Grizzly Bear Workshop: Babine Watershed

Summary prepared by Dave Daust and Karen Price, March 14, 2013 (revised May 22, 2013)

Workshop held Feb 8, Smithers, BC.

Participants: Tony Hamilton (BC large carnivore specialist), Clayton Apps (consultant; grizzly bear and large carnivore specialist), Debbie Wellwood (consultant; expert on Babine grizzly bears), Bill Jex (regional wildlife biologist), Krystal Kerckhoff (regional wildlife biologist), Troy Larden (regional senior ecosystems biologist), Don Morgan (regional wildlife habitat specialist) , Blair Ellis (regional information coordinator), Ben Heemskerk (regional cumulative effects project coordinator), Karen Price (ecological consultant), Dave Daust (cumulative effects consultant)

Purpose

This summary captures discussion among grizzly bear experts and interested parties about monitoring needs in the Babine Watershed (specifically, the portion considered by the Babine Watershed Monitoring Trust). The half day session on the Babine was part of two days of workshops addressing grizzly bears. Discussion on day 1 focussed on building a risk model for grizzly bears applicable to the Northwest Cumulative Effects Assessment Pilot Area; discussion on day 2 was divided between determining monitoring priorities for the Babine Watershed and determining regional priorities for monitoring and management activities.

This Babine session was funded by the Babine Watershed Monitoring Trust in partnership with the Ministry of Forests, Lands and Natural Resources Operations.

The Babine portion of the workshop had three objectives: to assess previous work on Babine grizzly bears, including limitations of data and knowledge gaps; to direct future monitoring activities; and to bring together experts with an interest in Babine grizzly bears. Participants discussed the first two priorities together. An additional objective was to define the population of bears appropriate for analysis.

Background

Karen Price gave a presentation introducing the Babine Watershed, describing BWMT's governance, monitoring framework and levels of funding, and briefly summarising the BWMT's grizzly bear projects to date. Projects to date include

1. 2007-1: Open road density. (Wellwood D and Pfalz J)
2. 2009-2: Human-Grizzly Bear Interactions and Education: Baseline Data. (Ciarniello L, Caira R and Svendsen J)
3. 2009-3: Grizzly bear habitat. Includes field assessment of effectiveness of access control points. (Wellwood D and Pfalz J)

Assessment of Past BWMT Projects

Appropriate population unit (all projects)

The BWMT study area is not an appropriate unit for studying grizzly bears because individuals travel both north and south of the boundary, and because individuals may travel long distances to reach fish at the river (Babine bears fall into the coastal/interior transition ecotype discussed in day 1 with potentially long movements, by some individuals, to harvest salmon). The BWMT area includes less than a third of the Babine Grizzly Bear Population Unit (GBPU), which is made up of two Wildlife Management Units (WMU)—the unit used for management purposes (e.g. for determining hunting quotas). Any meaningful monitoring of grizzly bear population must include areas beyond the BWMT boundary.

Recommendation: use biologically-based units rather than the BWMT boundary. These units may not be the same as the GBPU, although the boundaries seem reasonable for the Babine. Tony has been working on modifying boundaries across BC. The ideal unit is the BMU (bear management unit), which is about equivalent in size to a landscape unit and is created based on adult female home ranges. Determining the appropriate demographic unit for interpreting mortality in the Babine is crucial. For now, any population or mortality work on the Babine should investigate the entire GBPU for meaningful interpretation.

Open Road Density (Project 2007-1)

Discussion in Day 1 of the workshop confirmed the 0.6km/km^2 risk threshold for road density used in project 2007-1. Tony is using models that define *effective* habitat as a proportion of *suitable* habitat based on road density: 0% for road densities above 2.4 km/km^2, 25% for densities from 1.2 – 2.4 km/km^2 and 50% for densities from 0.6 – 1.2 km/km^2. Clayton Apps has developed an index based on accessibility to human population centres as an improvement to road density (the model includes travel time from a population centre, community size, probability of traveling further, decreased travel with increased urbanisation, off-road travel time[1]). This index is an important indictor of grizzly bear persistence. The model was developed for larger scales than the Babine and is still in the testing phase.

Grizzly bear habitat (Project 2009-3)

Experts discussed the best available habitat data for the Skeena Region on Day 1 of the workshop[2]. Although they agreed that habitat classification is poor, they felt that, currently, mortality issues in the Babine are a much higher priority for monitoring than habitat.

Human-Grizzly Bear Interactions and Education: Baseline Data (Project 2009-2)

Experts had some concerns with project 2009-2. First, the description of methods used to estimate numbers of bears is incorrect. The report compares ministry estimates with those derived from Mowat et al.'s model, and states that the Mowat methodology is new. However, Ministry biologists already use the Mowat et al. methodology as their initial estimate and modify these estimates using expert opinion. Experts agreed that the methods used to modify initial estimates (based on available protein and vegetation food sources) are good. This concern does not affect the analyses in Project 2009-2.

Second, the estimates of mortality rate by WMU are problematic. Because data were summarised only within the BWMT area, it is inappropriate to make statements about mortality rate for each WMU. Any

conclusions about potential overharvesting in WMU 6-8 are premature. It is crucial to collect data on mortality for each WMU to interpret results correctly.

Overview of Monitoring

The Babine grizzly population is the top priority for monitoring on the BC list. It is in the group of highest priority populations for the Skeena (along with Cranberry, Bulkley-Lakes and Francois[3]). Participants agreed that risk factors within the Babine Watershed are high and that risk near the bridge and fish fence is extreme and unsustainable.

Priorities for monitoring and management in relation to Babine grizzly bears, in order of importance, include

1. Reducing uncertainty about unreported mortality near the park entrance and plugging the potential population sink.
2. Reducing uncertainty about the grizzly bear population and about the significance of mortality on the whole population.
3. Improving habitat classification.

The following sections discuss the first two priorities and provide guidance on specific monitoring methodologies. The third priority is relatively less important and methods are well established.

Priority 1: Mortality at the Park Entrance area

The factors at play in this area (e.g., concentration of attractants associated with DFO weir, recreational angling and Fort Babine food and commercial fishery, high human density, lack of consistency in behaviour towards grizzly bears) result in high risk to bears in this area, as evidenced by the hotspot analyses in project 2009-2. Experts consider that, in the sub-unit centred on the fish fence, the risk factors are extreme and unsustainable. The situation is the worst in BC, paralleled only at Bella Coola (at the Atnarko).

The most significant risk is of female mortality due to human-bear conflict. Females with cubs frequent this area. Some disappear; others are known to have been killed. Concentrated adult female mortality can lead to gaps in grizzly bear distribution. With presence of an attractive sink, there is little impetus for females to disperse to fill the gaps. The weir area could be an attractive sink.

Experts agreed that neutral interactions between humans and grizzly bears (e.g. through well-managed bear viewing) are unlikely to translate into changed bear behaviour away from a site and hence unlikely to increase vulnerability: bears are sufficiently intelligent to recognise the difference between people at a viewing site and people elsewhere. However, food-conditioned bears do behave in ways that increase their mortality elsewhere. Eliminating food conditioning could reduce the sink potential near the weir area.

Experts agreed that, if the weir cannot be removed, human behaviour must change. In the past 20 years, 14 bears were either killed or moved as problem wildlife (project 2009-2). Experts consider that mortality of relocated bears is sufficiently high to consider moved bears as dead bears. Three quarters of management actions (including kills) are located near Fort Babine, with an additional 22% near the fish fence (project 2009-2). Smokehouses and garbage are particular attractive to bears.

The behaviour of recreational anglers in relation to attractants has improved over the past few years, following implementation of more stringent regulations set by BC Parks (e.g. no fish storage, no angling near dawn and dusk). The electric fence around the DFO compound has also eliminated accessibility of attractants. However, newly accessible attractants may be associated with the cleaning of fish (particularly jacks) as part of the commercial fishery. Good empirical data about bear movement in relation to attractants will be necessary to change management.

Uncertainty about the level of unreported mortality is also high. Studies to reduce this uncertainty are crucial.

Monitoring Recommendation: monitor bear movement in relation to attractants; monitor unreported mortality near the mortality hotspots.

Management Recommendation: change human behaviour and availability of attractants to plug the potential mortality sink.

Priority 2: Significance of mortality in the context of the larger population

The lack of population monitoring means that we do not know how mortality within the BWMT area, and within the sub-unit centred on the weir, affects the population unit.

Within the Babine GBPU, mortality is spatially concentrated in the BWMT area, however, so is the bear population. The BWMT area accounts for 28% of the GBPU habitat, 35% of the population and 40% of bear mortality (Table 1). Mortality rate (percent of estimated population killed per year) within the BWMT area (2.5%) is similar to the rate in the larger Babine GBPU (2.1%). The majority of the illegal kills occurred in the BWMT area (it is difficult to confirm that all illegal mortality occurred in the BWMT area because data in Table 1 were extracted from different reports and some discrepancies exist). The majority of animal control incidents and illegal harvests have occurred in WMU 6-8 which overlaps the southern portion of the BWMT area.

Unreported mortality and First Nations harvest remain a large uncertainty at the population scale. Calculations of allowable harvest include an estimate of unreported mortality (~0.9%) and First Nations harvest (~0.5%), based on research elsewhere in BC (project 2009-2). However, it is unknown how well these estimates apply to the Babine grizzly populations. There is currently no evidence to suggest modifying the level of unreported mortality, but it is possible that attitudes towards killing grizzly bears may differ in this region relative to the regions studied.

Translocation of "problem" bears also increases uncertainty of mortality estimates within a region. Translocated (outside home region) and relocated (within home region) bears face very high mortality risk from humans and other bears. Conceptually, bear translocation deflates mortality estimates for the source area and inflates estimates for the repository area, however bears do not necessarily stay in the area where they were released (project 2009-2).

Table 1. Area, bear density and bear mortality in different regions. Average bear mortality for 22 year period: 1990 to 2011. Mortality varied substantially by year, ranging from 3 to 12 bears per year in the Babine GBPU.

Region	Total area (km^2)	Suitable habitat (km^2)	Estimated Population (#)	Est. Pop. density (#/1000 km^2)	Average Mortality (#/yr)			
					Legal	Control	Illegal	Total
BWMT*		3,913	108	27	2.1	0.3	0.3	2.7
Babine GBPU**	14,323	13,805	313	23	5.2	1.1	0.3	6.7
WMU 6-7	4,536	4,193		35				
WMU 6-8	9,787	9,353		17				

*Data from tables 3 and 12 of Ciarniello et al. 2012. Human-grizzly bear interaction and education baseline data for the Babine Watershed Monitoring Trust. BWMT Project 2009-2. Online: http://www.babinetrust.ca/documents. Rough population estimates for BWMT area are based on area of BWMT in each WMU: 2,260 km^2 in WMU 6-7 and 1,653 km^2 in WMU 6-8 and on bear density in those WMUs.

**Data from MOE. 2012. Environmental Reporting BC—Plants and Animals: Grizzly bear population status in BC (2012). Online: http://www.env.gov.bc.ca/soe/archive/print_ver/plants-and-animals/2012_Grizzly_Bear_Population_Status_BC.pdf; Bill Jex, Regional Wildlife Biologist, Skeena Region provided advice on interpretation and habitat areas for GBPU and WMUs.

Table 2. Mortality and animal control activities by Wildlife Management Unit from 2000 to 2012. Animal control includes non-lethal actions such as relocation. Data provided by Bill Jex, Regional Wildlife Biologist, Skeena Region.

Region	Legal Hunt	Animal Control	Illegal Kills	First Nations Hunt	Total*
WMU 6-7	31	0	2	0	33
WMU 6-8	36	18	5	3	59

*three additional deaths for the period are attributed to natural causes.

Monitoring Recommendation: monitor bear population over the GBPU and WMU areas; reduce uncertainty about unreported mortality.

Management Recommendation: none necessary at present; modify habitat suitability by road density in habitat models.

Monitoring Methods

The best approach is to glean as much information as possible from many different sources. Possibilities include hair collection from marked trees, adapting a DNA hair grid, radio-collaring, monitoring bear behaviour, monitoring human behaviour, traffic counters and monitoring spatial and temporal trends in use over the whole area. GPS proximity collars can tell proximity to marked locations (e.g. smokehouses) in close to real time to allow quick response and track bear movement.

Potential monitoring methodologies include

1. **Bear collaring**: collaring bears around the park entrance area would have a high value for reducing human/bear conflict by gathering information, decreasing uncertainty about mortality in this area and allowing mitigation. Benefits include
    a. Information on bear movement patterns in relation to attractants and people (monitoring and research)
    b. Information about bear mortality
    c. Potential to avoid conflict by knowing where bears are
    d. Information about bear movement at night
    e. Bears become known and named; hence less likely to be shot
2. **Bear monitoring and management officer**: A knowledgeable person stationed near the park entrance every day throughout the busy season could collect monitoring data as well as mitigate risk:
    a. Collect hair for DNA analysis (note—there has been recent progress on extracting DNA from scats)
    b. Monitor human behaviour and spatial and temporal patterns of use: e.g. traffic counters on roads and by access control points; surveys of motorised and non-motorised use; stratified surveys of users.
    c. Monitor trail camera
    d. Act as education source—go-to person for questions
3. **Population sampling** using systematic grid to collect hair for DNA sampling. Coupling hair sampling with collaring is most effective. This method is necessary to examine population within the larger region.

Costs

For collaring program

- Collars are $5,000 each. Minimum 5 – 10 collars. $25 – 50K in the first year.
- Deployment (trapping, collecting DNA samples) about $5,000 each. $25 – 50K in the first year.
- Each year, some recaptures will be necessary to fix collars. $20K per year.
- Ongoing data collection and compilation (collars send out continuous GPS points for mapping). Wages $15K/ month for 3 – 4 months.
- Total: $160K first year, then $80K/year for 5 years.
- For useful information, it will be necessary to ensure continued funding for at least 5 years.

Monitoring human use patterns is cheaper and useful. Traffic counters are about $500 each. Some are already in place (BC Parks).

Funding

Funding will be a challenge. The Grizzly Bear Conservation Strategy Surcharge Account of the Habitat Conservation Trust Foundation is no longer a good option as it focuses on industry.

With a potential Spectra pipeline route through the Babine, funding may become available from industry. Partnership with First Nations will be necessary—building a relationship between BWMT and the people of Wud'at is an important first step. The pipeline route may divide one of the last core secure areas in the region. Research on the impact of this route on the grizzly population will be necessary. Mitigation for pipeline impacts may include paying for a grizzly bear monitoring and management officer stationed near the park entrance to minimise risk of cumulative effects.

Guide-outfitters may provide some funding.

There is a fund to support aboriginal research on species at risk. Grizzly bears are of special concern on both COSEWIC and SARA lists, and hence qualify. Funding is also possible for projects including Traditional Ecological Knowledge and for projects that build capacity in First Nations communities.

It would be possible to ask for money via the Department of Northern Affairs in relation to the First Nations commercial fishery.

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[1] See day 1 workshop summary: NW CEA Pilot Grizzly Bear Draft Model.
[2] See day 1 workshop summary: NW CEA Pilot Grizzly Bear Draft Model.
[3] Apps C 2011. Grizzly bear population inventory and monitoring across the Skeena Region of British Columbia: needs assessment and design recommendations. Unpublished report for BC MFLRO.