Are they listening? Monitoring cottager's compliance in reducing a property's attractiveness to bears in response to a targeted educational campaign

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Keywords: Bear Smart, Manitoba, audits

Introduction

Over the past few years we have witnessed a number of dramatic and tragic events resulting from conflicts between humans and black bears in Manitoba, including one human fatality and numerous bear deaths which reflect trends in human-bear conflict across North America. The reasons behind the apparent increase in conflicts between bears and humans are complex and have been posited to include increasing human encroachment and activity in bear habitat (Beckmann and Berger, 2003), population fluctuations (Peine, 2001), seasonal food shortages (Peine, 2001, Warburton and Maddrey, 1994), habituation (McCullough, 1982, Williams, 2002) and a reduction in population controls (Schull, 1994). In Manitoba, managers attempt to maintain provincial bear populations at or below biological and social carrying capacity in order to reduce the potential for human-bear conflicts (Manitoba Conservation). Among the many factors that contribute to human-bear conflict, one of the most important is the behaviour of people living in bear habitat.

Despite the generally accepted use of education to influence humans to engage in what might be termed *bear smart* behaviour decades (McCullough, 1982, McCarthy and Seavoy, 1994, Peine, 2001), there has been relatively little research to examine its effectiveness. This paper presents results of audits of bear attractants on cottage properties before and after the implementation of a Bear Smart education program.

Audit method

Bear attractant audits were conducted in Pinawa (n=547), Victoria Beach (n=643) and Grand Beach (n=513). In all cases, the audits were conducted both pre- and post survey. Every cottage property in the three communities (n= 1748) was visited twice and all bear attractants visible on the property were identified and recorded. Additionally, a sub sample of Pinawa properties (n= 140) was audited weekly throughout the summer to assess trends. In order to expedite the process and remove the threat of bias by differing observers, counts were made by simple dichotomous counts; that is, attractants were identified only as to whether they were present or not. Fifteen types of attractants, ranging from natural attractants such as wild fruit trees and mast, to human created attractants such as garbage and pet food, were identified and recorded and attractants were aggregated by type and are identified in Table 1 below (Human foods, Natural foods, Visual Attractants, Odor Attractants). As can be seen from the table several of the attractants might fit into one or more categories however, the categorisation used reflects the manner in which the province collects its nuisance bear reports and assesses an attractant on the basis of its primary attraction.

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Table 1. Categories and Types of Bear Attractants Identified on Property

Natural Attractants	Human Food Attractants	Visual Attractants	Odor Attractants
Hard Mast (acorns) Soft Mast ruit	Garbage Food left out Pet food Vegetable Garden Planted Fruit Trees Bird Feeders Compost	Freezers Coolers Fridges	BBQ Fire Barrel/Pit

Results and Discussion

Results of the attractant audits are presented in Table 2. Comparison of audits conducted at the beginning of the cottage season and those conducted at the end show little if any difference between bears attractants at either of the two cottage communities. Pinawa, a residential community, differed significantly in the nature and number of attractants measured. Comparisons of attractants between Grand Beach, which is located inside the Provincial Park, and Victoria Beach, located outside the park (but in the same cottage region) provide a striking contrast, particularly with respect to anthropogenic attractants (human foods, odors and visuals). Independent sample t-tests for all attractant categories (Natural, Human, Odor, Visual, Total of combined attractants) showed significant differences ($p < .001$) between the number of attractants at Grand Beach and Victoria Beach. Of the attractant categories Anthropogenic attractants (human foods, visual and odor) are significantly higher in Victoria Beach than in Grand Beach and can be largely attributed to the improper disposal of refuse. That is, garbage is the single biggest categorical difference between the two communities.

Table 2. Results of Attractant Audits

Victoria Beach n=690			**Grand Beach n=501**		**Pinawa n=547**	
Natural Foods	**June**	**Sept.**	**June**	**Sept.**	**June**	**Sept.**
Mast	390	395	208	208	0	35
Fruit	260	260	117	119	4	1
Total	**650**	**660**	**325**	**327**	**4**	**36**
Human Foods						
Veg. Garden	28	30	0	0	158	140
Garbage	142	96	9	7	125	140
Bird Feeder	82	75	72	75	175	170
Food	3	7	3	1	0	0
Pet food	10	6	1	0	0	0
Planted fruit	19	20	4	4	147	187
Compost	24	25	0	0	43	67
Total	**322**	**259**	**89**	**87**	**648**	**704**
Odor						
B-B-Q	487	455	94	98	369	395
Fire Pit/Barrel	37	38	19	23	206	238
Petro Products	18	15	2	3	26	29
Total	**532**	**508**	**115**	**123**	**601**	**662**
Visual						
Cooler	30	22	6	5	5	6
Freezer	7	7	0	0	6	6
Fridge	27	27	2	2	1	2
Total	**64**	**56**	**8**	**7**	**12**	**14**
Grand Total	**1568**	**1483**	**537**	**544**	**1265**	**1416**

Table 3 displays the weekly attractant audits on a subsample of Pinawa properties. Despite the significant differences between Pinawa and the two cottage communities, what is most evident in this subsample is the seasonal increase in attractants. In addition, this increase occurs during hyperphagia and as such represents a significantly greater risk for contributing to human bear conflicts. In both non-park communities bird feeders represent a significant attractant. According to Manitoba Conservation, bird feeders are the single greatest attractant involved in problem bear encounters suggesting that at least this part of the Bear Smart message is not necessarily resulting in changing behaviors. While beyond the scope of this paper, results of the survey on awareness and attitudes towards bear smart behavior conducted in parallel with this study indicate that there is a small but significant cohort who do not believe that bird feeders are attractants. Therefore it is imperative that the message must be reinforced and that direct management intervention (fines etc) be employed if bear-human conflicts are to be averted.

Table 3. Pinawa weekly partial audits (22.4 % of properties)

	July 3	July 8	July 17	Aug 2	Aug 8	Aug 15	Aug 19	Aug 28
Mast								
Fruit	1							
Vegetable Garden	3	3	9	36	37	54	51	51
Planted Fruit	2	3	12	42	45	56	44	53
Garbage	1	1	6	27	25	37	37	36
Compost	1		4	12	7	13	14	13
Food								
Bird Feeder	2	4	6	40	40	53	50	52
Pet Food								
BBQ	8	9	28	95	102	112	112	112
Cooler		1	2	2	2	1	1	1
Freezer								
Fridge								
Petroleum products	1	1		4	4	12	10	9
Fire Barrel/Fire Pit	4	3	17	43	41	56	55	53
	23	25	84	301	303	395	375	381

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