

Post Point Heron Colony

Management Plan 2003

prepared for:

The City of Bellingham
Department of Public Works
Bellingham, WA

prepared by:

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INTRODUCTION

The Post Point Great Blue Heron Colony is the only known heron nesting site in the City of Bellingham. The colony is located near the marine shoreline in south Bellingham, on city property adjacent to the Bellingham wastewater treatment plant. The colony is relatively new and currently supports ten active nests. The colony, due to its uniqueness and location, has been the subject of concern by the citizens and the City of Bellingham. As a result of concerns related to the heron's protection and site management, the City of Bellingham, Public Works Department has requested a management plan to guide the long term stewardship and protection of the site and the heron colony.

The following plan has been prepared to guide management and stewardship of the Post Point Great Blue Heron Colony. The plan includes a regulatory review, background information, site description, protection guidelines and graphic mapping to illustrate the colony location and related management areas. In addition, recommendations are listed for habitat restoration, monitoring and public education.

PURPOSE

The purpose of the Post Point Heron Colony Management Plan is to define the conservation needs and management requirements necessary to sustain and perpetuate the great blue heron's successful reproduction and use of the Post Point Colony and associated habitat. As the only heron colony within the City of Bellingham, the protection and proper management of the site is essential for the long term viability and stewardship of the Post Point Colony.

The Post Point management plan consists of nine primary components:

- Regulatory review
- Site description, delineation and landuse
- Site history and chronology
- Habitat protection
- Habitat restoration and enhancement
- Disturbance reduction
- Site security
- Monitoring
- Public education and involvement

The management and conservation of any wildlife area is founded on three key bodies of information: regulatory guidelines, existing literature and site specific information (empirical data). Management plans for great blue herons typically include: delineation of the colony, habitat protection through the application of buffers, reduction of disturbances with the definition of timing restrictions and allowed activities, habitat restoration (if needed), protection of foraging habitat, monitoring of the site and public education. With these complementary components, the management plan will provide the conservation and stewardship function necessary for the long term perpetuation and viability of this living treasure.

Each of the above component sections of the management plan will be composed of background information, applicable site information and recommendations. At the end of the report, a summary of recommendations will provide a bulleted list of guidelines for the City of Bellingham to implement.

It is the intent of the recommendations within this plan to provide directives to maximize the habitat benefits and ensure the long term conservation of target wildlife species and their supporting habitat. Although, recommendations may identify areas of private property, it is not the intent to take, infringe or limit the use of that property.

REGULATORY REVIEW

Regulatory guidance for the protection of great blue herons is provided through federal, state and local laws, legislation and landuse guidelines. Although herons are a prominent species and a vulnerable species due to their coloniality, their protection, particularly of their nest sites, is dependant on a combination of regulatory factors.

Federal Regulation

Great blue herons are not protected under the federal Endangered Species Act; however, other federal regulations apply to herons. Historically, herons and their allies were hunted for their plumes, in some cases to near extinction. By the 1880's all states had enacted wildlife laws; however only a few protected colonial waterbirds. Eventually federal law, the Lacy Act (1900) was promulgated for the purpose of controlling interstate commerce of wildlife including birds, bird parts, eggs and feathers. The subsequent Migratory Bird Treaty Act of 1913, further protected species which migrate across international boundaries, including herons, and prohibits the "hunt, take, capture, kill or possession of any bird (or its parts, nest, or egg) protected under the 1916 Convention with Great Britain for the Protection of Migratory Birds (Bean, 1983).

In short, the Act prohibits the "taking" (capturing, killing, or collecting) of any bird, its nest or eggs. The Migratory Bird Treaty Act is the most commonly cited federal wildlife law and the easiest to enforce according to the USFWS enforcement personnel. Cases originating in Whatcom County have been tried recently as the 1980's.

Provisions in the Migratory Bird Treaty Act and subsequent federal laws permit certain activities (hunting) or the possession of eggs or parts for scientific or educational purposes only. Permitting guidelines for the hunting, take, possession, or exportation of migratory birds are described in Title 50, code of Federal Regulations, Part 21-Migratory Bird Permits. The lead agency for all federal wildlife permits and enforcement is the U.S. Fish and Wildlife Service. Currently, a federal permit from the U.S. Fish and Wildlife Service is required by anyone anytime they intend to destroy eggs or nests; or capture, relocate, disturb or kill great blue herons for damage control. Such a permit may be granted only when extreme damage is occurring and only after all other non-lethal control techniques have proven to be unsuccessful.

The National Environmental Protection Act (NEPA) is a federal directive instrument for reviewing, measuring and commenting on federally led projects that may have an affect on the environment. It is unlikely that a project related to the heronry would require implementation of NEPA.

Although many living birds benefit from federal wildlife laws, they provide little protection for nesting areas or habitat. The Endangered Species Act of 1973 is the only federal law that governs wildlife habitat at a species specific level. Because great blue herons are currently not an endangered species or a designated species of concern, the Endangered Species Act does not apply. For further questions or regulatory advice regarding federal wildlife protection contact the U.S. Fish and Wildlife Service Enforcement Office in Bellingham, located at 104 W. Magnolia, RM 212, Bellingham, WA.

State Regulation

In Washington State, great blue herons are classified as protected wildlife under WAC 232-12-014 (3). Eggs and nests are protected from unlawful taking under RCW 77.15.130, Section 14.; this law also offers protection of nests when they are unoccupied outside of the nesting season and for five years following abandonment in the event that they may be recolonized. Great blue herons are designated as a State Priority Species and their breeding habitat is considered a Priority Habitat. As a Priority Species, the Washington Department of Fish and Wildlife reviews and offers management directives for actions that may directly affect herons and their habitat. The Washington Department of Fish and Wildlife offers Priority Habitats and Species Management Guidelines specific to herons, to guide the protection of heron-sensitive sites.

The State's management guidelines consist of seven *key points:

- 1) Wherever possible, a habitat protection buffer at least 300 m (984 ft) wide should be established around the periphery of a colony. All human activities likely to cause colony abandonment should be restricted in this buffer year-round, and all human activities likely to cause disturbance to nesting great blue herons should be restricted in this buffer area from 15 February to 31 July.
- 2) Site specific management plans should be developed for each great blue heron colony whenever activities that might affect that colony are proposed. Such plans should consider the following:
 - The colony's size, location, relative isolation, and degree of habituation to disturbance;
 - Topographic or vegetative features surrounding the colony that might ameliorate the effect of human disturbance;
 - The availability of foraging areas and their proximity to the colony site;
 - Proximity of forest lands that could be used as alternative colony sites;
 - Land-use patterns and potential for long-term availability of nesting and foraging habitat.
- 3) Stands of large trees at least 17 m (56 ft) high and at least 4 ha (10 ac) in size that can be buffered from disturbance should be left in the vicinity of great blue heron breeding colonies as alternative nesting habitat.
- 4) Foraging areas, especially wetlands, within a minimum radius of 4 km (2.5 mi) of colonies should be protected from development and should have a surrounding disturbance free buffer zone of at least 100 m (328 ft).
- 5) Attempts should be made to keep all pesticides out of great blue heron foraging and nesting habitat, and associated buffer zones. Refer to [Appendix A](#) for contacts useful when assessing pesticides, herbicides, and their alternatives.
- 6) Activities such as logging or construction should not occur within 1,000 m (3,281 ft) of a colony, and no aircraft should fly within a vertical distance of 650 m (2,133 ft) during the nesting season.
- 7) Alternative forested stands at least 4 ha (10 ac) in size with dominant trees at least 17 m (56 ft) in height should be left in the vicinity of existing great blue heron breeding colonies.

*These seven key points have been considered and incorporated into the management plan or adapted to the site to the greatest extent possible. Given the proximity of the colony to urban activity and constraints in existing habitat, the buffers in particular are restricted.

Because of the unique nature of each heron colony, consultation with experienced biologists specializing in heron biology and management is crucial. Priority Habitats and Species Management Recommendations for great blue heron are attached to this report. For further questions or management advice contact the Washington Department of Fish and Wildlife Region 4 office at 16018 Mill Creek Blvd. Mill Creek, WA 98012, phone: 425-775-1311 or visit the WDFW website: <http://www.wa.gov/wdfw>.

Further great blue heron habitat protection in Washington State is offered through the State Environmental Policy Act (SEPA) of 1972. The SEPA checklist, filed for development and road projects, includes the identification of wildlife in the project area and potentially impacted by the project. Species recognized by both the Federal and State laws are required to be addressed in the SEPA review. As a State priority species, the great blue heron, if present needs to be reviewed for potential impacts. Unfortunately, the lack of a field inventory requirement in SEPA results in erroneous reporting, many times missing entire heron colonies, bald eagle nests and other very sensitive sites. Following SEPA review, projects identified with the potential for major impacts to the environment or community must prepare an Environmental Impact Statement.

In 1990 the Washington State Legislature passed the Washington Growth Management Act. The Growth Management Act (SHB 2929) was enacted to ensure controlled growth in Washington's fast growing cities and counties through the adoption of local comprehensive land use plans and development regulations.

To preserve the natural environment, the Act defines environmentally critical areas with the provision that jurisdictions classify, designate and protect them. Critical areas include: wetlands, fish and wildlife habitat conservation areas. The designation of fish and wildlife habitat conservation areas require land management for maintaining species in a wild state in suitable habitats within their natural geographic distribution so that isolated subpopulations are not created.

Pertinent GMA minimum guidelines and general requirements defining critical habitats under WAC 365-190-030.

Habitats of local importance include, a seasonal range or habitat element with which a given species has a primary association, and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long-term. These might include areas of high relative density or species richness, breeding habitat, winter range and movement corridors. These might also include habitats that are of limited availability or high vulnerability to alteration, such as cliffs, talus and wetlands.

Species of local importance are those species that are of local concern due to their population status or their sensitivity to habitat manipulation....

Given that the great blue heron is a native species of prominence in the community and harbors only one location for breeding within the City, it is reasonable to consider the heron as a species of local importance and protect its nesting habitat appropriately.

Local Regulation

The City of Bellingham currently regulates critical areas through provisions under the Bellingham Municipal Code. The regulatory provisions are independent sections including the Shoreline Master Program and Wetland and Stream Ordinances. These three ordinances provide the protection of important and protected species and habitats within shorelines, wetland and stream regulated areas. The City does not have a critical area ordinance specific to wildlife or a wildlife program to direct the conservation of wildlife and/or promote habitat stewardship. However, wildlife habitats have been acquired and protected through parks and open space programs.

STATUS OF THE GREAT BLUE HERON

The following status of the great blue heron is extracted from two documents by Ann Eissinger, the *Birds of Washington: great blue heron species account* (2001) and *Hérons of the Salish Sea: a model for the conservation and stewardship of coastal heron colonies* (1996).

The great blue heron (Ardea herodias fannini) is a relatively common species ranging throughout North America. The herons of the Salish Sea (Puget Sound, Georgia Strait and the Strait of Juan de Fuca) are a resident population reliant on a variety of local habitats to support their needs throughout the year. These habitats include freshwater systems, marine shoreline and intertidal (particularly eelgrass), fallow fields and grassy margins and near-shore forests. All of these areas play an important role in providing habitat and prey necessary for maintaining heron populations.

The rich ecosystem of the Salish Sea supports one of the largest concentrations of great blue heron in North America. Herons thrive in the region given the generous shoreline, intertidal, wetland and upland habitats, coupled with abundant food resources and temperate climate. However, intense human development of the lowlands over the past several decades, has removed or marginalized heron breeding habitat and displaced colonies. As recently as 1999, massive abandonment affected approximately 40 percent of the regional breeding population. Degradation of foraging areas, filling of wetlands and loss of eelgrass meadows throughout Puget Sound is likely effecting the great blue heron's reproduction in the region. In addition, the growth of the bald eagle population is resulting in increased predation of heron eggs and young during the nesting season. With the loss of habitat, reduction of productivity and increase in bald eagle predation, the regional great blue heron population is at risk.

As colonial nesting birds, great blue herons usually nest in groups from six nests to over one hundred. Due to the habitat availability, mega-colonies supporting from 100-400 nesting pairs occur in Whatcom and Skagit Counties. Herons nest in trees, with one or more nests per tree situated in relatively undisturbed forests and buffered from human activity. These sites are located near productive food resources, usually in close proximity to marine shorelines and eelgrass meadows as well as wetlands, lakes, rivers and upland fields.

The current breeding population of northwestern great blue herons was estimated at 4,000 pairs (Butler 1996) with the greater percentage of this total concentrated within Puget Sound and Georgia Strait. Available numerical heron data for Washington State is deficient and inconsistent. Historical data is limited. Based on a review of 342 colony records from the WDFW data base (2001) a breeding population estimate of 6,300 pairs or 12,300 individuals was extrapolated from the most recent number of nests or nesting pairs recorded at each active colony between 1990 and 2001. This is a generous estimate given that much of the data is dated and data collection methods vary. Within each region of the state, the greatest breeding concentration occurs within the Puget Sound/Georgia Strait with 3027 nesting pairs in 114 colonies, followed by the upper Columbia River/Eastern Washington with 1,588 pairs in 78 colonies, the lower Columbia with 1,340 pairs in 26 colonies and the Olympic Peninsula/West Coast with 348 in 22 colonies. Although only the most recent data was used, 105 colonies listed had not been surveyed in the past five years and at least 28 had become inactive or abandoned within the eleven year period. The most notable abandonments were due to logging, two colonies were shot and the largest colony in the south sound was completely destroyed (and others were damaged) in the 1996 ice storm. In 1999 significant abandonment was reported throughout Northwest Washington including the largest colony at the time, Birch Bay with 440 nests. Fortunately many colonies reestablished the following year (2000). In review of colony counts annually, 1991 resulted in greatest survey effort state-wide with 110 active colonies recorded and a total 3,230 pairs or 6,460 individuals counted.

Colony size ranges from one nest to a documented high of 474 Nests at Point Roberts (1992). Historical data on colony sizes are scarce. Currently the ten largest colonies are concentrated in three specific areas: northern Puget sound/southern Georgia Strait, the lower Columbia River islands near Vancouver and the Potholes in eastern Washington. Based on the numbers available, these mega-colonies represent approximately 50% of the breeding population statewide. These concentrations are important because, fledging success is greater in larger colonies (Butler et al. 1995) and it is surmised that the influx of new herons to, and the dispersal of young from these sites contributes significantly to the genetic diversity and health of the regional population (DesGranges 1988). The concentrated breeding centers create a high level of localized sensitivity and vulnerability, and if left unprotected potentially places regional populations at risk.

Currently, Post Point is the only known active heron colony within the City of Bellingham and was identified in 2000. Another colony located west of the Chuckanut Gallery and Chuckanut Drive was active for several years and was known as the Chuckanut Bay colony. In 1999 monitoring of the Chuckanut colony revealed a minimum of seven active nests. The construction of the first house in the Blue Heron Estates development, located directly below the nesting colony, resulted in disturbance during construction. The colony also was targeted by bald eagles. Subsequently, the colony abandoned in June 1999. It is probable that the herons from the abandoned Chuckanut colony relocated to Post Point.

SITE DESCRIPTION, DELINEATION AND LANDUSE

The Post Point great blue heron colony consists of a cluster of trees with nests located on the south side of the City of Bellingham known as the Fairhaven District (T37N/R2E/Section 2) (Figure 1). The heronry is situated on a forested near-shore bluff within 525 feet of Bellingham Bay near Post Point (Figure 2). The bluff rises about sixty feet from a shoreline wet meadow and the colony's trees are situated in the lower one third of the bluff.

The mixed forest stand is a band of habitat composed of 7.5 acres, 266 feet wide at the colony, 330 feet at the widest point to about 90 feet at the narrowest point (variable widths) and approximately 2000 feet long which wraps around the bluff from east to west, then tapers and extends further to the south. The widest portion of the forest band is from where the colony is located and east nearly 300 feet.

The following habitat description is from the Post Point Great Blue Heron Colony Assessment (Eissinger, 2000).

The bluff forest consists of mature - emergent Douglas fir (Pseudotsuga menziesii), bigleaf maple (Acer macrophyllum), western red cedar (Thuja plicata), and red alder (Alnus rubra) as the dominate tree species. The nests are located in alder and Douglas fir trees situated on the forested bluff between the north side of Shorewood Dr. and a public access trail south of the Post Point sewage treatment facility. The estimated nesting area is identified on the attached aerial photograph.

Due to the emergent form of the Douglas fir, the nests situated in the shorter alders are partially screened from aerial view. A younger aged band of red alder lines the lower portion of the bluff which provides a thick vegetative screen from the public trail and open space area from April through October. The understory shrubs and small trees from Shorewood Drive north also provide screening and buffering from residential activities. The combined understory, particularly thick alder, salmonberry, blackberry and other impenetrable vegetation discourage access by people and dogs which is important to retain for wildlife protection.

In addition to the screening qualities of the nest stand, the aspect and location of the heronry, on the north side of the Post Point hill, provides buffering from prevailing south winds and associated adverse weather. During the April 25th site visit, the wind from the south was quiet strong (15-20 mph) and the heronry was unaffected by the wind. The buffering resulted from a combination of position on the slope and surrounding forest wind screen.

Foraging habitat for the Post Point herons is primarily marine shoreline and estuary. Herons have been reported foraging along the shoreline of Post Point, Padden Creek Lagoon, Port Point Lagoon, Edgemoor Lagoon and Chuckanut Bay, particularly inside the railroad trestle. Chuckanut Bay is by far the best foraging habitat due to the Chuckanut Creek estuary, extensive eelgrass meadows and intertidal margin and potential for greatest prey reserves.

Important habitat attributes of the Post Point site for nesting herons are:

- bluffline or sloped access to nests*
- screening from above and below*
- inaccessibility*
- northern aspect, protected from prevailing south winds*
- buffered on all sides from human activity and access*
- close proximity to feeding areas and marine shoreline*

As of January 2003, the Post Point colony consisted of 10 nests within 6 nest trees (Figure 3). The nests were recorded during a field survey and mapping of the site January 2003, by Nahkeeta Northwest Wildlife Services. It was then determined that all of the nest trees are located on city property. The colony as a whole was mapped with a perimeter line extending 50 feet from the base of the nest trees (Figure 4). This perimeter line denotes the colony core and contains all nests and nest trees currently used.

Table 1: Nest Trees and Active Nests 2002

Tree Number	Tree Species	Number of Nests
36	Birch	1
93a	Alder	2
93b	Alder	1
95a	Alder	2
95b	Alder	3
97	Alder	1

At the time the heron colony initiated and completed their first documented nesting cycle in 2000, the baseline conditions were an important determining factor for their initial relocation of the colony and its continued success. The success of the colony is exemplified in the expansion of the colony from 6 nests in 2000 to 10 nests in 2002. The baseline conditions are little changed from 1999. The conditions, as described in this section, are significant parameters for the protection of functional habitat and future support of the heron colony and its potential expansion.

Land use associated with the heron colony is mixed, residential, park-open space and industrial. In addition, the primary coastal railroad route servicing northwest Washington and British Columbia passes below the colony along the waterfront. Upland, south of the colony 135 feet, is Shorewood Drive and associated residential development. From the nesting colony (Figure 2), the nearest residences are located upslope to the west 334 feet, southwest 185 feet and southeast 264 feet. An industrial complex is located north-east 155+ feet which is Bellingham's Post Point Wastewater Treatment Plant. The area immediately at the toe of the slope, north and east is open space and a designated off-leash area for dogs. Dogs and their owners also utilize the trail network leading southwest around the bluff and east toward Fairhaven. The nearest trail was moved in the fall of 2001 from within 35 feet of the colony to 111 feet at the nearest point east of the colony. The merging of trails, a point of highest use, moved from 135 feet to 246 feet from the colony, with the trail traversing the field in view of the colony situated nearly 160 feet from the colony. At the western edge of the wet meadow/park area is a small intertidal lagoon connected to Bellingham Bay by a passage under the raised railroad bed, this lagoon is about 320 feet from the heronry. The lagoon is only occasionally utilized by heron for foraging due to dog use and trail proximity. The railroad runs about 500 feet to the west of the colony.

SITE HISTORY AND CHRONOLOGY

The Post Point heron colony is the only active heronry in the City of Bellingham. The Post Point site, where the colony is currently located, has been utilized by great blue herons for many years as a roost (Eissinger, 1995). The first nests (n=1-2) were noticed by neighbors in 1999 and may have been active earlier. The current colony is thought to have moved from Chuckanut Drive in 2000 to join the few nesters at Post Point. This assumption is based on reports of the herons abandoning the Chuckanut site in 1999 and attempting to reestablish just north of Viewcrest Drive in a large cottonwood tree the same season. The attempt failed and the herons, likely, moved to Post Point, which was a familiar roost.

In 2000, the City of Bellingham requested an assessment of the heron colony, and general information about herons and their management. The following is an excerpt from the 2000 Assessment (Eissinger 2000) providing a chronological reference to the site.

The shoreline bluff at Post Point in south Bellingham, has for many years provided perching and roosting habitat for great blue herons as well as other birds. In 1999 residents of the Edgemoor neighborhood reported nesting herons located in a large Douglas fir tree on the bluff. The nest was confirmed as active and believed to have fledged young (Eissinger, field notes 1999). It is possible that other nests were present but inactive at the time of the visit and/or obscured by vegetation.

In April of 2000, more herons were observed in the vicinity of the original nest and additional nests were reported. During a site visit, April 2, 2000, herons were actively occupying 6 nests and a possible 2 to 3 additional nests may have been present, given the vocalizations heard. Tree branches and leaves obscured full views of all nests. The herons were paired and perched at or near each nest. The exact number and location of the nests will be determined in the fall, following the herons departure and after the leaves have dropped.

Subsequent site visits, April 7 and April 25, provided an opportunity to observe herons at their nests while numerous dogs and people engaged in variety of activities in the off-leash area and trail below the heronry. Although the herons did not respond to the dog activity approximately 200 feet from their nests, it is obvious that the field and lagoon habitat is inaccessible to the herons as a result of the dogs free-run. During these visits, heron activity was low and likely a result of incubation of eggs which is a low activity period.

It is expected that heron chicks will be hatching within the first two weeks of May. Following hatching the herons will become increasingly active gathering food for the young. This will require disturbance free access to feeding areas and the reduction of disturbance around the nests so that adults are not discouraged from delivering food. This is also the period in which bald eagle predation could threaten the success of the colony.

The area directly upslope from the heron colony consists of two vacant lots associated with Shorewood, a residential development. Construction of multiple residential units has been planned for the adjacent Shorewood property. A view corridor for the development was planned through the City land on which the colony is located. The view corridor had previously been approved by City Council prior to the knowledge of the existence of the heron colony. Given the location of the nest trees, which are all located on City property, the view corridors would have bisected the heron habitat. In response to concerns regarding potential disturbance to the herons caused by development, an assessment prepared by the developers' consultant (Don Norman) was submitted to the City Department of Planning and Community Development in January 2002. Although the City Council subsequently

reversed its view-corridor management decision in 2002, the proposed residential development is still pending for 8 units and construction could occur within 100 feet from the heron nest trees. The findings of the City's Hearing Examiner issued November 15, 2000 imposed a timing restriction on development activities between March 1 and July 31st among other recommendations. These findings are on file at the City of Bellingham.

The chronology of the colony has not been established. To date there is no definitive data collected on the actual onset of breeding/nesting activities. A site visit made by Biologist, Ann Eissinger, in early April 2000 revealed herons present in the colony. Another visit by the City of Bellingham Survey crew encountered 7 adult herons in the colony March 4, 2003, while the day before, March 3rd revealed no herons present. For the completion of the breeding season, July 31st was identified as the conclusion of the nesting window by the City's Hearing Examiner (2000), a site visit August 7, 2002, by Ms. Eissinger revealed at least 2 young heron in a nest and adults perched nearby. Fledging from the colony was likely delayed another two weeks based on the size and behavior of the young herons. Critical baseline nesting and rearing dates are needed such as: the date of occupancy, nest building, incubation, hatching and fledging. Plus, year-round use of the site is also needed. This information is critical to the management of this site and will require systematic monitoring and formal data collection by a trained professional.

MANAGEMENT PLAN BACKGROUND AND RECOMMENDATIONS

HABITAT PROTECTION

Great blue herons utilize a matrix of habitats throughout their life cycle and require a certain configuration of habitats in order to nest and successfully raise young. The primary goal of habitat protection is to maintain the function and value of habitat over time. Habitat protection is therefore an essential component in a management for it is to ensure the perpetuation of the species within a given geographic location over time.

Habitat protection requires both the identification and definition of significant habitat areas associated with the heron colony in question. The habitat areas to be included for protection include five specific areas:

- Nesting and colony area habitat
- Buffer habitat (primary and secondary)
- Staging habitat
- Roosting and loafing habitat
- Foraging habitat

Each of these habitat areas are consistently associated with colonies throughout the Salish Sea and play an important role in the reproductive cycle.

Nesting and Colony Area Habitat

Nesting areas for great blue herons are referred to as colonies. Each colony varies in size and configuration depending on the numbers of breeding herons, location and available habitat. Because herons nest in trees, in high densities, the nesting area relative to the number of nests can be quite small. These areas are sensitive to both natural and unnatural disturbance and weather conditions.

The Post Point heron colony is .44 acres in size and is contained within a larger 7.5 acre forest band lining a near-shore bluff. The nest area specifically contains 6 nest trees and 30+ other trees. The “core” of the colony is that area containing nest trees. The core area is measured from the base of the nest trees out 50 feet to include over hanging nests, canopy and immediate vegetation (Figure 4). The forest immediately surrounding the core area that serves as screening and direct protection is the buffer. The buffer varies in size (width) depending on the size of the colony or core area. As a result the core area may fluctuate annually. The buffer serves the vital role of buffering the colony from human disturbance (activity, noise, light, pollution) limiting intrusion by aerial predators, screening, wind break, supplying some nest material and providing space for the colony to grow and/or move.

The Post Point heron colony requires full protection of the nesting core area. The core area is entirely located on city property and would be off limits to non-authorized personnel year-round. During the breeding season the core would be restricted from any entry, with the exception of the designated biologist. The core area will require additional buffering and timing restrictions in order to provide the current habitat function and value.

Under the WDFW Management Recommendations, the identification of alternate nesting habitat is suggested. A minimum of 10 acres is recommended. A brief examination of habitats was made. Given the necessary habitat suitability, isolation, protection from prevailing winds and proximity to foraging areas to support nesting great blue herons, four general areas were identified as possible alternate habitat within the City Limits. Alternate areas identified include Clark's Point, 100 Acre Woods (also referred to as Chuckanut Ridge), Hoag's Pond and the northern toe of Chuckanut Mountain (Figure 5). A more thorough examination of available habitats would be helpful.

Buffer Area Habitat

Buffers are an effective means of protecting heronries from unintentional disturbances, human intrusion and natural occurrences such as predation and storm events. Buffers provide distance and in most cases visual screening. Heavily vegetated buffers also reduce noise and inhibit entry to the nesting areas. Buffers are utilized as standard setbacks and are recommended as unaltered natural areas ranging from widths of 250 meters to 1,000 meters surrounding a nesting area (Vos et al. 1985; Bowman and Siderius 1984; Buckley and Buckley 1976; DesGranges 1989). Buffer width, screening and barrier effectiveness are all important factors. However in a recent study the highest fledgling rates were associated with effective barriers created by fencing and moat-like water barriers limiting foot access (Carlson and McLean 1996). Heronries experiencing human foot traffic had significantly fewer fledglings than sites with no disturbance or occasional mechanical disturbance (Carlson and McLean 1996).

The WDFW in Priority Habitats and Species Management Recommendations for great blue heron provide the following guidance.

The colony's size, location, relative isolation, and the degree of habituation to disturbance (Henny and Kurtz 1978, Bowman and Siderius 1984). Colonies located in close proximity to existing human activities may tolerate more disturbance than colonies located in undisturbed areas (Simpson 1984, Webb and Forbes 1982, Bowman and Siderius 1984)..... Additional considerations are: topographic or vegetative features surrounding the colony that might ameliorate the effect of human disturbance; the availability of foraging areas and their proximity to the colony site (Simpson 1984; Gibbs et al. 1987; Gibbs 1991; Butler 1992, 1995); proximity of forest lands that could be used as alternative colony sites (Simpson 1984, Julin 1986, Gibbs et al. 1987) and land-use patterns and potential for long-term availability of nesting and foraging habitat.

In the absence of comprehensive land-use and/or colony site management plans, we recommend the establishment of permanent, year-round minimum protection areas (buffers) of 250-300 m (820-984 ft) from the peripheries of colonies (Bowman and Siderius 1984, Quebec 1986 *in* Kelsall 1989, Vos et al. 1985, Buckley and Buckley 1976, Pullin 1988, Short and Cooper 1985, Parker 1980). All human activities likely to cause colony abandonment should be restricted in this buffer year-round.

Urban buffers, in particular, will likely vary depending on colony size, site conditions, habitat limitations and space constraints. As a result, buffers are best devised by a professional biologist with prior knowledge and direct field experience with herons, in a variety of settings, both urban and non-urban. To establish buffers, first review baseline and historical conditions, consider habitat availability, function, value, necessary nest material and future growth and/or movement of the colony.

The recommendation for the Post Point Heron Colony's buffer(s) follows a review of the pertinent factors previously mentioned. The resulting recommendations are as follows (Figure 6).

Post Point Heronry Buffer Recommendations:

1. Define a permanent no-entry/no activity buffer of 100' that includes the immediate habitat (but is not enough to sustain the colony over time). This includes both public and private lands. This includes a restoration area.
2. Create a permanent non-disturbance buffer of 250'.* This encompasses a relatively un-built area (with the exception of one road, one trail, a portion of a residence and a section of the waste water plant). The area would be subject to restricted use, limiting primary activities to passive recreation. Seasonal timing restrictions would further limit any other activities between March 1 and August 31. Motorized maintenance would be allowed in designated areas only. It is recommended, to limit further human development if possible, inside the 250' buffer.
3. Designate the area delineated in Figure 7, as a permanent heron/wildlife reserve, including roost area, wind break, area for nest material recruitment, further screening, area for colony expansion. This area is recommended for permanent protection as a publicly owned wildlife/natural area in perpetuity. Given the use of this area by bald eagles (*Haliaeetus leucocephalus*), band-tailed pigeon (*Columba fasciata*), pileated woodpecker (*Dryocopus pileatus*) and other potentially sensitive species, protection of the site as important wildlife habitat is easily justified. Because this area contains private land, it is recommended that the City purchase the property.
4. Restrict the application of pesticides (herbicides and insecticides) within 500 feet of the colony (Figure 6).

*This is approximately one third of the minimum recommended buffer in the WDFW guidelines.

Flyway and Aerial Buffer

Flyways for many colonies are important features that have received little attention or protection. Certain colonies, such as Point Roberts have specific flight paths that at times, during the breeding season, experience high use, hundreds of flights per hour. The smaller colonies such, as Post Point, also have flyways that are also important passages to foraging areas. In addition, overhead, aerial disturbances by predators or aircraft, particularly helicopters could cause a colony to abandon.

It is recommended to examine the flight patterns and potential aerial disturbances to determine if the Post Point colony will require a flyway or aerial buffer.

Staging Habitat

The staging area for most heron colonies is an area identified and utilized on a seasonal basis. Staging is the initial activity of herons in the breeding cycle prior to the herons entering the colony for courtship and the onset of nesting. Each colony has a specific staging site, many of which have not been identified. These areas are many times located in an open field or salt marsh associated with the colony, but may also be a forest stand or grove separate from the colony.

The staging site for the Post Point colony has yet to be verified. An employee of the water treatment plant has stated that herons perch and may stage on the clarifiers. Once identified however, the area will require evaluation and recommendations for protection. The recommendations would be timing restriction for minimizing disturbance and general protection to maintain function of the site and use by herons.

Roosting and Loafing Habitat

Roosting and loafing areas are essential for herons, particularly large colonies, where the adults may rest and preen between foraging for and feeding young. Frequently these same areas are utilized by the young once fledged. Roosting and loafing areas, like staging areas, are used primarily during the breeding season and may be located in a field, salt marsh or forest.

The roosting area for the Post Point heron colony has been tentatively identified as the forest in which the colony is located. The area of historical use encompasses the maturing forest of the bluff and it is likely that the designation of a heron reserve (Figure 7) encompassing the bluff forest would in effect protect this habitat. However, given that this colony has not received systematic monitoring by a professional, the habits and associated habitats of the Post Point herons have not yet been fully documented. Once identified however, the area will require evaluation and recommendations for protection.

Foraging Habitat

The great blue heron has been described as "the patient predator" (Butler 1995). Great blue herons feed on fish, invertebrates, small mammals and occasionally amphibians and reptiles. Herons are closely associated with marshes, wetlands, stream corridors, freshwater and marine shorelines, eelgrass meadows, fallow fields and grassy edges where prey is abundant. As a predatory fisher and mouser, the heron requires specific adaptations to succeed in its pursuit of prey. These adaptations include anatomy, plumage, vision, behavior and seasonal association with prey-rich foraging areas.

Heron colonies are usually located in close proximity to a productive food sources, particularly a combination of fallow field and intertidal eelgrass habitat in association with protected embayments and/or estuaries. Most colonies in the Pacific Northwest are located within 1.5-2 miles of a productive foraging area (Butler 1995). Although great blue herons may forage up to 18 mi (29 km) from a colony, most forage within 1-3 mi (2-5 km) of the colony (Short and Cooper 1985, Butler 1995) (*In* WDFW Management Recommendations). In addition, nearby terrestrial foraging habitat available at high tide is an attribute that could

play an important role in successful productivity. Foraging areas are a critical component in the habitat matrix and require identification, monitoring and protection. Identification of primary and secondary foraging areas is crucial. These areas could include undisturbed areas of: intertidal, shoreline, estuary, stream, lake, wetland, and field. The long term success of a colony is ultimately tied to the quality of foraging habitat and prey availability and abundance.

The following excerpt is from *Hérons of the Salish Sea* (Eissinger 1996).

Disturbance of herons in their aquatic feeding areas during the breeding season has also been documented by boating activities including water skiing and jet skis (Hanrahan 1992; Skagen and Melcher 1996). Jet skis in particular have the potential to create great disturbance as a result of their speed, noise and ability to enter shallows where herons gather to feed. Therefore not only is the identification of the foraging area important but a plan to minimize disturbance of herons while feeding and young herons learning to feed is critical.

The primary foraging areas for the Post Point herons is, like many of the habits and habitats of this colony, not yet documented. It is assumed that the primary foraging area for the Post Point herons is Chuckanut Bay. This assumption is based on the abandonment and subsequent relocation of the Chuckanut heron colony to the Post Point location in 1999. This assumption is reinforced by the observation of numerous herons in the Chuckanut Bay tidelands during the breeding season. However, herons leaving and returning to the colony have been observed flying to and from both the southwest and north indicating foraging in Bellingham Bay or the Nooksack River estuary. Other possible foraging areas within 3 miles include: wet meadows adjacent to heronry, Edgemoor lagoon, Chuckanut Creek estuary (1.36 miles), Chuckanut wetland complex, Padden Creek/estuary, Lake Padden, Hoag Lake, Interurban wetlands, Connelly Creek and associated fields (Figure 8). Other areas most likely utilized by the Post Point herons are, the Bellingham Bay shoreline, Squalicum Marina and Nooksack River estuary (Figure 8).

Further observation and documentation is recommended, to determine foraging areas frequented by the Post Point herons. Once foraging areas are identified, they need to be mapped and evaluated for protection options. Protection may include disturbance reduction, maintenance or enhancement of habitat quality and function. The fewer the foraging options, the more important each identified foraging site becomes.

HABITAT RESTORATION AND ENHANCEMENT

Restoration and/or enhancement are important to many heronry sites due to habitat loss, alteration or degradation. Restoration or enhancement can apply to nesting, buffer, outlying or foraging areas. Once the core and buffer habitats are protected and the colony's existence is ensured, associated habitat may be identified for restoration and/or enhancement to improve conditions for the colony in the present and future.

Restoration and/or enhancement involve five primary steps: identification, evaluation, planning, action, maintenance and monitoring. These steps include the identification of the areas that could be improved, evaluation of current conditions and beneficial effect on the colony and surrounding environment, development of a restoration or enhancement plan and timeline, implementation of the plan, maintenance and monitoring to document changes

and benefit. The most likely restoration and enhancement actions in association with a heronry would be buffer plantings, stream/wetland restoration, forest enhancement, and lagoon edge restoration.

The nesting habitat and buffer at the Post Point heronry is limited. The residential area to the south and treatment facility to the north, impose spatial restrictions and land ownership limits. The strip of habitat currently harboring the Post Point heronry has little room for expansion or recruitment of new nest trees. As a result, with the goal to improve buffer area, security and potential future nesting habitat for colony expansion, it is recommended that an area of alder forest is allowed to regenerate naturally to the north to fill out the 100 foot buffer area (Figure 6). A protective edge planting is also recommended for this area. It is also recommended to replant and restore forest habitat that had been cleared up slope of the colony both within and just outside the 100 buffer (Figure 6). This added forest edge will create a more secure core area, provide a wind break, and generate future potential nesting habitat.

The bluff habitat to the east and south of the colony has also been degraded or cut and should be allowed to regenerate without further disturbance.

Restoration of the Post Point wetlands is another element that could provide enhanced habitat for a number of species. A restoration plan would be needed; however the recommendation in general is to restore the stream/wetland corridor to the Post Point lagoon and restore/enhance the lagoon edge with native vegetation.

It should be stressed, that the wet and upland meadow serves an important roll for herons and other species. The fallow meadow (not lawn) is particularly important given that there is so little of this type of habitat remaining in the City, especially south Bellingham. Natural grassland is vital for heron foraging of Townsend's vole (*Microtus townsendii*) and other prey species.

The recommendations for the site are that the 100 foot forest buffer around the heronry be fully restored and enhanced. A perimeter planting of thorny native shrubs would assist in creating habitat diversity and deter access to the colony. Enhancement of stream/wetland corridor and lagoon edge would benefit a number of species including herons. Retention of fallow meadow area is vital for heron foraging.

DISTURBANCE REDUCTION

The minimization of disturbance and retention of buffers are the two most important elements of a heronry management plan. These two elements work together to reduce the potential for colony abandonment. To describe the threat of disturbance in greater detail is the following excerpt from Herons of the Salish Sea (Eissinger 1996): Disturbance and Other Negative Influences on Heron Populations.

Disturbance to great blue heron colonies during the breeding season has the potential to reduce productivity and cause nest abandonment. Although abandonment of an entire colony is uncommon, it has occurred in at least two major heronries in the past five years, Maury Is. Washington and Sidney Is. British Columbia. In both cases the actual cause of abandonment has not been determined, yet a direct disturbance of the nesting colony is the primary suspect. Response to disturbance varies by colony (Simpson 1984). Disturbances and other negative influences on heron populations are either human related or natural. Human impacts are common and include intrusion, pollution, habitat removal or alteration, noise and persecution. Natural disturbances include predation, storms, fire, flood and disease.

Great blue herons are negatively affected by human disturbance, particularly during their breeding season as they gather in colonies ranging from 2 to 500 birds to nest. The nesting colony is an exceptionally sensitive area due to the large numbers of birds concentrated in a small area and their heightened response to disturbance. Disturbance of nesting herons by humans is well documented (Hanrahan 1992; Bowman and Siderus 1984; Gibbs et al 1987; Vos et al 1985; DesGranges 1989; Kelsall 1992; Carlson and McLean 1996; Skagen and Melcher 1996). Documented human related disturbance of heron colonies range from direct human incursions into the colony, discharging of firearms, loud sudden noise from machinery, vehicular incursion, boats and aircraft. Herons are least tolerant of disturbance during courtship and the early nesting period (Kelsall and Simpson 1979; Bowman and Siderus 1984; Forbes et al. 1985; Vos et al. 1985). Abandonment of colonies resulting from repeated incursions or combined disturbance factors has occurred. Of 38 cases of colony abandonment, Forbes (1985) reported that 82 percent were related to human disturbance.

Disturbance by aircraft include several variables including size, speed, color, proximity, noise and direction of flight of the craft (Ward et al. 1989). Helicopters cause the greatest response for several species (Ward et al. 1989). However, frequent flights of certain types of aircraft over time reduce response by certain species including herons. It is suggested that herons may habituate to fixed wing and rotary winged vessels (Bowles 1995). Very low altitude aircraft overflights of less than 100 meters have caused panic response and caused flocking waterfowl to collide with human-made structures (Blokpoel and Hatch 1976). Kelsall (1992), based on literature review, recommended that a vertical buffer of 600-650 meters be placed over heronries to prevent harassment by low-flying aircraft. The impacts of noise frequency and magnitude on wildlife are little known (Knight and Gutzwiller 1995).

Generally, most disturbance studies concur that the response of each individual or group (colony) is unique. Therefore it is vital to integrate response observations into all monitoring and research activities. A catalog of disturbances and response by site will create an important behavioral baseline for consideration in the stewardship of each site.

The habituation of wildlife to disturbance is a process that can occur slowly, so it may not be detected by short term field studies. In the long term, nesting birds become more tenacious and less responsive in the presence of human disturbance if they are not deliberately harassed (Burger & Gochfeld 1981; Knight et al 1987, In Bowles 1995).

Disturbance is a major subject of concern around the Post Point Heronry. Currently there is an off-leash dog park, and a proposed residential development within 100 feet of the colony, in addition a residential area, municipal waste water treatment plant and major railroad corridor are also in close proximity. The issue of disturbance at Post Point is therefore primarily human related.

The 2000 Post Point site assessment provided the following disturbance information:

Active heron colonies are very sensitive to human disturbance. Human entry into colonies may cause flushing from nests and possible abandonment. In addition, regular human disturbance allows for the predation of unattended eggs and young. Unrestrained dogs, particularly barking dogs under a colony will also flush birds from their nests and generally disturb the colony. To avoid human disturbance, human entry and nearby activity should be restricted by signage and/or restrictive barriers such as dense vegetation.

Site visits in 2000 by Biologist, Ann Eissinger, April 7 and April 25, provided an opportunity to observe herons at their nests while numerous dogs and people engaged in variety of activities in the off-leash area and trail below the heronry. Although the herons did not respond to the dog activity approximately 250-300 feet from their nests, it is obvious that the field and lagoon habitat is inaccessible to the herons as a result of the dogs running free and swimming in the lagoon. During these visits, heron activity was low and likely a result of incubation of eggs which is a low activity period.

The Post Point great blue heron colony, as an urban colony that has adapted to and is tolerant of many disturbances normally found in an urban environment. In spite of the close proximity to an off-leash dog park, a municipal waste water treatment facility, railroad corridor, a boat repair yard, train station and residential living, the herons have selected the site. The selection was likely for historical association, proximity to Bellingham Bay and suitable habitat, rather than its tranquil setting. As a result, the herons nesting at this site are likely tolerant of the current surrounding activities. However, human intrusion into the colony and major changes or activities directly associated with the nest stand, particularly, clearing, tree removal, brush cutting or construction could tip the tolerance of the herons and cause abandonment.

The existing residential area above the colony is relatively peaceful and is currently buffered from the heronry by approximately 150-200 feet of forest, with the exception of a small cleared area. Additional homes constructed in this area would however, infringe on the buffering effect of the surrounding forest and definitely creates an incalculable risk to the herons. Unfortunately, heron colony abandonment is frequently permanent.

The dog off-leash park directly adjacent to the heron colony has been a subject of debate with regard to potential disturbance. Most of the activity occurs between 100-300 feet from the colony. Given that the herons selected this site while the dogs were utilizing the park, and don't appear to react to the dogs barking, jumping, running and playing together, it is reasonable to assume that the dogs have minimal impact on the herons given their restriction from the colony core area. However, definitive empirical data is not available and would be helpful to guide any decision making.

Certain questions regarding the off-leash area relative to the herons are:

- Do the dogs disturb the herons?
- If the field and lagoon were restricted to access (dogs and humans) and allowed to regenerate, would the herons utilize the field and future forest habitat and/or associated lagoon/marine habitat?
- Is access to this habitat important to this colony and its success?

These questions need to be explored further. At present, the dogs and their owners appear to be of little concern to the herons; however, they likely restrict access of the herons to the immediate habitat opportunities.

The following recommendations are made to minimize disturbance to the colony and ensure successful reproduction and fledging of healthy young.

Limit Access: Access into the colony at any time by unauthorized personnel, should be strictly prohibited. The exception of the monitoring biologist, trained steward or designated City staff. Access into the core area during the breeding season is particularly sensitive and would be the most restrictive. Dogs should also be restricted from the colony area.

The restriction of human access into the colony is essential and non-debatable. This could be accomplished several ways, however, because of the seasonality of the herons and natural setting of the site, a less aggressive approach is recommended. The no-access buffer (Figure 6) defines the protection of habitat 100 feet from the colony. This buffer is appropriate to limit access year-round. To define the boundary and to deter access, combination of fencing and plantings are recommended. The planting of thorny native shrubs including wild rose (*Rosa nutkana.*) and other species along the 100 foot boundary in the upper and lower areas of the bluff will act as a natural barrier. Outside the planting could be a simple wooden fence (split rail) as a visual boundary. The purpose of the natural barrier is to allow wildlife to move through freely, but limit easy access by humans and their dogs. In addition, the restoration of forest buffer, wetland and stream corridor, at the base of the bluff will over time deter entry into the sensitive habitat area. No trails should be located within the 100 foot zone.

Limit Disturbance: Disturbance is a primary factor in heron colony abandonment. With the designation of a non-disturbance buffer, the potential threat of abandonment is reduced.

Because disturbance to heron colonies are also the result of perceived threats from natural and unnatural sources, a protective screening of habitat is necessary to protect from unnecessary flushing of nesting adults and pre-fledging of young. Perceived threats are also mitigated with distance. By creating a zone of non-disturbance, the herons are more likely to perpetuate their current nesting activities. The proposed non-disturbance buffer, recommended to be at least 250 feet from the colony or 300 feet from the base of the nearest nest tree, would provide habitat screening, deterred access and distance, resulting in a safety zone for the herons and their young (Figure 6).

There have been plans to develop land near the heron colony. The development includes residential structures and expansion of the municipal wastewater treatment plant. These developments, if too close to the colony and/or constructed during the nesting season, could

have a negative impact on the herons, and may cause or contribute to abandonment. Due to the potential for abandonment, full implementation of the 250 foot non-disturbance buffer is essential. Public purchase of private property, and restriction of further development on public property within the buffer, would ensure protection of the heron colony.

Limiting disturbance in primary feeding areas is also recommended.

Timing Restrictions: Timing restrictions are an effective tool to control disturbances from specific projects. If a project is proposed within the 250 meter (820 feet) zone (minimum WDFW buffer) (Figure 6), that may create significant noise, activity or other disturbance to the herons, it is recommended that timing restrictions be imposed on the project or portions of the project.

Timing restrictions are imposed on activities within the designated buffer zone around the heronry prior to staging and the re-colonization of the herons in the nesting area and then extend through the nesting season until the last of the young have fledged. Because the chronology of the Post Point colony has not been established the commencement of timing restrictions using the WDFW management recommendations of February 15th is reasonable. The end of the nesting season is later than July 31st, so it is recommended that August 31st will provide maximum protection until the colony chronology is established. Monitoring of the site, for a minimum of three years, will provide a representative sample to determine the nesting period for most years. Another consideration is the year round use of the site as a roost which may require additional documentation and timing considerations.

Further study of the site for disturbance is needed. Although it is known that the herons have a low tolerance for construction (resulting in their abandonment of the Chuckanut colony), it is necessary to observe interactions of herons and other activities in the proximity of the colony, particularly the dog park, maintenance and aircraft during different periods of the breeding season to document responses. Further restrictions or adjustments of the recommendation herein may be needed.

SITE SECURITY and STEWARDSHIP

Concern over the security of the heronry is an important consideration in the management and conservation of this sensitive site. Obviously buffers without definition or enforcement are of limited usefulness. Therefore an effort is required to protect the site from intrusion, disturbance and vandalism. The following provides a discussion of security issues and options from the *Great Blue Herons of the Salish Sea: conservation and stewardship model* (Eissinger 1996).

As the local human population increases, the natural uplands and shoreline become more developed and access limited. At the same time, public open space and recreational areas become crowded. The result will be pressure on sensitive habitat areas for both access and development. Security of protected heronries is a concern and requires careful consideration. Fencing around the perimeter of a heronry has been recommended and is a standard practice by state and federal agencies, and is the most obvious solution for human deterrence. However, given the seasonality of heron activity and the important value and function of these natural habitats for other wildlife; mammals, as well as, birds will require passage. It is conceivable that solutions other than fences exist. It is recommended that alternatives to fences such as vegetative screen (hawthorn, salmonberry, wild rose, etc.) be seriously explored prior to erecting any obstruction to the natural movement of wildlife. It is possible that with the presence of an on-site steward and regular patrols that illegal entry and harassment could be minimized.

Other security issues include smoke, fire, shooting, fireworks and loud noises adjacent to the heronry. Protection against natural disaster is difficult. Human associated disturbances may be greatly reduced with frequent patrolling by the steward or other security personnel. Frequency of visits to the heronry depends on the isolation and habituation of the colony to disturbance. Daily or odd day visits for high risk sites are recommended; twice weekly visits for well isolated colonies on restricted lands are acceptable. It will be necessary for the designated Steward of the site to meet with and establish familiarity with neighbors, local law enforcement and businesses in the vicinity.

A designated Steward for the heronry is essential. This individual may be a trained volunteer or professional. The security and maintenance of the heronry will be the responsibility of the Steward. The Steward should also be trained by a professional biologist in field observation, record keeping and heron biology to facilitate accurate in-the-field documentation of activities in the heronry, particularly disturbances. The Steward will also be the public representative of the heronry and should possess good communication skills and be able to handle difficult situations.

It is recommended that a Steward be hired or assigned to the task of managing and overseeing the security of the Post Point Heron colony. Guidelines and directives for stewardship must also be clearly defined.

MONITORING

Monitoring of heron colonies is an important component of management and stewardship of the heronry and its habitat. Monitoring is essential for establishing the baseline for each individual colony beginning with the site chronology, behaviors, patterns, flyways, staging, foraging, etc., and as a long term tool to document trends, changes and stability. Monitoring is also a scientific tool for measuring yearly nesting numbers, productivity and spatial movement within the nest stand. Regular monitoring of a colony during the breeding season is essential for detecting disturbances by documenting responses to predation, particular noises or activities that could lead to abandonment. There are three general types of monitoring schemes:

- General monitoring: regular visits to the colony to document chronology, activity, disturbances and success throughout the season. General monitoring incorporates regular visits with a productivity survey, foraging area survey and autumn nest count. This is the best method for establishing a colony baseline for the first 3-5 of years if possible.
- Intensive monitoring: is a variation of general monitoring, but includes more visits for a longer duration. This method is generally used to determine or document project related disturbances and safe guard against abandonment and to document related changes in the colony productivity and success.
- Seasonal monitoring: seasonal visits to determine occupancy only. This method should include a minimum of three visits to the colony, first to establish re-colonization in the early spring and dates if possible (in the event that timing information is needed for nearby project mitigation), midseason productivity count and confirmation of fledging. Colonies have been know to abandon mid-season and without a fledging confirmation there is no way to confirming that the young actually survived to fledge. Finally an annual nest count following the dropping of leaves is essential to document actual numbers and track growth over time.

The methodology for each monitoring type is as follows.

General Monitoring

Beginning February 15-March 1, perform weekly visits to the heronry to determine re-colonization and successful nesting, and to ensure security of the site. Once the herons have re-established, weekly or biweekly (every other week) visits will continue to document reproductive chronology, behavior, predation, and record any disturbances. The duration of monitoring would be from March 1 to August 31 (or until the young have fledged) approximately six months total. Monitoring should be conducted by professional biologist with field experience and prior knowledge of heron biology and behavior. Recruitment and training of a volunteer assistant may also be made in order to assist in monitoring and add additional visits to the heronry to track disturbances, such as predation and any other irregularities. The other part of this component would be to act as a seasonal manager for the heronry by fielding inquires about access, review any research proposals and provide public education. Monitoring summary reports would be provided to stakeholders and agencies on an annual basis (or more frequently if needed).

Intensive Monitoring

Intensive monitoring is applied in the event of a potential or anticipated disturbance, such as a construction project or other action. This method is used as a means of determining disturbance to the herons based on behavioral response to noise and activities outside the heron colony. Through close observation, disturbance to the heronry can be detected and the cause corrected prior to the abandonment of the colony. Disturbance is based on heron agitation and distraction from breeding activities including leaving the nest. A major disturbance results in the flushing of the majority of the colony from nests and could result in the loss of egg or young viability. Under this methodology, major disturbances to a heronry would result in the immediate notification of the parties involved.

Prior to the commencement of intensive monitoring, one year of general monitoring is strongly recommended to establish colony baseline as well as observation points and access. Beginning in February of the first season of intensive monitoring, site visits would be made to assess conditions and establish baseline project activities and related ambient noise. Pre-breeding visits continue weekly until herons are detected in the colony. As of March 1 or upon the arrival of the first herons, monitoring visits increase to a minimum of three times weekly. The duration of each visit is four hours. Once the herons have re-established nesting, and the majority of herons are incubating and show no signs of disturbance, weekly visits will be reduced to twice weekly. Monitoring then continues through the nesting season to document disturbances, behavior, predation, reproductive chronology and breeding success.

The schedule and duration of intensive monitoring would be as follows.

- One season of baseline (General) monitoring.
- Pre-breeding: establish observation points and access.
- February 15: weekly on-site visits to document herons returning to colony and determine ambient conditions.
- March 1 (or earlier if herons return)-April 15: on-site visits 3 times weekly for 4 hours minimum, to continue until majority of herons are incubating.
- April 15-August 31: on-site visits 2 times weekly

Duration: February 17-August 31= 28 weeks

In the event that the herons return to the colony earlier than March 1, monitoring 3 times/week would commence upon arrival of the herons to the colony. April 1 is the estimated date for incubation; however, some herons delay incubation, so the 15th is used as the transition from 3 to 2 visits. If the herons show evidence that they are agitated or may abandon, on-site monitoring will continue at 3 times per week.

Productivity Survey

The annual productivity survey provides a sampling of or all active nests to represent the number of fledging young and estimate the level of productivity within the heronry. Productivity is an important parameter needed to track the health and vitality of the colony over time. This effort is important to determine the success of the colony in any given year and would reflect reproductive failures that nest counts do not provide. This is also

important for tracking reproductive trends, affects of predation and changes in food supply. One full day of sampling by an experienced biologist (manager), with the help of volunteers, is required in most large heronries to collect an adequate data set, representing a minimum of one third of the colony's nests. For small colonies, all visible nests should be sampled. The survey should be done at a distant observation point or in such a way that it does not disturb the herons or flush herons from their nest. These results would be compiled and presented in the Annual Report.

Autumn Nest Survey & Mapping

The autumn nest count is the standard method for determining the actual number of nests within the heronry and indicates the number of active nesting pairs utilizing the site during that year. Late autumn prior to major winter storms allows maximum viewing of the whole heronry and is the most accurate count of the year. The survey is conducted by the heron biologist with the help of trained volunteers.

Tree tagging is the standard method of marking nest trees. This should be done using appropriate equipment and tags. Care must be taken to avoid injuring the tree. Tags should be of a specific numerical sequence and up dated yearly. The numerical sequence allows for easy tracking of nest trees over time. Tagging should only be done by a trained professional, with the permission of the land owner.

Mapping of the colony documents nest trees and nest locations. The map provides a yearly, template of the colony and its boundaries. Mapping includes GPS or manual on-site measuring and recording with a trained assistant(s). In addition, a follow-up visit for truthing may be required. This mapping effort could be done in conjunction with the autumn nest survey, but requires a training session with the volunteers for larger colonies. The nest location data will then be plotted on a map as the baseline for future comparisons. Each annual map will contain a clear perimeter line, depicting a different color for each year. The completed map using the data collected for the year will be included in the annual report.

Landuse Monitoring

One other form of monitoring is that of review of proposed landuse activities in the vicinity of the heronry. Those activities that could pose an impact or potential disturbance to the colony would need further evaluation, determination of impact and possible mitigation.

Monitoring Reports and Consultation

Reports include the monthly status reports for general methods or weekly reports for intensive methods. The reports are submitted to all concerned parties either by mail or email. At the end of the year, an annual report provides a summary of the year's monitoring. The annual report includes a summary of the year's activities, updated maps, data sheets and copies of associated publicity and photos.

Monitoring Recommendations:

The monitoring scheme recommended for the Post Point Colony consists of a general monitoring plan to establish the baseline, with requisite productivity survey, nest count and mapping. The duration of monitoring is annually for a minimum of three years. At the end of

three years the monitoring should be reviewed and adjusted or extended as needed. Landuse monitoring needs to be on-going by the City of Bellingham and effective for all projects within the 250 meter buffer. In the event of a proposed project in close proximity to the colony, intensive monitoring may be necessary.

HERONRY SITE MANAGEMENT

Heronry sites need oversight by a qualified biologist or trained personnel who would serve as the site's manager. The management of the site may also be enhanced with assistance from local volunteers. The manager is responsible for all aspects of site and heron stewardship and monitoring. He or she represents the stake holders, works with neighbors and community and oversees volunteer involvement and public education. Site management includes correspondence with the general public and media, general monitoring, security of the colony, fielding inquires about access, reviewing research proposals, coordinating volunteer stewards, managing data and reporting. (A land ownership profile and purchase plan for buffer properties may also be included). The manager or steward also provides public education and trains volunteers as docents for on site educational programs and tours.

PUBLIC EDUCATION AND INVOLVEMENT

Recreational wildlife viewing has become a popular North American past time involving approximately 16 percent of the U.S. population and representing over twice the number of people who hunt (Larson 1995). The value of public wildlife viewing lies in both educational and economic gains. It is feasible to provide a valuable nature experience for recreationalists if a viewing area is developed with a sensitive design to minimize visitor intrusions and disturbances to the subject wildlife. One well designed heron viewing area in Colorado has had little detectable disturbance on the reproduction success of the subject heron colony (Skagen and Melcher 1996). Important considerations for such areas are access and location (outside the core area), timing, screening, buffers, visitation rates, educational and interpretive programs, security and scientific monitoring. The management plan of the Colorado site included scientific monitoring of the heron colony two years pre- and post-construction to document responses to the development (Larson 1995). Additional long-term monitoring was also recommended.

A direct means of avoiding human intrusion and accomplish viewing opportunities is to create a viewing and interpretive facility near a feeding area, flyway or staging area, well away from the sensitive nesting colony. By redirecting human activity away from the vulnerable core area, the potential for accidental disturbance or intentional harassment is diminished. The experience for visitors has the potential to be enhanced by broadening the species focus and eliminating the seasonal limitations of a nesting site. Viewing areas should be carefully considered from both human and wildlife management perspectives prior to development. Monitoring of sites pre- and post-development is strongly recommended.

Public education at Post Point would be helpful both at a stationary viewing/interpretive site and by a steward or docent for visitors. There is also an opportunity for an in-school education program delivered by the steward.

SUMMARY OF RECOMMENDATIONS

A summary of recommendations for the Post Point heron colony are as follows:

- **HABITAT PROTECTION**

- The Post Point heron colony requires full protection of the nesting core area. The core area is entirely located on city property and would be off limits to non-authorized personnel year-round. During the breeding season the core would be restricted from any entry, with the exception of the designated biologist. The core area will require additional buffering and timing restrictions in order to provide the current habitat function and value.
- Public ownership would be the ultimate protection strategy
- Under the WDFW Management Recommendations, the identification of alternate nesting habitat is suggested. A minimum of 10 acres is recommended. A brief examination of habitats was made. Given the necessary habitat suitability, isolation, protection from prevailing winds and proximity to foraging areas to support nesting great blue herons, four general areas were identified as possible alternate habitat within the City Limits. Alternate areas identified include Clark's Point, 100 Acre Woods (also referred to as Chuckanut Ridge), Hoag's Pond and the northern toe of Chuckanut Mountain (Figure 5). A more thorough examination of available habitats would be helpful.
- It is recommended to examine the flight patterns and potential aerial disturbances to determine if the Post Point colony will require a flyway or aerial buffer.
- The staging site for the Post Point colony has yet to be verified. Once identified however, the area will require evaluation and recommendations for protection. The recommendations would be timing restriction for minimizing disturbance and general protection to maintain function of the site and use by herons.
- The roosting area for the Post Point heron colony has been tentatively identified as the forest in which the colony is located. The area of historical use encompasses the maturing forest of the bluff and it is likely that the designation of a heron reserve (Figure 7) encompassing the bluff forest would in effect protect this habitat. However, given that this colony has not received systematic monitoring by a professional, the habits and associated habitats of the Post Point herons have not yet been fully documented. Once identified however, the area will require evaluation and recommendations for protection.
- Foraging areas need protection. Further observation and documentation is recommended, to determine foraging areas frequented by the Post Point

herons. Once foraging areas are identified, they need to be mapped and evaluated for protection options. Protection may include disturbance reduction, maintenance or enhancement of habitat quality and function. The fewer the foraging options, the more important each identified foraging site becomes.

● BUFFERS

- Define a permanent no-entry/no activity buffer of 100' that includes the immediate habitat (but is not enough to sustain the colony over time). This includes both public and private lands and a restoration area.
- Create a permanent non-disturbance buffer of 250'.* This encompasses a relatively un-built area (with the exception of one road, one trail, a portion of a residence and a section of the waste water plant). The area would be subject to restricted use, limiting primary activities to passive recreation. Seasonal timing restrictions would further limit any other activities between March 1 and August 31. Motorized maintenance would be allowed in designated areas only. It is recommended, to limit further human development if possible, inside the 250' buffer.
- Designate the area delineated in Figure 7, as a permanent heron/wildlife reserve, including roost area, wind break, area for nest material recruitment, further screening, area for colony expansion. This area is recommended for permanent protection as a publicly owned wildlife/natural area in perpetuity. Given the use of this area by bald eagles (*Haliaeetus leucocephalus*), band-tailed pigeon (*Columba fasciata*), pileated woodpecker (*Dryocopus pileatus*) and other potentially sensitive species, protection of the site as important wildlife habitat is easily justified. Because this area contains private land, it is recommended that the City purchase the property.
- Restrict the application of pesticides (herbicides and insecticides) within 500 feet of the colony (Figure 6).
- Further refine buffers based on systematic monitoring, multi-year heron behavioral patterns and productivity, in addition to site specific habitat considerations.

● RESTORATION AND ENHANCEMENT

- Restoration of the Post Point wetlands is another element that could provide enhanced habitat for a number of species. A restoration plan would be needed; however, the recommendation in general is to restore the stream/wetland corridor to the Post Point lagoon and restore/enhance the lagoon edge with native vegetation.
- It is therefore recommended that the 100 foot forest buffer around the heronry be fully restored and enhanced. A perimeter planting of thorny native shrubs would assist in creating habitat diversity and deter access to the colony.

Enhancement of stream/wetland corridor and lagoon edge would benefit a number of species including herons. Retention of fallow meadow area is vital for heron foraging.

- **REDUCTION OF DISTURBANCE**

- Limit access with a no-access buffer (Figure 6) which defines the protection of habitat 100 feet from the colony. This buffer is appropriate to limit access year-round. To define the boundary and to deter access on the ground, a combination of fencing and plantings are recommended. The planting of thorny native shrubs including wild rose (*Rosa nutkana*) and other species along the 100 foot boundary in the upper and lower areas of the bluff will act as a natural barrier. Outside the planting could be a simple wooden fence (split rail) as a visual boundary. The purpose of the natural barrier is to allow wildlife to move through freely, but limit easy access by humans and their dogs. In addition, the restoration of forest buffer, wetland and stream corridor at the base of the bluff will over time deter entry into the sensitive habitat area.
- No trails should be located within the 100 foot zone.
- Limit disturbance to the colony by creating a zone of non-disturbance, the herons are more likely to perpetuate their current nesting activities. The proposed non-disturbance buffer, recommended to be at least 250 feet from the colony or 300 feet from the base of the nearest nest tree, would provide habitat screening, deterred access and distance, resulting in a safety zone for the herons and their young (Figure 6).
- Timing restrictions are an effective tool to control disturbances from specific projects. If a project is proposed within the 250 meter (820 feet) zone (minimum WDFW buffer) (Figure 6) that may create significant noise, activity or other disturbance to the herons, it is recommended that timing restrictions be imposed on the project or portions of the project.
- Timing restrictions are imposed on activities within the designated buffer zone around the heronry prior to staging and the re-colonization of the herons in the nesting area and then extend through the nesting season until the last of the young have fledged. Because the chronology of the Post Point colony has not been established the commencement of timing restrictions using the WDFW management recommendations of February 15th is reasonable. The end of the nesting season is later than July 31st, so it is recommended that August 31st will provide maximum protection until the colony chronology is established, over a minimum of three years. Monitoring of the site will determine the nesting period over time.
- Security of the colony is needed. It is recommended that a Steward be hired or assigned and trained for the task of managing and overseeing the security of the Post Point Heron colony.

- **MONITORING RECOMMENDATIONS:**

- The monitoring scheme recommended for the Post Point Colony consists of a general monitoring plan to establish the baseline, with requisite productivity survey, nest count and mapping. The duration of monitoring is annually for a minimum of three years. At the end of three years the monitoring should be reviewed and adjusted or extended as needed. Landuse monitoring needs to be on-going by the City of Bellingham and effective for all projects within the 250 meter buffer. In the event of a proposed project in close proximity to the colony, intensive monitoring may be necessary.

- **HERONRY SITE MANAGEMENT**

- Heronry sites need oversight by a qualified biologist or trained personnel who would serve as the site's manager. The management of the site may also be enhanced with assistance from local volunteers. The manager is responsible for all aspects of site and heron stewardship and monitoring. He or she represents the stake holders, works with neighbors and community and oversees volunteer involvement and public education. Site management includes correspondence with the general public and media, general monitoring, security of the colony, fielding inquires about access, reviewing research proposals, coordinating volunteer stewards, managing data and reporting. (A land ownership profile and purchase plan for buffer properties may also be included). The manager or steward also provides public education and trains volunteers as docents for on site educational programs and tours.

- **PUBLIC EDUCATION**

- Public education at Post Point would be helpful both at a stationary viewing/interpretive site and by a steward or docent for visitors. There is also an opportunity for an in-school education program delivered by the steward.

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