



**IMPLEMENTATION OF RECOMMENDATIONS FOR MITIGATION OF DISTURBANCE
AND MORTALITY TO GREAT BLUE HERONS
IN BALFOUR BEACH REGIONAL PARK**

Prepared for:

**Cary Gaynor, Regional Parks Manager
Regional District of Central Kootenay
Box 590, 202 Lakeside Drive, Nelson, BC V1L 5R4**

Prepared by:

**Marlene M. Machmer, M.Sc., R.P. Bio,
Pandion Ecological Research Ltd.
532 Park St., Nelson, BC V1L 2G9**

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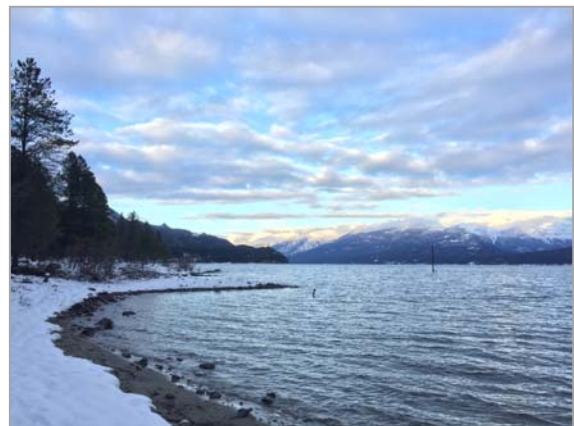
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1.0 BACKGROUND

Inventory and research conducted from 2003 to 2017 on provincially blue-listed Great Blue Herons in the Columbia Basin confirms the importance of Balfour Beach Regional Park (BBRP) as key year-round habitat for this species (review in Machmer 2017). A heronry comprised of 5-10 breeding pairs occupies a mature coniferous stand just west of the park boundary (off Queen's Bay Road; Figure 1) and previous nesting stands have been documented within the park. Herons forage along shorelines, roost in trees and taller shrubs, and perch on instream boulders and pilings within the park boundaries in all seasons. This same riparian habitat is used by a variety of waterfowl, shorebirds, songbirds, amphibians, reptiles and invertebrates, including rare and endangered species (e.g., Tundra Swan, Western and Horned Grebes, Western Toad, Northern Rubber Boa). Aquatic furbearers such as North American River Otter and American Beaver use the park as well. All of the above guilds are potentially sensitive to human disturbance and displacement from their riparian habitat.

As was predicted before the park was established (Machmer 2013), increased use of the beach at BBRP by people and dogs in recent years appears to coincide with up to 50% reduced occupancy and reproductive success at the heronry located just outside the park. These changes also coincided with fuel mitigation treatments completed in December of 2014, which have increased windthrow in the park and adjacent to the heronry, resulting in increased nest tree visibility and reduced breeding habitat suitability.

Furthermore, from September to December of 2017, at least seven dead herons were found along the West Arm of Kootenay Lake in or near parks at Balfour, Harrop, and Kokanee Creek. All were found dead on the ground near popular dog-walking spots, and carcasses showed signs of struggle (e.g., punctures, torn limbs). Concurrent observations of unleashed dogs stalking and attacking herons at BBRP in fall of 2017 (Machmer 2017) support unleashed dogs as a source of heron mortality and displacement from high value habitats. These observations confirm the conflict between accommodating both conservation and recreation values in these small parks park.

The Regional District of Central Kootenay (RDCK) is aware of this conflict and has expressed interest in mitigating aforementioned impacts by implementing the recommendations proposed in this report.

2.0 MANAGEMENT RECOMMENDATIONS

There is a need to improve management of park infrastructure, visitors, dogs and habitat to mitigate impacts of BBRP establishment on heron habitat suitability, use, reproductive success and mortality. Proposed mitigation actions will clearly benefit a diversity of other sensitive wildlife, including waterfowl, shorebirds, amphibians, reptiles, and aquatic furbearers. General management objectives and associated recommendations for BBRP were originally proposed by Machmer (2018) and are summarized below as a framework for developing specific deliverables focusing on interpretive signage, fencing, and habitat enhancement (i.e., vegetation planting, boulder placement).



Figure 1. Balfour Beach Regional Park boundaries and foreshore, showing the active heronry, as well as a previous heron breeding site abandoned in recent years post-fuel mitigation.

2.1 General Objectives and Recommendations

1 – Reduce direct interaction between herons and people and/or dogs.

- Either exclude dogs from BBRP and direct dogs and their owners to areas outside the park (at the public boat launch and to the south), for instance.
- If this is not feasible, limit dog use to leashed dogs only in all seasons.
- Restrict dog use of the park to the forested trail area away from the foreshore in all seasons, and encourage human use of that trail, to the extent possible.
- Erect signage at park boundaries and along the trail specifying that all dogs must be on the trail, leashed, and under control at all times and in all seasons.
- This guidelines must be coupled with periodic enforcement to improve compliance and effectiveness.

2 – Create a physical barrier between areas used by herons and those used by people and dogs.

- Consider erecting low height fencing along the trail edge to further deter dogs and people from encroaching away from the trail and through the forest onto shoreline and foreshore areas.

3 – Increase visual screening between areas used by people and dogs and those used by herons.

- Plant deciduous trees and shrubs along the foreshore to increase the buffer between the forested trail and open areas. Use flood and drought-tolerant hardy native tree and shrub species. These tree/shrub plantings will not only increase visual screening, but will also provide roosting/perching substrate for herons and improve habitat suitability for a range of species, without significantly increasing the fire hazard.
- Note that such plantings could actually be detrimental if unleashed dogs and can benefit from vegetative screening to approach herons at closer range, thereby increasing mortality risk. Hence dogs must be leashed even once plantings are fully established.

4 – Restore shallow water foraging/loafing habitat for waterfowl and shorebirds. Some large boulders (≥ 0.75 m in diameter) have been moved from the foreshore and piled onto the shore at the north end of the park (presumably to improve shoreline accessibility for motor boats). These provide valuable loafing and foraging habitat “islands” which are physically buffered from people and dogs. They provide a safe alternative to existing shorelines during busy periods, hence they should be replaced in water to restore habitat suitability. Similarly, shoreline homeowners have cleared cobble and boulders from the foreshore adjacent to their properties in order to create open sandy beaches. Rocky substrates help trap and hold soil in place and anchor shoreline vegetation; removal of these anchors has altered the natural shoreline and reduced habitat suitability, while attracting more people to use these cleared sandy areas. To restore valuable habitat attributes for wildlife:

- Replace piled boulders (≥ 0.75 m in diameter) into shallow water (<0.75 m deep) along the park foreshore to restore the instream loafing habitat and also to deter motor boats from approaching park shorelines.

- If possible, also replace selected boulders and cobble in sandy areas devoid of rocky substrate (from those areas alongside where they have been piled). It may be very difficult to achieve this if adjacent landowners are not on side. At a base minimum, it is important to not permit any further removal of rock or woody debris substrates.

5 – Provide information to park users regarding impacts of their activities on herons and other sensitive wildlife, in an effort to promote greater awareness, sensitivity and ultimately compliance.

- Erect interpretive signage explaining why human and dog disturbance causes stress and displacement to sensitive wildlife, using listed herons as an example.

6 – Maintain habitat connectivity and undisturbed mature forest interior habitat conditions in and adjacent to the heron breeding and feeding areas, while minimizing the potential for blowdown.

- Work with relevant agencies (i.e., FWCP, KLCF, KLSP, NCC, Nature Trust) to maintain forested habitat and prioritize acquisition of a property (currently for sale) adjacent to the heron breeding area and BBRP.

To address aforementioned general recommendations, RDCK requested the development of the following specific deliverables:

1. A signage schedule with wording and design as well as identification of installation points, in order to improve public awareness of (a) park wildlife and habitat values, (b) people and dog impacts on natural values, and (c) park rules and regulations to protect these values. It is hoped that this signage will encourage greater awareness and compliance with park regulations);
2. A planting and fencing design to provide improved physical barriers in areas used by herons and other sensitive wildlife.

3.0 DELIVERABLES

3.1 Signage Design Recommendations

A total of four colour panels (Figures 1-4) are proposed for installation at the main entrance to the park (from Meadow Street adjacent to the public boat launch and parking area).

These four panels could be mounted directly onto an unsightly chain link fence (see photo 1), which currently separates the Balfour Community Water System Intake from BBRP (UTMs: 503879 E and 5497305 N). This would improve aesthetics and take advantage of existing infrastructure to keep installation costs down. Alternatively, a separate interpretive kiosk structure could be built on which to mount the panels at a higher cost. The panels are formatted in 8.5 x 12 landscape format and could be reproduced in any size to properly fit the existing fence (using the same aspect ratio). The intended objectives of these four panels are briefly summarized below:

Panel 1. Welcomes visitors and introduces them to the park, its habitats and guilds of dependent wildlife year-round. Note that the inset map provided by RDCK will require some minor modifications for this specific purpose.

Panel 2. Focuses on the important ecological linkage between upland breeding habitat and park riparian habitat, using herons as an example.

Panel 3. Focuses on riparian habitat, its importance for feeding, and how disturbance (by people and dogs) is linked to poor breeding success and mortality, using herons as an example.

Panel 4. Focuses on the impacts of disturbance to sensitive wildlife, using herons as an example. It provides explicit guidance for use of the park, in order to mitigate these impacts.

Additional signage (Panel 4 only) is needed at both the south (UTMs: 503891 E and 5497358 N; photo 2) and north (UTMs: 503569 E and 5497779 N; photo 3) access points to the forested trail. The latter signage is intended to remind people of the need to keep dogs leashed and under control at all times. Installation of two wooden or metal posts would be required to support Panel 4 at these trail access point locations.



Photos 1-3 (upper, middle, lower, respectively): Proposed locations for signage installation. Photo 4 (lower right): Standard “no dogs” signage.



To further reinforce the need for dogs to use the trail exclusively rather than the shoreline, standard “no dogs” allowed signs (Photo 4, right) should be placed at the following two locations on the south (UTMs: 503893 E and 5497361 N) and north (UTMs: 503587 E and 5497782 N) ends of the trail, closer to the shoreline. Piling large CWD at these same locations to essentially block easy access to the shoreline may further promote trail use. Installation of 4 additional “no dog” signs along the shoreline are recommended to alert visitors approaching from water or private upland properties. Table 1 summarizes proposed signage point locations and installation comments. These locations are also mapped in Figure 5.

Photo: M. Machmer

Welcome to Balfour Beach Regional Park

- This park supports many habitats, including upland and riparian forests, shrubland, sand and cobble shorelines, and shallow open water.
- These habitats are important year-round for wildlife (e.g., waterfowl, shorebirds, mammals, amphibians, reptiles and invertebrates).



Figure 1. Panel 1

Upland Breeding Habitat

- Beside this park, several pairs of provincially listed Great Blue Herons nest annually in mature forest. They fly from their nests to the park to feed many times a day.
- Numbers of active and successful nests have declined up to 50% in recent years, due to disturbance at breeding and feeding sites.



Figure 2. Panel 2

Riparian Feeding Habitat

- Herons can be seen in the park year-round perched on trees and tall shrubs, or standing on the waterfront.
- Herons feed along shorelines (for fish, invertebrates, and small vertebrates) where they are vulnerable to disturbance.
- Repeated disturbance impairs feeding and is linked to poor nesting success and mortality.



Impacts of Disturbance

- Disturbance by people and dogs causes wildlife mortality
- Heron mortality is increasing in this park and on Kootenay Lake shorelines

Help Protect Wildlife:

- Please limit dog use to the forested trail away from shorelines
- Keep dogs on a leash and in control at all times in all seasons

Figure 4. Panel 4

Table 1. Summary of recommended signage location points and installation comments.

POINT	UTM LOCATION		DESCRIPTION	INSTALLATION COMMENTS
A	503879 E	5497305 N	Panels 1-4	Install on fence or on separate structure
B	503891 E	5497358 N	Panel 4 only	Mount on poles at south end of trail access
C	503569 E	5497779 N	Panel 4 only	Mount on poles at north end of trail access
D	503893 E	5497361 N	No dogs sign	Mount on pole on south side of shoreline
E	503587 E	5497782 N	No dogs sign	Mount on pole on north side of shoreline



Figure 5. Point locations (from GPS in field) recommended for installation of signage (yellow), fencing (blue), vegetation plantings (green), and invasive weed treatment (red).

3.2 Fencing Design Recommendations

Fence installation along the eastern boundary of the trail is considered a high priority to achieve compliance on use of the trail by dogs. Traditional cedar split rail fencing would be a good choice and there are several designs (<http://www.sawmillsales.ca/2017/05/17/cedar-split-rail-fence-designs/>) to choose from, depending on objectives, cost, aesthetics and maintenance requirements. They differ in style, height, number of rails, and spacing of posts, and some even have wire mesh between rails to restrict animal passage (photo 5). A continuous low height (≥ 2 feet) split rail fence with at least two rails is considered adequate to meet the objectives. Table 2 provides a summary of selected fence GPS-location points referenced in the field and these are mapped in Figure 5.

Table 2. Summary of selected fence location points and description/comments.

POINT	UTM LOCATIONS		DESCRIPTION/COMMENTS
1	503868 E	5497360 N	Start of fence
2	503867 E	5497401 N	Junction with upland trail; opening not recommended
3	503872 E	5497426 N	Junction with stairway; opening not recommended
4	503870 E	5497452 N	
5	503878 E	5497482 N	
6	503877 E	5497521 N	
7	503872 E	5497541 N	Junction with sand beach; opening not recommended
8	503863 E	5497571 N	
9	503851 E	5497598 N	Junction with stairway; opening not recommended
10	503822 E	5497623 N	
11	503801 E	5497645 N	
12	503790 E	5497657 N	
13	503770 E	5497675 N	
14	503743 E	5497695 N	
15	503724 E	5497705 N	
16	503691 E	5497732 N	
17	503672 E	5497727 N	
18	503632 E	5497725 N	
19	503599 E	5497751 N	
20	503569 E	5497729 N	
21	503568 E	5497768 N	End of fence

There are selected trail junctions with upland access points (i.e., trails and/or stairways originating from adjacent private land). To discourage further establishment of passage ways from the existing forested trail into shoreline areas, fence openings at these junctions are not recommended. Instead, the fence should be low enough to permit adjacent land owners to climb over and to lift their watercrafts over the fence. Note that currently, many canoes and kayaks are stored on park property, and this practice should be actively discouraged.

3.3 Planting Design Recommendations

Planting patches of deciduous vegetation will not measurably increase the wildfire risk, but once established, plantings will fill in more exposed areas between the forest and shoreline transition zone opened up by human activity. Infill planting of native vegetation may also deter the public from walking along the shoreline and reduce the potential for invasive weed establishment and/or encroachment, while buffering visual and/or acoustic disturbance to wildlife using open shoreline areas. Depending on what is established, vegetation can also provide perching, nesting and cover substrates, thereby enhancing habitat for some species.



Photo 5 (left): Tapered edge of deciduous trees and shrubs separating conifer-dominated forest from rocky shoreline.

Photo 6 (right): Clumps of taller willow used for perching in patchy distribution.

Photo 7 (lower left): Thinned understory of conifer-dominated forest with deciduous regenerating shrubs visible toward shoreline.

Conversely, plantings can have negative impacts if unleashed dogs use new vegetative screening to approach and attack wildlife on shorelines from closer range, thereby increasing the mortality risk. Planting must therefore be accompanied by an ongoing commitment to enforce dog leash and trail regulations. If not, then shoreline wildlife need to see approaching non-compliant dogs from a distance.

If the decision is made to proceed with plantings, they should be “tapered in” from conifer-dominated forest edges towards open rocky shoreline habitat and “patchy” in distribution (emulating how they grow naturally (see photos 5, 6 and 7). Only flood and drought-tolerant hardy native tree (e.g., black cottonwood, paper birch, black hawthorn, Douglas maple, mountain ash and red alder) and shrub species (e.g., Sitka, Scouler’s, Bebb’s and/or Tea-leaved willows, red-osier dogwood) should be used. Table 3 provides site-specific recommendations for infill planting, CWD placement and invasive weed control. Locations are also mapped in Figure 5.

Table 3. Summary of recommendations for fill-planting, CWD placement and invasive weed control treatment.

POINT	UTM LOCATION		MANAGEMENT OBJECTIVE AND COMMENTS
22	0503757 E	5497717 N	Plant 10 m clump of black cottonwood, with mixed red-osier dogwood, willow spp., black hawthorn
23	0503780 E	5497702 N	Plant 3 m clump of mixed willow spp., red-osier dogwood
24	0503789 E	5497691 N	Plant 3 m clump of mixed willow spp., red-osier dogwood
25	0503835 E	5497650 N	Plant 3 m clump of black hawthorn
26	0503844 E	5497639 N	Same as above
27	0503845 E	5497625 N	Plant 10 m clump of mixed black hawthorn, paper black cottonwood, willow spp., red-osier dogwood
28	0503876 E	5497586 N	Plant 5 m clump of mixed willow spp., red-osier dogwood
29	0503903 E	5497525 N	Plant 10 m clump of cottonwood, red-osier dogwood, willow spp., black hawthorn
30	0503905 E	5497509 N	Same as above
31	0503915 E	5497498 N	Same as above
32	0503917 E	5497484 N	Same as above
33	0503909 E	5497460 N	Same as above
34	0503910 E	5497447 N	Same as above
35	0503906 E	5497429 N	Plant 3 m clump of willow spp., black hawthorn and red-osier dogwood
36	0503894 E	5497383 N	Plant 5 m clump of paper birch, willow spp., and red-osier dogwood
37	0503893 E	5497361 N	Plant 2 m clump of willow spp., and red-osier dogwood; also re-distribute and pile additional CWD at this location, as needed, to deter access to the shoreline (a good donor site is located at 503777 E; 5497684 N
38	503857 E	5497382 N	Conduct pulling and herbicide treatment to address relatively small patch of scotch broom along trail and in adjacent upland; the infestation comes from the adjacent private property, which should be treated as well.
39	503896 E	5497331 N	Conduct pulling to eradicate small invasive Himalayan blackberry infestation along park shoreline

Successful re-establishment of vegetation in these locations will require very frequent watering over two or more growing seasons, as well as the use of browse protectors (to guard against chewing by American beavers, ungulates, snowshoe hare and other herbivores whose tracks and sign were confirmed during field visits).

3.4 Other Management Recommendations

Relative small patches of invasive Scotch broom and Himalayan blackberry were confirmed during field visits in fall 2018. These should be eradicated quickly, while this is still possible, and before the plants spread along this well-used trail. See Figure 5 and Table 3 for specific locations and treatment recommendations, respectively.

There remain a few unburnt piles of woody debris adjacent to the forested trail that should either be burnt or re-distributed to reduce fire hazard and improve aesthetics. At this stage, it may make sense to more evenly re-distribute residual CWD piles (from the denser north end) along the entire trail, which would also deter dog passage from the trail through the forest and onto open shoreline areas. One large CWD donor area is located at: 503777 Easting; 5497684 Northing.

Although specific locations were not designated for boulder replacement, it is important that some of the large boulders (≥ 0.75 m in diameter) currently piled along the north boundary of the shoreline (photo 8, right) be replaced into shallow water (<0.75 m deep) habitat along the park foreshore to restore the instream loafing habitat. This would also deter disruptive motor boats from approaching park shorelines. It may be difficult to achieve this where the adjacent landowners are not on side, so greater emphasis may be placed on the northern half of the park.



4.0 LITERATURE CITED

Machmer, M.M. 2013. Management recommendations for a great blue heron breeding site near Balfour, BC. Report prepared for Fish & Wildlife Compensation Program, Nelson, BC and John Cathro Consulting Ltd., Kaslo, BC. 11pp.

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