Plants & Animals

Grizzly Bear Conservation Ranking in B.C.

- **Grizzly bears are an important part of the British Columbia landscape.**
  - They are a symbol of ecological integrity that represents much of what British Columbians and visitors alike appreciate about B.C.'s natural beauty.
  - B.C. is host to some of North America's last remaining places where large predators and their prey play out their millennia-old roles. Grizzly bears are a key part of these systems.
  - Grizzly bears are listed as a species of 'Special Concern' under federal legislation[1] and ranked as S3? (Vulnerable Uncertain) provincially[2].
- **Grizzly bears are divided into 55 Grizzly Bear Population Units (GBPUs) across B.C.** These units range in area from 2,670 km^2 to 49,578 km^2 and mostly follow Wildlife Management Unit boundaries. Very few of these units are isolated enough to be considered discrete populations. These units help managers to identify local conservation concerns, track grizzly bear population trends and apply specific management practices.
- **GBPUs are rated from low to extreme conservation ranking.** Rankings are determined using internationally recognized methods developed by NatureServe[3] and the International Union for Conservation of Nature (IUCN). GBPU conservation rankings are based on; 1) population size and isolation, 2) population trend, and 3) level of threat to bears or bear habitat. The level of threat considered seven sub-categories; including Residential, Agriculture, Energy, Transportation, Biological Use, Human intrusion and Climate Change. See below for detailed methodology[4].
- **Human development is the greatest threat to Grizzly bears in B.C.** Development can impact bears directly by increasing the frequency of bear and human conflict, leading to higher mortality and indirectly by reducing habitat availability due to human-caused disturbance and avoidance by bears. The expansion of human settlements and agriculture can lead to isolation of grizzly bear populations which reduces the movement of bears into the area to compensate for local mortalities.

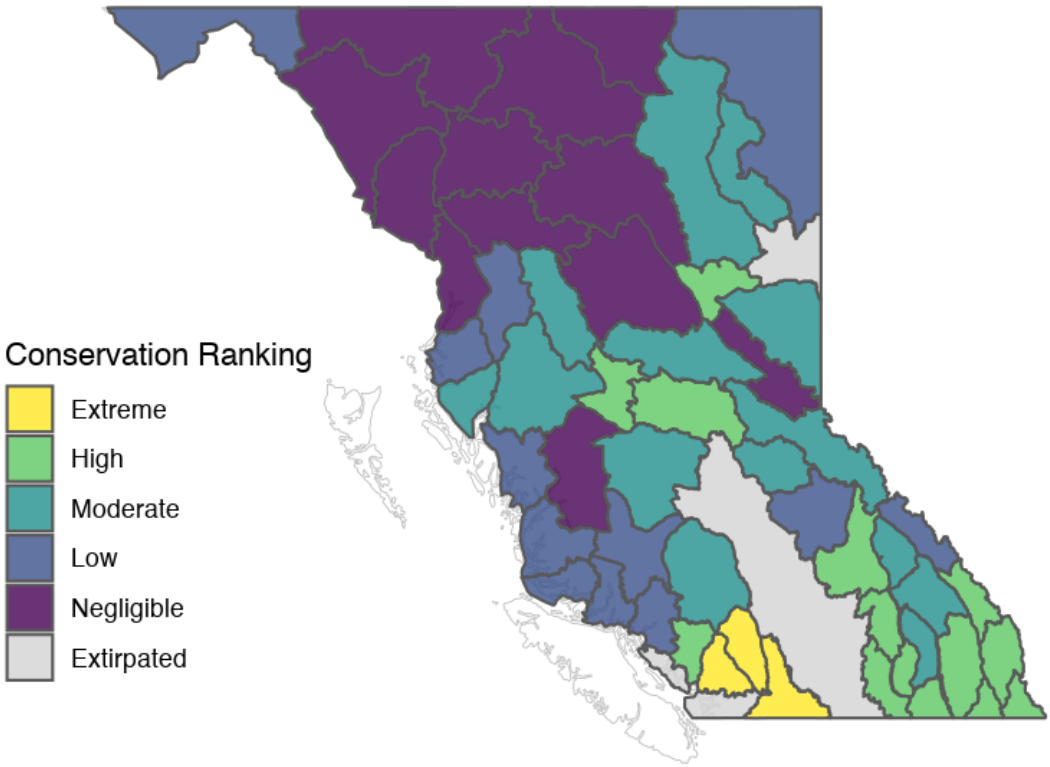


Figure 1: Conservation Ranking for Grizzly Bear Population units (GBPU)

Conservation Ranking

Of the 55 Grizzly Bear Population units (GBPU), conservation ranking was extreme for three GBPUs, high for 14 GBPUs and moderate for 14 GBPUs with the remainder of lower conservation rank. Refer to Appendices for full dataset.

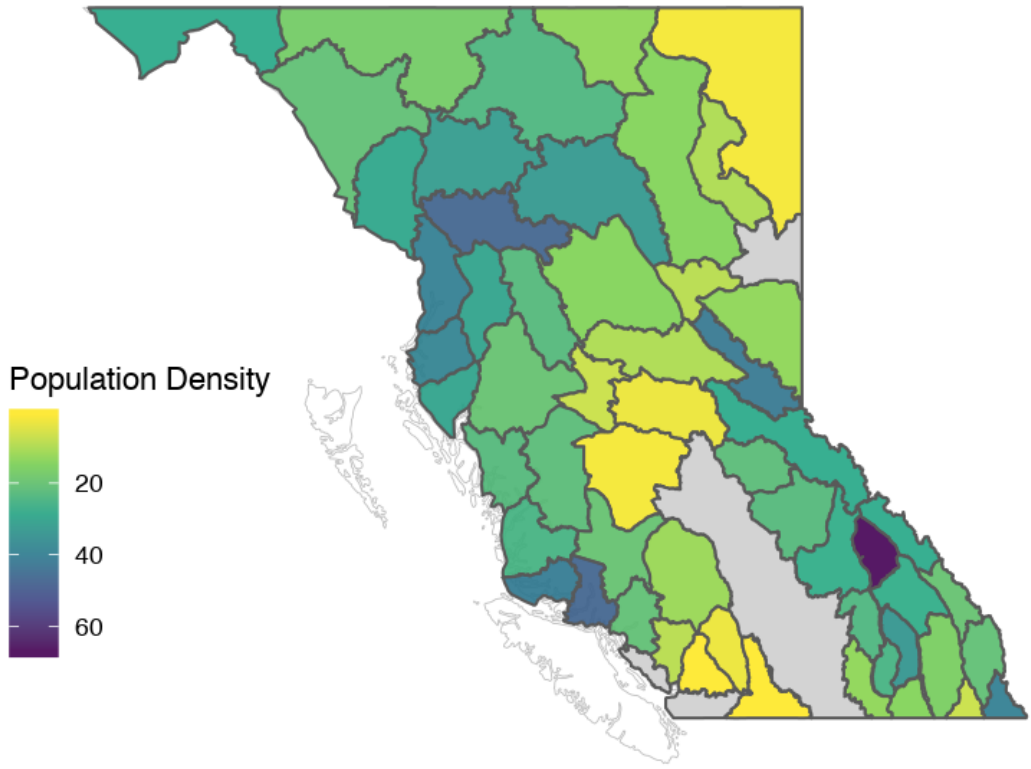


Figure 2: Estimated Grizzly bear population density (adults/1000 km2) per GBPU

Population Density Estimates

Grizzly Bear population density are estimated between from 1 - 49 adults/1000 km². North Selkirk GBPU had the highest population density.

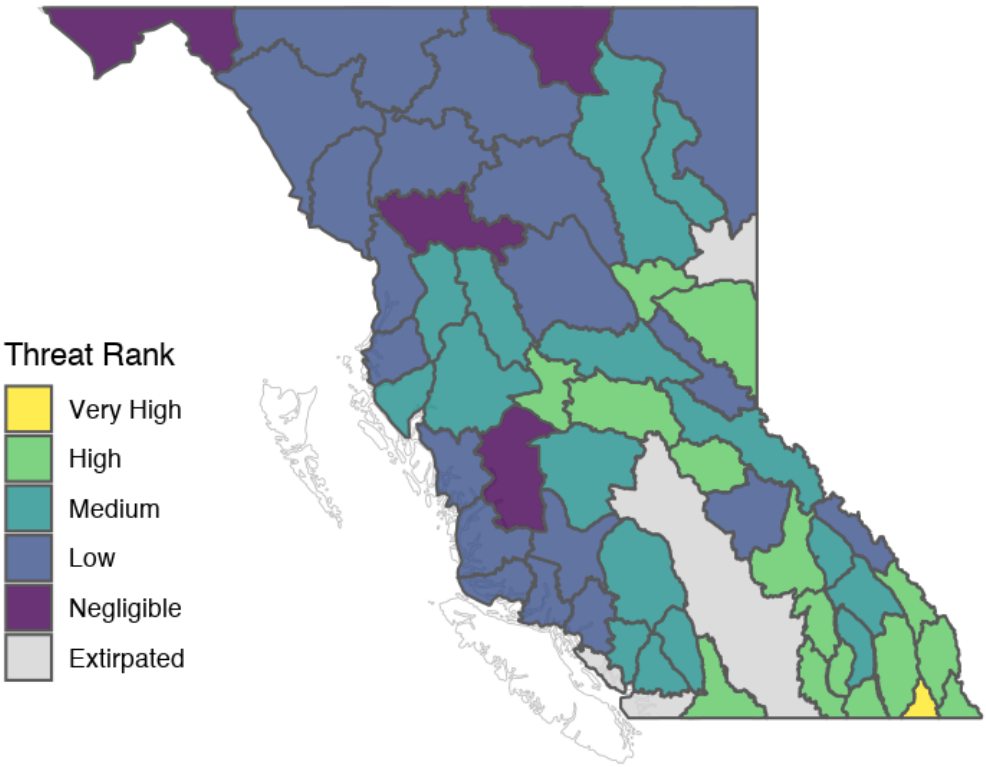
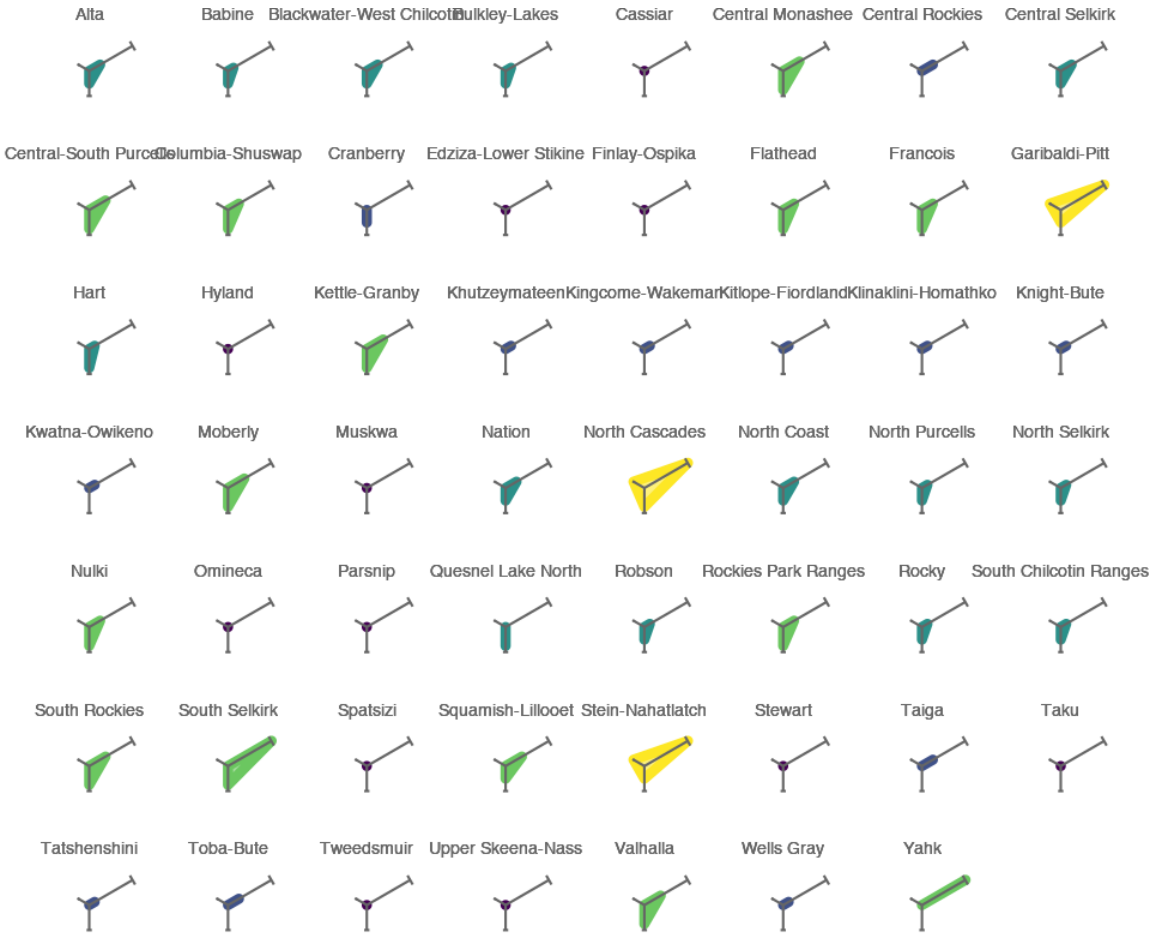


Figure 3: Overall Grizzly bear GBPU threat classification

Threat Classification

Approximately half of all GBPUs (23 GBPUs) had an overall threat of Low or Negligible. Yahk GBPU, located in the Kooteney-Boundary, had the highest overall threat due to combined risks of Agriculture, Human intrusion, Residential, Transportation and Biological Use.

Figure 4: Contribution of different factors to the overall rank for each GBPU. Each arm represents the relative contribution of each factor: Population/Isolation (0-4), Threat (0-2) and Trend (0-1). The coloured area represents the influence of each of the factors on the overall ranking. A larger coloured area represents greather risk to the GBPU and thus an increase in ranking. The colours reflect conservation rank (extreme (yellow), high (green), moderate (teal), low(blue), negligible (purple)



- Historic mortality data is based on historic Grizzly Bear Management Units defined in 2012.
- Prior to 2004, road and rail kills were not distinguished and were documented with 'Pick Ups'.
- Grizzly Bear hunting was banned in B.C. in 2017.

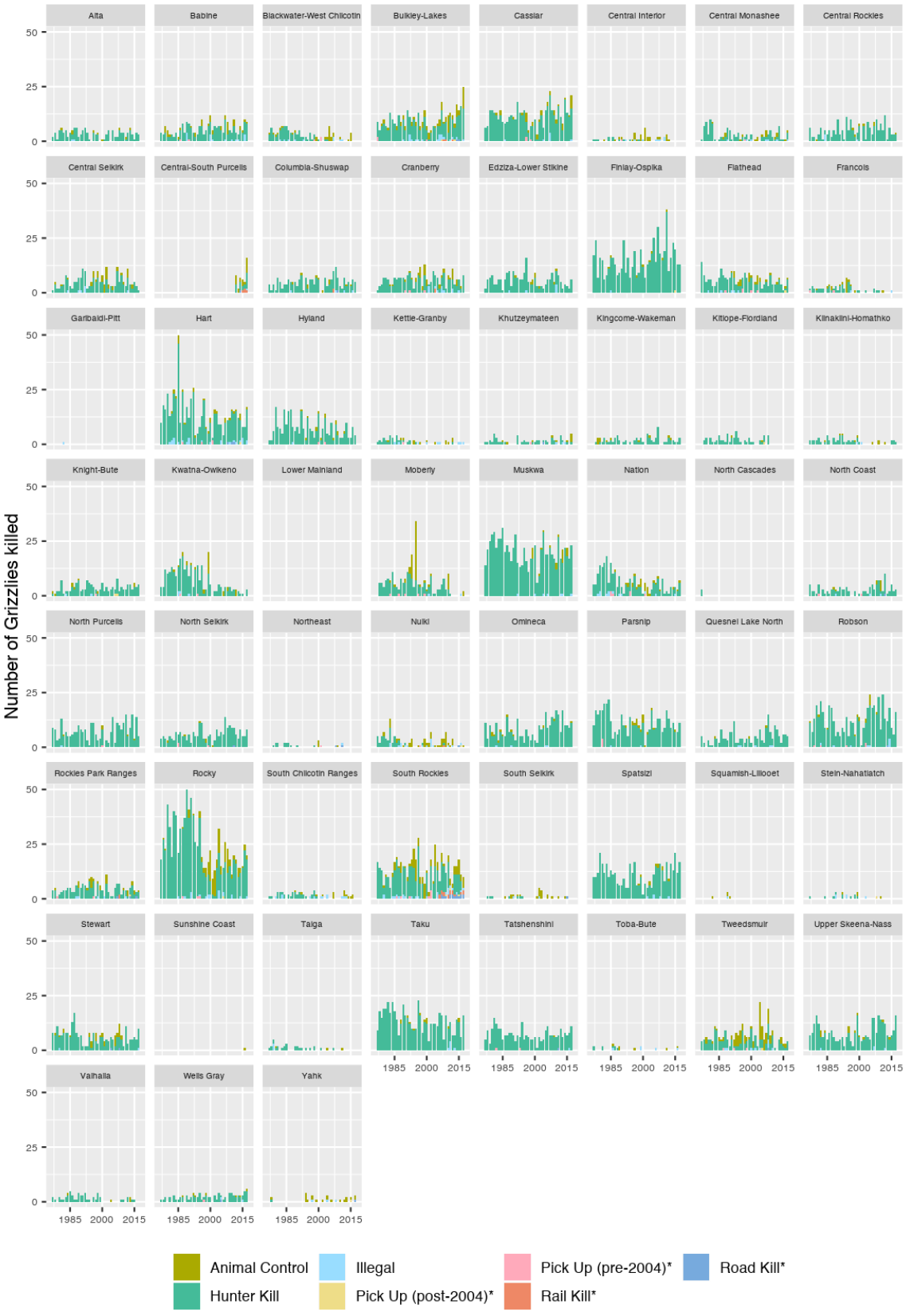
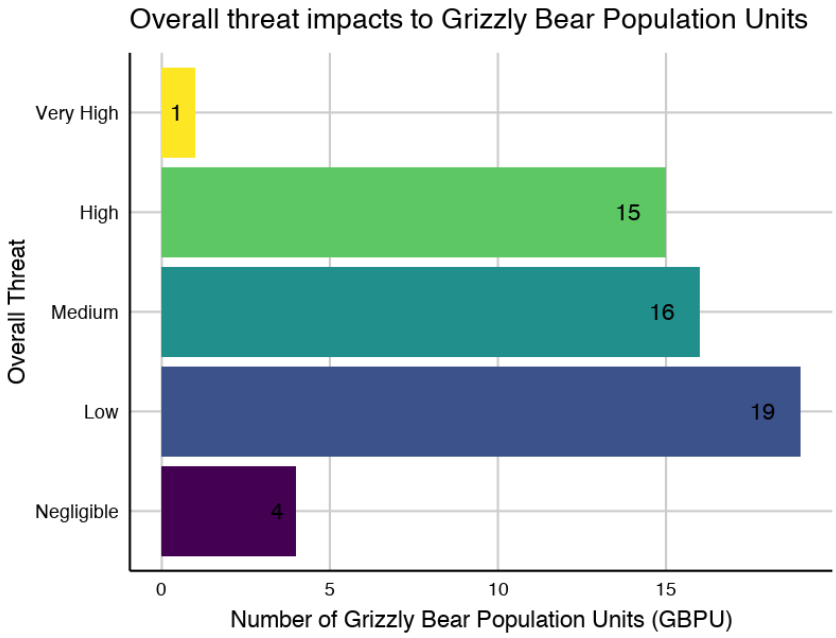
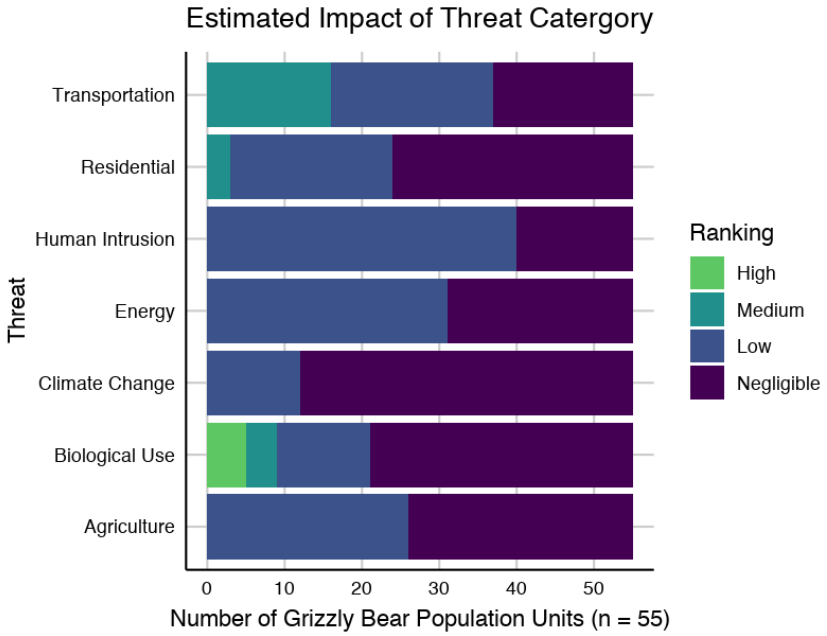


Figure 5: Historic Grizzly Bear Mortality (1976 - 2018)*

Summary of threats to Grizzly Bears



Across all GBPUs, Human Intrusion was the most common threat category, followed by Transportation (road and rail density), Energy production and mining, Agriculture (livestock density), Residential (human density), Biological Use (mortality), and Climate-change (salmon decline).



Methods

- Conservation ranks were calculated based on NatureServe's 'Element Rank Calculator' in conjunction with Provincial bear biologists. This ensured rankings were consistent with international standards (B.C. Conservation Data Centre, NatureServe, IUCN).

- Each GBPU was assigned a rank based on population size and trend, genetic and demographic isolation, and overall threat to grizzly bears and bear habitat. GBPUs started with a score of 5 (no conservation concern) with points reduced for 1) declining population trend, 2) small and/or isolated population, and 3) increasing overall threat.
- Population trend was measured over 3 generations (~30 years). If the population decreased by more than 25% the overall score was reduced, leading to a lower conservation ranking.
- Population size and isolation are combined such that smaller isolated population's rank scores could be reduced by as much as 4 points, whereas large well-connected populations are not downgraded.
- We determined threats using categories identified by IUCN-CMP. Threats were quantified using published spatial data, including Statistics Canada, B.C.'s Baseline Thematic Mapping, Digital Road Atlas, Fish and Wildlife hunter and mortality data and Federal Department of Fisheries and Oceans' Salmon escapement. The NatureServe calculator combined individual threats into an overall threat class.
- The full ranking report[4] detailing ranking methodology and results can be viewed on the B.C. Grizzly Bear webpage
- The R code for creating the charts and maps presented on this page is available on Github

References and Other Useful Links

*1 Species at Risk Act, (2002)

*2 Provincial Conservation Status Ranks

*3 NatureServe. 2015. NatureServe Element Occurrence Viability Calculator Version 1. NatureServe, Arlington, VA.

*4 Province of British Columbia. 2019. Ranking the Conservation of Grizzly Bear Population Units).

*British Columbia's Bear Smart Program.

*British Columbia Ministry of Environment. 2016. British Columbia guide to recovery planning for species and ecosystems at risk. B.C. Ministry of Environment, Victoria, BC. PDF.

Data

*By accessing these datasets, you agree to the licence associated with each file, as indicated in parentheses below.

- Grizzly Bear Population Units
- BC Grizzly Bear Conservation Ranking Results
- BC Grizzly Bear Population Estimates
- Grizzly Bear Historic Mortality

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http://www.env.gov.bc.ca/soe/indicators/plants-and-animals/grizzly-bears.html

Email correspondence to: envreportbc@gov.bc.ca

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Environmental Reporting BC. 2020. Grizzly Bear Population Status in B.C. State of Environment Reporting, Ministry of Environment and Climate Change Strategy, British Columbia, Canada.

Appendices

Table 1: Conservation Ranking for Grizzly Bear Population Units. Note extirpated GBPUs are not included.

Population Name	Conservation Rank	Overall Threat	Isolation	Trend
Tatshenshini	Low	Negligible	Moderate Isolated	0
Cassiar	Negligible	Low	Not Isolated	0
Taiga	Low	Low	Moderate Isolated	0
Hyland	Negligible	Negligible	Not Isolated	0
Muskwa	Negligible	Low	Not Isolated	0
Taku	Negligible	Low	Not Isolated	0
Rocky	Moderate	Medium	Moderate Isolated	0
Alta	Moderate	Medium	Moderate Isolated	0
Spatsizi	Negligible	Low	Not Isolated	0
Edziza-Lower Stikine	Negligible	Low	Not Isolated	0
Finlay-Ospika	Negligible	Low	Not Isolated	0
Upper Skeena-Nass	Negligible	Negligible	Not Isolated	0
Stewart	Negligible	Low	Not Isolated	0
Omineca	Negligible	Low	Not Isolated	0
Cranberry	Low	Medium	Not Isolated	0
Babine	Moderate	Medium	Moderate Isolated	0
Moberly	High	High	Highly Isolated	0
Parsnip	Negligible	Low	Not Isolated	0
Bulkley-Lakes	Moderate	Medium	Moderate Isolated	0
Nation	Moderate	Medium	Moderate Isolated	0
Francois	High	High	Moderate Isolated	0
North Coast	Moderate	Medium	Highly Isolated	0
Robson	Moderate	Medium	Moderate Isolated	0
Tweedsmuir	Negligible	Negligible	Not Isolated	0
Blackwater-West Chilcotin	Moderate	Medium	Moderate Isolated	0
Quesnel Lake North	Moderate	High	Not Isolated	0
Wells Gray	Low	Low	Moderate Isolated	0
Columbia-Shuswap	High	High	Highly Isolated	0
Central Rockies	Low	Low	Moderate Isolated	0
Klinaklini-Homathko	Low	Low	Moderate Isolated	0
Kwatna-Owikeno	Low	Low	Moderate Isolated	0
North Selkirk	Moderate	Medium	Moderate Isolated	0
South Chilcotin Ranges	Moderate	Medium	Moderate Isolated	0
Rockies Park Ranges	High	High	Moderate Isolated	0
North Purcells	Moderate	Medium	Moderate Isolated	0
Kingcome-Wakeman	Low	Low	Moderate Isolated	0
Central Monashee	High	High	Highly Isolated	0
Toba-Bute	Low	Low	Moderate Isolated	0
Central Selkirk	Moderate	Medium	Highly Isolated	0
Stein-Nahatlatch	Extreme	Medium	Totally Isolated	-1
Squamish-Lillooet	High	Medium	Highly Isolated	0
Valhalla	High	High	Highly Isolated	0
Kettle-Granby	High	High	Highly Isolated	0
North Cascades	Extreme	High	Totally Isolated	-1
Garibaldi-Pitt	Extreme	Medium	Highly Isolated	-1
Flathead	High	High	Moderate Isolated	0
Yahk	High	Very High	Totally Isolated	0
South Selkirk	High	High	Totally Isolated	0
Knight-Bute	Low	Low	Moderate Isolated	0

Population Name	Conservation Rank	Overall Threat	Isolation	Trend
Hart	Moderate	High	Moderate Isolated	0
Nulki	High	High	Moderate Isolated	0
Central-South Purcells	High	High	Highly Isolated	0
Khutzeymateen	Low	Low	Moderate Isolated	0
South Rockies	High	High	Highly Isolated	0
Kitlope-Fiordland	Low	Low	Moderate Isolated	0
Central Interior	NA	NA	NA	Data Deficient
Northeast	NA	NA	NA	Data Deficient
Sunshine Coast	NA	NA	NA	Data Deficient
Lower Mainland	NA	NA	NA	Data Deficient

Table 2: Population Density Estimates by GBPU in 2018. Note extripated GBPUs not included.

Population Name	Population Size (Adults)	Population Density (Adults/1000 km^2)	Area of Useable Habitat (km^2)	Total Area of GBPU (km^2)
Tatshenshini	407	28		19,765
Cassiar	612	17		36,937
Taiga	94	2		50,046
Hyland	231	13		17,376
Muskwa	840	24		36,018
Taku	575	21		32,343
Rocky	538	14		38,381
Alta	132	10		13,256
Spatsizi	666	32		21,702
Edziza-Lower Stikine	398	29		17,130
Finlay-Ospika	971	33		30,768
Upper Skeena-Nass	755	47		16,999
Stewart	358	40		11,740
Omineca	402	14		30,022
Cranberry	349	30		11,773
Babine	313	23		14,323
Moberly	71	9		7,834
Parsnip	455	42		10,996
Bulkley-Lakes	439	20		23,884
Nation	170	10		18,687
Francois	58	7		8,702
North Coast	190	30		7,168
Robson	534	28		20,036
Tweedsmuir	368	22		19,366
Blackwater-West Chilcotin	53	2		22,662
Quesnel Lake North	187	22		9,375
Wells Gray	317	23		14,689
Columbia-Shuswap	346	27		13,602
Central Rockies	169	28		7,093
Klinaklini-Homathko	251	20		14,853
Kwatna-Owikeno	229	25		12,138
North Selkirk	363	67		6,105
South Chilcotin Ranges	222	12		20,311
Rockies Park Ranges	116	20		5,850
North Purcells	234	27		9,619
Kingcome-Wakeman	199	41		6,863
Central Monashee	147	24		6,349
Toba-Bute	130	21		8,038
Central Selkirk	188	34		5,681
Stein-Nahatlatch	22	3		7,798
Squamish-Lillooet	46	9		5,828
Valhalla	88	25		3,479
Kettle-Granby	87	13		6,585
North Cascades	6	1		9,808
Garibaldi-Pitt	3	1		6,604
Flathead	140	40		3,515
Yahk	20	7		2,719
South Selkirk	58	14		4,074
Knight-Bute	250	47		7,283
Hart	244	13		19,661
Nulki	44	3		16,798
Central-South Purcells	176	16		11,517
Khutzeymateen	280	39		8,221
South Rockies	170	21		8,225
Kitlope-Fiordland	214	23		11,186
Central Interior	NA	NA		66,493
Northeast	NA	NA		10,970
Sunshine Coast	NA	NA		3,044
Lower Mainland	NA	NA		5,614

Table 3: Threat Level for threat catergories per GBPU. Threats rank from Very High (VH) to Negligible (N). Note extirpated GBPUs are not include.

Population Name	Overall	Residential	Agriculture	Energy	Transportation	Biological Use	Human Intrusion	Climate Change
Tatshenshini	N	N	N	N	N	N	N	N
Cassiar	L	N	N	L	N	N	N	N
Taiga	L	N	N	L	L	N	L	N
Hyland	N	N	N	N	N	N	N	N
Muskwa	L	N	N	L	N	N	N	N
Taku	L	N	N	L	N	N	N	N
Rocky	M	N	L	N	L	L	L	N
Alta	M	N	L	N	M	N	L	N
Spatsizi	L	N	N	L	N	N	N	N
Edziza-Lower Stikine	L	N	N	L	N	N	N	N
Finlay-Ospika	L	N	L	L	N	N	N	N
Upper Skeena-Nass	N	N	N	N	N	N	N	N
Stewart	L	N	N	L	N	N	L	L
Omineca	L	N	N	L	L	N	L	N
Cranberry	M	L	N	N	L	N	L	L
Babine	M	N	L	N	L	L	L	N
Moberly	H	L	L	L	L	M	L	N
Parsnip	L	N	N	N	N	N	L	N
Bulkley-Lakes	M	L	L	L	L	L	L	N
Nation	M	N	N	L	M	L	L	N
Francois	H	L	L	L	M	N	L	N
North Coast	M	L	N	L	N	L	L	N
Robson	M	N	L	L	L	N	L	N
Tweedsmuir	N	N	N	N	N	N	N	N
Blackwater-West Chilcotin	M	N	L	L	M	N	L	N
Quesnel Lake North	H	N	L	L	M	L	L	L
Wells Gray	L	N	L	N	L	N	L	N
Columbia-Shuswap	H	L	L	L	M	N	L	N
Central Rockies	L	N	N	N	L	N	L	N
Klinaklini-Homathko	L	N	N	N	N	N	L	N
Kwatna-Owikeno	L	N	N	N	N	N	N	L
North Selkirk	M	L	N	L	L	N	L	N
South Chilcotin Ranges	M	N	L	L	L	N	L	L
Rockies Park Ranges	H	L	L	L	L	M	L	N
North Purcells	M	L	N	N	L	L	L	N
Kingcome-Wakeman	L	N	N	N	L	N	N	L
Central Monashee	H	L	L	N	M	M	L	N
Toba-Bute	L	N	N	L	N	N	N	L
Central Selkirk	M	L	N	L	L	L	L	N
Stein-Nahatlatch	M	L	N	L	L	N	L	L
Squamish-Lillooet	M	L	L	L	L	N	L	N
Valhalla	H	L	L	N	M	L	L	N
Kettle-Granby	H	L	L	N	M	L	L	N
North Cascades	H	L	L	L	M	L	L	L
Garibaldi-Pitt	M	M	N	N	L	N	L	L
Flathead	H	L	L	L	M	H	L	N
Yahk	VH	M	L	N	M	H	L	N
South Selkirk	H	M	L	N	M	L	L	N
Knight-Bute	L	N	N	N	L	N	N	L
Hart	H	L	L	L	L	M	L	N
Nulki	H	L	L	L	M	H	L	N
Central-South Purcells	H	L	L	N	M	H	L	N
Khutzeymateen	L	N	N	L	N	N	L	N
South Rockies	H	L	L	L	M	H	L	N
Kitlope-Fiordland	L	N	N	N	N	N	N	L
Central Interior								
Northeast								
Sunshine Coast								
Lower Mainland								