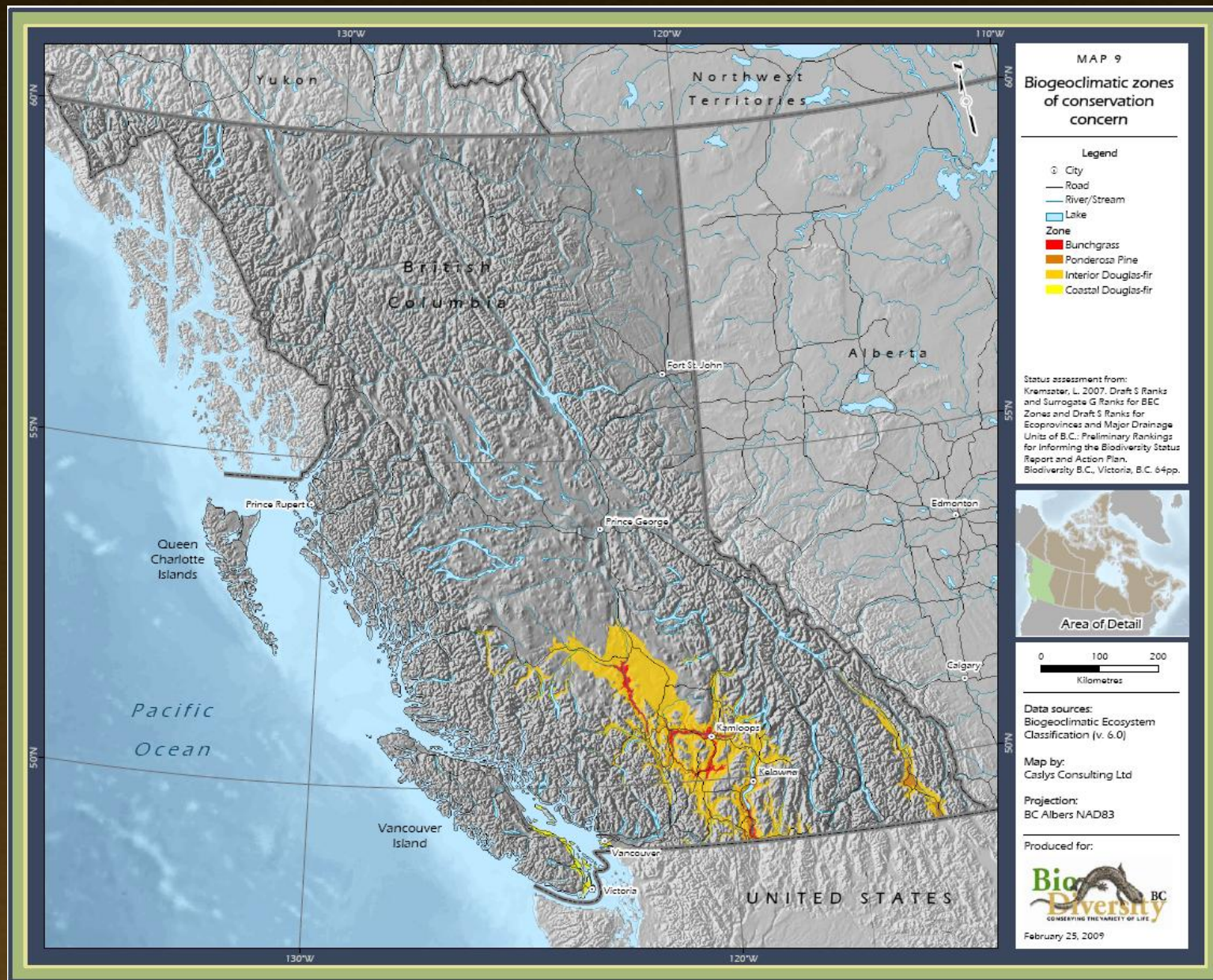


TABLE 4. DISTRIBUTION OF SPECIES OF CONSERVATION CONCERN IN B.C. BY BIOGEOCLIMATIC ZONE.

BIOGEOCLIMATIC ZONE	TOTAL AREA (KM ²)	SPECIES OF GLOBAL CONSERVATION CONCERN		SPECIES OF PROVINCIAL CONSERVATION CONCERN	
		Number of species	Density (# of species/ 1,000 km ²)	Number of species	Density (# of species/ 1,000 km ²)
Coastal Douglas-fir	1,310	24	18.3	170	129.8
Bunchgrass	2,048	10	4.9	165	80.6
Ponderosa Pine	2,896	10	3.5	114	39.4
Interior Douglas-fir	40,418	27	0.7	252	6.2
Montane Spruce	27,795	12	0.4	93	3.3
Coastal Western Hemlock	102,253	40	0.4	242	2.4
Mountain Hemlock	36,572	13	0.4	45	1.2
Interior Cedar–Hemlock	50,915	17	0.3	170	3.3
Alpine Tundra	146,500	21	0.1	144	1.0
Spruce–Willow–Birch	80,101	10	0.1	68	0.8
Engelmann Spruce–Subalpine Fir	170,364	21	0.1	138	0.8
Sub-boreal Spruce	92,346	10	0.1	89	1.0
Sub-boreal Pine–Spruce	22,359	2	0.1	33	1.5
Boreal White and Black Spruce	153,367	12	0.1	140	0.9

TABLE 7. PROVINCIAL CONSERVATION STATUS OF ECOLOGICAL COMMUNITIES IN B.C.
BY BIOGEOCLIMATIC ZONE.

BIOGEOCLIMATIC ZONE	NUMBER OF COMMUNITIES DESCRIBED	NUMBER OF COMMUNITIES ASSESSED	NUMBER OF COMMUNITIES OF PROVINCIAL CONSERVATION CONCERN	PERCENT OF COMMUNITIES DESCRIBED THAT ARE OF PROVINCIAL CONSERVATION CONCERN
Coastal Douglas-fir	36	36	35	97%
Bunchgrass	30	30	28	93%
Ponderosa Pine	29	29	27	93%
Coastal Western Hemlock	128	128	106	83%
Interior Douglas-fir	87	87	71	82%
Sub-boreal Spruce	92	83	56	61%
Interior Cedar–Hemlock	89	75	46	52%
Sub-boreal Pine–Spruce	38	34	19	50%
Montane Spruce	66	57	31	47%
Boreal White and Black Spruce	52	41	13	25%
Engelmann Spruce–Subalpine Fir	149	99	31	21%
Mountain Hemlock	43	22	8	19%
Spruce–Willow–Birch	21	1	1	5%
Coastal Mountain-heather Alpine	23	1	1	4%
Interior Mountain-heather Alpine	39	2	1	3%
Boreal Altai Fescue Alpine	53	3	1	2%
Province	611	532	340	56%

Major Findings – Species Diversity

- 43% of species assessed are of conservation concern
- B.C. has a majority of the global range for 99 species



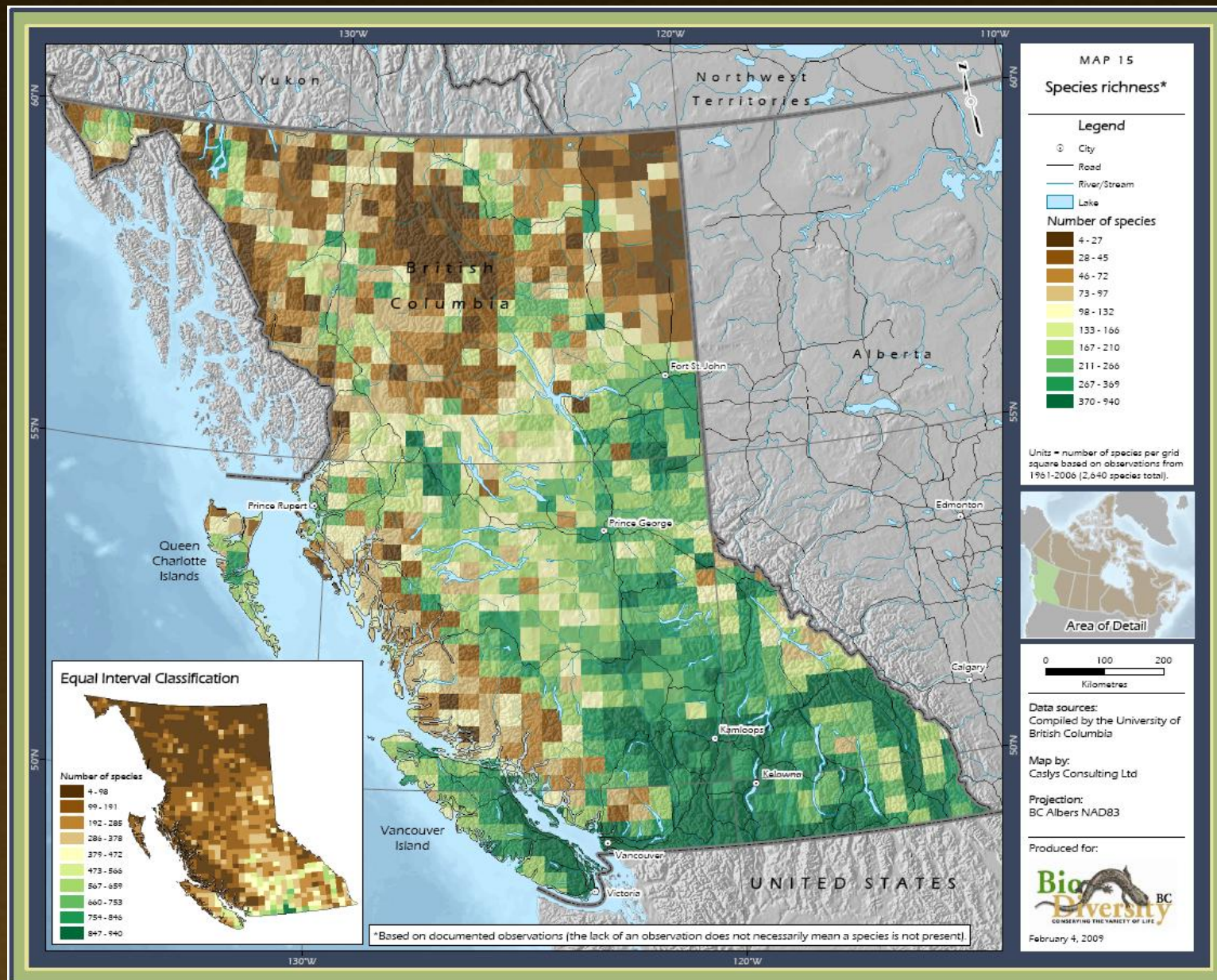


TABLE 13. SUMMARY OF B.C. SPECIES ASSESSED FOR GLOBAL AND PROVINCIAL CONSERVATION STATUS.

CONSERVATION STATUS RANK	GLOBAL		PROVINCIAL	
	Number of Species	Percentage of Species	Number of Species	Percentage of Species
Extinct or Extirpated (GX, SX)	1	<1%	14	<1%
Historical (GH, SH)	1	<1%	28	<1%
Critically Imperilled (G1, S1)	19	<1%	301	8%
Imperilled (G2, S2)	40	<1%	629	17%
Vulnerable (G3, S3)	172	5%	668	18%
Total species of conservation concern	233	6%	1,640	43%
Apparently Secure or Secure (G4, S4, G5, S5)	3,475	91%	2,055	54%
Not Assessed, Not Ranked, or Unrankable (NA, NR, or U)	100	3%	113	3%
Total number of species assessed	3,808		3,808	

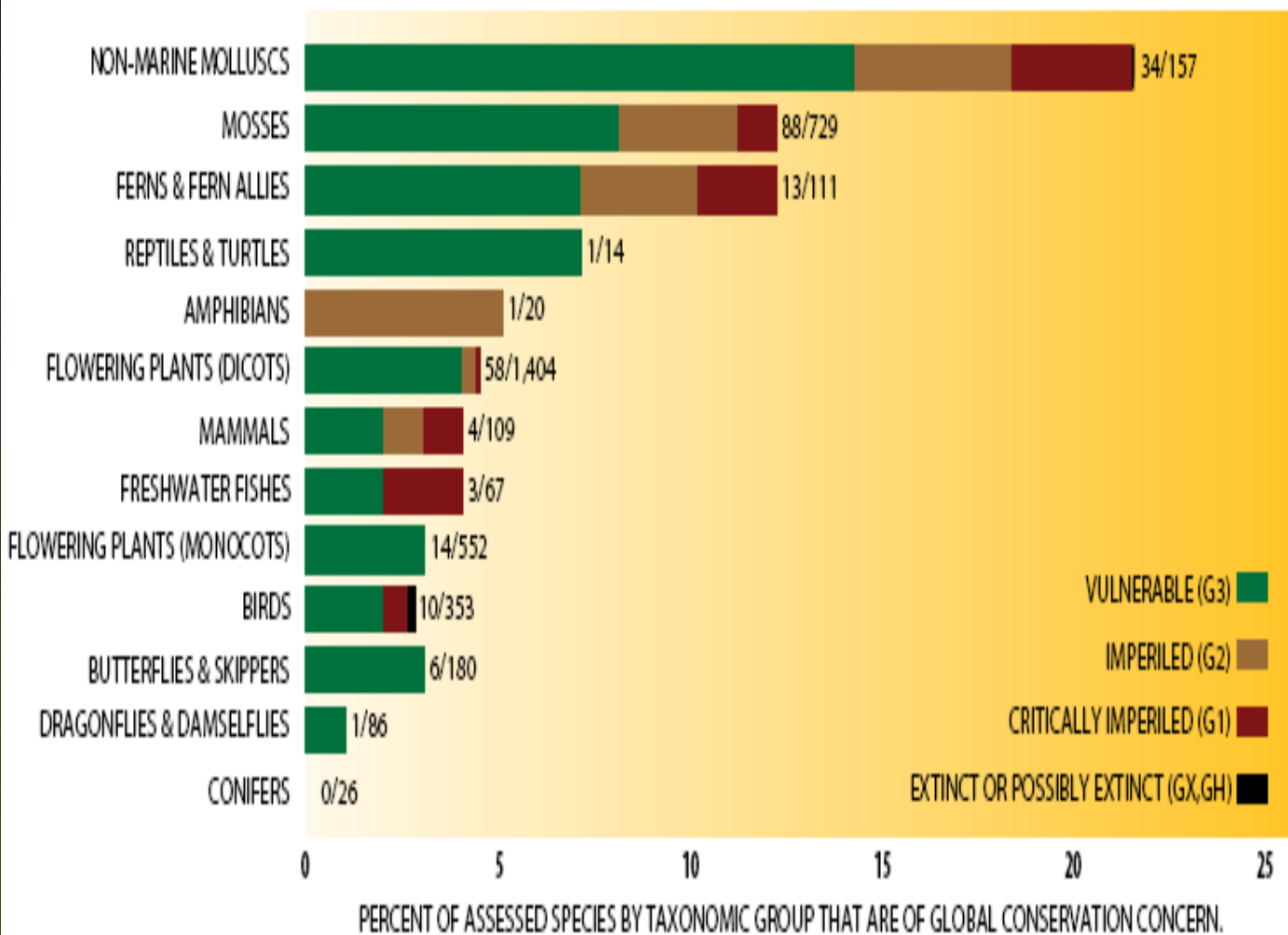
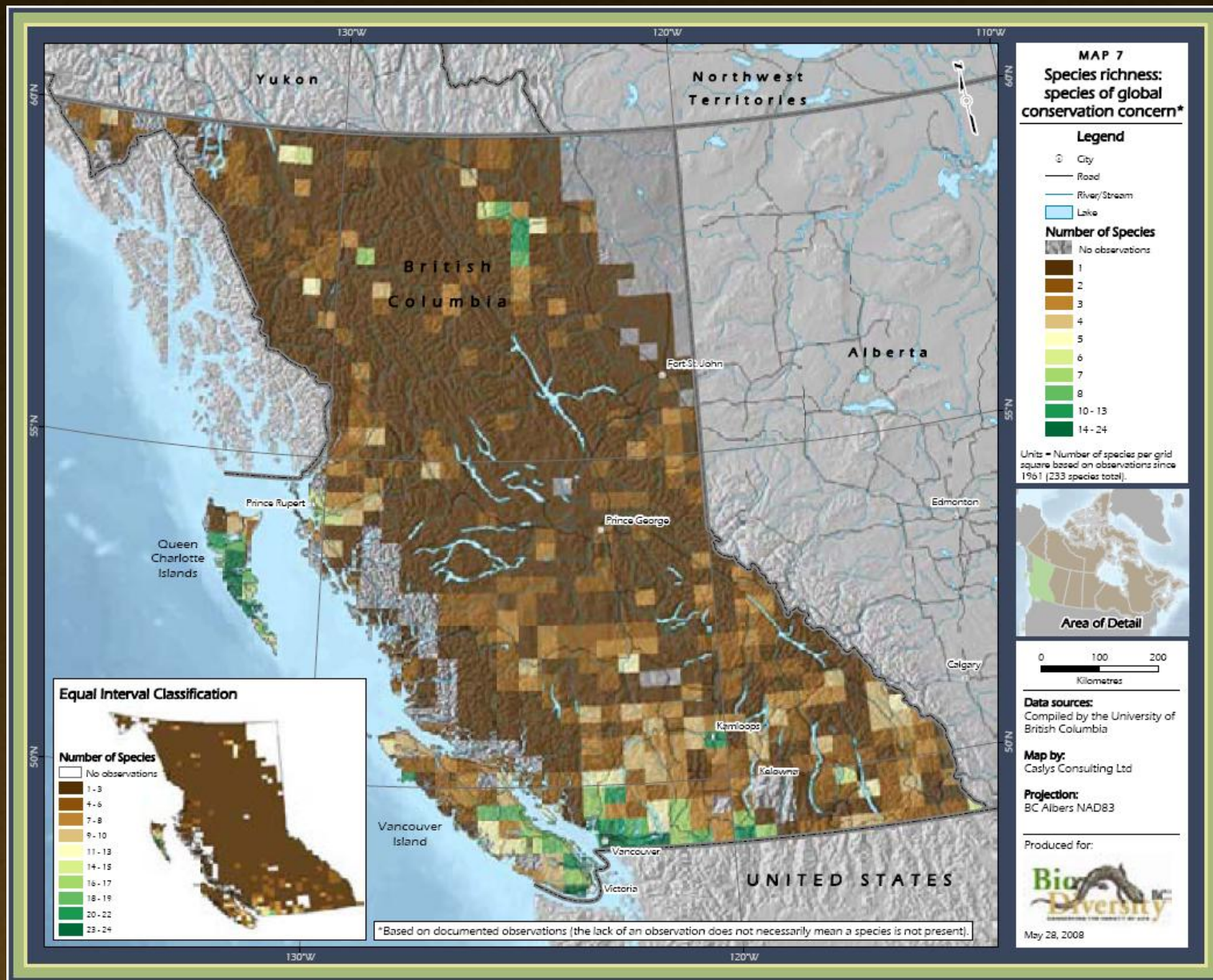


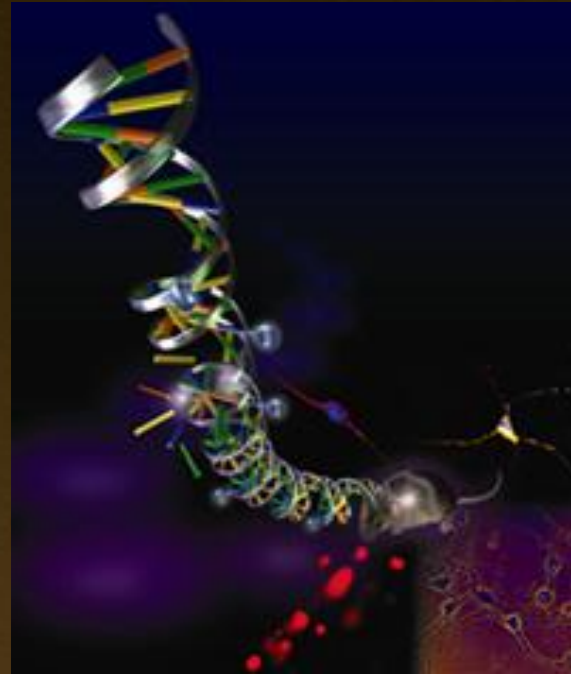
FIGURE 15: Species of global conservation concern as percent of total number of plant and animal species assessed in B.C.

NOTES: Total number of species assessed = 3,808. For each species group, numbers shown represent the number of species assessed as being of global conservation concern and the total number of species in the group (e.g., birds: 10 species of global conservation concern / 353 species in total).



Major Findings – Genetic Diversity

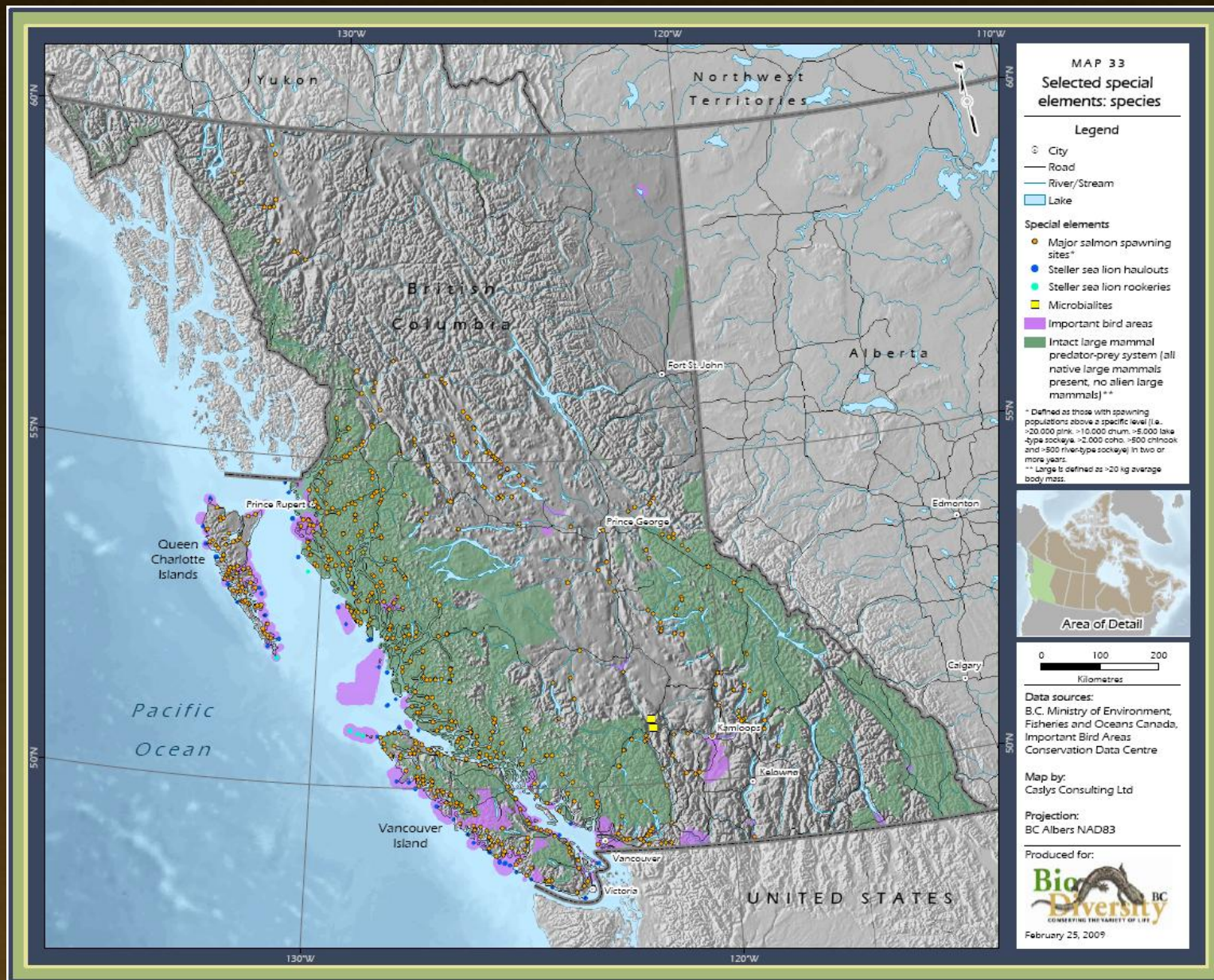
- B.C. has high levels of genetic diversity within species which are critical for adaptation and resilience

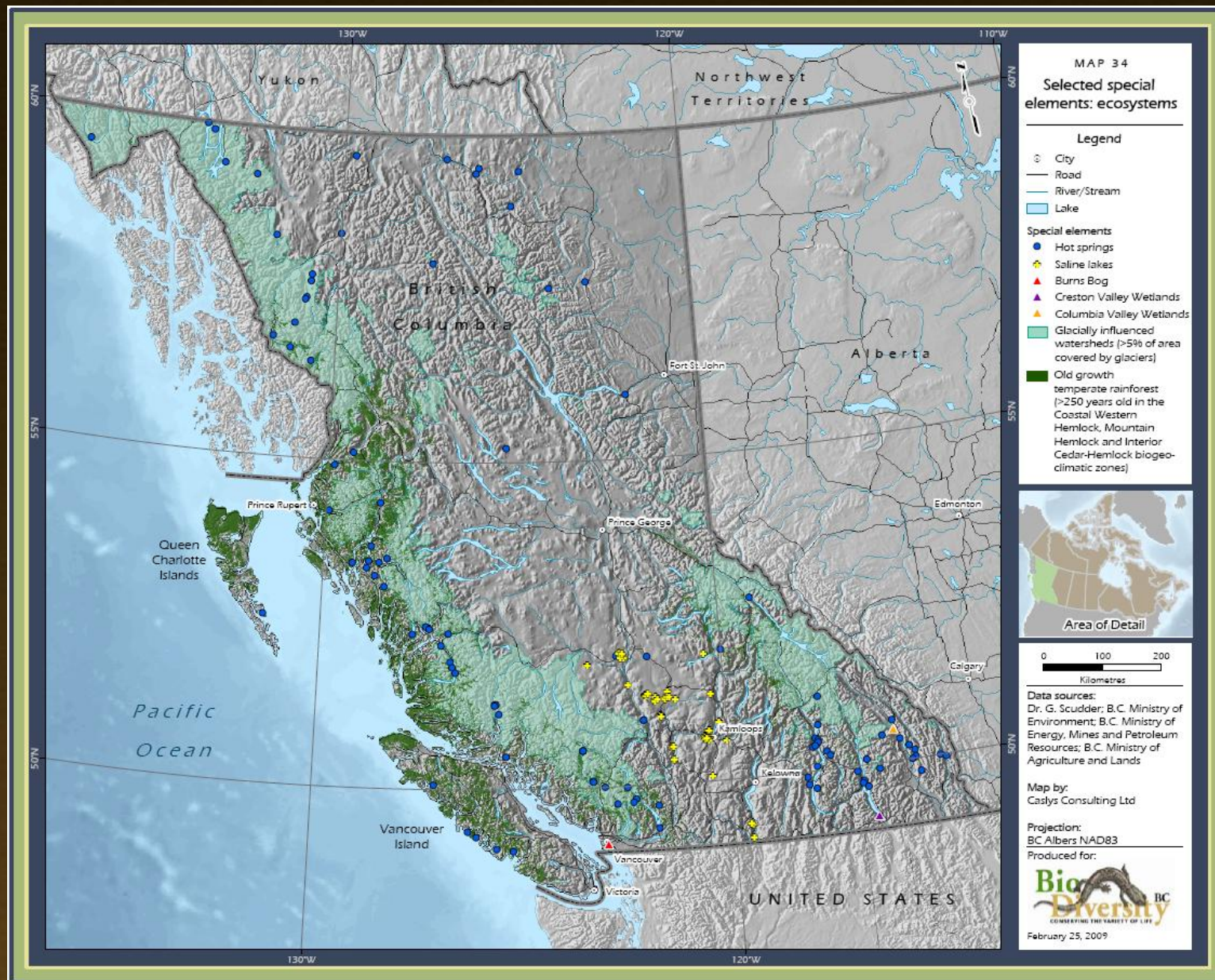


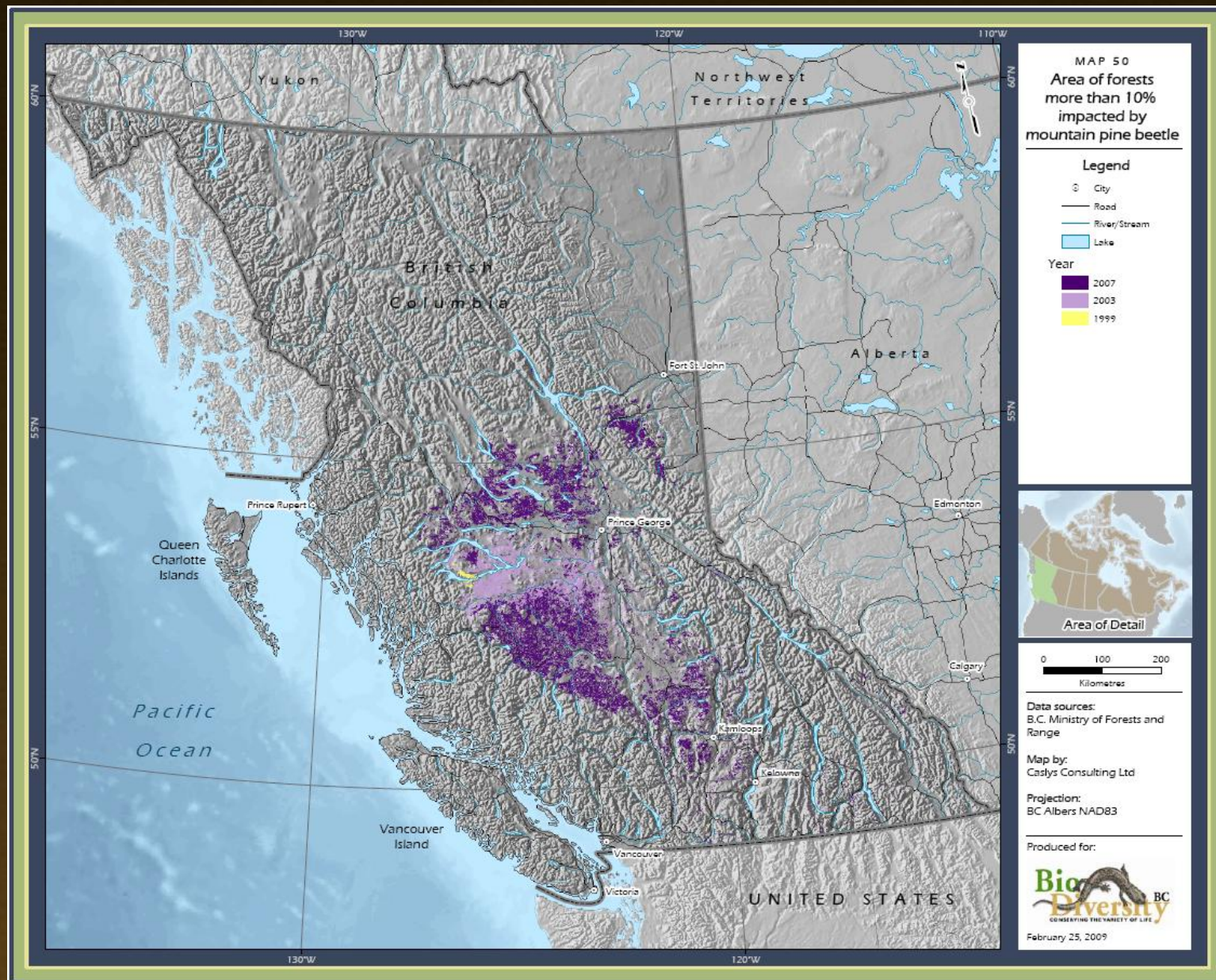
Major Findings – Key and Special Elements

- Water flow in lakes, wetlands and groundwater systems is being seriously impacted
- Natural disturbance processes in forests are being disrupted
- The mainland coast has connected key and special elements
- The majority of B.C. has relatively intact predator-prey systems
- B.C. has significant seasonal concentrations of species vulnerable to human impact









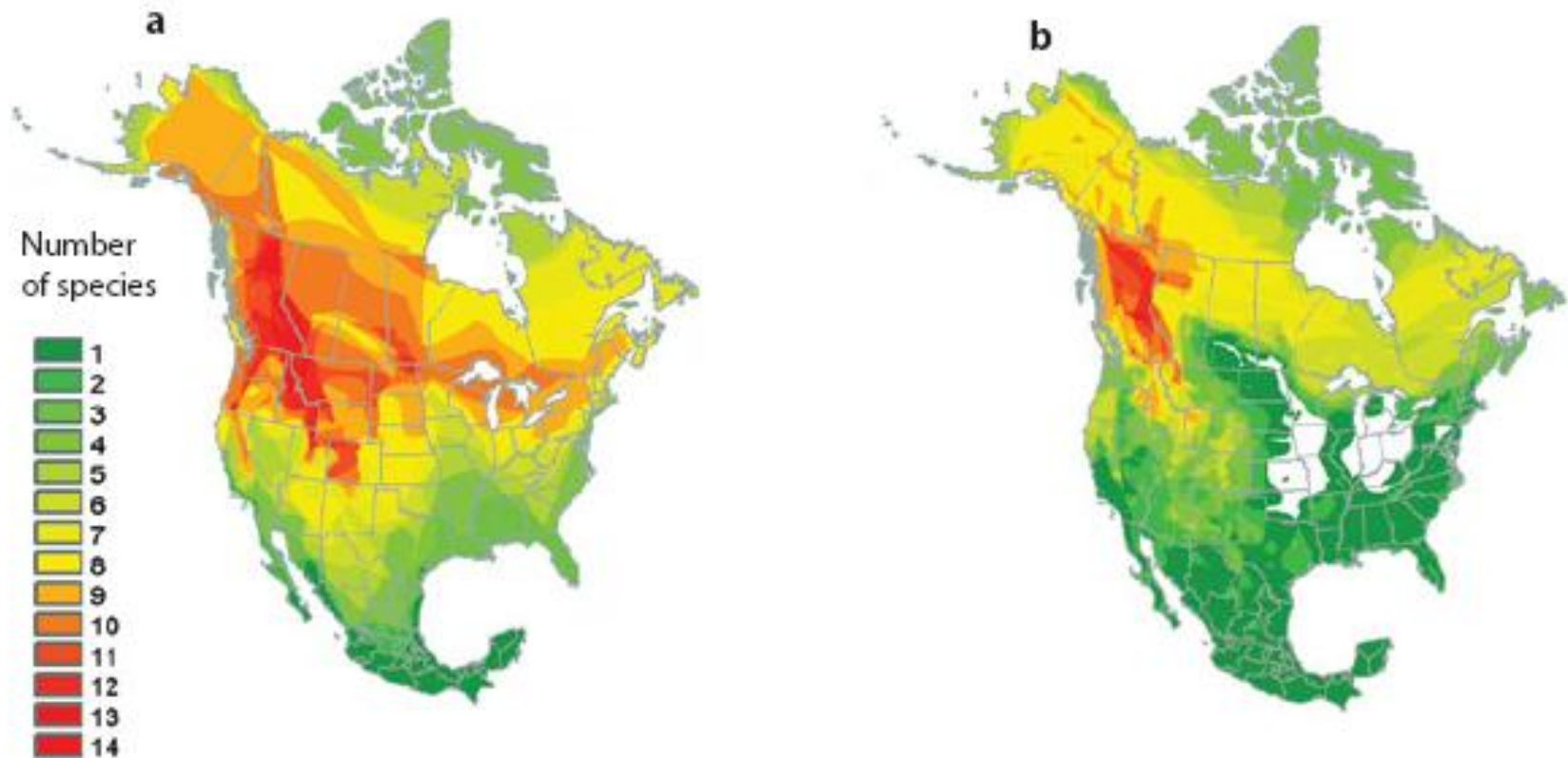


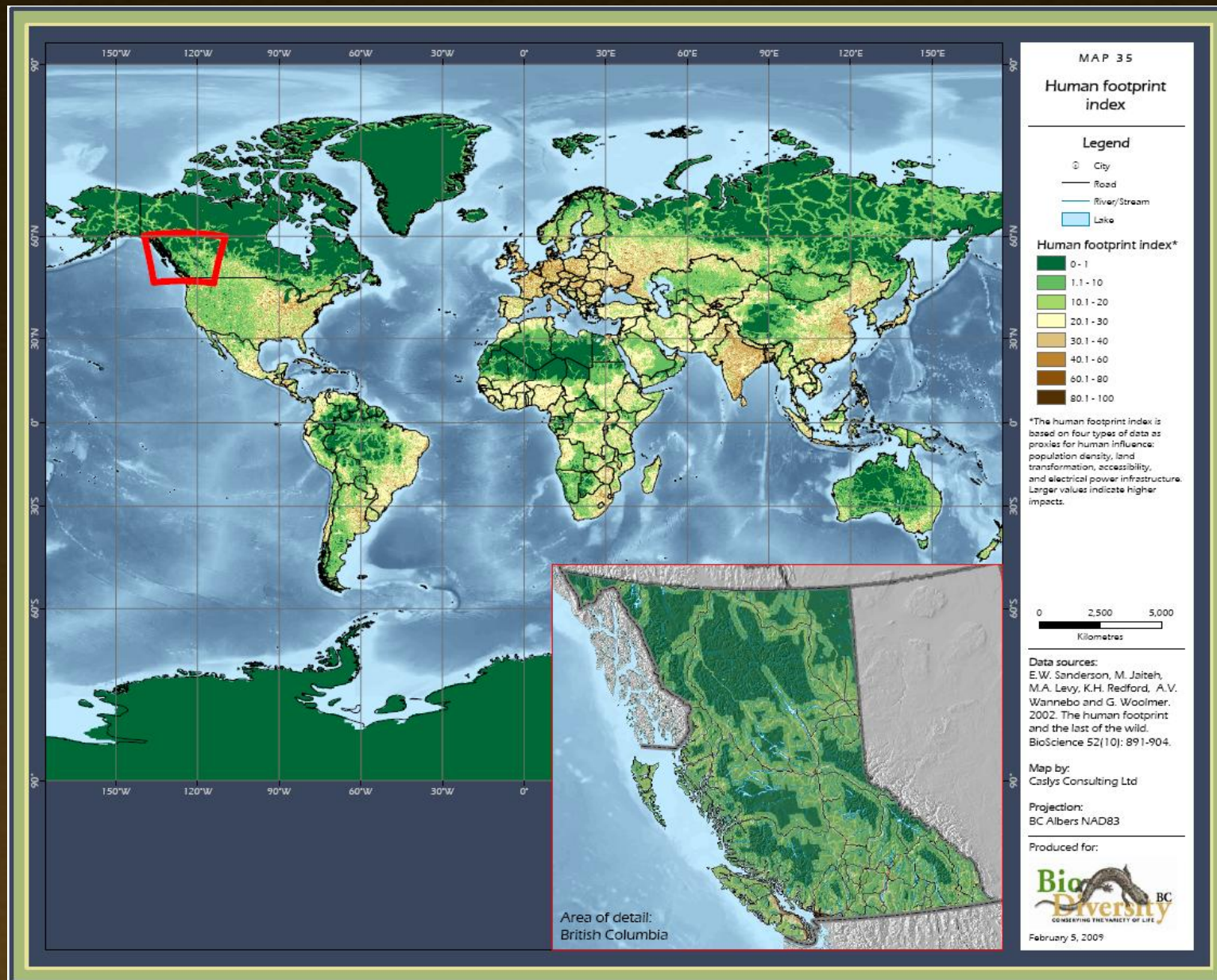
FIGURE 5: Historic (a) and current (b) species richness for 17 carnivore and ungulate species that have undergone significant range contractions in North America.

SOURCE: Laliberte, A.S. and W.J. Ripple. 2004. Range contractions of North American carnivores and ungulates. *Bioscience* 54(2): 123-138.

Major Findings – Threats to Biodiversity

- Ecosystem conversion and degradation have seriously impacted biodiversity
- Alien species are seriously impacting biodiversity
- Climate change is the foremost threat to biodiversity
- Cumulative impacts are impacting ecosystem resilience
- Ecosystem connectivity is being lost





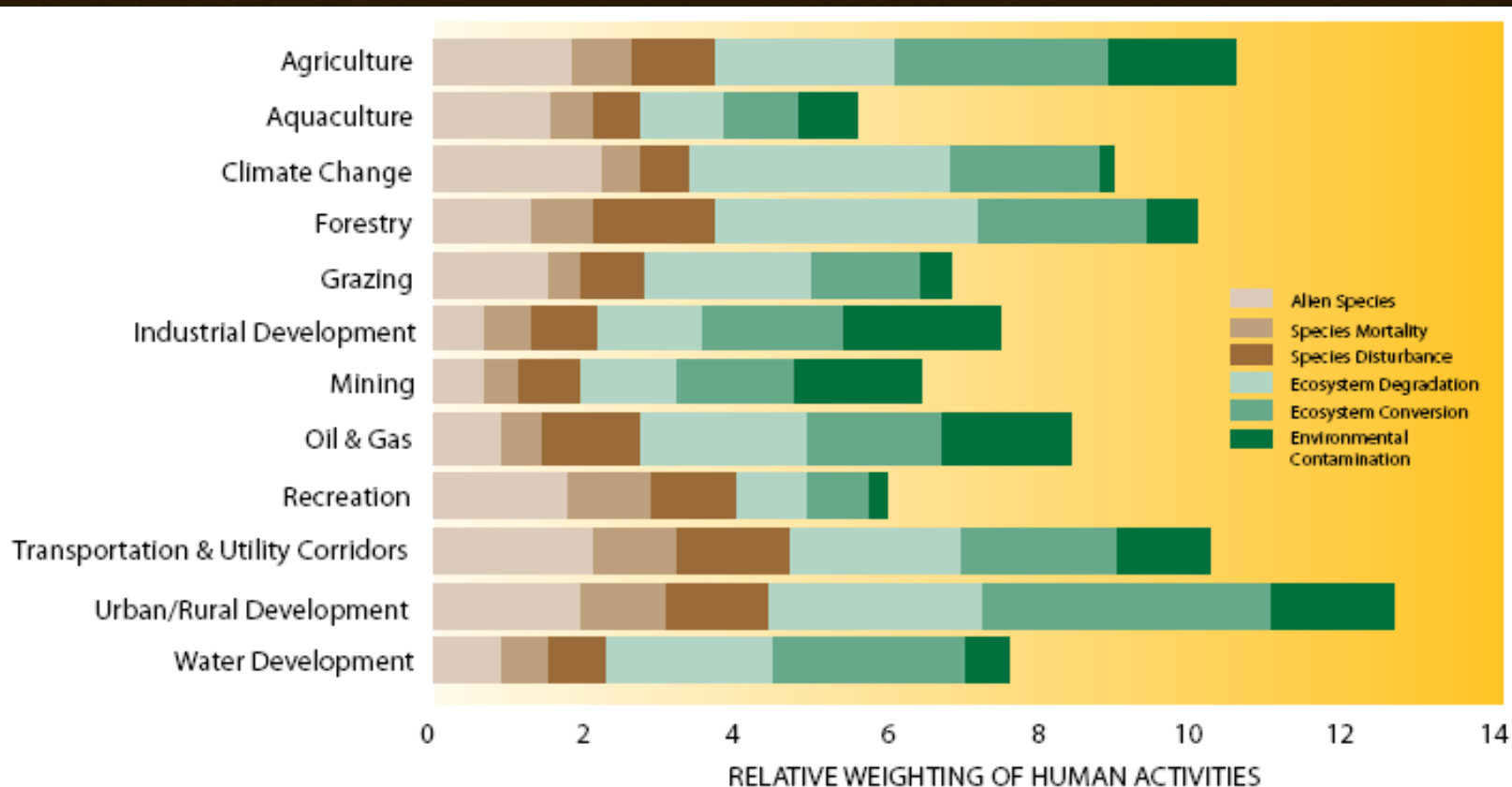
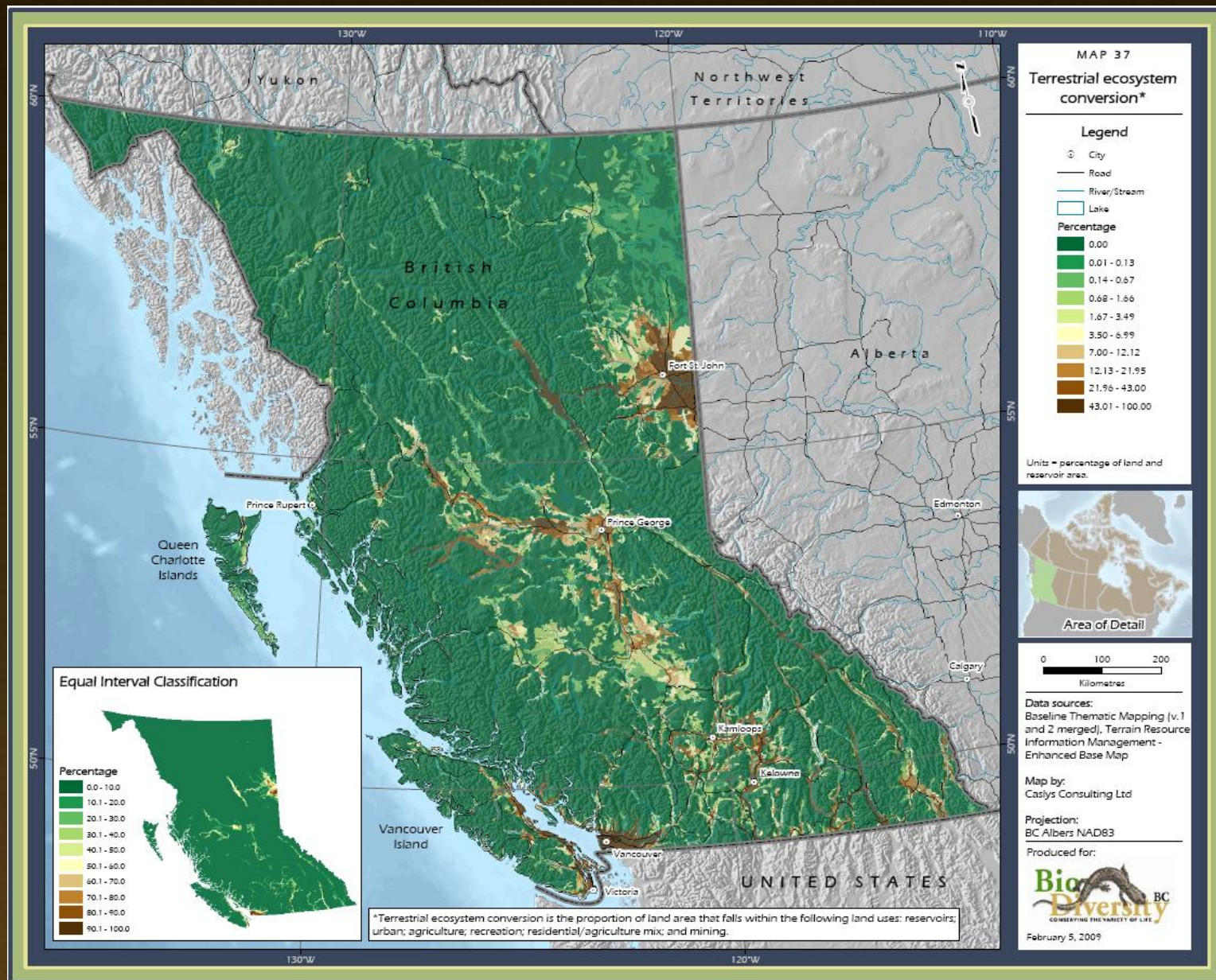
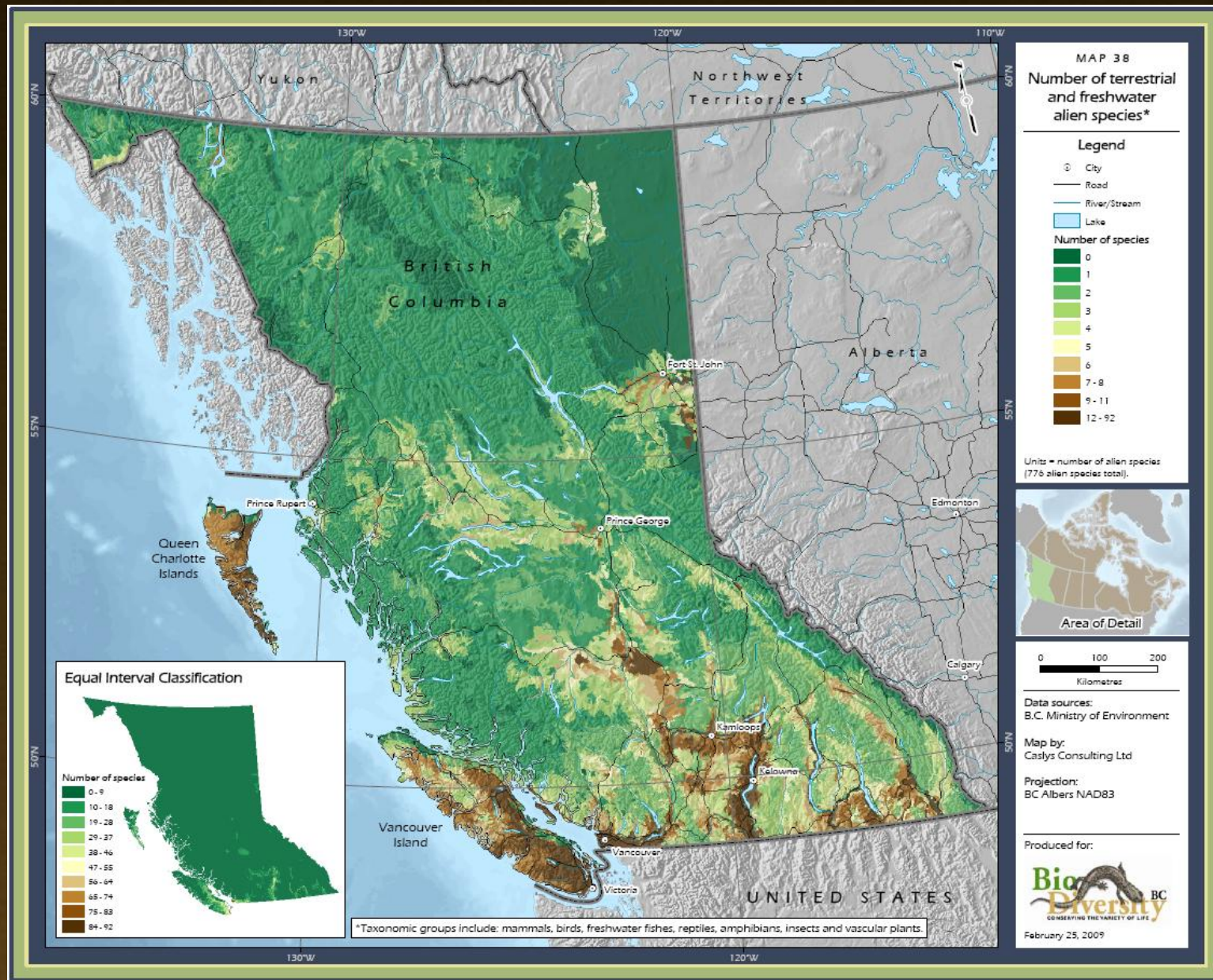
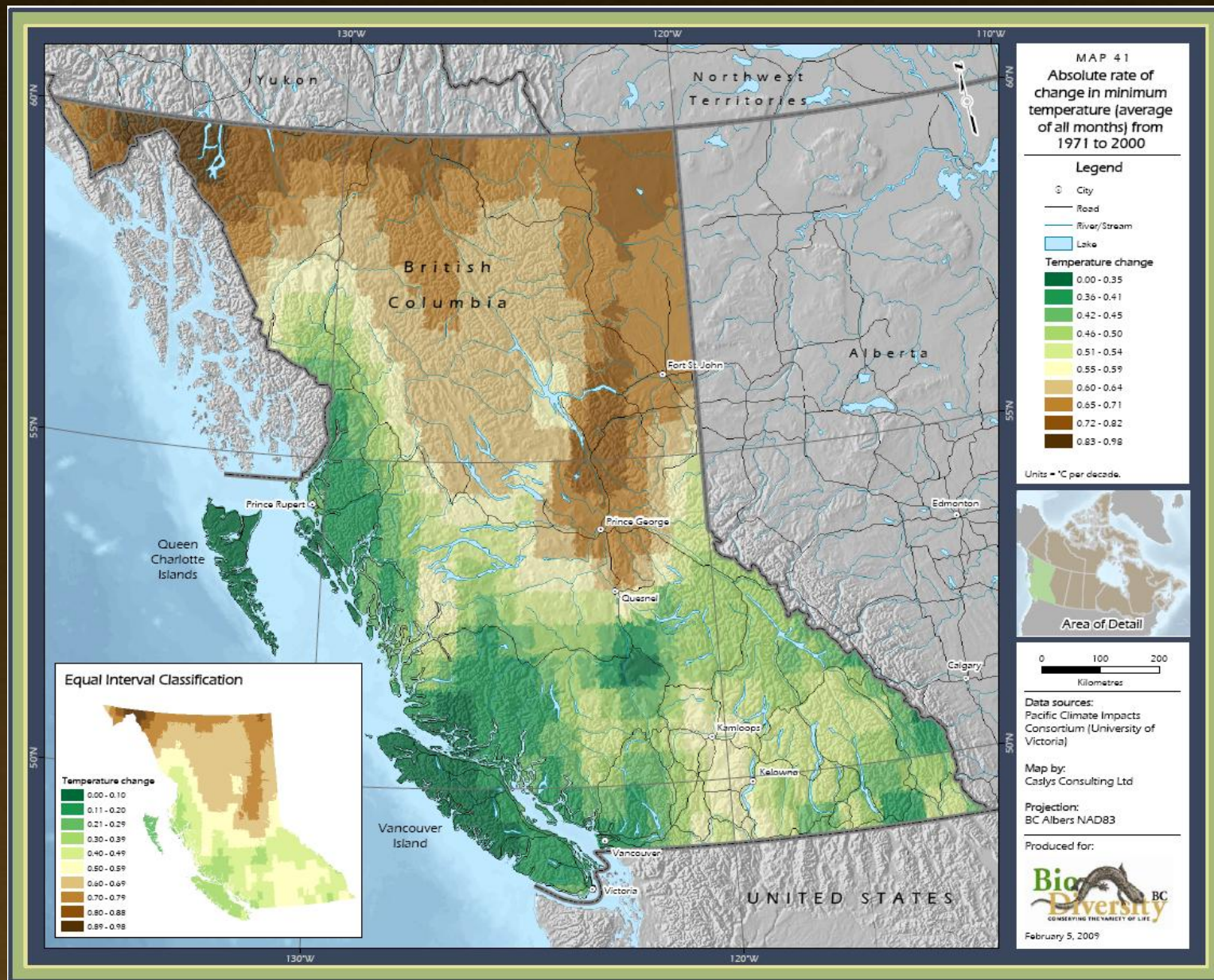


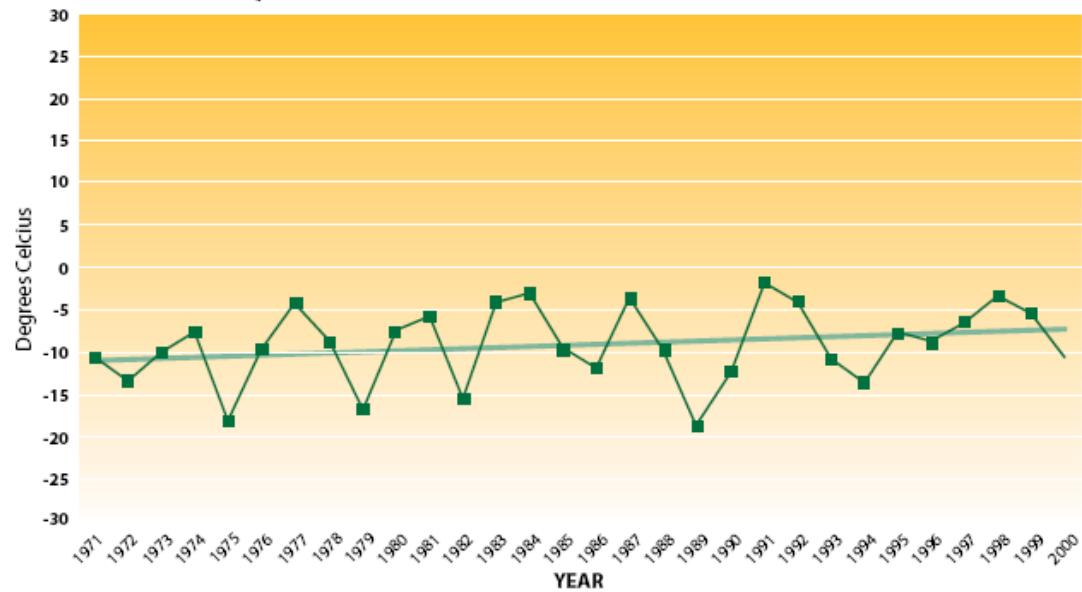
FIGURE 36: Impact of human activities on elements of biodiversity.
 SOURCE: Long, G. 2007. Biodiversity Safety Net Gap Analysis. Biodiversity BC, Victoria, BC. 66pp. Available at: www.biodiversitybc.org.



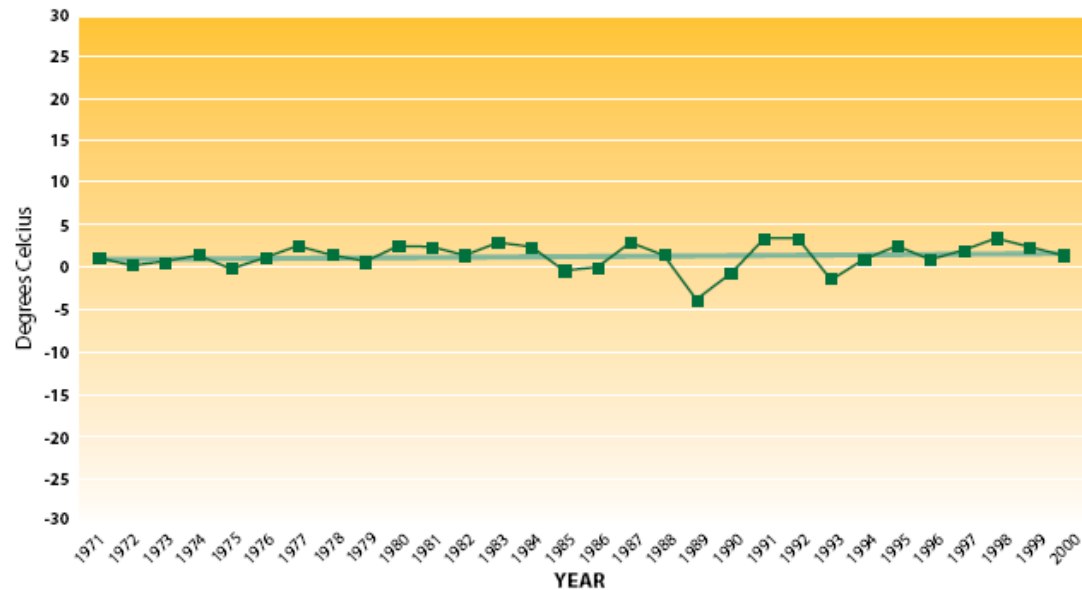


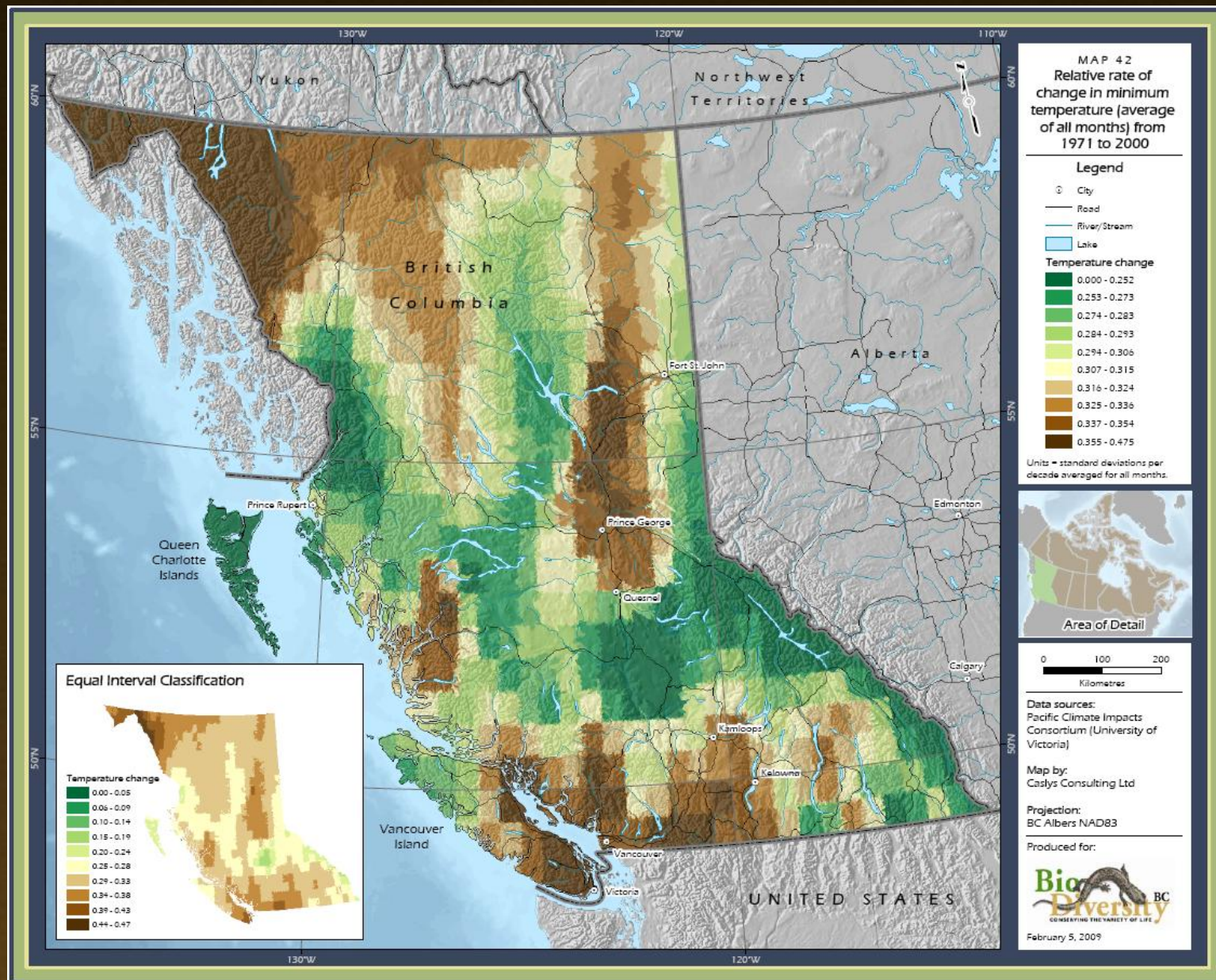


QUESNEL – AVERAGE MINIMUM TEMPERATURE FOR FEBRUARY



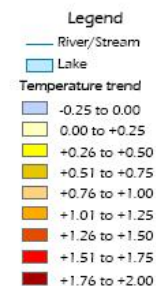
VICTORIA INTERNATIONAL AIRPORT – AVERAGE MINIMUM TEMPERATURE FOR FEBRUARY



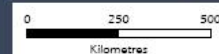




MAP 47
Seasonal trends in
minimum temperature
from 1971 to 2000



Units = °C per decade.
Negative numbers indicate a
decrease and positive an increase
in temperature.



Data sources:
Pacific Climate Impacts
Consortium (University of
Victoria)

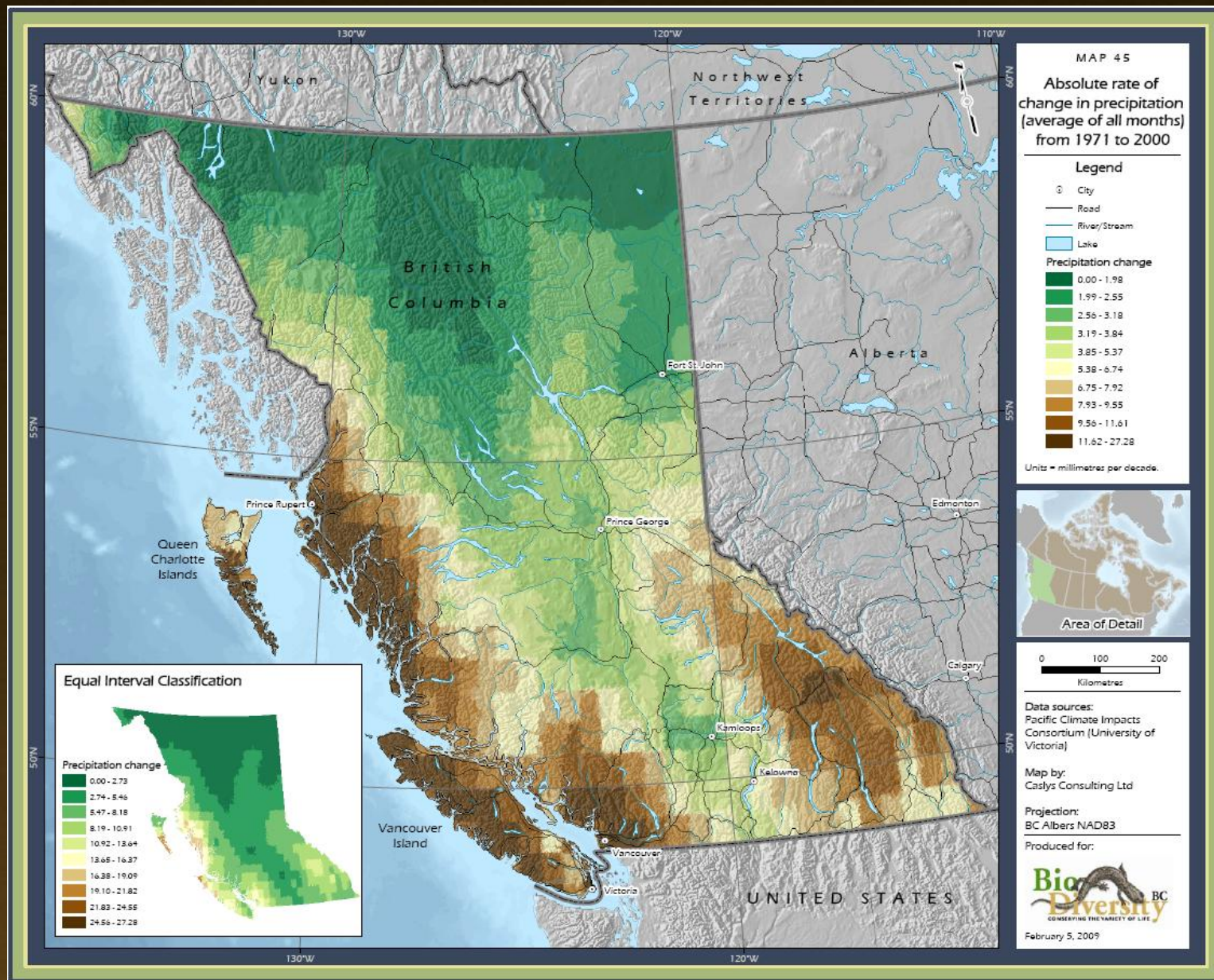
Map by:
Caslys Consulting Ltd

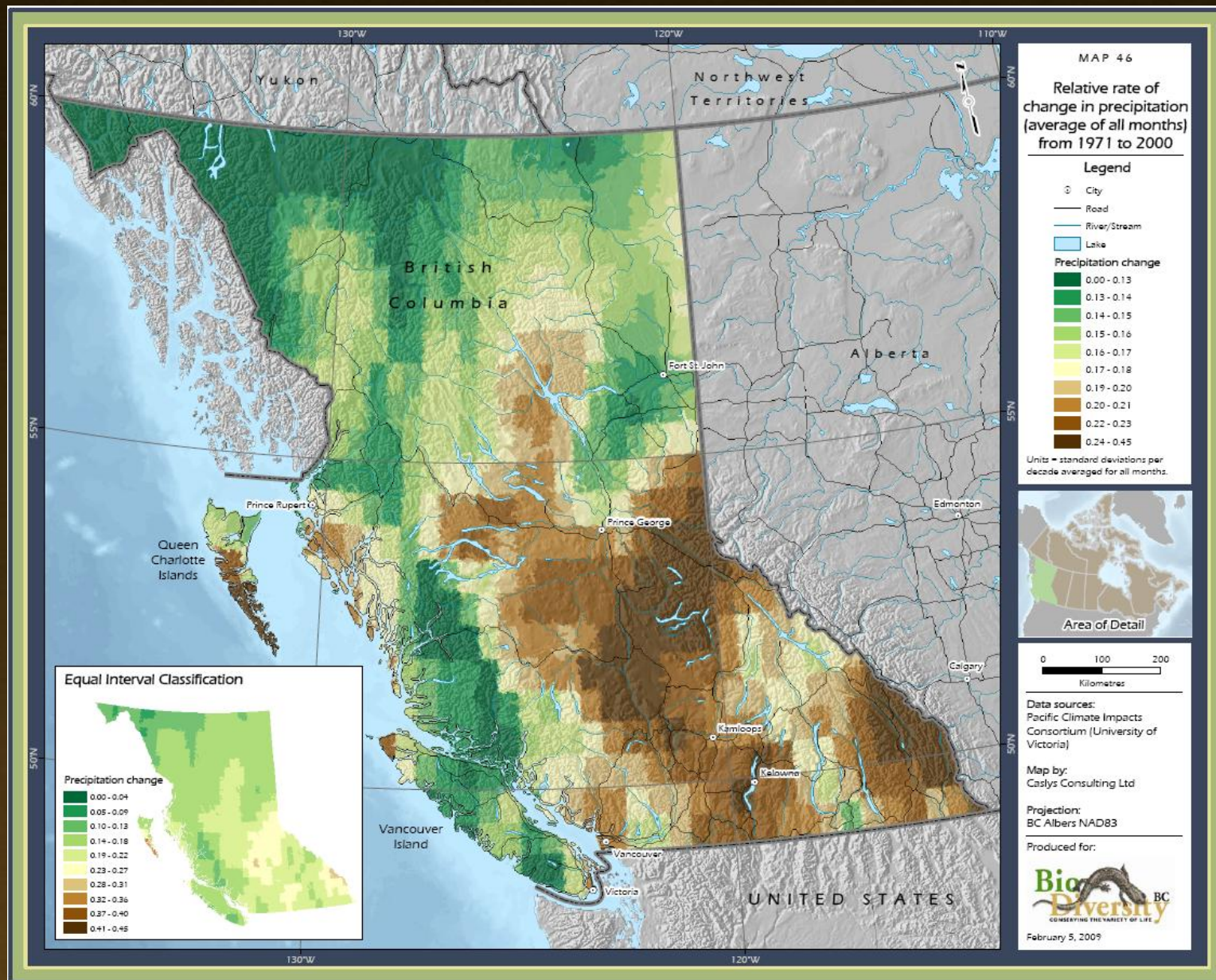
Projection:
BC Albers NAD83

Produced for:



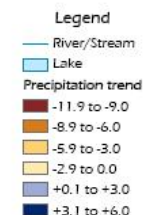
February 4, 2009



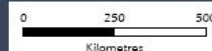




MAP 49
Seasonal trends
in precipitation from
1971 to 2000



Unit = millimetres per decade.
Negative numbers indicate a
decrease and positive an increase
in precipitation.



Data sources:
Pacific Climate Impacts
Consortium (University of
Victoria)

Map by:
Caslys Consulting Ltd

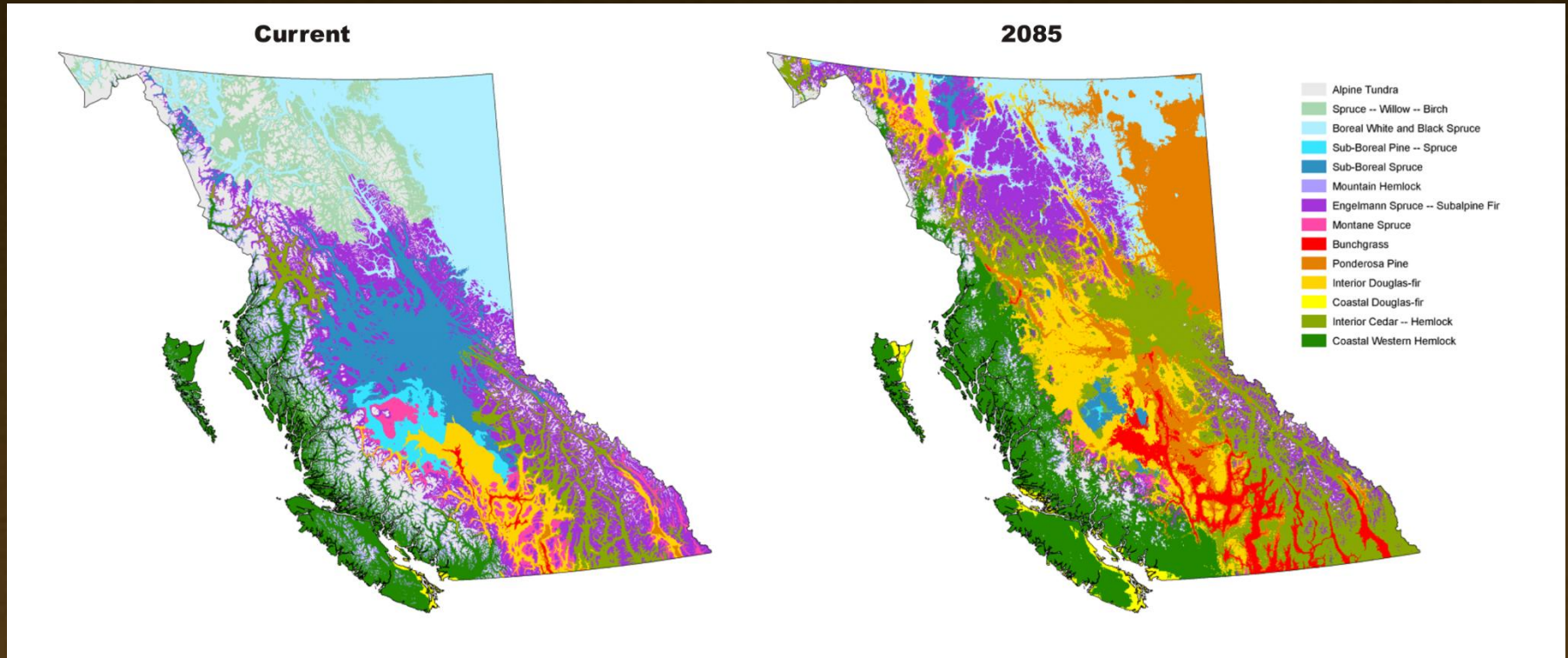
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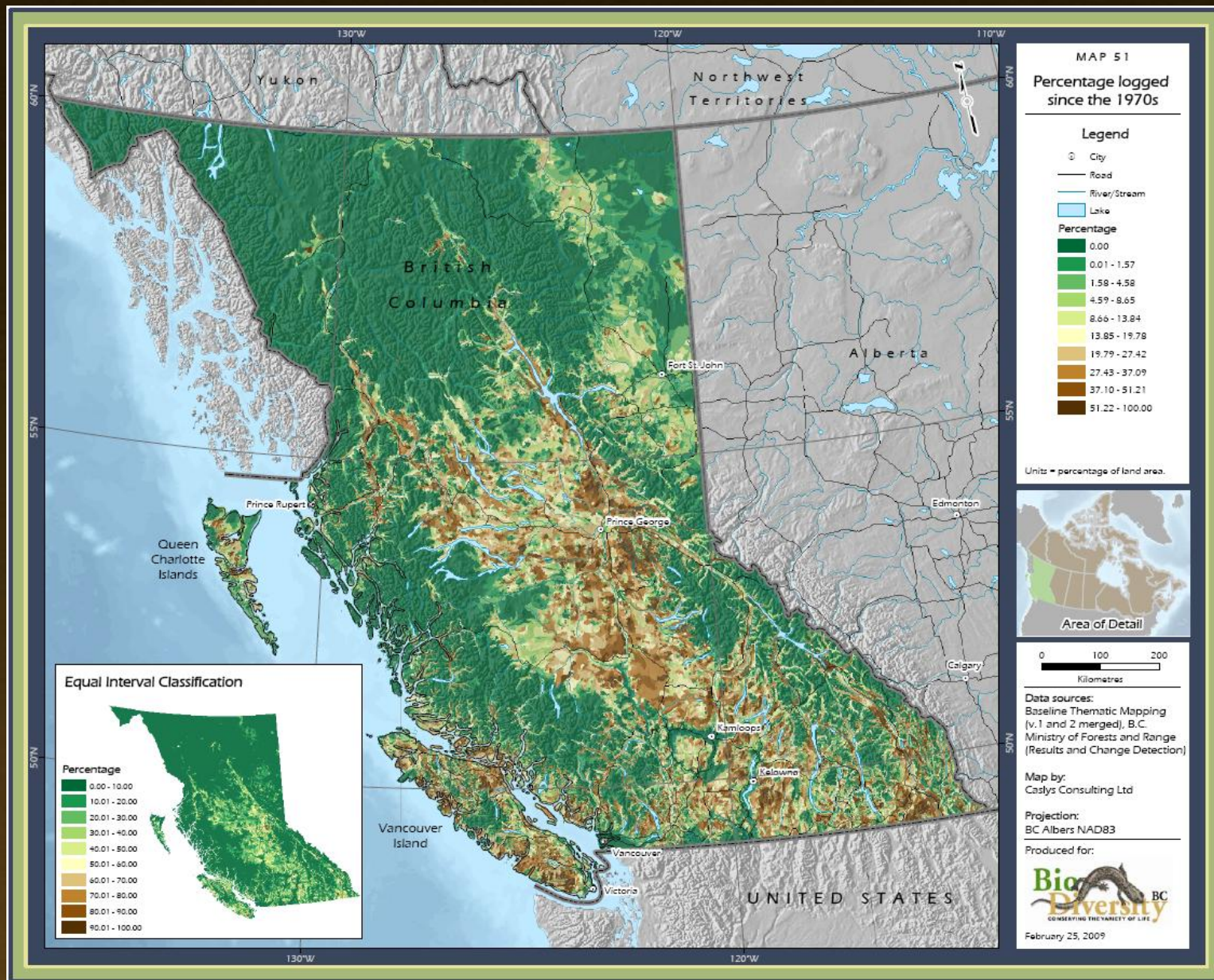
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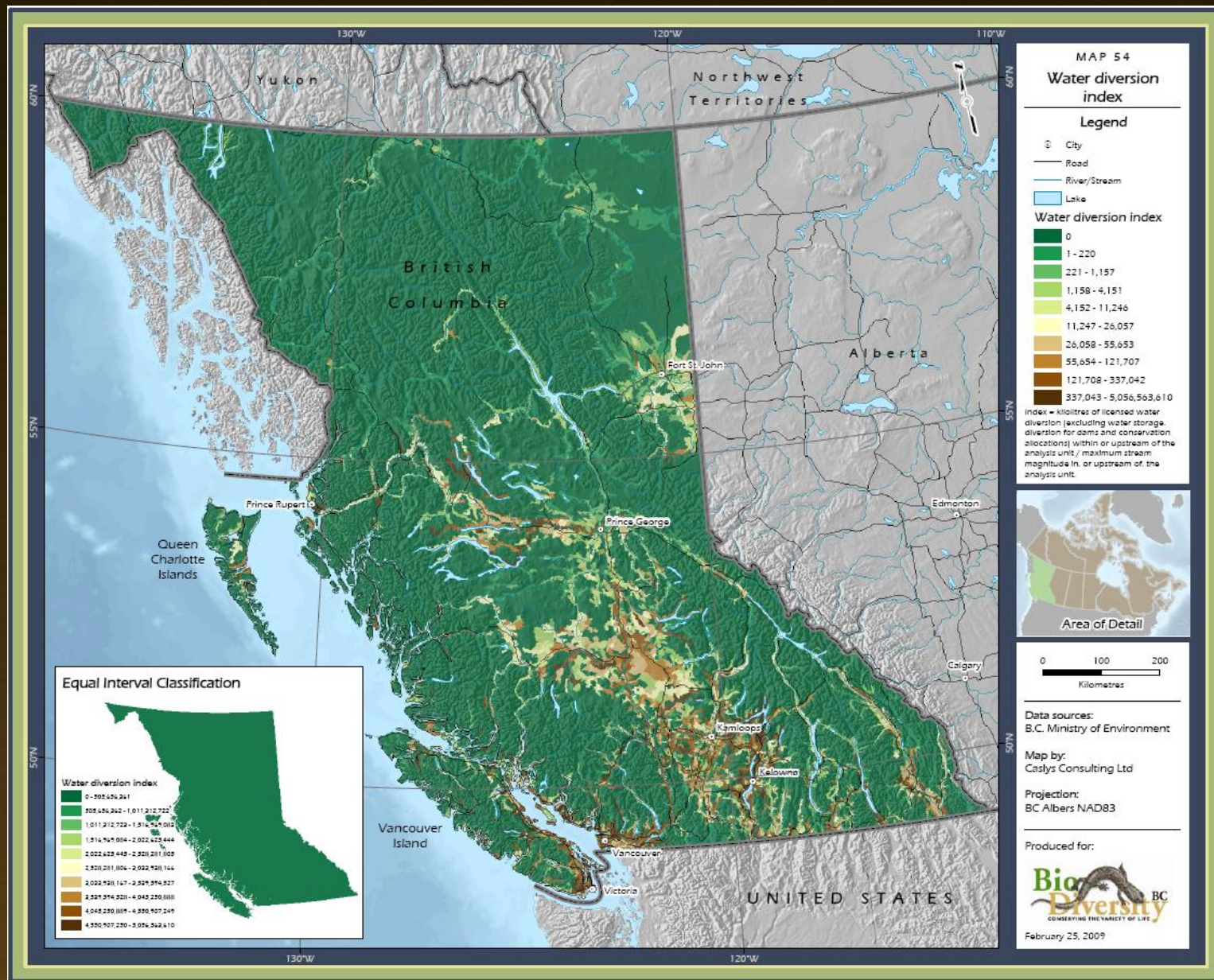


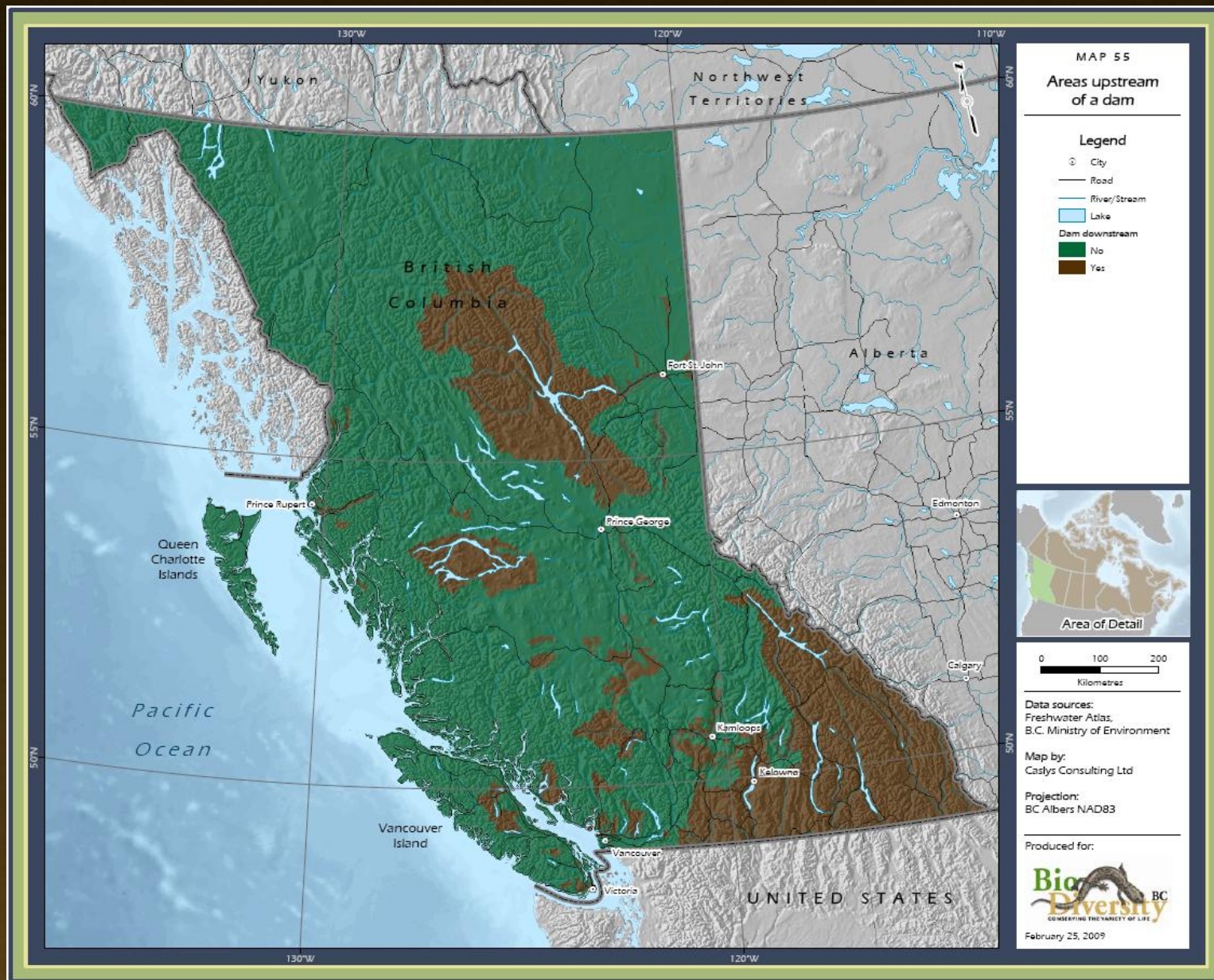
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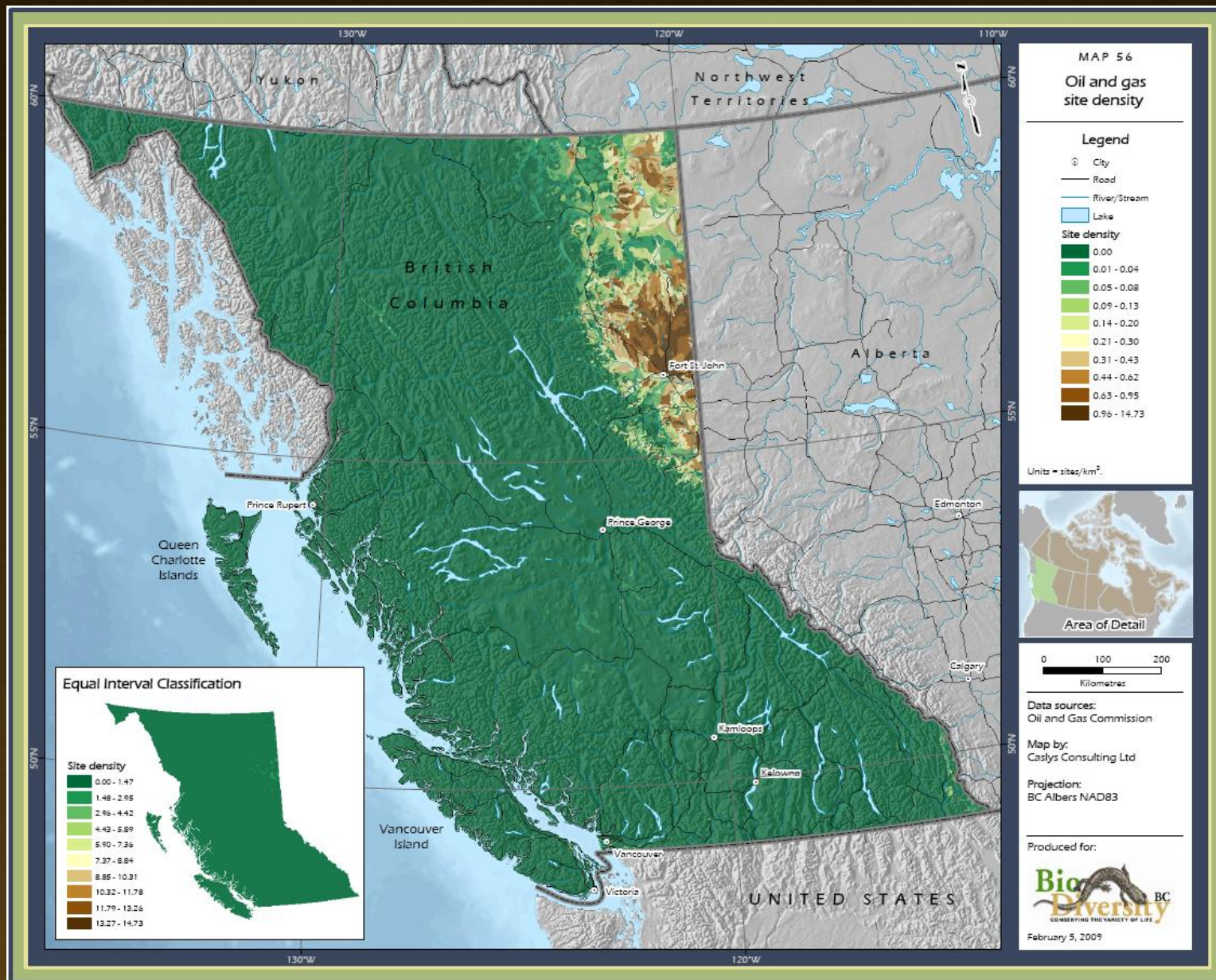
Potential shift in BEC Zones by 2085 due to climate change

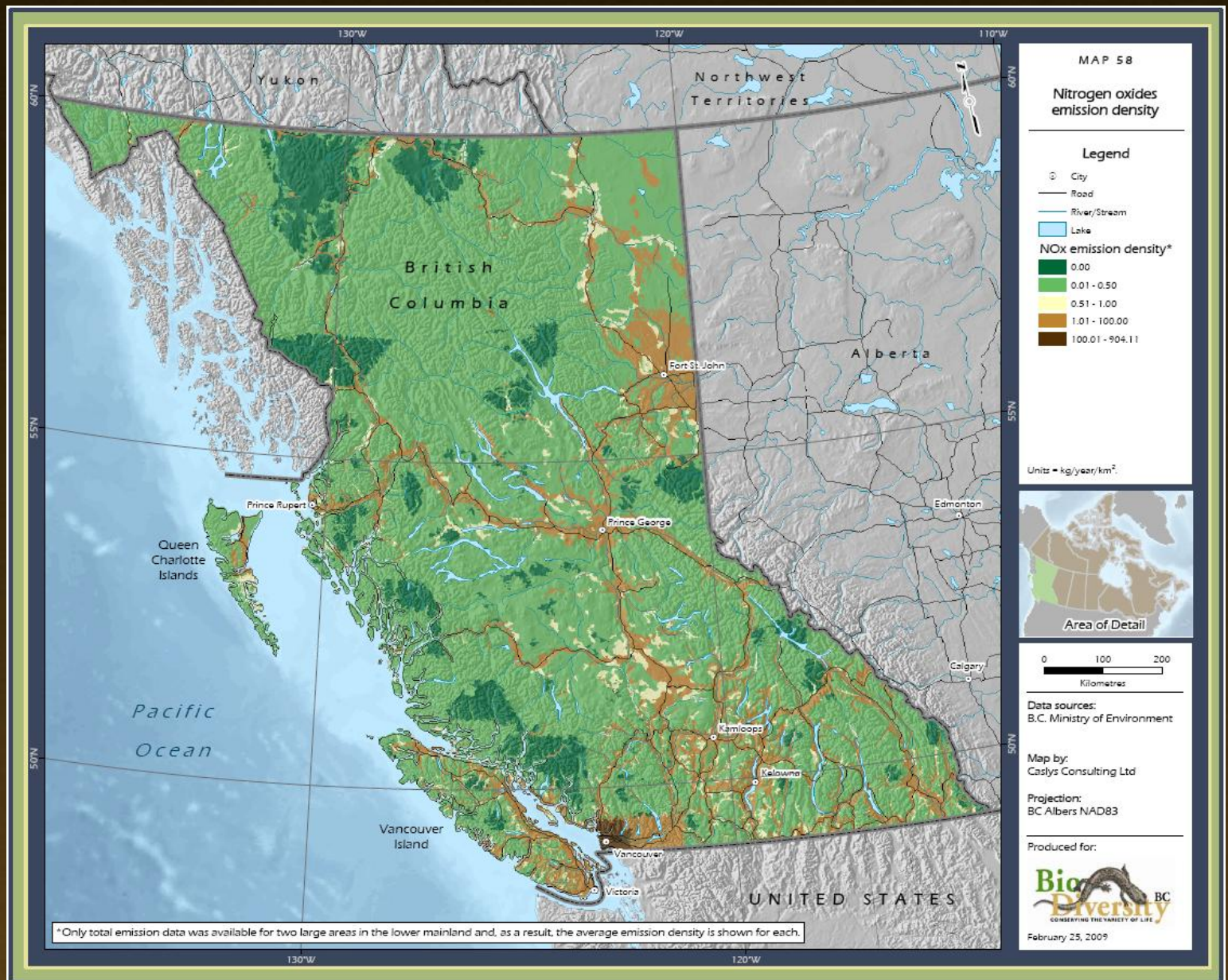


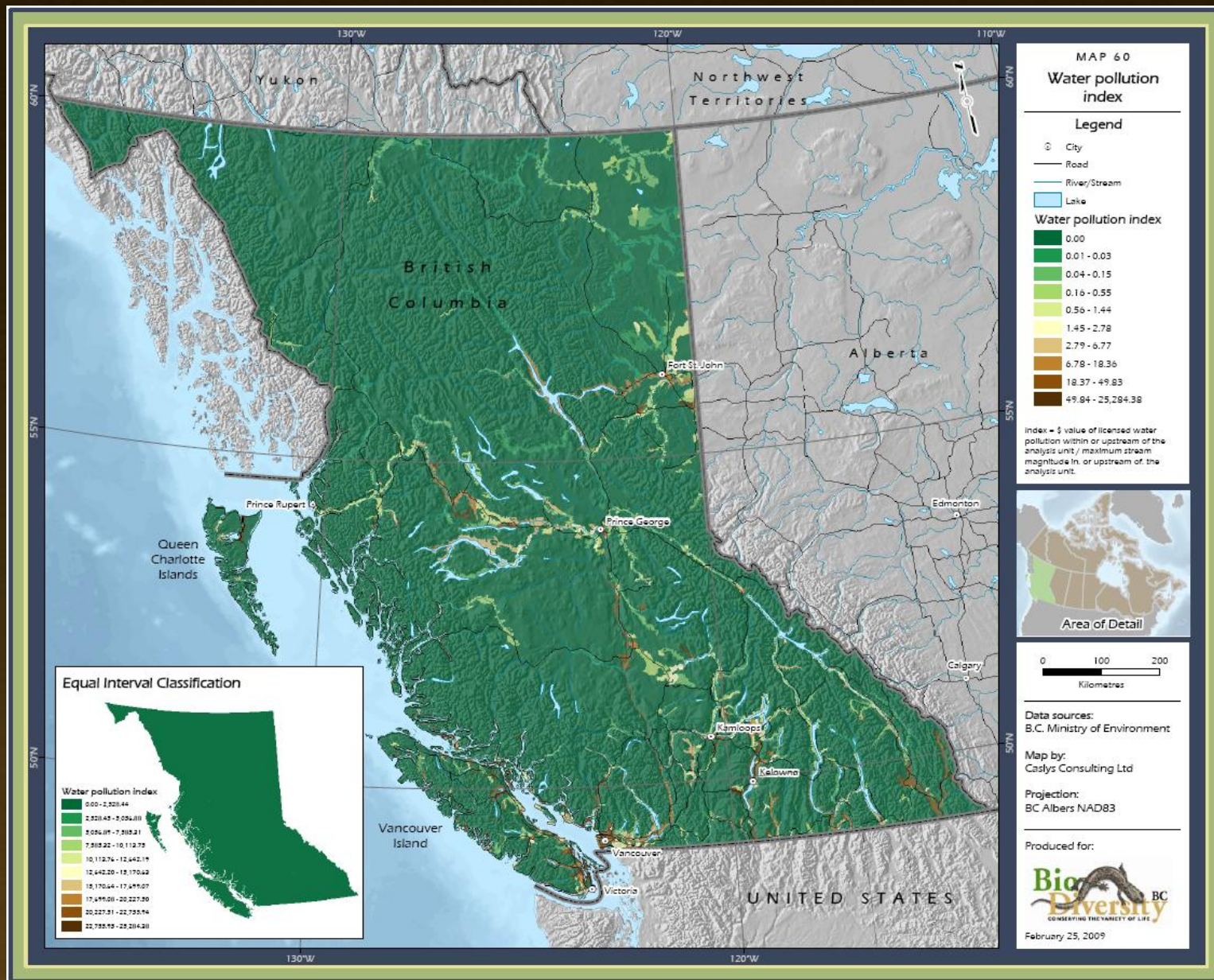


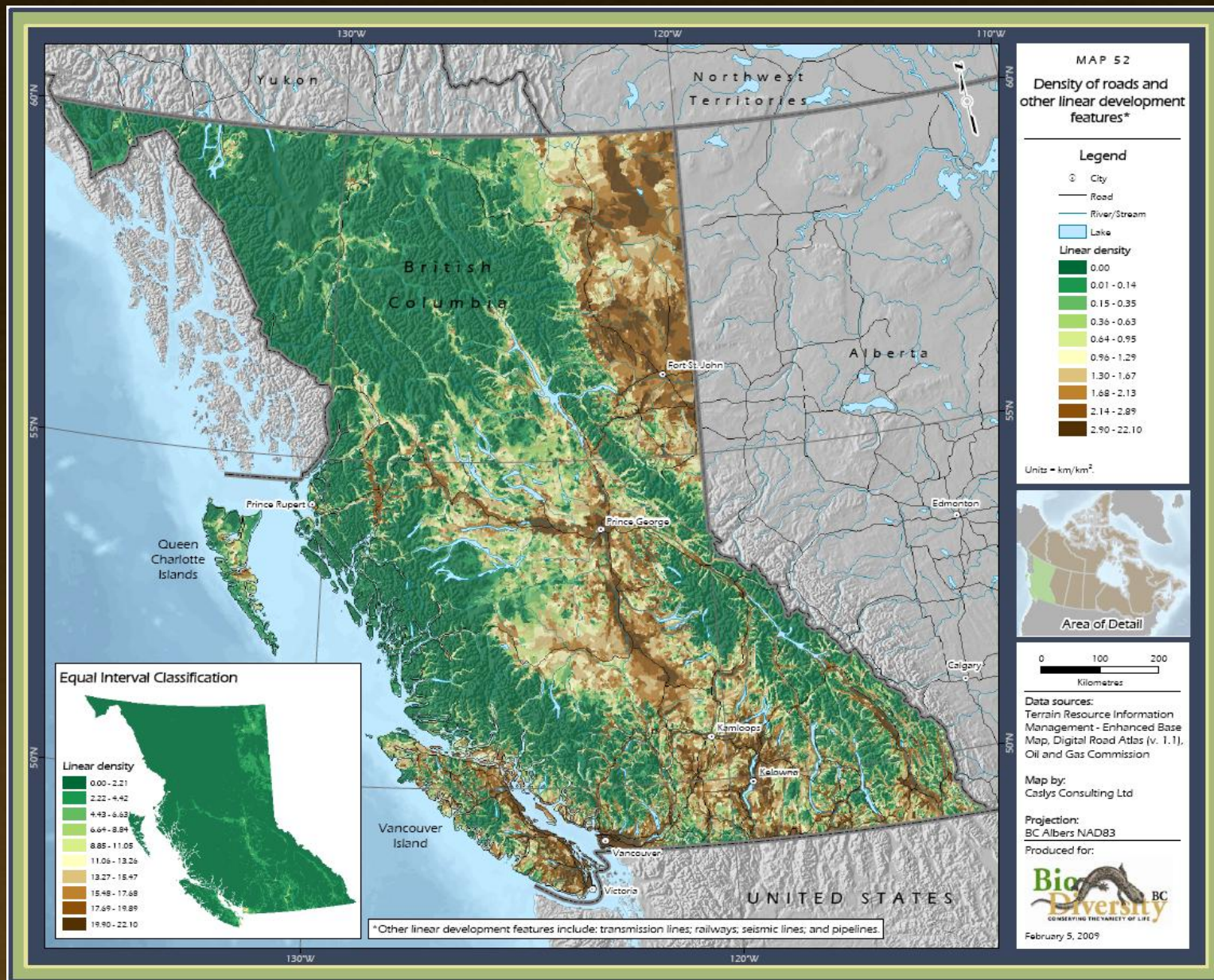












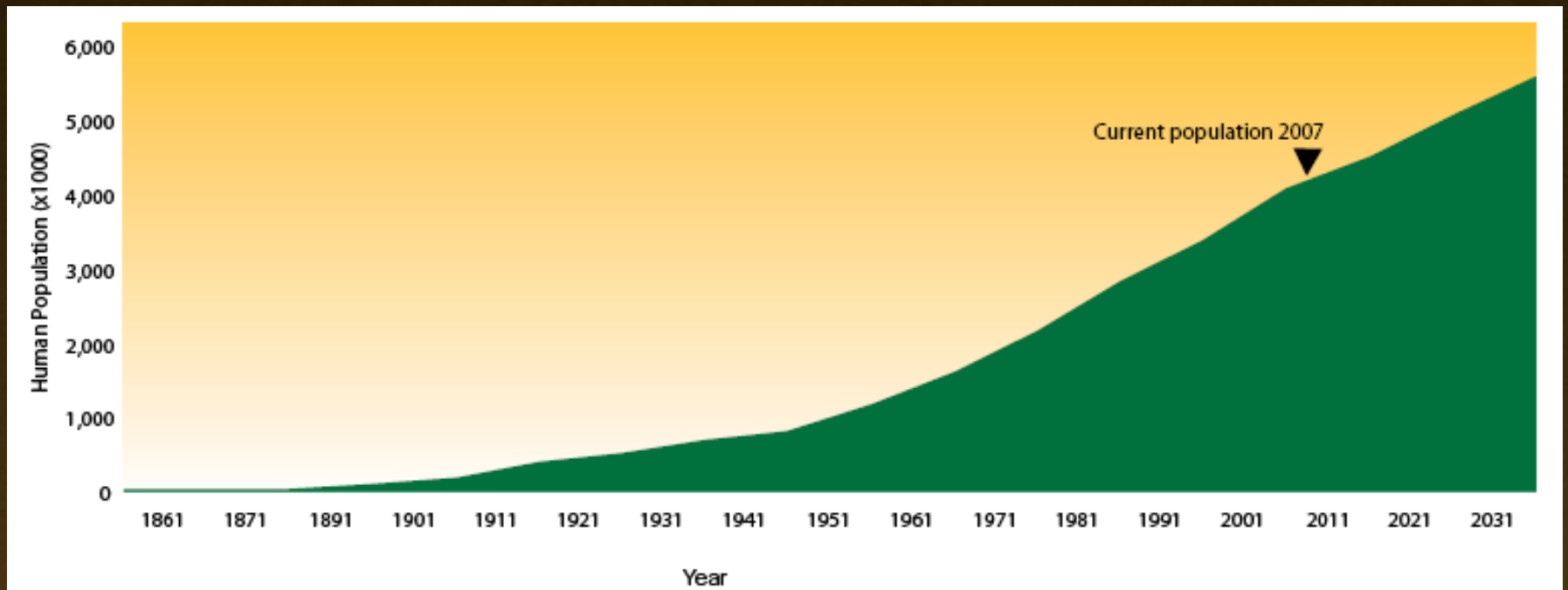


FIGURE 42: Population growth for B.C. (1861–2006) with a projection to 2031.

SOURCE: B.C. Stats. 2007. British Columbia Population 1867 to 2007. Available at: www.bcstats.gov.bc.ca/data/pop/pop/bc1867on.csv.

Major Findings – Data Gaps

- Gaps in our knowledge create major challenges
- The capacity to address the gaps in our knowledge is being impacted



**THE STATUS OF
BIODIVERSITY IN B.C.
CAN BE SUMMARIZED
AS FOLLOWS:**

**British Columbia's biodiversity
is globally significant because
of its variety and integrity,
but without immediate action,
it is vulnerable to rapid
deterioration, especially
in light of climate change.**

Conclusion

- Increasing complexity, need to think at multiple scales/levels/issues
- “Place” is the tie that binds:
 - ◆ Location
 - ◆ Integration
 - ◆ Collaboration
- Tools are advancing...

Welcome to



Hectares | BC



Fisheries and Oceans
Canada

Pêches et Océans
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Parks
Canada

Parcs
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