Northern Bear Awareness Society

Urban Bear Research Project

Preliminary Data Release

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Project evaluation and accomplishments

The Northern Bear Awareness Society (NBAS) located in Prince George, BC, conducted an urban bear study as one way of increasing its public education and outreach efforts regarding the creation of 'problem' bears within the City. NBAS's goal is to improve public safety and reduce the number of bears destroyed each year by promoting an increased environmental understanding of the biology of urban bears among developers, City planners, the COS and the public. Prince George has one of the highest records of bear complaints and numbers of bears destroyed in the province (10-year average = 47 bears destroyed per year). The Urban Bear Smart Research Project aims to reduce the number of 'problem' bears created and destroyed through the identification and maintenance of movement and travel corridors (Fraser and Nechako Rivers) used by bears, identification of important/high quality habitats, and monitoring bear movements and survival. Further, the Project had a high public profile and we found that residents related to the maps of radio collared bear movements within their neighbourhood. In addition to the landscape level planning objectives of the research project the data gathered will be used to foster a greater appreciation of the importance of keeping bears wild and securing human-provided non-natural attractants within urban environments.

Between June 2009 and September 2010, four adult female black bears were radio collared within the city of Prince George ($n = 3$) or immediately adjacent to the City limits ($n = 1$). The bears were outfitted with Global Positioning Collars (GPS) or GPS collar devices that were programmed to take each bear's locations every 2 to 3 hours depending on the collar type and subsequent programming availability. The bears were also given a yellow ear tag with a unique number so they could be identified if sighted by the public and/or if they lost their collar.

The bears were named after the areas where they were captured (Irene, Nechako, Cindy and KD). Providing a name for the bears allowed the public to connect with the individual bear within their community. This was particularly important for Irene, who was captured in 2009 on Irene Road in the College Heights area, and Nechako captured in 2010 in the Nechako area of the lower Hart Highlands. These two females were often reported by members of the public and became somewhat of bear ambassadors for their communities. Both females were alone when captured but produced 3 and 4 cub litters the following spring. The Northern Bear Awareness Society used the location information obtained from the GPS collars to inform the public of the bears' movements and how to act responsibly in bear country.

The survival and reproduction of study bears was also monitored. The radio-collars placed on bears contained a mortality function where the signal transmitted became

different if the collar lay motionless for a set number of hours. This collar feature combined with working in cooperation with the Conservation Officer Service allowed us to monitor the survival of study animals. The only bear to die during the study was Irene and all three of her cubs of the year. Irene was a true urban bear and capitalized on most non-natural feeding opportunities, living almost entirely within the urban green spaces of College Heights (Figure 4). Irene and her cubs were destroyed by the COS while feeding in a residential apple tree in the yard of a house situated along the Fraser River. The death of Irene resulted in an outrage for people within the community that had come to know her and her cubs. Some concerned residents took to campaigning on the importance of securing attractants and the interest in the Northern Bear Awareness program peaked. There is little doubt that due to the circumstances surrounding the death of Irene and her cubs public support was mobilized for urban bears and the mission of the Northern Bear Awareness Society to address issues relating to the high number of bears destroyed within Prince George was achieved.

The GPS collars gathered a total of 5,579 locations on these four urban bears:

Bear 1 - Cindy	2119
2009	105
2010	720
2011	1113
2012	181
Bear 2 - Irene	1653
2009	539
2010	1114
Bear 3 - Nechako	1216
2010	315
2011	901
Bear 4 - KD	791
2010	123
2011	668
Grand Total	5779

These locations allowed us to examine how bears were using the urban landscape (Figures 1 through 6 attached). It is evident that the green spaces within and surrounding Prince George were contributing to urban bear use of the city (Figures 1-6 attached). In addition to managing attractants, these bears show us that managing the green spaces is necessary if the City wants to reduce the number of bears coming into residential areas.

GPS collars require the batteries to be replaced once per year. We visited bears in their den sites to replace the batteries and also to monitor their reproduction by removing the

female and her cubs. The following extremely important data were obtained from the den site visits:

Bear	Year	Capture Dates	Den Visit	Reproductive status	Fate
Cindy BF1	2009	12-Jun-09	First capture	Lone	
Cindy BF1	2010	17-Feb-10	Den Visit 2009-10	3 COYs[1] - all female	All cubs died at some point during year[2]
Cindy BF1	2011	15-Mar-11	Den Visit 2010-11	4 COYs - 3 female, 1 male	Two cubs died, two survived
Cindy BF1	2012	16-Mar-12	Den Visit 2011-12	2 yearlings	
Yearling 1	2012			Female yearling	
Yearling 2	2012			Female yearling	
		May 3, 2012			Dropped Collar
Irene BF2	2009	15-Jun-09	First capture	Lone	
Irene BF2	2010	24-Feb-10	Den Visit 2009-10	3 COYs - 2 male, 1 female	
Irene BF2		14-Aug-10			Dropped Collar
Irene BF2		08-Sep-10			Bear Destroyed
Nechako BF3	2010	16-Jul-10	First capture	Lone & in estrus	
Nechako BF3	2011	17-Mar-11	Den Visit 2010-11	4 Coys - all boys	
		23-Sep-11 30-Sep-11			Dropped Collar
KD Domano BF4	2010	08-Sep-10	First capture	Mammae did not appear developed	
KD BF4	2011	30-Mar-11	Den Visit 2010-11	3 Coys - 2 girls, 1 boy	
		17-Sep-11			Dropped Collar

[1]COY stands for Cubs of the Year, which is used for cubs newly born during that year's denning event.
[2]Since it is known that COYs- (turning to yearling) bears den with their mother it is assumed that these bears died and did not disperse as COYs.

The data gathered by the GPS collars also enabled us to determine when bears entered and exited their den sites, which is termed the "denning duration". On average female bears that were either pregnant or with cubs entered their den sites on 13 Oct (range 26 Sept to 30 Oct) and emerged on 19 April (range 17 to 26th April). Study bears spent on average 177 days (6 months) in their den sites.

Bear 1 - Cindy		
2009	Captured	11 June 2009
Lone	Collar fix fails last fix still 500 m from den site	23 Sept 2009
2010	Wakes up	17 April 2010
3 COYs	Leaves Den area	21 April 2010
	At den site	23 Oct 2010
	Last fix at den site	30 Oct 2010
2011	Wakes up	19 April 2011
4 COYS	Leaves Den area	22 April 2011
	At den site	30 Oct 2011
	Last fix at den site	30 Oct 2011
2012	Wakes up	17 April 2012
2 Yearlings	Leaves Den area	By 21 April 2012
	Dropped Collar	3 May 2012
Bear 2 - Irene		
2009	Captured	15 June 2009
Lone bear	Moves to den area	9 Oct 2009
	Last fix	13 Oct & one on 27 Nov
2010	Wakes up	20 April 2010
3 COYs	Leaves Den area	22 April 2010
	Drops Collar	14 Aug 2010
	Bear & 3 Cubs destroyed	8 Sept 2010
Bear 3 - Nechako		
2010	Captured	16 July 2010
Lone	At her den site and then leaves	25 Sept 2010
	Moves to den site, denned next day.	29 Sept 2010
2011	Wakes up	17 April 2011
4 COYs	Leaves Den area	23 April 2011
	Drops Collar	23 Sept 2011
Bear 4 - KD		
2010	Captured	16 July 2010
Lone	Moves to den area	24 Sept 2010
	Denned.	26-27 Sept 2010
	Last fix	28 Sept 2010
2011	Wakes up	26-April-2011
3 COYs	Drops Collar	17-Sept-2011

Currently, these data are being analyzed to answer additional questions, such as:

- Do urban bears move more during the night than the day?
- When and where do bears cross major roads?

These questions will help to target and prioritize areas for management.

We plan to examine the data to develop landscape level planning recommendations based on the monitoring of bear use of urban green-spaces. Our goal is that the resulting recommendations will be utilized by the City of Prince George and developers, and that this will result in a reduction of the number of "problem" bears killed each year, the number of bears entering urban areas, and human-bear encounters. We believe proactive bear smart management recommendations are urgently required in Prince George to increase public safety and foster an increased appreciation of bears within their natural habitats.

Nechako with her four cubs September 2011
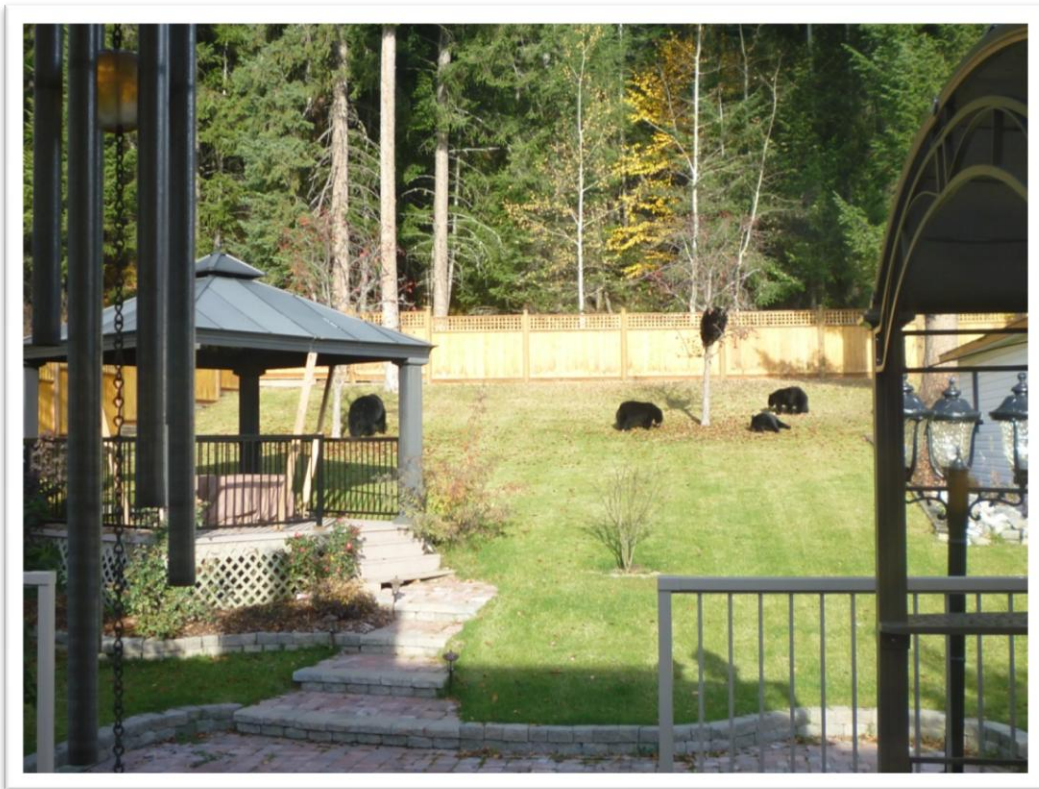
Figure 1. Map of the GPS locations obtained on the 4 Prince George Urban Bear Smart Research Project bears, 2009-2012. GPS collar devices were programmed to take each bear's location every 2 to 3 hours.
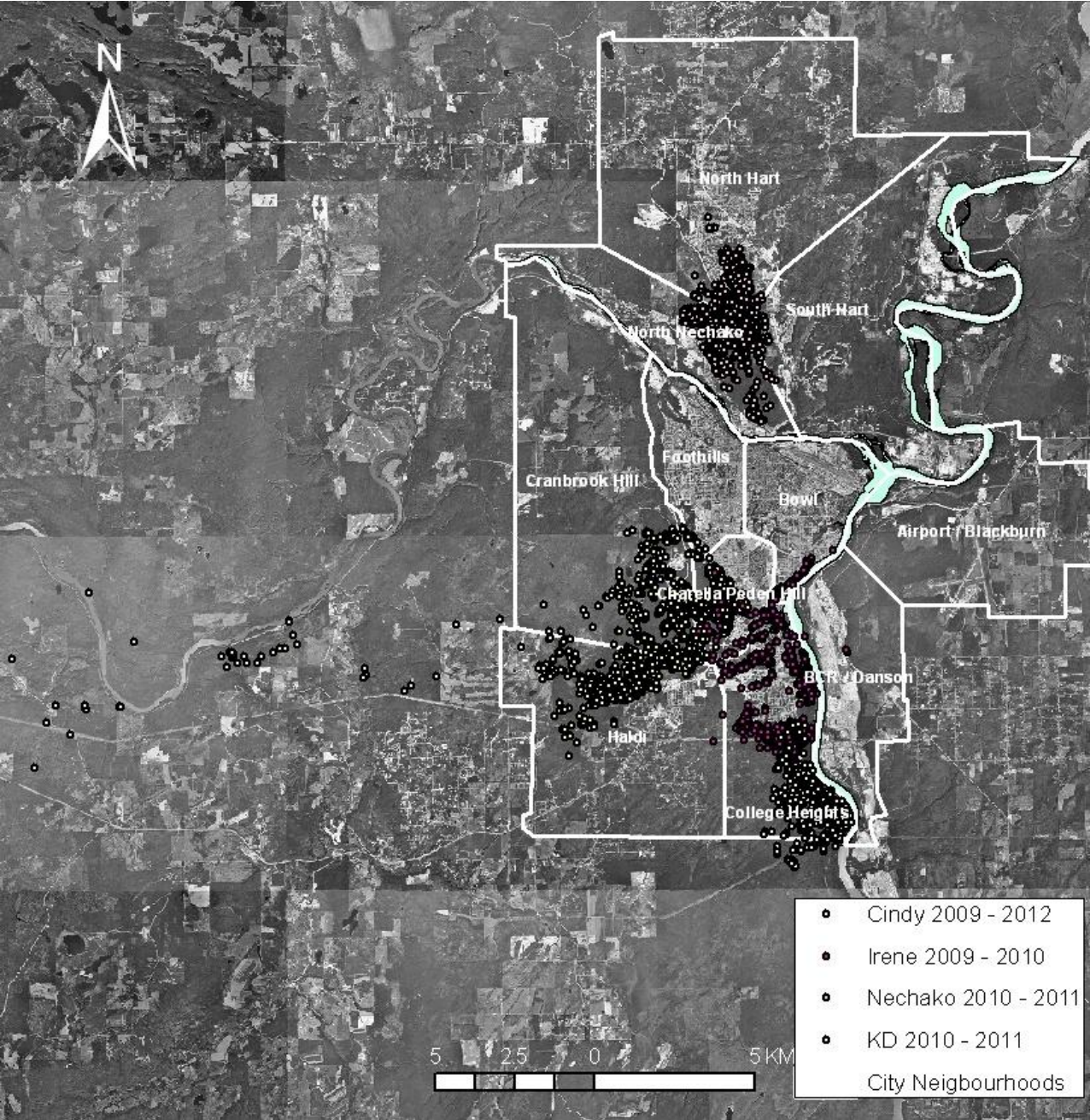
Figure 2. Black Bear Female #1, Cindy's GPS locations, 2009-2012.
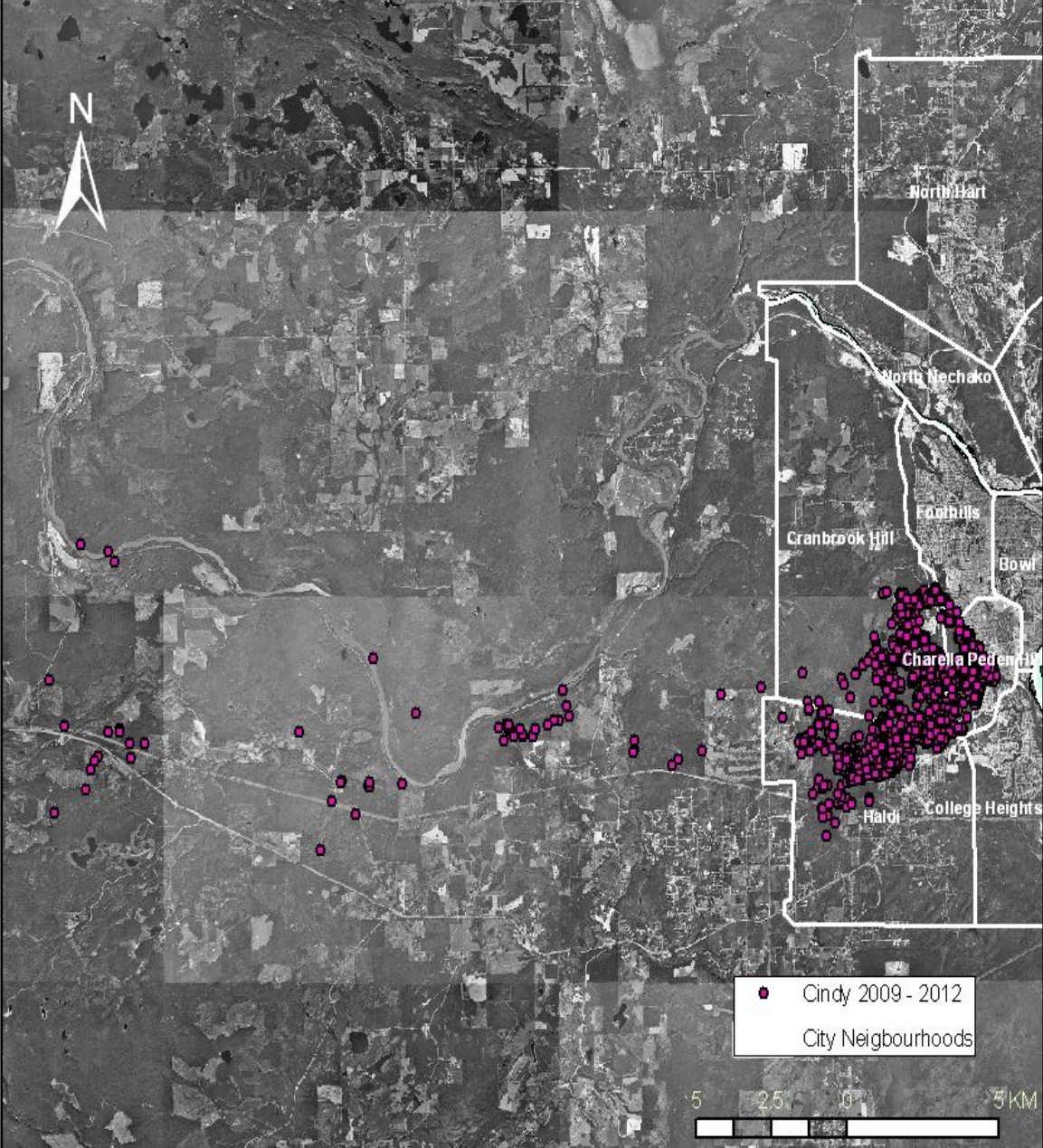
Figure 3. A close-up of the subset of Cindy's GPS locations that occurred with the City limits.
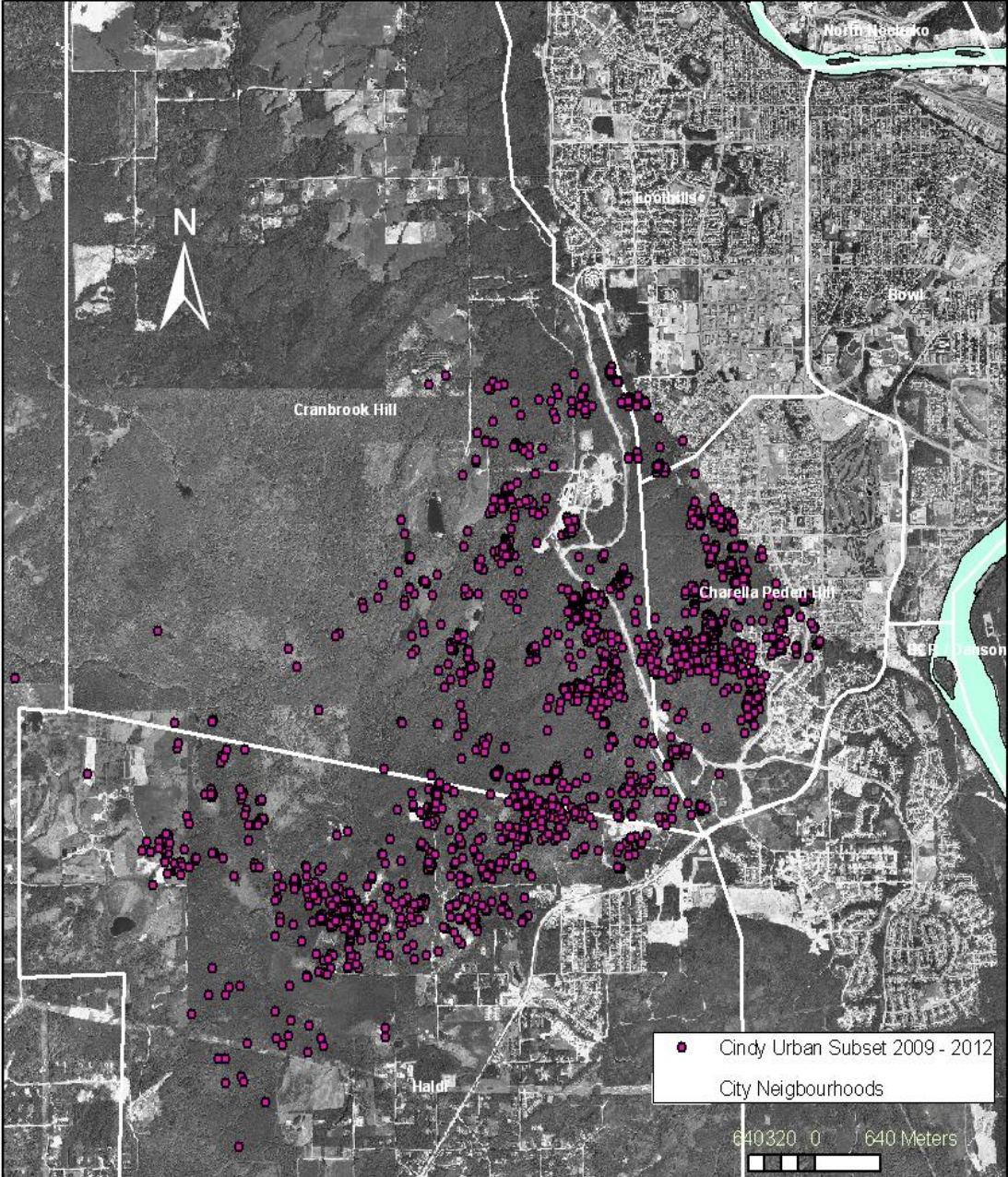
Figure 4. Black Bear Female #2, Irene's GPS locations, 2009-2010. Irene and her three cubs of the year were destroyed while eating apples in a tree in a residential yard along the Fraser River.
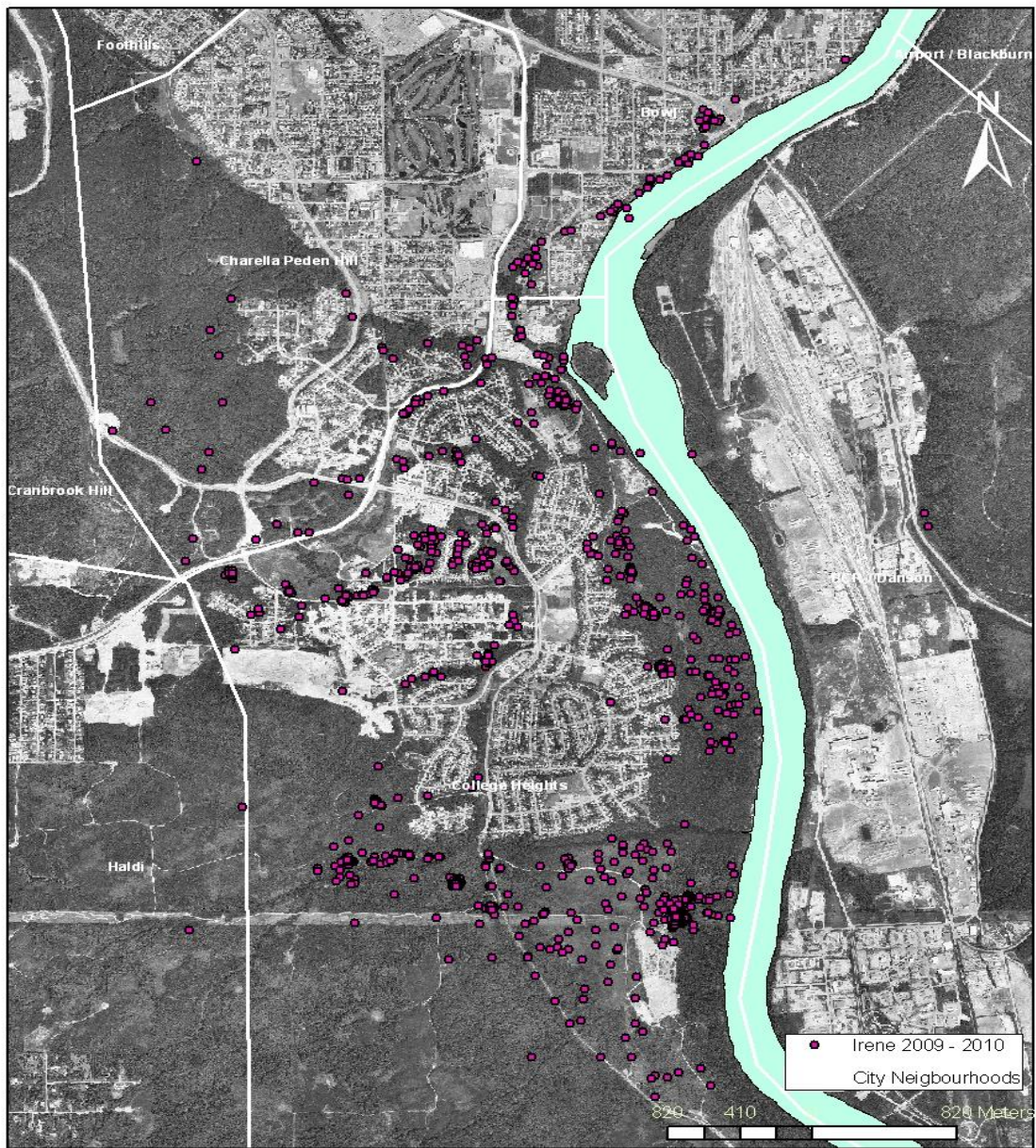
Figure 5. Black Bear Female #3, Nechako's GPS locations, 2010-2011. Although Nechako dropped her collar just weeks before denning in 2011 she continues to be spotted by the public due to her yellow ear tag. She was last reported on the 6 September 2013 with two new cubs of the year!
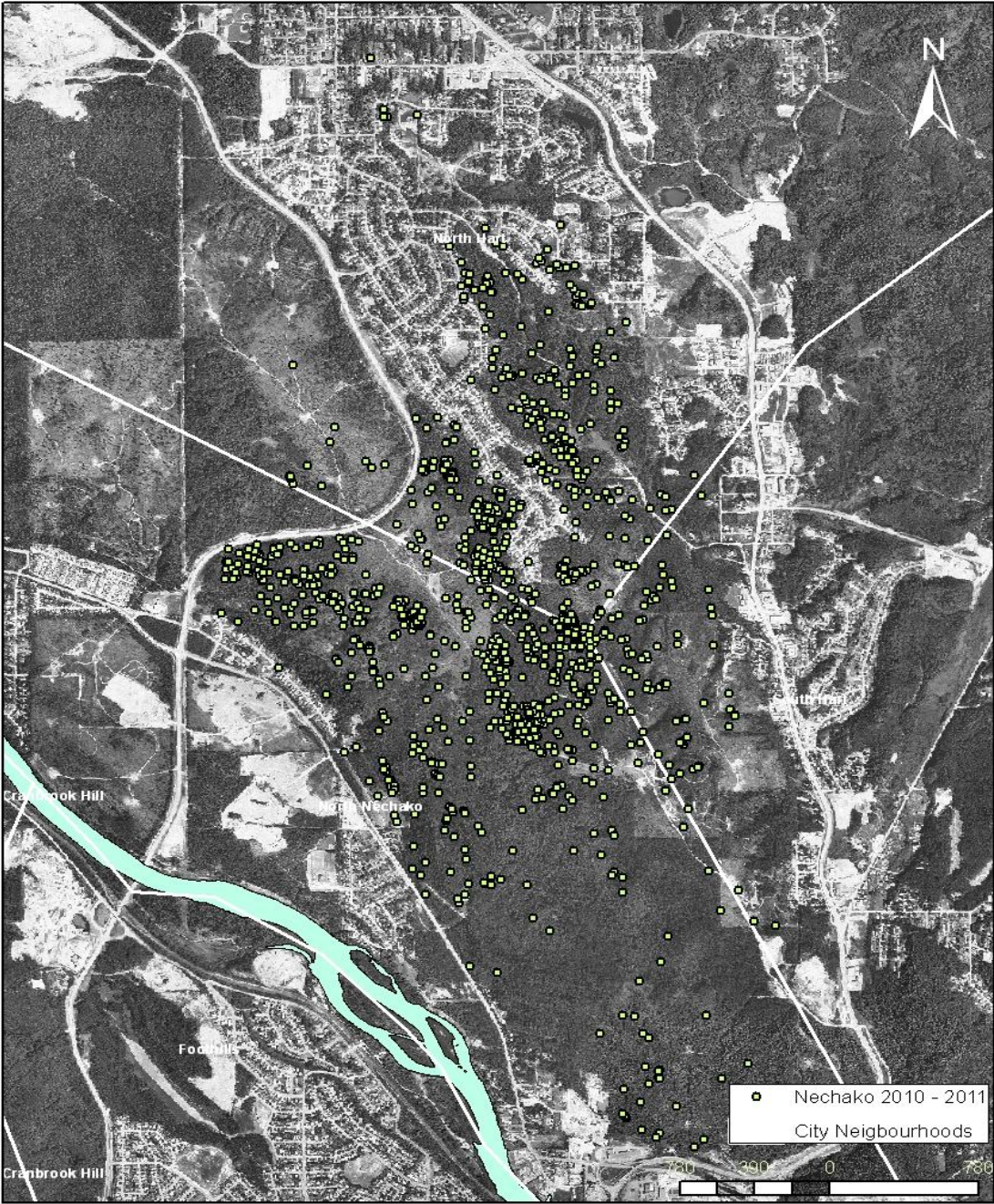
Figure 6. Black Bear Female #4, KD's GPS locations, 2010-2011. KD's locations are interesting because although she was captured very close to the College Heights/Domano developments her locations show that she wants to avoid people! KD and her cubs were sighted by people using the forestry road as a walking trail but she was always reported to actively avoid humans.