Post Point Heron Colony
Management Recommendations Update 2019

prepared for:
The City of Bellingham Department of Public Works
Bellingham, WA

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1. INTRODUCTION

The focus of this document is to address the need for updated management guidelines and recommendations to protect and sustain the Post Point Heron Colony, the only colony of Great Blue Heron *(Ardea herodias)* nesting in the City of Bellingham. The colony is located near the marine shoreline in south Bellingham, on city owned property adjacent to Bellingham's Post Point Resource Recovery Plant (PPRRP), formerly known as the Post Point Wastewater Treatment Plant.

The Post Point Heron Colony established in its current location in 2000. Due to the need for more information about the herons, the City's Public Works Department, who manages the colony site, requested a biological evaluation of the colony in 2002 and later a management plan in 2003. When the 2003 Post Point Heron Colony Management Plan was prepared, the colony was 4 years old, and supported 10 active nests. Over time, the 2003 Management Plan has provided guidance in supporting and protecting the colony. Recommendations in the plan resulted in the 2005 baseline report for the colony followed by annual monitoring of the colony to track the colony and provide ongoing stewardship. Annual monitoring over the past 15 years has provided a wealth of information and a greater understanding of the herons, nesting behavior, colony dynamics and habitat use.

Over 20 years the colony has persisted in the same location and has supported up to 42 nesting pairs seasonally and fledged an estimated 1,000 young herons. Not only is this colony a valued ecosystem component and an important Critical Area supporting a state Priority species, but it is also a vital contributor to the resident Great Blue Heron population of the region.

In 2019 the City of Bellingham, Public Works Department requested a management plan update. This management update has been prepared with the same goal as the original 2003, which 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 Heron Colony and associated habitat. In addition to updated management recommendations, this document will also provide a species summary, site and colony descriptions, and a synopsis of data observations over the past 20 years.

2. PURPOSE

The purpose of the Post Point Heron Colony Management Recommendations 2019 update is to provide current information about the heron colony and site conditions, and update the 2003 management recommendations. The revisions herein are based on newer Washington State Department of Fish and Wildlife guidelines for Great Blue Heron colony management, recent literature, and an informed understanding of the heron colony as a result of monitoring over 15 years. The 2003 management plan forms the foundation for this document and many of the heron related references and information are still valid.

This document is made up of 4 primary sections.

1) Background Information: species summary, regulatory review, site and habitat description.
2) Site History
3) Colony History and Chronology
4) Management and Recommendations: Heron Management Area description, habitat protective guidelines, buffers, reserve area and management recommendations.

The management and conservation of any wildlife area is founded on three key sources of information: regulatory guidelines, scientific literature and site specific information (empirical data). Management recommendations for Great Blue Heron colonies typically start with the delineation of the colony area and associated habitats, obtaining a baseline of the colony including its level of sensitivity, size, and nesting chronology. Then protective measures relevant to the colony need to be identified including: buffers or setbacks, timing restrictions, restricted activities, and site management. Outside of the colony area, other habitats, such as foraging areas, are vital to the colony and also need consideration for protection. With these complementary components and necessary management actions defined, the management plan will provide the conservation and stewardship function necessary to support the sustainability and productivity of the target colony over time.

In 2012 the Washington Department of Fish and Wildlife (WDFW) published the updated Management Recommendations for Washington's Priority Species: Great Blue Heron (Azerrad, 2012). The WDFW Management Recommendations are based on the best available science applicable to the management of heron colonies in this region. The WDFW Management Recommendations is used as guidance for this management plan. In addition, other documents, studies, and input from regional heron experts is also utilized and cited.

It is the intent of the recommendations contained herein to provide guidance to achieve the management goals of habitat protection and supporting successful reproduction by the herons at Post Point. Implementation of the recommendations by the City of Bellingham depends on regulatory authority, land ownership, and logistical considerations

3. BACKGROUND INFORMATION

The background information provided in this section includes a regionally pertinent species summary, regulatory review of heron protection, and a detailed site description of the Post Point heron colony, including location, landuse and associated habitats.

3.1. Species and Status

The Great Blue Heron *(Ardea herodias fannini)*, is a year-round resident of the Salish Sea. Heron colonies are locations where herons seasonally aggregate to nest and reproduce, and are critically important areas for maintaining the regional species population. When not nesting, herons are scattered throughout the area and are relatively common.

The Great Blue Heron is an iconic species and recognizable by most residents of the Pacific Northwest. Great Blue Herons were named as a Valued Ecosystem Component by the Puget Sound Nearshore Partnership in 2007 (Eissinger, 2007), as a Sentinel Species by Environment Canada (Champous et al, 2002) and as part of a biological early-warning system, or indicator species, important to the human population (Wilson et al, 1996). The heron is also important culturally, both in the past by indigenous tribes and at present, by modern society.

As a resident non-migratory species, Great Blue Herons are widespread throughout the Salish Sea, particularly in coastal lowlands, wetlands, and riverine systems. Herons utilize a habitat mosaic throughout their life cycle and require a variety of suitable habitats in order to survive harsh conditions, find seasonal prey, nest, and successfully raise young. Herons forage on a variety of small prey found in marine, freshwater, and terrestrial environments, and concentrate in large numbers as food demands and prey abundance converge during the nesting season.

Heron nest sites are referred to as a colony or heronry. Heron colonies are situated within mature forests or groves, usually isolated from human disturbance. Herons utilize a wide range of tree species for nesting including both deciduous and conifer. Colonies range in size from less than 10 to over 700 nests. Most colonies are closely associated with productive feeding grounds and many are situated in coastal areas with nearby shallow intertidal habitat and abundant eelgrass meadows. Heron colonies with supporting habitats are particularly important, considering that the adult herons spend 5-7 months in the same location, and require access to nesting, resting and feeding areas with abundant prey within an easy flight distance to support both themselves and their offspring (Knight et. al. 2016). The nesting season is usually February-August depending on the colony and conditions. After nesting the herons disperse from colony sites and move across the landscape as individuals or in small groups through fall and winter.

The population and status of the Great Blue Heron population in both Puget Sound and southwest British Colombia is in the process of being updated (Eissinger and Vennesland pers. com.) From past data, the Puget Sound Great Blue Heron breeding population was estimated to be 6130 individuals in 2004 (Eissinger 2007), and 3074 for the Strait of Georgia, British Columbia in 1999 (Gebauer and Moul 2001). A preliminary review of recent Puget Sound data indicates a decline of active colonies

due to abandonment and habitat loss. Currently, the Great Blue Heron is a "Priority Species" in Washington State (WDFW 2008). Population declines in British Columbia's Strait of Georgia and Fraser Valley caused herons to be designated as a "Species of Concern" by the Committee On The Status of Endangered Wildlife in Canada (Vennesland and Butler 2004).

Factors affecting the regional heron population include habitat loss, human disturbance, environmental toxins, and depredation by predators (Vennesland 2000).

Declining habitat including coastal forests suitable for nesting, wetlands and fields for feeding and loafing is resulting from increased human development within the Puget lowlands. This situation is compounded by that fact that 73% of the colonies in Northwest Washington (including Post Point) are directly linked to and dependent on marine intertidal habitat, particularly eelgrass meadows, for foraging and require coastal areas to nest (Eissinger, 2007). Disruption and loss to vital intertidal habitats such as eelgrass is a real threat, with causes ranging from poor water quality, oil spill, sedimentation, ocean acidification and climate change, including heat facilitated pathogens causing eelgrass wasting disease (Thom and Hallum 1990, Thom et. al 2011, Mumford 2007, Eisenlord et al 2018). Human disturbance is also a factor as more people live and utilize shoreline areas and engage in water sports near the shoreline.

The loss and disruption of heron colonies by human activity has been well documented in the literature. As stated by Vennesland and Norman 2006, several studies have linked colony abandonment to human activity including residential and industrial development, highway construction, logging, vehicle traffic, and repeated human intrusions (Bjorklund 1975, Mark 1976, Werschkul et al. 1976, Simpson and Kelsall 1978, Kelsall and Simpson 1979, Forbes et al. 1985b, Vennesland and Butler 2004, Parnell et al. 1988, Rodgers and Smith 1995, Vennesland 2000). The rationale for the protection of heron colonies and associated habitat is based on the species vulnerability to human disturbance, predation and habitat loss (Vennesland 2000). Human disturbance is of particular concern due to its negative effect on productivity (Azerrad 2012).

3.2. 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 seasonal aggregations, their protection, particularly of their nest sites, is dependent on a combination of regulatory factors.

3.2.1. 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, or unlawful wildlife trafficking.

The subsequent Migratory Bird Treaty Act of 1918 (MBTA), further protects 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 MBTA does not protect habitat.

The list of species protected under the MBTA is periodically updated. As of December 2013, the Great Blue Heron is listed as a protected species (10.13 List) (USFWS). Provisions in the Migratory Bird Treaty Act and subsequent federal laws permit certain activities, collection 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.

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 advice regarding federal wildlife protection, contact the U.S. Fish and Wildlife Service Office of Law Enforcement, located at 911 NE 11th Ave. Portland OR 97232 or call 503-231-6125.

3.2.2. State Regulation and Management

Washington State regulation, policies and management guidelines for wildlife and habitat is the primary responsibility of the Washington Department of Fish and Wildlife (WDFW). The Department of Natural Resources and Department of Ecology also play a role in species and habitat management.

The Great Blue Heron in Washington State is classified as a non-game species and protected under WAC 220-200-100. Herons, and their eggs and nests are protected from unauthorized taking under RCW 77.15.130.

The WDFW non-regulatory Priority and Habitats and Species Program provides biological and spatial information plus management recommendations to inform planning, permitting or conservation actions for nearly 200 species and 20 habitat types. Great Blue Herons are designated as a State Priority Species and their nesting and associated foraging habitat is considered a Priority Area.

In 2012 the Washington Department of Wildlife published updated state-wide Management Recommendations for Washington's Priority Species: Great Blue Heron (Azerrad 2012) and online at: https://wdfw.wa.gov/publications/01371. This 18-page document replaces earlier guidelines with more thorough coverage of the species life history, habitat requirements, limiting factors and other

considerations for which the management recommendations are based. The 2012 update also provides specific definitions and guidelines for urban colonies, buffers, Heron Management Areas (HMA) and Habitat Management Plans (HMP). 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.

Great Blue Heron habitat identification and protection may result from the State Environmental Policy Act (SEPA) of 1971. The lead agency for SEPA for the Post Point Heron Colony will typically be the City of Bellingham. Similar to the federal NEPA process, SEPA is the State's legal instrument for identifying project or action related environmental impacts during permitting and decision making stage by state and local agencies. Based on the SEPA rules, WAC 197-11, the SEPA process begins with a checklist, filed as part of the permitting process for projects or actions which includes the identification of wildlife and habitat in the project area that may be impacted. General wildlife species as well as Threatened and Endangered species 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. Following SEPA review, if the project is not exempt from SEPA rules, and the SEPA official determines that a proposal may have probable significant adverse environmental impacts, an environmental impact statement is prepared.

In 1990 the Washington State Legislature passed the Washington Growth Management Act (GMA). 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 designated areas. There are 5 critical areas identified in the GMA, including 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….*

The Great Blue Heron as a designated Priority Species qualifies it as a Species of Local Importance under the City of Bellingham Critical Areas Ordinance.

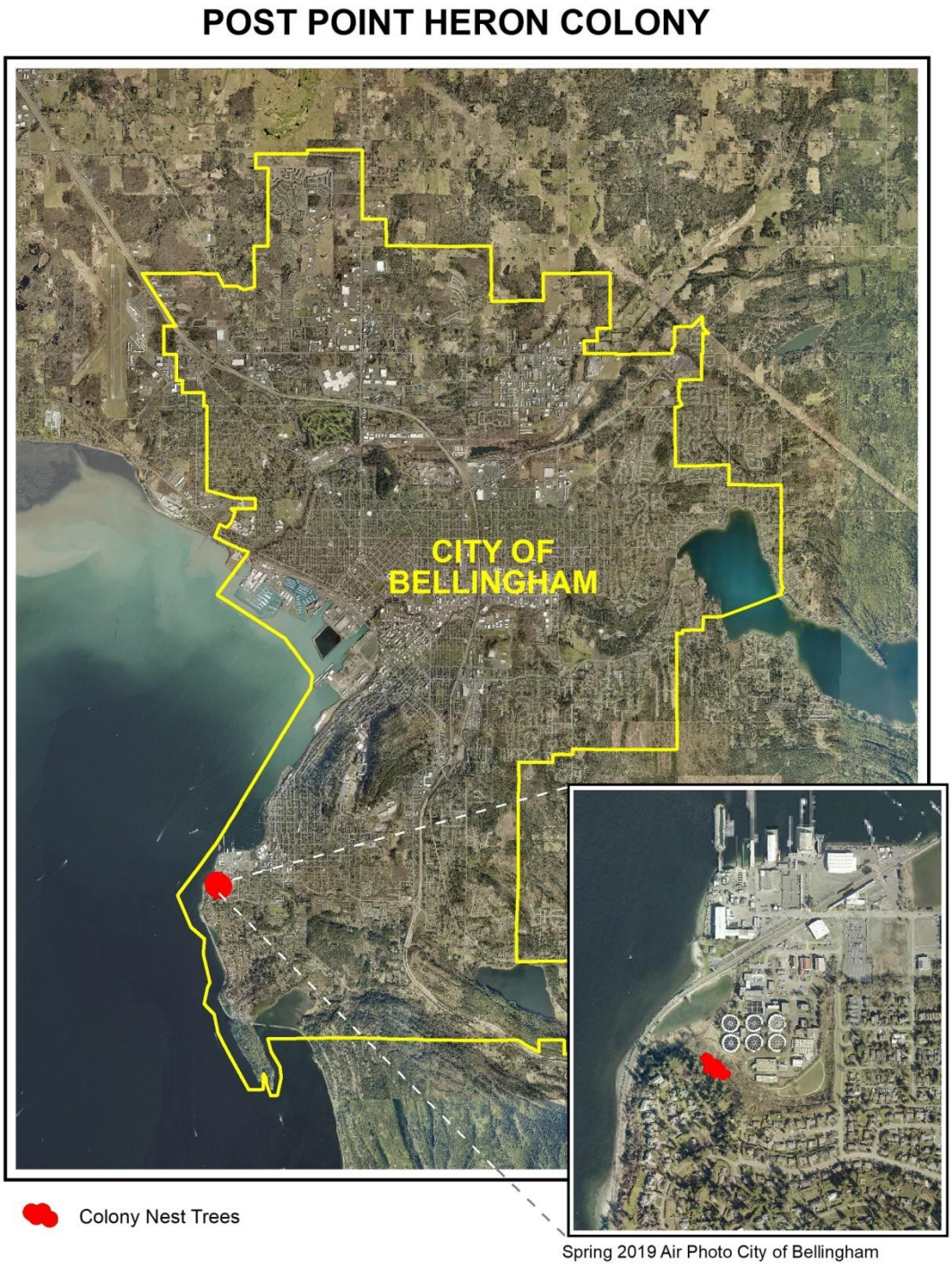
3.2.3. Local Regulation and Plans

In the City of Bellingham, local regulatory programs and policies associated with wildlife and habitat include the Critical Areas Ordinance (CAO), Shoreline Master Program, and the Comprehensive Plan. Some neighborhood plans also identify certain wildlife areas as sensitive or in need of protection.

The City of Bellingham's current Critical Areas Ordinance – updated in 2016, regulates critical areas through provisions under the Bellingham Municipal Code 16.55. Designation of fish and wildlife habitat conservation areas is defined in BMC 16.55.470 and includes: "State priority habitats and areas associated with state priority species are considered to be priorities for conservation and management." This includes the Post Point Heron Colony and associated "habitat areas."

The Bellingham Shoreline Master Program provides shoreline habitat protections within 200 feet of the shoreline. This includes heron foraging areas particularly eelgrass meadows, Post Point Lagoon and the marine shoreline habitats around Bellingham and Chuckanut Bays.

Figure 1. Post Point Heron Colony Location



3.3. Site Description and Land Use

In 2000 a group of Great Blue Herons moved to an area in south Bellingham to nest. Located adjacent to the Post Point Resource Recovery Plant formerly known as the Post Point Wastewater Treatment Plant, on City of Bellingham property, the Post Point heron colony became a point of interest by both City staff and citizens soon after it established. As a result of this interest, the City has been engaged in the documentation and tracking of the colony for 20 years and the biological monitoring of the colony for 15 years. The site specific information provided in this section is a direct result of monitoring the Post Point heron colony which has led to an understanding of the heron's habits and their habitat associations.

3.3.1. Site Description

The Post Point Heron Colony is located on the south side of the City of Bellingham known as the Fairhaven District (T37N/R2E/Section 2) (Figure 1). The colony is situated in a remnant forest 550 feet east of Bellingham Bay, near Post Point (Figure 2).

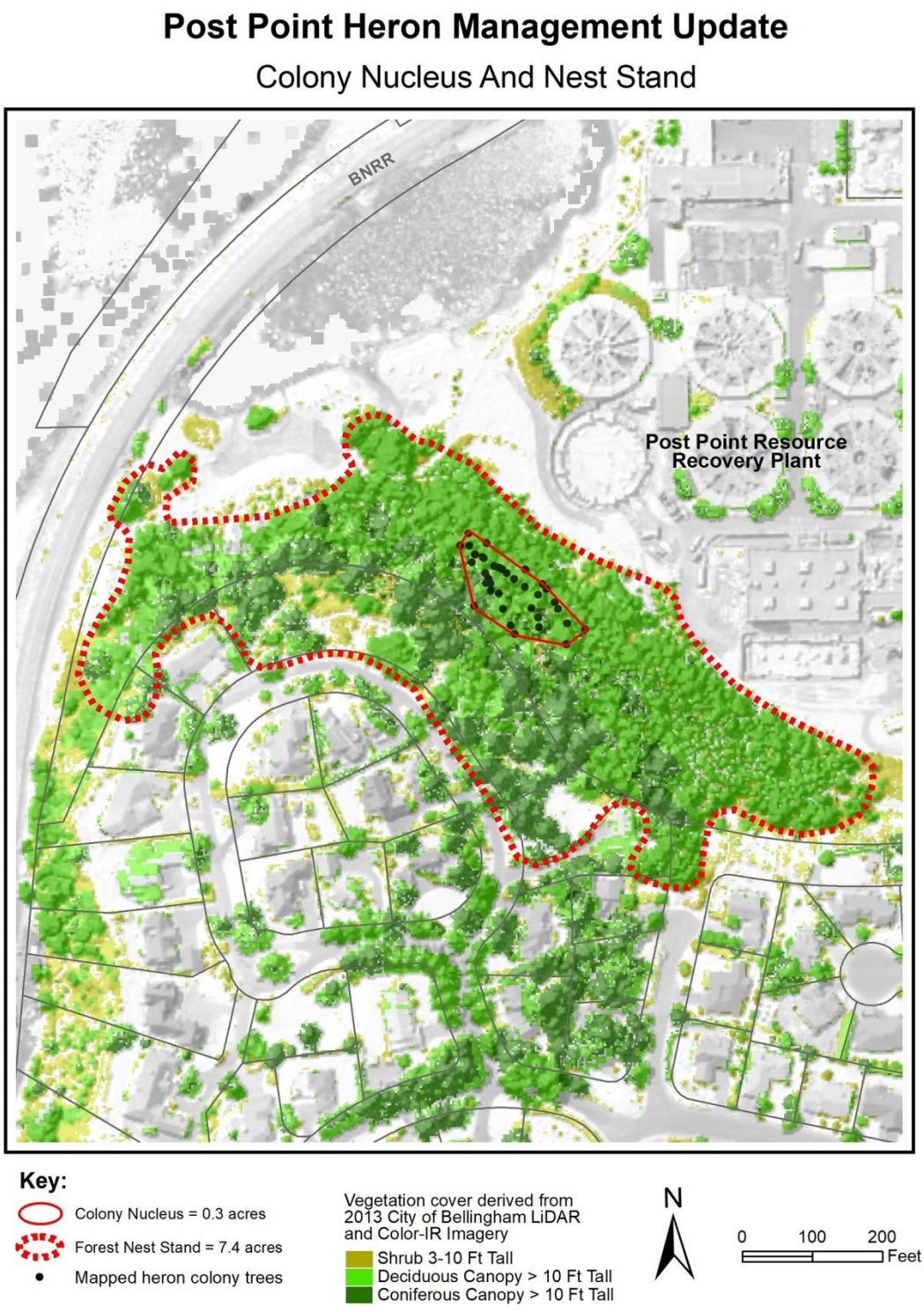
The property on which the heron colony is located is part of a 30 acre parcel owned by the City of Bellingham (Figure 2). The colony is located on the south-southwest edge of the parcel. The Post Point Resource Recovery Plant (PPRRP) occupies over half of the property and is located to the north-northeast of the colony (108 ft.), with a public off-leash dog park to the east-southeast (450 ft.), Post Point lagoon to the northwest (280 ft) and associated natural area to the east and west of the colony. To the west, separating the lagoon from Bellingham Bay and Marine Park is an active railroad causeway, 485 feet west of the colony. The publicly owned property has a public trail that follows the perimeter of the PPRRP and passes within 85 feet from the colony. Immediately adjacent to the heron colony, upslope to the south southwest and southeast, is 1.8 acres of privately owned undeveloped property, serviced by Shorewood Drive. This property is currently forested with native vegetation. The nearest residence to the colony is located to the southeast at 288 ft.

The forest or nest stand in which the colony is located spans a coastal bluff that gently rises over 100 feet in elevation, running north-south along Bellingham Bay at Post Point then turns east, or inland from the shoreline. It is on this northern-aspect inland slope where the colony is situated, wedged between the PPRRP at near sea level to the northeast and the Shorewood neighborhood upslope to the south. The forested hillside provides the heron colony separation and elevation above the public trail and nearby municipal facilities. The colony's nest trees are situated on the lower half of the slope and are surrounded by forest of various desity and height.

As of 2019, a total of 42 of nests are located in a cluster of 22 trees. The nests are located in the crown of the trees about 80 feet in height. The distance of the nests off the ground provide protection from ground predators and provides a vertical buffer from disturbance. The nucleus of the colony is that area containing nests in trees (0.30 acre) and is defined by the outer perimeter of the nest trees (Figure 3). The heron habitat is further described in section 3.4 and the colony in section 5 of this document.

Figure 2. Heron Colony Site

Figure 3. Colony Nucleus and Nest Stand



3.3.2. Landuse

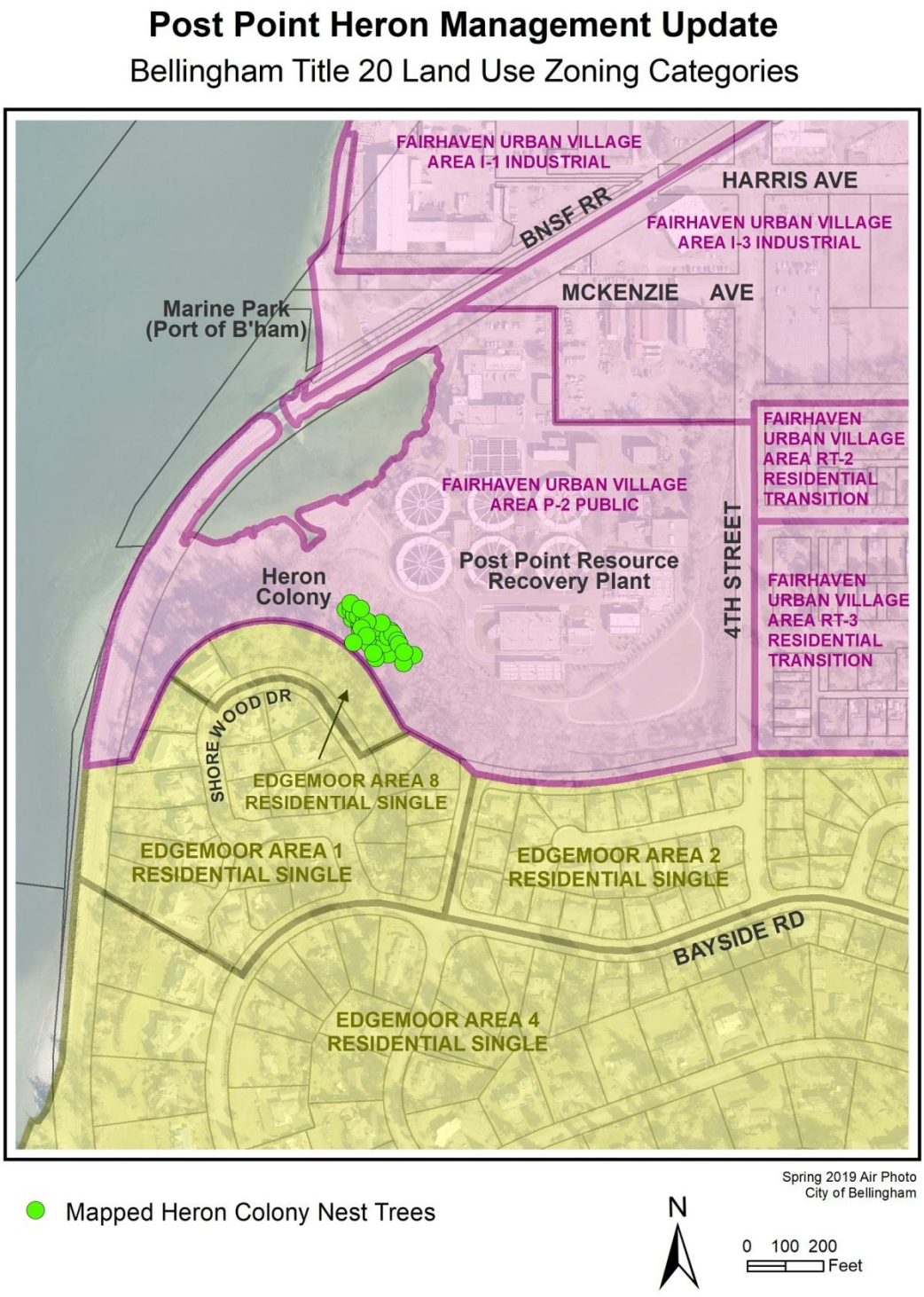
The Post Point heron colony's location is characterized as urban. Land use within .25 mile of the heron colony is mixed and includes: a municipal wastewater treatment plant, park-open space, residential, industrial, commercial and marine transportation. In addition, the main coastal railroad route servicing Western Washington and British Columbia passes to the west of the colony along the marine shoreline. In this section there are 4 rails to accommodate 2 trains. The railroad is used multiple times daily by Amtrak – passenger rail service, and BNSF railway transporting freight including, lumber, coal, and crude oil.

City of Bellingham zoning of the area where the colony is located is, Urban Village (Area P-2) to the north, east and west; to the south, directly adjacent to the colony, is Single Residential (COB Zoning Map 3/29/2019). The Fairhaven Plan's Urban Village Area P-2, is a Public Area designation, that includes: Padden Creek and estuary, the PPRRP, an off leash dog park, trails, Post Point Lagoon, Marine Park and the Post Point Shoreline. The Public Areas Goals and Policies in the plan specify the protection, environmental stewardship and monitoring of the Post Point Heron Colony (BMC Policy 2.24 and 2.25) (Figure 4).

The Bellingham Shoreline Master Program Shoreline designation is UC-Urban Conservancy from the Marine Park Beach south to Clark Point, defined by the BMC 22.03.030. The Post Point Lagoon is UC and also designated as a pocket estuary, which are areas of ecological value and targeted for restoration BMC 22.02.020.

Heron and young by A. Fritzberg 2011

Figure 4. City of Bellingham Zoning



3.4. Habitat Descriptions

The habitats utilized by Great Blue Herons in association with the Post Point Heron Colony has been documented over the past 20 years. Although herons may concentrate in certain areas seasonally, a mosaic of habitats is needed to support the heron population year-round.

There are five primary habitats used by the Post Point herons including:

- Coastal Forest – nest stand and roost areas
- Upland Field or Wet Meadow – foraging, loafing and staging
- Marine Shoreline – foraging
- Estuary – foraging and loafing, occasional staging
- Freshwater Systems: wetlands, lakes, streams and riparian areas – year-round use, foraging and roosting

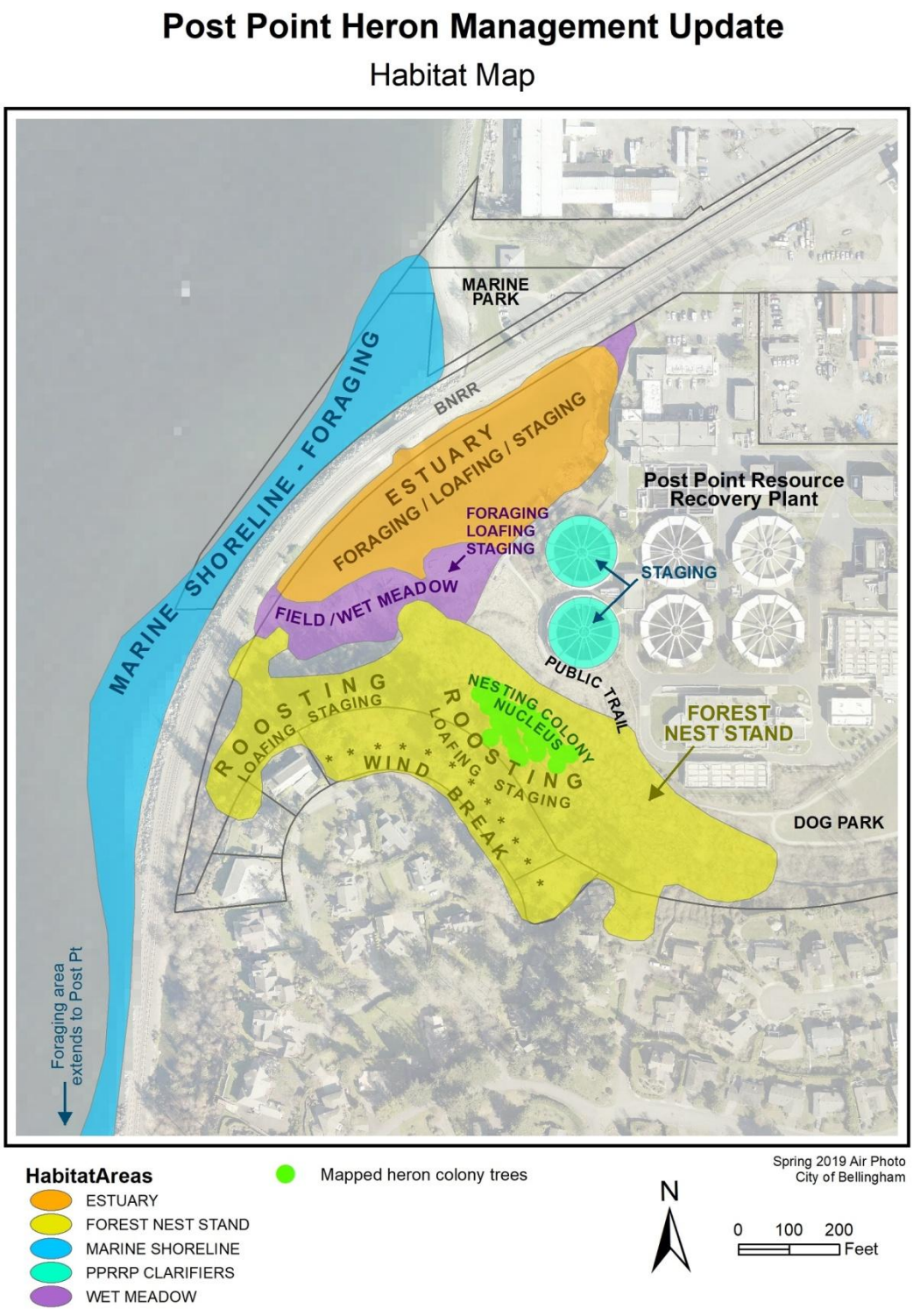
Each habitat will be described separately. The habitats are illustrated in Figure 5

The heron's use of areas around Post Point may have multiple habitat associations. The types of use areas referred to in this document are defined as follows and are mentioned by habitat or alone.

- Colony, Nest Area, Colony Nucleus: the specific area where nesting occurs and nests and nest trees are located. Each colony varies in size and configuration depending on the numbers of breeding herons, location and available habitat. These sites are usually isolated away from human disturbance.
- Nest Stand: the forest area surrounding and contiguous with a heron colony.
- Roosting and Loafing Areas: are locations adjacent to or outside of the colony nucleus for the adults to rest, preen and depending on conditions provide sun, shade or shelter, or by young herons following their fledging from the nest. These areas can be in trees or on the ground and may be used year-round.
- Staging or Pre-Nesting Areas: sites where the herons gather prior to reoccupying nests in the colony. Use of these areas is limited to early in the season January to February or March if the season is late. Staging at Post Point is inconsistent year to year, and the location is likely weather dependant. However, one unique feature of the Post Point heron colony is their use of the PPRRP clarifiers for staging.
- Foraging Areas: sites where heron feed individually or in groups. Heron foraging areas include terrestrial, freshwater and marine habitats, where over 30 prey species have been identified (Butler 1995). During the nesting season herons may feed in large concentrations particularly in open intertidal areas.

The habitat descriptions are as follows.

Figure 5. Habitat Map

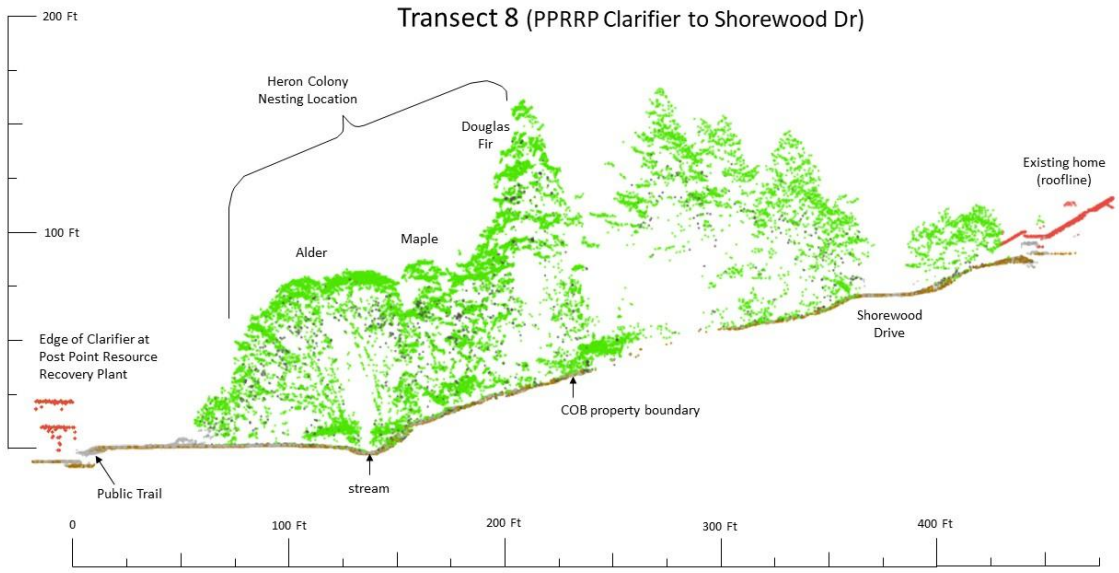


3.4.1. Forest: nest stand and roost areas

The Post Point Heron Colony is situated in a 7.4 acre forest of mixed species and ages. The dominate species include mature emergent Douglas fir *(Pseudotsuga menziesii)*, bigleaf maple *(Acer macrophyllum)*, western red cedar *(Thuja plicata),* and red alder (*Alnus rubra).* The nest trees are currently mature alder and big-leaf maple. A band of young alders have rapidly filled in along the north edge of the colony providing additional screening. Douglas fir was utilized one season for nesting., Between 2000 and 2007 native western paper birch *(Betula papyrifera)* were also present and used for nesting, but have since all died (possibly of birch blight or birch borer beetle). There are currently no birch trees remaining in this forest stand as of 2019. This forest or nest stand also includes other tree species and a mix of shrubs and forest plants. A full inventory of flora within the forest has not been conducted.

The forest area measures 300 feet wide at the colony, 350 feet at the widest point to about 90 feet at the narrowest point (variable widths) and approximately 1300 feet long which wraps around the bluff from east to west. This site is located on a slope, rising to the south about 100 feet in elevation and envelopes the heron colony on the lower half (Figure 6). The lower portion of the forested slope is predominately alder, with big-leaf maple and large Douglas fir dominating the mid and upper slope area. The upper forest on the south side of the heron colony provides wind break from prevailing winds and visual screening and vegetative buffer from the residential area along Shorewood Drive. The lower north side has a band of alders that form a thin buffer between the colony from the PPRRP. To the east and west the forest is dense and serves as a substantial buffer for the colony. In addition to vegetative buffer, screening, and wind break, the forest also creates a microclimate which moderates temperatures and the tall firs provide shaded perches.

Figure 6. Landscape Cross Section PPRRP to Shorewood Dr.



Overall the forest condition is relatively good; however, more recently some changes and disturbances have occurred in the forest and are described in section 5.5.7 of this document.

The heron's current nest area is 0.3 acres (colony nucleus), but the herons require additional forest for other activities as well as vegetative buffer and screening from adverse weather and human disturbance. Heron colony's also migrate within the nest stand and expand or contract annually which requires greater area. Although the nest stand is 7.4 acres, the minimum nest stand size recommended by WDFW is 10 acres (for alternate nest sites), which is 26% more area than Post Point. Due to this restrictive area, any loss of forest habitat could impact the colony.

In addition to nesting the herons also use the forest for, roosting, loafing and staging. These activities are concentrated during the nesting season, however herons are known to roost here year round.

3.4.2. Field and Wet Meadow

The field/wet meadow habitat component is vital to herons for foraging, loafing and occasionally staging prior to nesting. These habitats are fallow grassy areas, usually populated with small mammals, particularly voles *(Microtus townsendii),* amphibians and occasionally snakes on which herons feed. The voles provide an important winter and spring food source. Prior to the eelgrass filling in and prey becoming readily available within the marine intertidal areas, voles found in grassy fields and margins provide a nutritional boost for the breeding season.

At Post Point, there was a large wet meadow habitat area located between the heron colony nest stand and PPRRP and extending west to the Post Point Lagoon. Most of this area east of the Lagoon was planted with shrubs. The remaining habitat supports a population of voles. The grassy margins around the lagoon are utilized regularly by both young at fledging and adults for loafing and feeding. The isolated pockets of open grass also provide good sunning locations and protected resting locations during poor weather.

Grassy margins along Post Point Lagoon – wet meadow habitat

South end of lagoon

Heron loafing with mallards along Post Point Lagoon shoreline meadow

3.4.3. Marine Shoreline

Marine shorelines and intertidal areas are a significantly important foraging habitat for herons, particularly in eelgrass (seagrass) meadows where large concentrations of prey are found. Eelgrass *(Zostera marina)* is a critical component of the Salish Sea ecosystem occurring in shallow intertidal areas that are easily accessed by wading herons. Eelgrass grows in sandy and mud substrates at depths between =1.4m-12.5 meters MLLW (Christiaen et.al, 2019). If present, *Zostera japonica*, the non-native, eelgrass may occur with the native species or at slightly higher levels in the intertidal zone and serves a similar function as the native species. The microhabitats created by eelgrass form biologically rich areas with abundant prey for numerous species including Great Blue Heron (Mumford, 2007). Nearly all coastal heron colonies in the Salish Sea are directly associated with and supported by eelgrass feeding grounds (Eissinger, 2007). These feeding habitats are inextricably linked to coastal heron colonies and likely a determinate factor in the heron's reproductive success.

Although eelgrass has been surveyed in Bellingham Bay, there is not sufficient data to calculate trends, however eelgrass has remained relatively stable in Puget Sound since 2000, with the exception of declines in certain shallow beds in 2015-2016 thought to be related to higher than normal temperatures (Christiaen et.al, 2019). Sound-wide monitoring of seagrasses is extremely valuable and the City of Bellingham's support for these efforts locally provides impetus for more intensely sampled and complete monitoring (Christiaen et.al, 2019).

At Post Point, eelgrass grows both in the Post Point lagoon and outer shoreline area from Marine Park south. These areas have also been enhanced with additional planting of eelgrass in 2008. Eelgrass also occurs in larger meadows in Chuckanut Bay, Portage Island area and in patches along the Bellingham Bay shoreline.

The marine associated foraging areas for the Post Point herons in and around Bellingham Bay were surveyed and mapped in 2006 (Figure 7). Follow up surveys were conducted during the nesting season in 2007 and in 2008 detailed observations were made at Post Point and Chuckanut Bay. The primary feeding grounds observed during the nesting season included eelgrass-rich intertidal shorelines from Marine Park south, Chuckanut Bay in and outside the trestle, east side of Portage Island, Portage Bay, and Brant Island. Herons were also observed along the shoreline below Lummi Shore Drive and Marine Drive. The herons use of the Nooksack River delta is assumed, based on year-round food availability and quality habitat, but the area is difficult to survey.

Heron foraging in eelgrass at Post Point

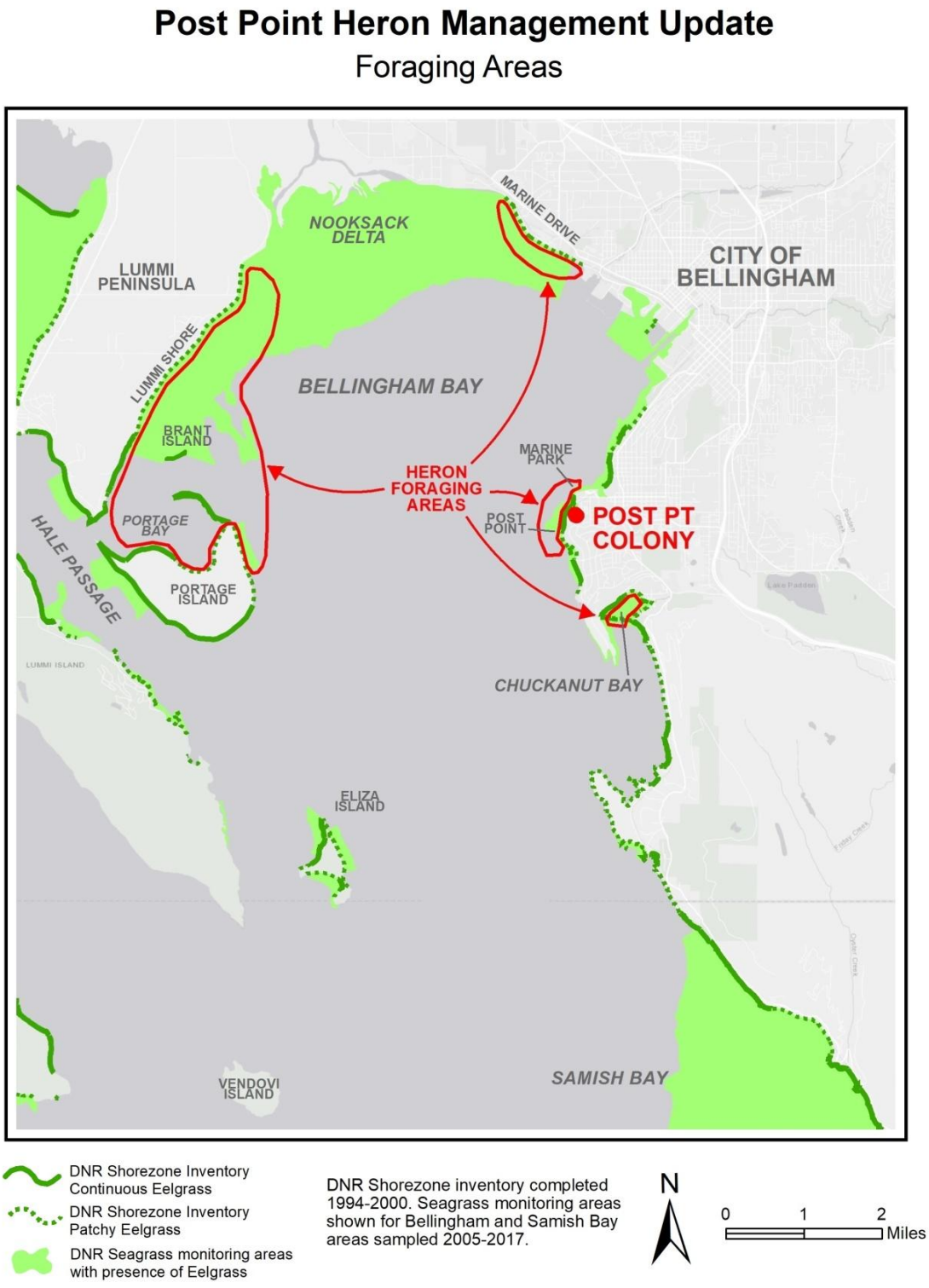
Colony proximity to foraging areas is critical to reproductive success. For example, it is estimated that 15 km or 9.3 miles is the distance at which the energetic cost of flight requires 90% of the forging intake that could be provisioned to young. (Knight, Vennesland and Winchester 2016). So, protecting the foraging areas nearest to the colony and reducing disturbance in those areas is vital to the heron colony success.

The Post Point herons travel from 0.60 to 11 miles round-trip to feed and collect food for their young (Table 1). Protecting and enhancing the foraging sites nearest to the colony has potential measurable value to the heron's productivity. Reducing disturbance at these sites is also important.

Table 1. Distance to foraging areas from Post Point Colony

Foraging Area	Distance from colony
Marine Park	0.15 miles
Post Point	0.30 miles
Portage Island	4.25 miles
Portage Bay	5.25 miles
Brant Island	4.66 miles
Lummi Shore	5.50 miles
Marine Drive	4.00 miles
Chuckanut Bay	1.40 miles

Figure 7. Foraging Areas Associated with Eelgrass



Herons optimize their feeding opportunities by following tidal stage and intertidal conditions such as gradient, channels and presence of eelgrass which vary by site location. From their central location at Post Point, herons are able to follow favorable tidal stages moving from one location to another around the bay.

Shoreline saltmarsh, and wet meadows also provide valuable feeding, staging, loafing and diurnal roost areas. Many of these pocket habitats are isolated from human activity, protected from harsh wind and weather, providing ideal hunkering sites for individual or small groups of herons. Small patches of wet meadow and salicornia dominated salt marsh areas are found around the edge of Post Point Lagoon, and both Padden Creek and Chuckanut Creek estuaries.

Shoreline or riparian forest and tree groves are valuable habitats for heron and other coastal birds for perching and roosting, which allow birds to rest, preen or vantages from which to hunt. Recognized as a valuable ecosystem component (Brennan, 2007) these features provide staging or pre-nesting gathering, and roosting habitat for herons. At Post Point, the forested area in association with the nest colony extends east and west, providing roosting and staging opportunities for herons. This forested slope historically fronted the shoreline, prior to the railroad installation. The herons utilize the Douglas fir and Sitka spruce *(Picea sitchensis)* to the west of the colony for year-round roosts. At Post Point, Great Blue Herons and Bald Eagles are frequently observed perched in fir trees at the water's edge.

3.4.4. Freshwater Systems

Freshwater systems which include wetlands, lakes, streams and rivers, are utilized by herons throughout their range and are important for providing prey, as well as roosting, loafing and in more inland areas, nest sites. Use of these systems depends on access, suitable habitat, and the lack of human disturbance.

The use of freshwater systems in the Bellingham vicinity by the Post Point herons has not been studied. However, herons, usually individuals, are observed on the shorelines of large water bodies such as Lake Padden and Lake Whatcom, certain stream segments of Chuckanut, Padden, Whatcom and Squalicum Creeks, and areas of the Nooksack River and delta. Area wetlands are also frequented by herons. These systems provide important year-round prey and habitat opportunities.

4. SITE HISTORY AND CHANGES

This section describes the site history and a summary of tangible changes based on site records and monitoring by Nahkeeta Northwest over the past 20 years. A site overview is provided in Figure 8, and a site change map is Figure 9.

4.1. Site History and Physical Changes

The Post Point site, where the colony is currently located, has been utilized for heron roosting for many years prior to nesting (Eissinger, 1995). The first nests were reported by neighbors in 1999 and may have been active earlier. The heron colony established at the current Post Point location in 2000, following the abandonment of a colony near Chuckanut Drive, due to the construction of the Blue Heron Estates development.

In September 1999, the City Council had adopted the Post Point Vegetation Management Plan for the purpose of creating views of Bellingham Bay for residential lots immediately upslope from the colony on Shorewood Drive. The Plan allowed tree and vegetation removal on City property that otherwise served as a buffer between residential uses and the PPRRP. In 2000, the City of Bellingham requested an assessment of the heron colony, and general information about herons and their management. An assessment was completed and submitted, which described the nesting area, site conditions, heron activity and recommendations for the protection of the colony (Eissinger, 2000). The City rescinded the Post Point Vegetation Plan in 2002 (Resolution 2002-07). Although the Plan was rescinded before view corridors were created, clearing of some trees and understory vegetation was allowed on the undeveloped lots on Shorewood Drive.

Recognizing the sensitivity of the Post Point heron colony, in 2001 the City of Bellingham - Department of Public Works, implemented the relocation of a public trail from its original location less than 50 feet from the colony, north to the edge of the PPRRP grounds about 150+ feet from the colony at the time. In addition, a simple wood rail fence with woven wire was also constructed through the field between the colony and the trail, to separate people and dogs using the public trail from entering the colony or causing disturbance to the herons.

In 2003, the City contracted the preparation of the 2003 Management Plan for the Post Point heron colony (Eissinger, 2003). The management plan followed guidelines from Washington Department of Fish and Wildlife, and detailed specifics about the colony, including habitat and protective measures to maintain and manage the colony and area around the colony. This plan was not formally adopted by the City, but used as guidance for stewardship of the site. In 2004, the City Council committed to continuing conservation and protection measures for the heron colony on the City's Post Point property (Resolution 2004-10). In 2005, consistent with the management plan, the City contracted with Nahkeeta Northwest Wildlife Services to conduct annual monitoring of the colony.

Between 2003 and 2012 the colony site and area around the colony remained relatively unchanged. In 2008, the City of Bellingham further implemented habitat restoration of the Post Point lagoon, including the planting of additional eelgrass took place, expanding the saltmarsh by 70%, expanding

shoreline length by 18%, restricting dog and pedestrian access to wetlands and the shoreline, and educational signs related to the herons and estuarine habitat were placed along the public trail. In 2009 an unauthorized pedestrian foot path was discovered next to the colony. The foot path cut through the heron's nest stand and skirts the colony, linking the existing public trail west of the dog-park to Shorewood Dr. The City repeatedly removed the trail and blocked access with fencing and posting signage at the trail entry points. Despite these efforts, use of the trail continues through 2019.

Between July 2012 to June 2014, the City of Bellingham Public Works Department expanded and modified the Post Point Wastewater Treatment Plant, consistent with the City's 2009 Comprehensive Sewer Plan and as defined in the City's 2011 Facilities Plan. The expansion was required for the City to comply with state and federal regulatory standards and treatment requirements for the city's growing population. This major expansion project required construction activity on the 10 acre site for 2 years and the addition of 3 new structures including a 13,000 square foot secondary clarifier with portions of the structure within 100 feet of the heron colony. This level of construction and related disturbance in close proximity to an existing heron colony was unprecedented in Puget Sound, based on known colonies 2004-2005 (Eissinger 2007).

An expansion design that fully avoided potential impacts on the heron colony was not possible due to location of the existing infrastructure. In order to mitigate impacts, the City of Bellingham, Public Works Department contracted with ESA Adolfson of Seattle to conduct a Biological Evaluation and provide a Wetland and Wildlife Mitigation Plan for the project.

A series of conditions were defined in the City's 2011 Mitigated Determination of Non-Significance (MDNS) as a means of mitigating impacts to the heronry. The MDNS is available in the appendix of the 2011 and 2012 Post Point Heron Colony Annual Reports. The MDNS included 12 mitigating conditions, for example, complete and follow a mitigation plan, work timing restriction within a 100 foot buffer from the colony between Feb. 1 and Aug. 31st (or until all the young have fledged), work within a 300 ft buffer be limited during the nesting season, monitoring of the heron colony during and after the construction, expanding the lagoon and wetland function, native plant installation, and temporarily closing the public trail during construction.

In addition to mitigation related to the heron colony, the expansion included mitigation for wetland impacts. ESA Adolfson prepared a Wetland and Wildlife Mitigation Plan for the project. Wetland mitigation for the PPRRP expansion project began in 2012. Mitigation included grading areas to enhance wetland habitat around the Post Point lagoon, native plantings, addition of large woody debris, and other steps (ESA Adolfson, 2011).

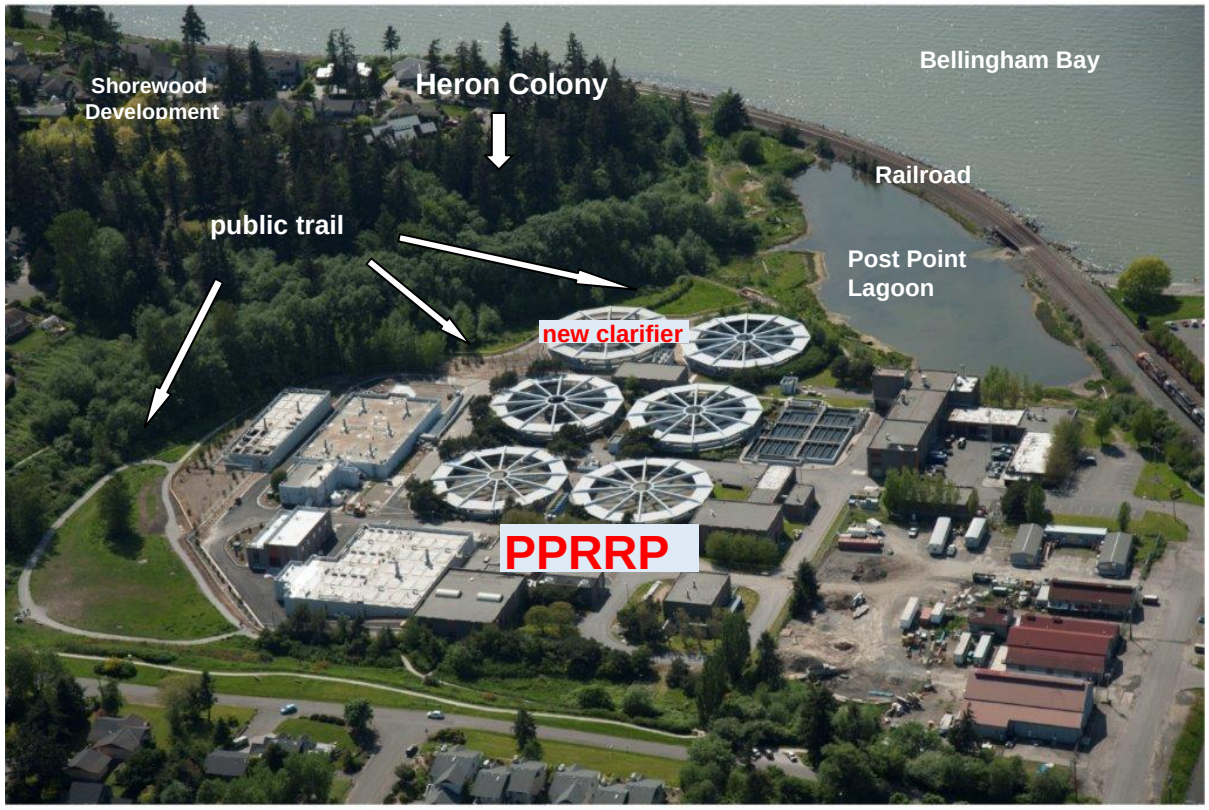
The wet meadow habitat next to the colony totaling 1 acre was reduced to .12 acre (ESA Adolfson 2011), however the mitigation for wetland loss is converting the meadow to shrubs and trees, which serve as an expanded vegetated buffer to the north of the heron colony. Mitigation for wetland loss also included removing fill, and restricting access. Mitigation activities expanded the saltmarsh by 70%, shoreline length by 18%, and re-established native marine riparian buffer. The meadow habitats around the lagoon were also altered for mitigation, but added a small salt marsh planting and grassy gaps in shrubs were maintained providing some functional space for herons, but only a fraction of the previous area. The remaining grassy area at Post Point is the off-leash dog park which

is not conducive to heron use. Overall, the habitat changes have substantially reduced the suitable meadow habitat available for heron use at Post Point.

The public trail was also moved and blocked from reaching the lagoon's south edge or continuing west to the railroad tracks, thus reducing disturbance to herons or other wildlife using that area. Replacing the trail is a viewing platform and bench with the educational interpretive signs about the herons and lagoon ecosystem. The wetland meadow below the colony was also enhanced with woody plants, essentially changing its function and eliminating use by herons, but providing future vegetative buffer and screening for the heron colony.

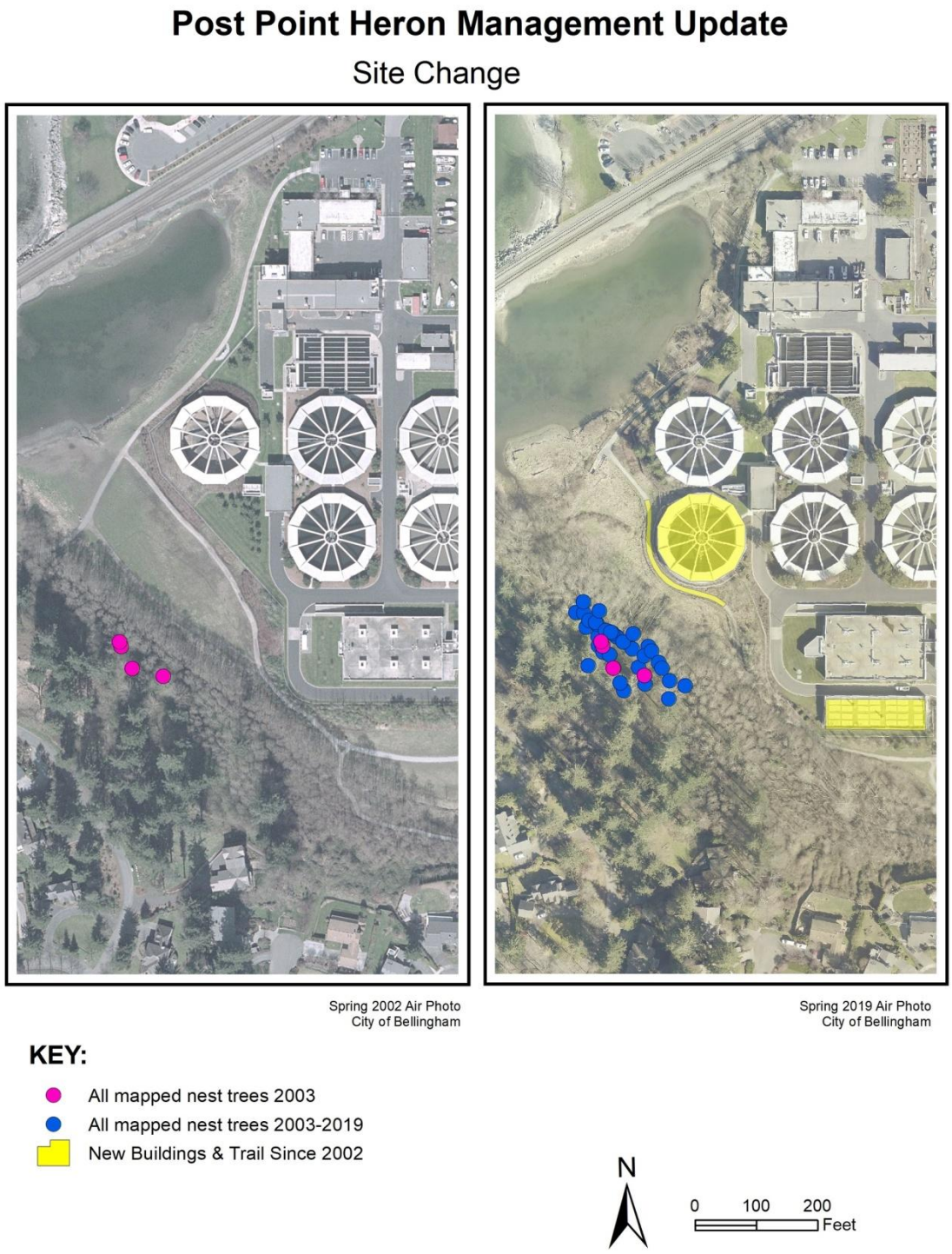
Following the completion of the PPRRP expansion in 2014, through to 2018, the Post Point heron colony and associated habitat remained relatively unchanged. Vegetation in mitigation areas grew and filled in, while the row of alders on the north side of the colony became dense and tall enough to provide screening for the colony from the PPRRP.

Figure 8. Post Point Site Overview



Post Point Resource Recovery Plant following expansion completion 2015

Figure 9. Site Changes 2002-2019



5. POST POINT HERON COLONY: HISTORY and CHRONOLOGY

Starting with the first year of nesting in 2000, the Post Point Heron Colony history has been documented by Nahkeeta Northwest Wildlife Services for the City of Bellingham. In 2005 the City began contracting Nahkeeta Northwest for formal annual biological monitoring which recorded the colony's nesting, productivity, annual chronology, disturbance and other details. Monitoring of the colony has been completed consistently each year from February 1 to the end of each season for 15 years, 2005-2019, and the results are provided in the Post Point Heronry Annual Reports which are available online. Based on monitoring the following is a summary of the colony over time.

5.1. Colony Origin

The Post Point Great Blue Heron colony is the only heron nesting site within the City of Bellingham and was first identified in 2000. The origin of the Post Point colony is from the relocation of a colony which abandoned in 1999. Known as the Chuckanut Bay colony, with about 7 nests (Eissinger, pers obs), it was located west of Chuckanut Drive and was active for several years. The construction of the Blue Heron Estates development, located directly adjacent to and in line-of-site to the nesting colony, resulted in disturbances during construction. Subsequently, the colony was abandoned in June 1999. It is confidently assumed that the herons from the abandoned Chuckanut colony relocated to Post Point.

The first account of the Post Point Heron Colony was provided to the City of Bellingham in May of 2000, following an assessment of the colony by Nahkeeta Northwest. At that time, the colony was occupied and at least 6 nests were active. The assessment provided a description of the colony, habitat and land use in the vicinity. A brief overview of the heron nesting cycle was also provided as well as an overview of WDFW management guidelines and specific recommendations for the colony. A more thorough review of the colony and site conditions was made in 2002 at which time 10 nests were occupied. The subsequent 2003 Post Point Heron Colony Management Plan was completed for the city.

5.2. Nesting Chronology

The annual nesting chronology of the Post Point heron colony is an important indicator of health and stability. The stages of nesting include: staging, colony reoccupation, incubation, hatching, fledging, and dispersal The Post Point Heron Colony annual reports identified timing for each of these nesting stages which, when viewed over time, can be informative and provide the bases for setting timing restrictions and other management guidelines.

One unique feature of the Post Point Heron Colony is their use of the PPRRP clarifiers to stage prior to nesting. Staging is a poorly understood behavior in which early arrivals to a colony will gather nearby for a number of days or weeks prior to entering the nesting area and begin breeding. This behavior has been observed at Post Point over multiple years. The herons also will utilize the lagoon edge or roost areas including the colony area prior to engaging in nesting activities.

The arrival of herons to the colony or general vicinity is usually in late January or early February. Reoccupation of the colony and the onset of nesting ranges from February 9 to March 21. Weather influences the herons' arrival and the onset of nesting. The herons were either delayed in arrival or temporarily forced from the colony early in the season due to late winter storms for 6 of the 15 years. Between 2017 and 2019 freezing temperatures, northeast winds and snow have delayed nesting into mid to late March. The latest reoccupation was 2019, on March 19.

The onset of incubation is determined by heron behavior and is an estimate due to potential confusion with egg laying. Incubation has occurred between March 12 and April 1, except 2019's late incubation on April 9.

Hatching of young occurs following 28 days of incubation, and detection is by discarded egg shells and/or young vocalizing in the nest. Due to asynchronous egg laying, hatching may require up to five days per nest. In the event of failure or depredation of eggs or newly hatched young, the season could be extended while the heron lay a second clutch or the nest could possibly fail. The dates of hatching have ranged from April 15 to May 9.

Young require 8 weeks to reach fledging age, at which time they generally leave the nest. The onset of fledging has occurred from June 17 to July 20. For several years the peak fledging has occurred the first or second week of July.

The end of the nesting season depends on all the nests completing their fledging of young and dispersal from the colony. Late arrivals to the colony or second clutches due to predation cause later fledging and dispersal dates. End of season dates range from July 12 to August 26.

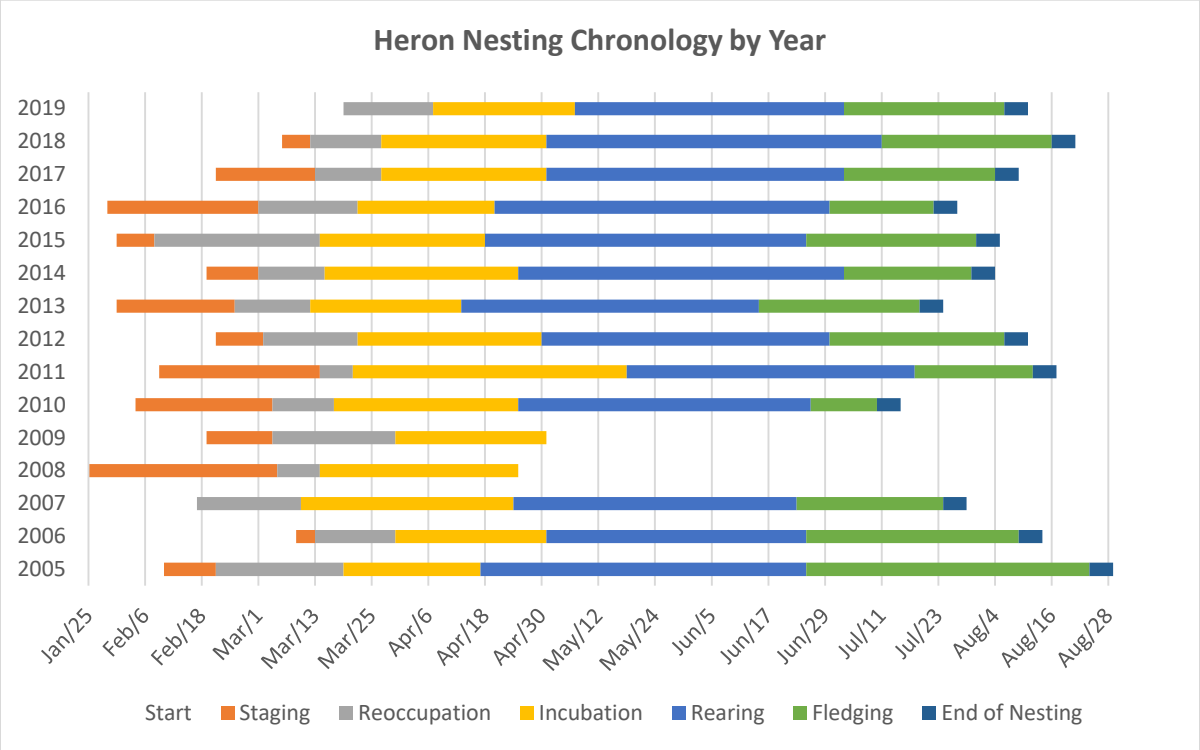
The total duration of the nesting period at Post Point in 2019 was 20 weeks total. Previous nesting periods include:

- 2018 = 22 weeks
- 2017 = 17-18 weeks for most nests up to 23+ weeks total
- 2016 = 22 weeks, which does not include the initial 2 week occupancy, followed by the 2 week desertion of the colony in February
- 2015 = 25 weeks
- 2014 = 22 weeks
- 2013 = 19 weeks (PPRRP expansion)

Based on the chronology of the Post Point Heron Colony over the past 15 years, as described and illustrated, the nesting or breeding season of this colony for management purposes is January 15 to September 1. These dates are framed by the earliest return for the herons and the latest departure with the addition of a few days at the beginning and end to account for potential variation.

The annual nesting chronology is illustrated in Figure 10.

Figure 10. Post Point Nesting Chronology 2005-2019

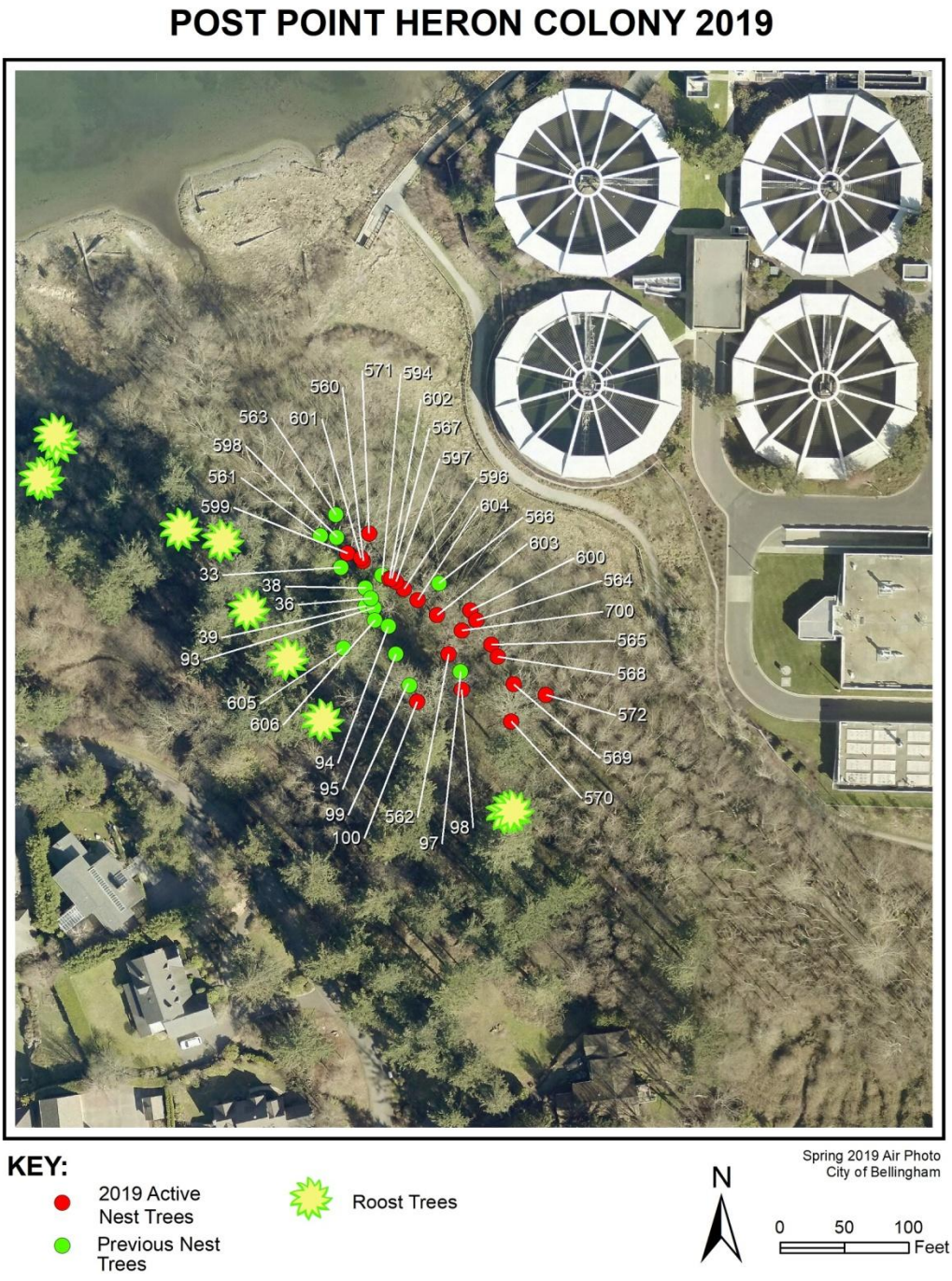


5.3. Nests and Nest Trees

The Post Point Heron Colony consists of large stick nests situated in the crowns of alder and big-leaf maple trees about 80 feet in height. The distance of the nests off the ground provide protection from ground predators and provides a vertical buffer from disturbance. Some trees hold multiple nests. All nest trees have been marked (tagged), assessed, number of nests recorded and mapped. This inventory is updated annually. Mapping of the colony is conducted by the City of Bellingham GIS Services. An illustration of the nest tree map for 2019 is in Figure 11.

The assessment of nests and their use is also recorded. The total number of nests in a heron colony is generally used to indicate colony size for any given year. However, if nests are not used, that number can be misleading. Therefore, the number of active nests is a more accurate representation of actual colony size. Active nests are those that have been occupied by a pair of heron during all or part of a nesting season. The number of successful nests, represent nests that fledged young. The number of nest trees or trees that hold one or more nests, reflect nest concentration. These values, combined with productivity, timing, heron behavior and nest location, if tracked over time, effectively indicate the dynamics of the colony.

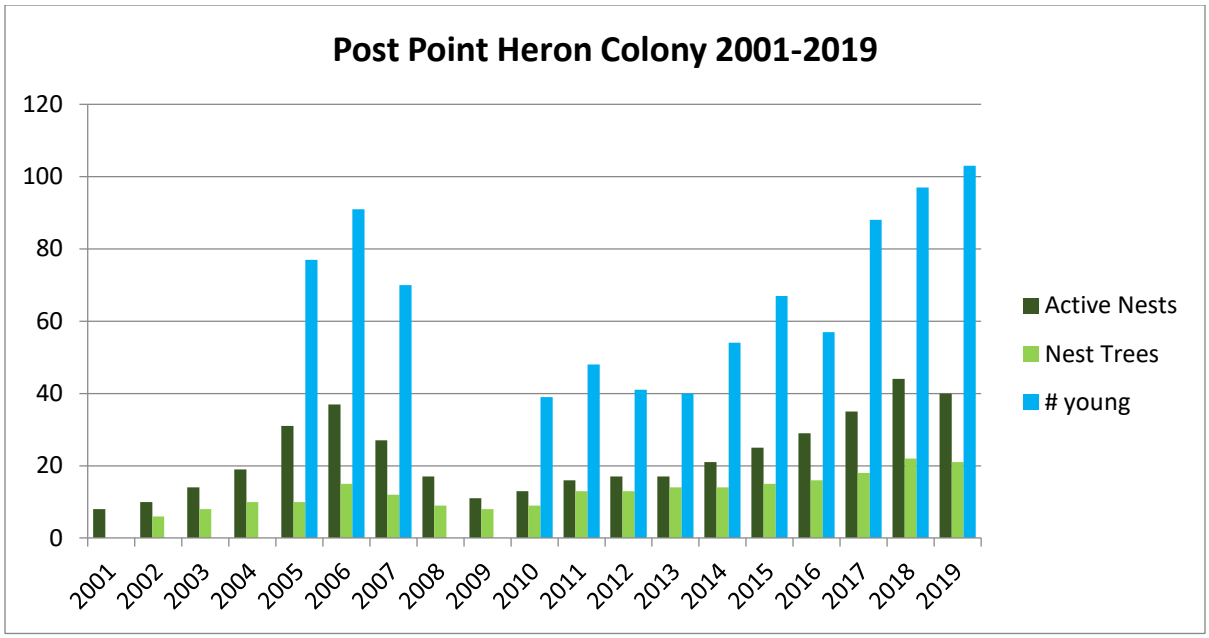
Figure 11. Post Point Heron Colony Nest Trees by Tag Number



Note: 28 of 38 tagged tree locations have been located by PW Survey staff in 2013 and 2018. Six additional trees (2014-2019) were located in the field by Nahkeeta NW and/or City Planning staff by triangulating between previously-mapped trees. Four historic nesting trees that have since blown-down or been damaged are represented with last known location.

A summary of the colony total nests, nest trees and young per year is illustrated in Figure 12.

Figure 12. Total Nests, Nest Trees and Young Per Year



A part of the annual colony inventory is tree health and condition. Health and condition of the nest trees is assessed visually and recorded. Beginning in 2002, the colony nest trees seemed to be healthy and protected from wind throw as little storm damage was recorded through 2006, with the exception of some winter nest loss. The colony also appeared to be protected from prevailing south winds due to a combination of topography and vegetation, including tall firs providing a wind break.

However, in 2007 a winter storm blew down 5 birch trees and damaged 1 alder. All of the trees were tagged and had been active nest trees at one time. One of the birch was already dead, and another in poor condition, but both still used for nesting. It is possible that those trees were diseased since no birch remain or have since regenerated in the nest stand. Following the loss of the birch nesting trees the herons have concentrated their nesting primary in alder, and big-leaf maple, and occasionally in Douglas fir.

More recently, in 2018-2019 significant tree mortality occurred in the colony and nest stand. Storms and high winds blew down and broke off a few nest trees and many trees in the northern buffer. In addition, 4 nest trees died from unknown causes in 2019. All of the damaged or dead nest trees were large mature alders, with no previous indication of poor health or condition. Over all, a total of 36 trees were lost, creating a gap in the colony and nest stand from the public trail to Shorewood Dr. (see photo in section 5.5.7). A more detailed description of the storms and tree wind-throw is provided in section 5.5.7.

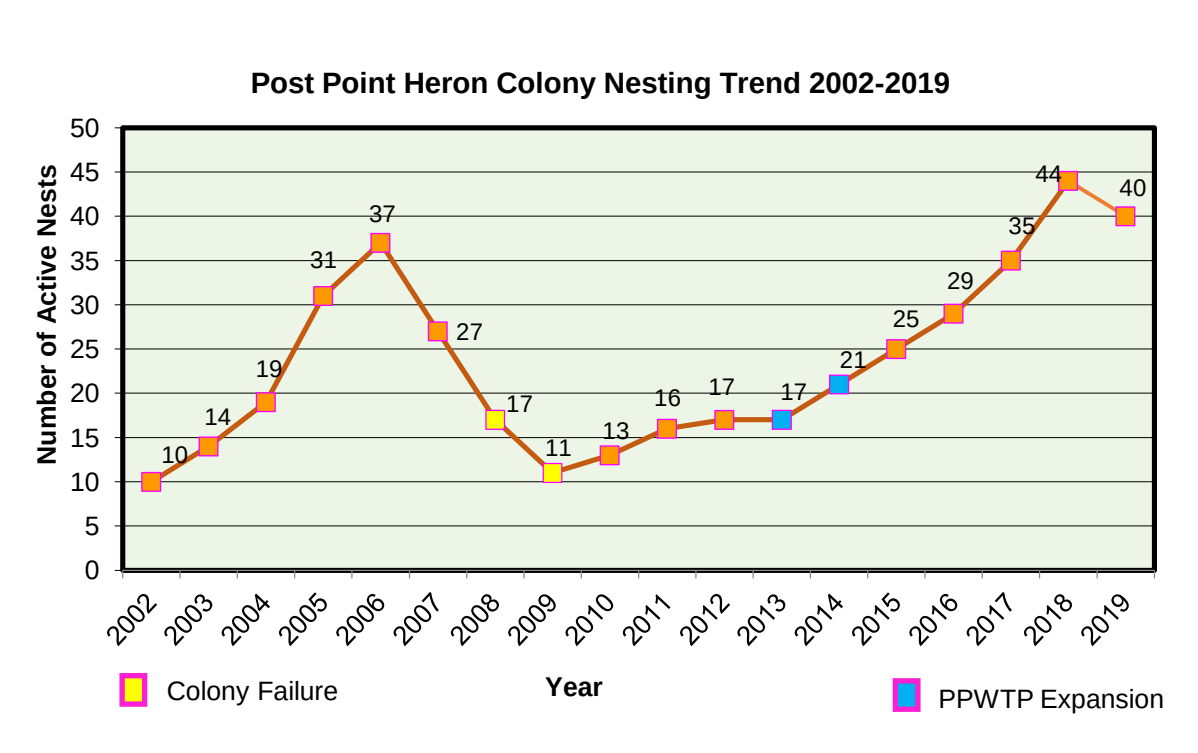
A visual evaluation of the tree loss was made by Nahkeeta Northwest in the fall of 2019, and no obvious sign of disease, insect infestation or tampering was detected. Further evaluation by a professional arborist is needed.

5.4. Colony Success, Growth and Productivity

The Post Point Heron Colony has experienced fluctuations in its success, growth and productivity. Success is measured by the number of young successfully fledged. Growth is based on the number of active nests representing nesting pairs. Productivity is gauged by the number of young per nest.

The success of the colony has been relatively good. The colony failed 2 seasons out of the 19 seasons of data collection. The failure occurred midseason in 2008 and 2009. The cause of nest failure was related to Bald Eagle depredation. Unlike many failed colonies that have suffered severe depredation, at Post Point the herons returned to the colony to nest in 2010, and have continued to return each subsequent year to nest to present. This demonstrates the resilience of the colony and strong site fidelity of the adult herons returning to Post Point.

Figure 13. Post Point Annual Active Nests



Overall the Post Point Heron Colony has grown from 10 nests in 2002 to a high of 44 Nests in 2018. However, the colony's growth has not been a linear trajectory. As illustrated in Figure 13, the colony has experienced growth during 2 time periods 2001-2006 then 2010-2018. Between 2007-2009 the colony experienced increased Bald Eagle depredation and subsequent failure in 2008-2009. Although the colony rebounded in 2010, fewer heron returned and growth resumed at a slower

pace. In 2017, a nearby large heron colony (Samish Island) abandoned and it is assumed that the growth in 2018 was in part a result of the relocation of some displaced herons.

The productivity of the Post Point Heron Colony has been excellent – averaging 2.5 young per nest between 2013-2019. The colony's productivity is above the normal range for this region based on published data; the comparable references include 1998-1999 averages for south-coastal of British Columbia which range from 1.24 per active nest to 2.15 per successful nest (Butler and Vennesland 2004) and 2000 averages in King County of 1.77 per active nest and 2.42 per successful nest (Stabins et.al. 2006). Based on these figures, mean productivity is 1.5 per active nest and 2.28 per successful nest, less than the 2.5 of Post Point.

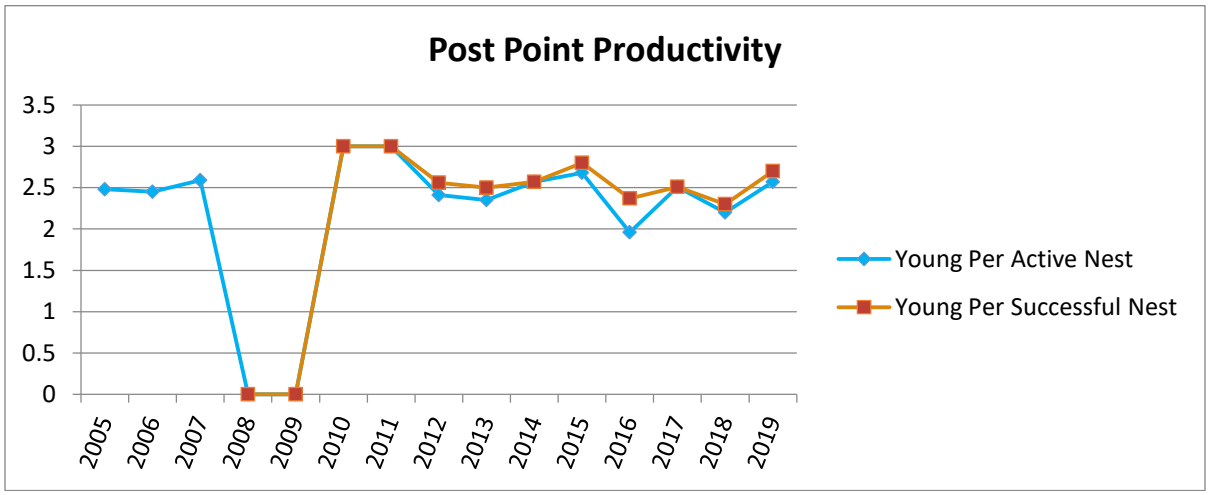
Table 2. Post Point Productivity 2013-2019 – based on all active nests

Year	No. active nests	No. successful nests	No. young	No. young per active nest
2019	42	38	104	2.47
2018	44	41	97	2.2
2017	35	35	89	2.5
2016	29	24	56	1.96
2015	25	24	67	2.68
2014	21	21	54+/-2	2.57
2013	17	16	40	2.35

Note: prior to 2013 productivity was based on a sample of nests.

The difference between active and successful nests at the Post Point Heron Colony is negligible for most years, Table 2 and illustrated in Figure 14. In 2016, herons in the colony were exhibiting agitation for unknown reasons, which may have contributed to the lower productivity for that season.

Figure 14. Post Point Heron Colony Productivity 2005-2019



Note: the Post Point heron colony was active but abandoned mid-season and failed to fledge young in 2008 and 2009.

5.5. Colony Disturbance and Disruption

Disturbance to heron colonies is the primary cause of reduced productivity, colony failure or abandonment (Rogers and Smith 1995, Vos et al. 1985, Vennesland and Butler 2004, and others). Disturbance is defined as an adverse behavioral and/or physiological response from at least one individual (Sutherland 1996, Walker et al. 2006 *in* Vennesland 2017). Documented disturbances or disruptions are generally from 2 primary sources: natural and human. Natural causes include predators – primarily Bald Eagle, adverse or extreme weather events, fire, and disease.

Human caused disturbances range from human activities near or intrusion into heron colonies, habitat removal or alteration, shooting, low-flying air craft (manned and unmanned), boats, noise, and toxins. Disturbance of nesting herons by humans is well documented (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 Siderius 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.

Any natural or unnatural disruption to the colony or cause of stress, changes in normal behavior, or flushing from nests, roosts or feeding grounds is considered a disturbance. In some cases, intentional human-caused disturbance would be considered harassment and could be an enforceable offense (RCW 77.15.130) .

Predicting a colony's tolerance for disturbance is difficult. It is acknowledged by the 2012 WDFW guidelines that *"we do not know the threshold for threat or disturbance resulting in suspension of nesting or abandonment of a heron colony."* New activities should not add to the intensity of disturbance a colony has historically adapted to (Azerrad 2012). This would include new homes located closer to the colony than current conditions. New residential development places humans and their pets even closer to the colony with little controls. Noise, lighting, vegetation alteration, use of pesticides and the potential for incursions into or close to the colony are all possible disturbances.

A more thorough discussion of disturbances and related studies is provided in the 2003 Post Point Heron Colony Management Plan: Disturbance Reduction. Most importantly is the fact that repeated disturbances may result in the impairment of a colony, so enforceable actions to prevent or limit disturbance to a colony are necessary for long term protection.

The City of Bellingham contracts with Nahkeeta Northwest Wildlife Services to monitor the Post Point Heron Colony and recording disturbances is a component of that monitoring. Any observed or reported loss of heron, young, or eggs, or repeated disturbance to the colony or feeding area are documented by the on-site monitor, and the City explores remedies to counter the disturbance and implements remedies where possible. Unfortunately, weekly monitoring is usually inadequate to

witness disturbances in real-time, so monitoring is often supplemented by reporting by neighbors, citizens and PPRRP staff.

Over the past 20 years the herons of Post Point have experienced numerous disturbances and disruption. The behaviors of the herons provide the best indicator of disturbance, with the extreme response resulting in flushing from nests, roosts, or feeding grounds, and the ultimate negative affect resulting in the evacuation of the colony, all of which has been documented. Although the herons have demonstrated resilience in the past, and have returned to the colony each season, there is a tolerance threshold that when reached will result in the loss of the colony. Unfortunately, there is no way to forecast a colony's threshold for threat or disturbance resulting in the suspension of nesting or abandonment of the colony (Azerrad 2012).

The following are summaries of disturbances and disruptions which have occurred at the Post Point heron colony.

5.5.1. Bald Eagle and Other Predators

Bald Eagles *(Haliaeetus leucocephalus)* also impact some heron colonies. A rebounding Bald Eagle population has played a role in heron colony disruption by preying on eggs and young. Eagle incursions adversely affect heron productivity in certain colonies (Norman, et. al. 1989, Vennesland and Bulter 2004). More aggressive eagles also threaten and prey on adult herons, although this is rare. However there is also clear evidence that Bald Eagle nesting in or near a heron colony has a beneficial effect on the heron colony productivity because the resident eagles repel other eagles away from their nest territories, thus limiting the depredation to the colony (Jones, Butler, Ydenberg 2013).

During each monitoring visit to, and in the vicinity of, the Post Point Heron Colony, observations are made of potential predators, primarily Bald Eagles.

Bald Eagles have been known to directly disrupt the Post Point Heron Colony. Eagle incursions into the heron colony occurred in 2005, and in 2008 and 2009 eagle depredation is thought to be the reason for a mid-season colony evacuation. In 2010, no incursions occurred. In 2011 eagle depredation caused some herons to re-lay eggs, after their first clutch was consumed or damaged. In 2012 only 1 eagle incursion was reported, and from that point through 2019 no Bald Eagle incursions into the colony have been observed or reported.

In 2006 a pair of Bald Eagles built a nest in a large Douglas fir approximately 62 feet south east from the heron colony. The nest was active in 2006 and possibly 2007, 2008 and 2009, after which there was no activity. In 2013 another active Bald Eagle nest was identified on Hawthorn Rd. approximately ½ mile southeast of the colony. The new nest location relative to Post Point is illustrated in Figure 15. This nest site was active from 2014-2016. No nesting has been observed or reported from 2017 to 2019.

Aside from acting as predators, Bald Eagles generally co-exist with herons. Bald Eagles are relatively common near the Post Point heron colony. One or occasionally 2 adult Bald Eagles regularly perch above the colony or to the west in large emergent Douglas Firs. The eagle's presence roosting near the colony does not disturb the herons or disrupt their nesting activities. Interestingly, the resident

eagles appear to ignore the herons and do not raid the colony. When incursions do occur the eagles are many times sub-adult and act opportunistically.

The status of Bald Eagles in this region is not known, due to the discontinuation of Bald Eagle monitoring by WDFW. A Periodic Status Review for the Bald Eagle in Washington indicated that the population has continued to grow through 2015 (Kalasz and Buchanan 2016). Due to the success of the Bald Eagle population and its rebound from near extinction in the 1960's and 70's, the species was delisted from the Federal Endangered Species Act in 2007, followed by down listing to "Sensitive" in Washington State in 2008. However, Bald Eagles and their nests, remain protected under the Bald and Golden Eagle Protection Act (federal), and under the Washington State Bald Eagle Protection Rules (WAC 232-12-292) and local Critical Area guidelines.

Other predators have not been observed as antagonists in the heron colony. Northwestern Crows *(Corvus caurinus)* have been known to enter the colony following Bald Eagle incursions, presumably to scavenge on the spoils, and crows nest near the colony without conflict with the herons. Red-tailed Hawks *(Buteo jamaicensis)* and Ravens (*Corvus corax)* have been observed flying over the colony and may stop at the nest stand, but have not been observed causing any disturbance. These predators were also found to have little impact on heron colonies in south-coastal B.C. (Vennesland and Butler 2004).

Figure 15. Bald Eagle Use Areas

5.5.2. People and Dogs

One of the questions raised when colony monitoring began in 2005 was – will the off-leash dog park and/or public trail used by people and dogs disturb the herons or disrupt the colony? Since monitoring began, the City of Bellingham has moved the dog park further from the colony, relocated the public trail further to the north, installed protective fencing, and installed protective signage (please see Site History and Chronology, above). The dog park is currently located 450 ft. from the colony to the western trail junction of the dog park. The dog park is visually screened and partitioned from the colony with dense forest and vegetation. Although the park is used nearly continuously during daylight hours there has been no conflict with the herons. Herons have shown no response during monitoring visits to people or dogs in the off-leash area, including active dogs playing and loud barking.

The public trail is also well used, and the herons appear to be adapted to the movement of people and dogs on leash. The public trail continues from the dog park west through a forest patch into a field about 85 ft. north of the colony. To maintain physical and visual separation from the colony, the trail is well fenced to contain off leash dogs, plus, there is a dense row of alder providing visual screening, except for one section of buffer that blew down in 2019. The height of the nest trees, about 80 ft., also serves an important function to create vertical separation or added buffer from the ground to the nests.

Human activity in and around the Post Point Waste Water Treatment Facility appears to have little effect on the nesting herons. During the late winter herons have regularly staged on the clarifiers at the PPRRP and were occasionally flushed by plant personnel, however, this did not deter the herons from returning.

Where herons, people and dogs do not mix, is in the nest stand and on the feeding rounds. People camping and an unauthorized pedestrian trail within the nest stand near the colony have occurred over the years. These situations are both likely disturbances to nesting herons and could result in nesting disruption or abandonment.

On the Marine Park beach south to Post Point is a popular area for public shoreline access. At low tide, heron feeding in the intertidal areas are vulnerable to people and/or off leash dogs that approach the herons too close and flush them from the beach. This situation is a clear disturbance and if repeated will cause the heron to relocate to feed costing time and energy and ultimately has a negative effect on both the adult and young in the nest.

5.5.3. Railroad - BNSF

The railroad causeway to the west of the colony is frequently used and is noisy. Railroad train traffic has increased substantially over the past decade, with increased frequency and longer loads, both day and night. Train horns have also increased in frequency and have been measured at 85.8 decibels (dB) at the colony, while the average ambient noise level at the colony is 55-60 dB. In addition to the horns, is the loud noise of the trains on the tracks, screeching breaks, vibration and exhaust fumes. Due to the close proximity of the heron colony to the railway, the cumulative disturbance by the trains could negatively affect the heron colony and reproduction, however to date productivity remains stable.

Direct train related disturbance to the herons has been observed on the shoreline as trains have approached. Both the approaching train and sounding of its horn disturb herons near the tracks. The disturbance caused the herons to flush from their feeding grounds. Some heron return to feed, others leave the area.

Maintenance and repair of the Post Point trestle took place in February-March of 2017. The noise from construction activities was measurable, with decibels reaching 80 dB in the colony, which is about 18 dB above the average ambient sound level at the colony. Although the noise from the railroad maintenance was well above ambient levels, there was no observed disturbance to the heron colony.

5.5.4. Post Point Resource Recovery Plant (PPRRP) Expansion

In close proximity to the heron colony, the Post Point Resource Recovery Plant (PPRRP) expansion was a major construction project that ran 2 years from July 2012 to June 2014. The project involved plant upgrades for regulatory compliance as described in Section 4.1. The scale of the project, magnitude of the noise, level of activity and close proximity to the heron colony would be defined as an extreme disturbance.

Mitigation, as defined in the City's MDNS for the anticipated project disruption, included a 100 foot heron colony no-disturbance buffer (actual measurement = 150 ft. from the nearest nest tree) a timing restriction of February 1-August 31 for construction of the clarifier or any other activity within the 100 ft. buffer. Plus, a secondary buffer of 300 ft. from the colony, redirected work during the nesting season to concentrate inside the built facility and its partially screened perimeter. There was also instruction to limit noise and lighting from construction. During the project there was a daily workforce of 30 to 80 construction personal, multiple pieces of heavy equipment running simultaneously, including trucks coming and going, and 2 construction cranes ranging in height from 80 to over 100 feet that were periodically moved around the grounds where needed. As a result, the construction activity and related noise was high at peak periods.

Post Point Wastewater Treatment Plant Expansion 2013 – A. Eissinger

During the construction of the PPRRP expansion, the City of Bellingham contracted with Nahkeeta Northwest to closely monitor the heron colony (twice weekly) for changes in behavior or other signs of disturbance. Weekly reports were provided to the project supervisor. In addition to heron observations, noise levels were informally recorded at the base of the colony's northeast edge at ground level. These levels are measured in decibels (dB) and ranged from a low ambient level of 57 dB, to a high level of 97 dB. Generally on-site sound levels range from the mid-60 dB to low-90 dB. The greatest noise levels occurred during combined construction activities using heavy equipment, drilling and dumping of materials (rocks). High noise levels were also recorded for trains passing and low flying aircraft.

The duration of the project ran through only 2 heron nesting seasons (2013 and 2014), due to the project startup in 2012 following fledging. Also, by the onset of nesting in 2014, much of the heavy construction had been completed, with finish work underway until June.

No extreme responses to construction disturbance, such as flushing, were exhibited by the herons, although there were changes in nesting behavior. The results of heron monitoring included the lack of staging early in the 2013 season, the lack of normal roosting and loafing aggregations of heron within the colony, and the heron's broad flight avoidance of cranes. The lack of regular Bald Eagle activity may also have been influenced by the construction and related disturbance. The heron colony remained at the same size in 2013 as it was in 2012, and grew by 4 nests in 2014. Colony nest productivity for 2013-2014 remained within the normal mean of 2.5 young per active nest.

One notable difference between 2013 and 2014, was the more relaxed nesting season in 2014, opposed to the notable change in behavior and abbreviated nesting season in 2013. Normally, herons at this site are in the colony nesting over a period of 21 to 25 weeks. In 2013, the heron were in the colony only 19 weeks total.

Following the completion of the Post Point Wastewater Treatment Plant expansion in 2014, close attention was paid to the heron's response to the alteration of habitat, new clarifier and associated public trail, both located within 100 feet of the colony. Over the past five years, no obvious disturbance or negative reaction by the herons has been noted. However, since 2014 the monitoring biologist has noted a strong chemical odor from the PPRRP. We recommended this odor be evaluated to determine the cause and potential effects on the heron colony.

5.5.5. Ski to Sea

Every Memorial Day weekend an international competitive event, the Ski to Sea Race, finishes at the Port of Bellingham's Marine Park and stages associated festivities in Fairhaven. This one day event includes a multi-leg relay race involving about 350 teams and 1000 volunteers. As a result, the Marine Park area at Post Point is inundated with people, temporary structures and equipment on race day. The activity is concentrated on the shoreline and Marine Park site located about 700 feet northwest of the heron colony.

Nahkeeta Northwest has conducted monitoring during the event of both the heron colony and heron feeding along the marine shoreline. Results of observations conclude that the heron colony has been unaffected by Ski to Sea due to the colony's distance from the activities at Marine Park

and the lack of noticeable increase in use of the public trail or dog park near the colony; also the PPRRP provides a physical buffer between some of the event activities and the colony.

However, during Ski to Sea hundreds of race-day fans gather on the shoreline, or in boats, to observe the completion of the race as participants paddle sea kayaks to shore then run to the finish line. As a result, disturbance to herons foraging along the shoreline or displacement is nearly unavoidable, unless the tide is high at the time of the event or if the beach were to be partitioned with a temporary barrier south of Marine Park to allow the herons an undisturbed area to feed.

In 2019 the City took additional steps to minimize conflicts between the Ski to Sea event and the Post Point Heron Colony. These efforts were in response to recommendations provided in Nahkeeta Northwest's 2018 annual monitoring report. The City coordinated with the Port of Bellingham, park owner, to post temporary signs at Marine Park and Post Point Lagoon asking citizens to keep their distance from herons and avoid flying drones over the heron colony and foraging habitat. The City also worked with the Ski to Sea organizers and the Bellingham Herald to confirm they would avoid drone use over these same areas.

Ski to Sea Finish Line Marine Park 2016 photo by Tami DuBow

5.5.6. Aircraft and Drones

Low flying aircraft such as helicopters have been reported flying over the Post Point heron colony. Although no direct disturbance to the heron colony has been observed or reported there is concern that the noise and/or downwash from a low flying helicopter could flush adults or young out of nests or dislodge nests.

Drones continue to be of concern. In 2016, individuals flying drones were observed at Marine Park. Drones were also used in this area in 2017 for aerial photography. Drones may be considered a source of intentional harassment if flown in sensitive areas such as heron colonies when herons are present and are repeatedly disturbed (RCW 77.15.130).

5.5.7. Weather

Annual monitoring of the colony has documented weather as a cause of disruption to the herons and their nesting cycle. Late winter storms, high wind events, uncommonly high and low temperatures, heavy rain, hail, snow and periods of drought have all been recorded, some of which have been record setting. Weather events that could influence the herons are generally summarized or described in the Annual Reports.

Severe late winter storms have become a regular disruption for the heron colony. Beginning in 2011, late winter storms in February have occurred 6 out of the past 9 seasons. The storms vary in onset, duration and intensity, and include strong northeast winds, sub-freezing temperatures, snow and ice. The observable effect of the storms on the heron colony is to either delay the herons reoccupation of the colony or in some cases force the herons out of the colony temporarily to wait out the harsh conditions. The worst storms have occurred 2017, 2018 and 2019. During all 3 years the herons have delayed their nesting, and in 2018 and 2019 the herons did not return to the colony until March. The latest delay due to late winter weather was in 2019, with nesting setback until March 21. Other than the delay to the onset of heron nesting, the storms did not appear to impact the heron's reproductive success.

For much of the past 20 years, the effects of wind or storms have had little impact on the nest stand or nest trees. Generally, the heronry at Post Point is protected from south-southwest winds due to topography, and a band of forest vegetation upslope with tall firs extending west to provide wind break, and although the colony is somewhat exposed to northeast winds, not at full force. However, in 2007, and particularly in 2018-2019, wind storms did cause damage to the colony and associated forest habitat.

In 2007 all of the birch trees that were used for nesting were lost by wind and possibly a pre-existing disease. No birch remain in the nest stand today.

More recently, there has been notable tree mortality in the nest stand and colony. A total of 36 trees have blown down, broken off, or died. From early 2018 to September 2019 there was the loss of 29 alders along the northern edge of the colony, as result of wind throw; the trees were up rooted and fell in clumps to the north (majority 30 deg N, with fewer at 338 deg NW and 15 deg N.). This is illustrated in Figure 16 and the photographs below.

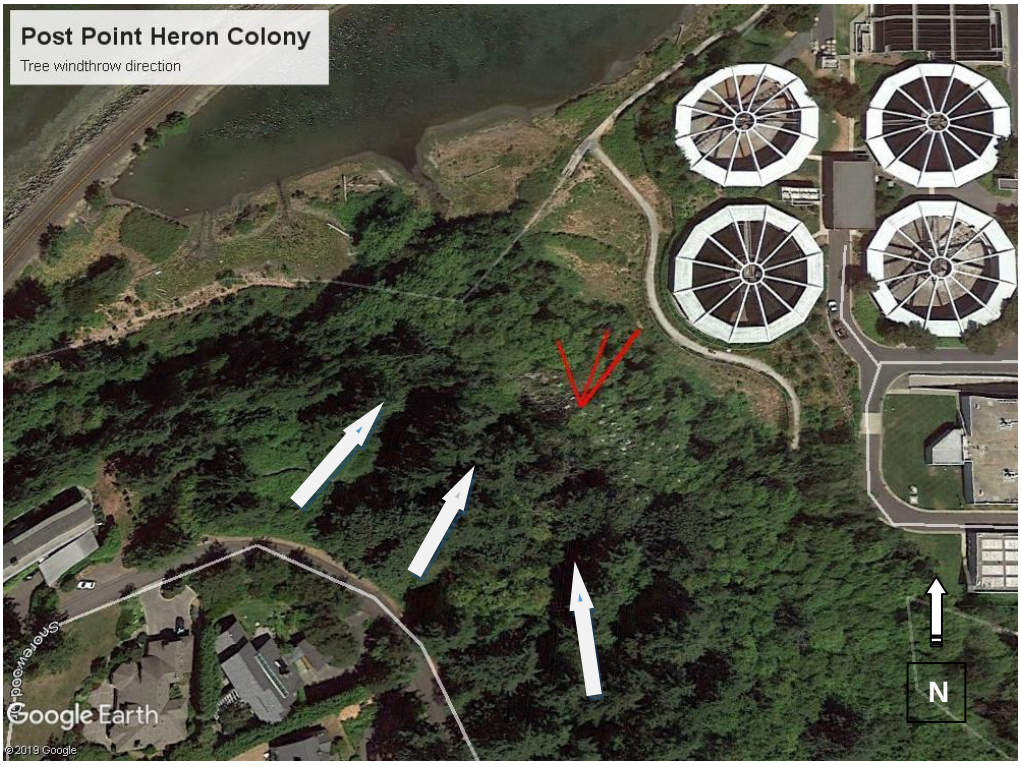
Nest trees were also affected by the storms. In early 2019, 4 nest trees did not leaf out and were determined to be dead. During a storm in September 2019, one nest tree blew down that was already dead, and 3 nest trees were broken off, indicating a high velocity south wind striking the colony.

Due to the history of storms and the previous lack of tree damage in the colony or nest stand, the scale of tree loss in 2018-2019 was unprecedented. These losses have impacted the heron colony by removing well used nest trees, creating a gap through the center of the colony and nest stand, and reducing screening of the colony to the north, exposing a portion of the colony core to the public trail and to the south.

March 2019 - alder wind-throw on north side of colony – A. Eissinger

2018-2019 Storm damage to the colony and northern buffer, creating gap in the nest stand from the public trail to Shorewood Dr. - photo taken from public trail to south. Photo by T. DuBow

Figure 16. 2018-2019 Wind-throw in Heron Colony and Northern Buffer



White arrows indicate wind direction, red arrows are wind throw direction

5.5.8. Other Disturbances

While most disturbances are identifiable, certain activities or occurrences are difficult to explain. Numerous golf balls have been found in the heron colony periodically. The first incident was in 2006, but continued in subsequent years. These were likely hit into the colony from a location outside of the colony, either a nearby residence upslope (south) of the colony, or somewhere associated with the PPRRP grounds, which is unlikely. Golf balls at high velocity can cause serious injury or possible death to both adult and young heron. The source, timing and responsible party for the repeated and potentially harmful acts is not known.

Heron colonies are less tolerant to disturbance early in the season mid-February to mid-April (Azerrad 2012). In early 2016 the Post Point heron colony was unsettled and the herons acted nervous, abruptly flushing or leaving the colony without obvious reason. At one point they evacuated the colony, but returned by the following monitoring visit. The cause of this nervousness was not determined, however certain potential causes of disturbance were reported during this time including: a low flying helicopter over the colony during this same period, and a maintenance crew weed-wacking near the colony. The previously mentioned unauthorized pedestrian trail linking the PPRRP public trail with Shorewood Dr. may also have contributed since users of this trail may have caused disturbance by entering the colony edge. It should be noted that the colony in 2016 had the lowest productivity ever recorded, so the early season disturbance may have been more pervasive during the season than observed.

Photographs taken for real estate advertising of a lot proposed for development on Shorewood Dr. occurred in 2019. Aerial photos were taken over the colony, and others appeared to have been taken from within the colony's southern no-entry zone, per 2003 Management Plan, during the heron's incubation period in March or April 2019. The aerial photographs would have required a low-flying aircraft, helicopter or drone which would have potentially caused disturbance to the nesting herons. Neither city personnel nor the monitoring biologist was consulted prior to the taking of these photos.

Despite the many disturbances both temporary and sustained over the years, the Post Point Heron Colony has demonstrated tolerance and resilience. The attributes of the habitat and nest stand have also likely contributed to the colony's stability. Few colonies abandon mid-season two years in a row and return. However, in the case of Post Point, the herons returned and the colony has grown.

5.6. Disturbance Reduction

As an urban colony the Post Point heronry is subject to a wide array of human activity and noise. In spite of the close proximity to an off-leash dog park, a municipal waste water treatment facility, railroad corridor and residential homes, the herons selected the site to nest and have been successful 18 out of 20 years. Herons in urban environments exhibit a greater tolerance for human activity (Vennesland 2000).

Although urban colonies have a higher tolerance level, new activities should not add to the intensity of disturbance a colony has historically tolerated and adapted to (Azerrad 2012). It may be argued that the expansion of the PPRRP was a significant disturbance, which is evidence that the heron colony could tolerate just about anything. However, the PPRRP project employed timing restrictions, setbacks and did not infringe on the nest stand or protective habitat surrounding the colony or roost sites which are the heron's safe zone. Therefore to minimize disturbance is important, even in an urban environment.

Since 2014, there has been minimal detectable disturbance at the heron colony. The greatest disturbance currently are the trains passing blaring horns and screeching on the tracks, and people on the beach with their dogs. However, preventable disturbance should be avoided.

At Post Point possible human related disturbances include: human intrusion into the colony or feeding areas, loose dogs, loud activities or noises near the colony, clearing brush, tree or brush cutting, construction, low flying aircraft or drones, just to name a few.

Effective tools to minimize disturbance to a heron nesting area include: buffers or setbacks (including aerial), restricting access, retaining or planting dense native vegetation around the site (vegetative buffer), creating a barrier, timing restrictions, reduced noise and artificial lighting, and restriction of certain activities.

The following general guidelines are used to minimize disturbance to heron colonies.

Limit Access

Limiting access into a colony or near a colony during the nesting season requires a delineation of sensitive areas, a well defined plan and active management. Access into a forested colony nesting area at any time by unauthorized personnel, should be strictly prohibited due to the high risk of disturbance. Exceptions for authorized individuals, personnel or biologists are recommended. A system for permission may be developed as well as exemptions and timing, such as areas inside public trails or other use areas.

The restriction of human access into a heronry during nesting is essential, as repeated disturbance to the herons during nesting could cause the evacuation of the colony. Access into the colony area during the breeding season is particularly sensitive and this restriction should be enforced. Dogs should also be restricted from heron colonies and associated habitat.

Currently at Post Point there is a fence along the public trail to the north of the colony and no public access beyond that fence is allowed, that includes to the west into the lagoon area. In the early 2000's dogs were allowed to run freely along the trail and swim in the lagoon. As a result, the lagoon edge was denuded and herons did not use that area. But with the addition of a fence along the trail, and designated off and on-leash areas, the dogs are excluded from the lagoon and the herons returned to utilize that habitat.

In the past fences at Post Point were used sparingly due to concerns for restricting wildlife movement. However, as the heron colony grows and public use increases, fences may be needed to maintain separation between people, their pets and the heron colony. Recommendations from the 2003 Plan to plant thorny shrubs in the buffer of the colony have been implemented.

Buffers

Buffers are used to create distance between the sensitive nesting area and human activity. Vegetated buffers are particularly advantageous as they serve as visual screening as well as providing distance. If buffers are thick vegetation they may also provide noise abatement. By maximizing natural vegetation, including trees and understory, around a heron colony, the herons will have a greater sense of isolation and safety.

Aerial buffers are also suggested for heron colonies that may be subjected to low flying aircraft.

Barriers

Barriers have been identified as most effective; particularly open water bodies (Skagen and Melcher 1996). Other types of barriers include dense vegetation, fences and other man-made structures. Not all colony sites require or can accommodate barriers. Barrier placement planning requires an understanding of other species that are resident or use the area seasonally and that may be adversely affected by a barrier.

Timing Restrictions

Timing restrictions are an effective tool to control disturbances related to specific projects or maintenance activities. Working outside of the breeding season allows for greater flexibility in the level of activity related disturbance and/or noise.

Determination of a heron colony's nesting cycle and annual chronology is needed. Based on the monitoring of a colony, the regular breeding season and variations may be established, and then used to set timing restrictions in and around the heronry to limit disturbance and avoid impacts.

Disturbance reduction recommendations specific to the Post Point Heron Colony are provided in the following section.

6. MANAGEMENT AND RECOMMENDATIONS

The 2019 Post Point Heron Colony Management Recommendations are an update of the 2003 Post Point Heron Colony Management Plan. While the 2003 Management Plan provides an excellent foundation, this update also utilizes new guidelines from Washington Department of Fish and Wildlife (2012), best available science, advice from regional heron experts, and monitoring results from the Post Point Heron Colony.

The WDFW Priority Habitats and Species Management Recommendations for Great Blue Heron (Azerrad, 2012) serves as a guidance document for this 2019 plan update. The updated 2012 PHS Management Recommendations offers urban heron colony management considerations and direction. The guidelines provided by WDFW are generic for heron colonies throughout Washington State. Information about Great Blue Heron range, nesting, habitats and need for protection are also discussed.

In addition to the WDFW guidelines, this section will also include recommendations specific to the Post Point Heron Colony which are based on the author's over 25 years of professional field work with Great Blue Herons in the region and Nahkeeta Northwest's 15 years of on-site monitoring and empirical data collection from the Post Point heron colony. The detailed results of the Post Point monitoring are summarized in the "Background Information" section of this document and are also detailed in the Post Point Heron Colony Annual Reports 2005-2019, available on the City of Bellingham Public Works Department website.

The management recommendations herein are provided to the City of Bellingham for their information and discretionary use. The recommendations provided do not take into consideration property ownership; therefore, implementation and enforcement may be limited by property ownership and regulatory authority.

It is recommended that the Post Point Management Recommendations be reviewed and updated at a minimum every 10 years.

6.1. Management Framework

Great Blue Herons in the Salish Sea are a vulnerable species due to their large seasonal reproductive aggregations, exposure to disturbance, predation, and reliance on highly sought after coastal habitat. Management and conservation of Great Blue Heron colonies and supporting habitats, particularly foraging areas, is required in order to protect the regional population from decline. A combination of management tools are used to accomplish the protection of heron colonies including: regulatory, voluntary conservation, acquisition, and in some cases public-private partnerships. Public, governmental, tribal, trans-boundary and political support are also needed to protect vital habitats that maintain the regional heron population.

The primary goal of the Post Point Heron Management Recommendations 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 Heron Colony and associated habitat. This document provides a summary of what we have learned from monitoring the Post Point colony (background information), and sets forth a framework for management and protective actions for the. Post Point Heron Colony.

The recommended management objectives include the following.

- Identify and protect the Post Point Heron Colony nesting site and vital associated habitats year-round.
- Minimize disturbance to herons, the heron colony, and associated habitats.
- Maintain the function and ecological value of heron habitats in the vicinity of Post Point and habitat areas known to be important to the colony.
- Enhance the function and ecological value of heron habitat where possible.
- Provide public education to support these management objectives.

The 2012 WDFW PHS Great Blue Heron Management Recommendations provide steps to assess a heron colony site, identify associated habitats, and then assign protective measures to key habitat areas. These steps require an understanding of heron life history and habitat requirements, thorough on-site assessment and data collection or an understanding of existing data, mapping, review of local landuse regulations and land ownership, and working with owners and authorities to devise a plan and assign management or conservation measures.

The first step in the process is defining the Heron Management Area (HMA). This is done through site assessment and data collection. The primary goal of the HMA assessment is to document a colony's spatial and functional characteristics, which include the colony location, nest and nest tree numbers, configuration, associated habitats, nesting chronology, sensitivity, possible limitations, etc. This information is compiled and mapped, then used as a tool to inform management of the colony over time. As stated in the WDFW recommendations regarding the HMA "*you should protect all these areas as disturbance to any part of an HMA can harm the colony*." Habitat protection is therefore an essential component in management of a heron colony, to ensure the sustainability of a colony and the perpetuation of the species within a given geographic area.

The HMA assessment information for the Post Point Heron Colony has been collected, mapped, and provided in detail in Sections 3, 4, and 5 of this document. The ongoing monitoring of the colony also updates this information on an annual basis.

The second step involves assigning protective measures to the HMA to ensure that the function of the colony and associated habitats are retained and that the colony is sustainable over time. The recommended protective measures for the Post Point Heron Colony are organized at three scales which include:

- habitat specific protections,
- buffers or setbacks centered on the colony, but overlay other habitats,
- reserve area – encompassing the colony and all associated habitats.

A third step includes the identification and protection of alternate nesting areas within 0.6 mi of colony or 1.9 mi of foraging areas. This is to conserve potential nest stands for future heron use.

In addition to the assessment and defining protection measures, are recommended supporting management actions. These include: restoration and enhancement, site management and security, colony monitoring, and public education to build awareness and compliance with protection measures.

6.2. Habitat Protection Recommendations

The Post Point Heron habitat areas have been previously described in the Background Information section of this document. The Post Point Heron Colony habitat areas are illustrated in figure 5.

The habitats include:

- Colony or nesting area: the colony nucleus consists of trees with nests and the area is defined by the perimeter of the nest trees,
- Nest stand: contiguous forested area surrounding the colony,
- Roosting and loafing areas: trees, field, shoreline and nearshore wetlands - these also serve as fledging sites for young,
- Staging habitat: pre-nesting congregation areas,
- Foraging habitat: areas of feeding concentrations during the nesting season.

6.2.1. Colony Nucleus

The nesting area and colony nucleus are described in sections 3.3.1, 3.4.1, and 5, and illustrated in figures 3 and 5.

Recommended Protection Measures

The colony nucleus requires full year-round protection. Protection of all vegetation including forest, nest trees and understory - must be maintained in a natural unaltered state.

Only authorized access should be allowed, and no access during the nesting season January 15-September 1 except authorized personnel and the heron monitoring biologist.

The most sensitive period for the colony is the early season prior to incubation or January-March.

Protection of the airspace above the colony should be pursued by creating a no-fly-zone for drones and requesting the US Coast Guard and other helicopter operators to maintain at least 1000 feet elevation* in order to avoid disturbance and downwash if possible. (* FAA minimum height for fixed winged aircraft over urban areas is 500 ft.)

Vegetation restoration and enhancement should be allowed only between September 2 and January 14, and should be further defined by the recommended vegetation management plan. All plants need to be pathogen and pest free.

It is recommended that the air quality be evaluated at the site to determine whether any airborne constituents from the PPRRP could have a possible health impact on the herons or their young, and mitigate any potential impacts if possible. A passive air sampler could determine compounds being emitted.

6.2.2. Nest-Stand – Associated Forest

The nest stand and forest habitat area is described in section 3.3.1 and 3.4.1, and illustrated in figures 3 and 5.

Recommended Protection Measures

The Post Point nest-stand area requires year-round protection as a whole.

The WDFW guidelines recommend a minimum 197 ft. year-round buffer to protect the colony nucleus and surrounding habitat, however additional habitat protection may be necessary. This is further described in section 6.3 Buffer Recommendations.

Avoid areas when and where herons are present.

Only authorized access should be allowed on public property, and no access during the nesting season January 15-September 1 except authorized personnel and the heron monitoring biologist..

Aerial protection should also be enabled by creating a no-fly-zone for drones and requesting the US Coast Guard and other helicopter operators maintain at least 1,000 feet at the very minimum altitude in order to avoid disturbance and downwash.

Vegetation restoration and enhancement is allowed only between September 2 and January 14, and should be part of the recommended vegetation management plan. All plants also need to be pathogen and pest free.

Due to the loss of trees in the colony and nest-stand from high winds in 2018-2019, there is a need to retain all trees within the forest particularly to the south and west in order to maintain a windbreak from prevailing winds and higher velocity wind storms. Restoration of trees to fill gaps caused by storms on the north and south sides of the nest stand is recommended.

6.2.3. Roosting and Loafing Areas

The Post Point roosting and loafing areas are scattered within the nest-stand and lagoon shoreline, as described in sections 3.4, 3.4.1, 3.4.2, 3.4.3 and illustrated in figure 5.

Protection of roosting and loafing areas is needed to maintain the vital habitat components of this site. Protection for roosting areas, includes maintaining not just the large fir trees, but the forest stand as a whole which provides the shelter, sun or shade, wind break and screening needed for the herons to rest, preen and not be disturbed.

Recommended Protection Measures:

No tree cutting, pruning, or thinning is recommended within the nest stand or documented roost sites.

Avoid areas when and where herons are present.

The open, ground loafing areas around the Post Point Lagoon should be off limits year-round except by authorized personnel.

Large patches of open grass or low-growing, non-woody, salt marsh plants should be maintained with open access to allow for herons to fly in and out and to reach the water where herons may forage.

Vegetative screening from the public trail and railroad is recommended where possible.

6.2.4. Staging or pre-nesting areas

The Post Point staging is not a single location, but several locations in close proximity to the colony. These areas include the PPRRP western clarifiers, the roosting area associated with the colony and to the west and loafing areas along the lagoon shoreline. Staging is mentioned in section 3.4, and described in section 5.2. Staging areas are illustrated in figure 5.

The timing of staging varies annually at Post Point, between January 15-March 15 (figure 10).

Recommended Protection Measures

Avoid areas when and where herons are present.

Protection of staging areas will be accomplished by maintaining both roost and loafing areas – that include large conifer trees to the south and west of the colony. No tree removal or pruning of these areas due to their year-round use. Maintaining screening of these areas is also recommended.

Review of the clarifiers and associated structures is needed to ensure that these structures and other roof top areas are bird-friendly. Use of bird deterrent wires, spikes or other physical repellents on the PPRRP structures should be removed and/or prohibited as they cause injury to herons. Non-lethal or non-injurious deterrents (except lights and sounds) are recommended. Lights and sounds can be disruptive to the colony.

6.2.5. Foraging Areas

Areas with concentrations of herons feeding during the nesting season are particularly sensitive to disturbance. Locally these areas are usually along marine shorelines where large numbers of herons occur during the nesting season.

Disturbances to feeding herons and activities limiting the use of foraging areas by herons include:

- human activity on the shoreline or nearshore, including the use of kite boards, kayaks and other shallow draft vessels,
- off leash dogs on the shoreline
- high wave action or boat wakes
- loud train horns
- low flying aircraft or drones
- kites
- fireworks (illegal in the City of Bellingham but not outside the city limits)

Foraging areas are described in section 3.4, 3.4.2 and 3.4.3, and foraging disturbance 5.5.2. Foraging areas are illustrated in figures 5 and 7.

Recommended Protection Measures

Protection of the Post Point heron's primary foraging areas is recommended. These areas should also be periodically monitored for use, disturbance issues and habitat health.

A heron foraging survey update is needed in addition to an updated evaluation of eelgrass presence and status in enhancement areas

The WDFW recommends the reduction of disturbance for foraging areas during seasonal use periods between March-September, and to minimize certain activities where herons feed. Specific recommendations relevant to the Post Point Heron Colony foraging areas include:

- Restrict removal (or disturbance) of aquatic vegetation, especially native eelgrass
- limit use of all watercraft within 180 meters (590 ft) of shallow waters where herons forage
- Keep dogs on leash
- Disallow logging mature forest (or roost trees) close to nearshore foraging habitat
- No removal of perch trees adjacent to foraging areas
- No draining, filling, or dredging wetlands or marshes
- No building close to riparian shorelines

In addition to WDFW recommendations, the following foraging area guidelines are also suggested for consideration:

- Avoid herons when and where they are present
- Pedestrians should maintain a distance of at least 300 feet from foraging herons (Rogers and Smith 1997) (or place seasonal use restrictions on Post Point shoreline due to limited beach margin of only 300 feet at lowest tide)
- Prohibit the use of drones – no drone zone
- Prohibit the flying of kites
- Prohibit the use of kite boards

  Note: The Post Point beach is 300' wide at widest point from riprap to lowest minus tide edge (Google Earth 7/10/2014)

Heron foraging area protection pose particular challenges as shoreline areas available for public access and recreational use are both limited in Bellingham and also in high demand. In addition, foraging areas extend outside City-owned property. Discussion with owners and user groups to help avoid conflicts with herons is recommended.

The Marine Park shoreline is the site of the most known conflict between herons and people and dogs. This is a high use area with seasonal events such as Ski to Sea. Generally, the restored gravel beach area is little used by herons. However, the lower tide zone of cobble, mud, sand and eelgrass extending south to Post Point is used by herons and is a primary feeding area for herons during the nesting season, and is the closest feeding grounds to the colony. Due to the importance of this intertidal area for herons, this needs greater management priority and protective action by the City of Bellingham and the Port of Bellingham. Seasonal use restrictions are needed. Informative signage on the beach and/or a temporary fence during Ski to Sea if the tide is expected to be low (below 2 ft.), are recommended. Monitoring of management actions is also needed to determine effectiveness. Further discussions and actions are needed to address conflicts between people, dogs and herons on this beach.

Foraging sites on the west side of Bellingham Bay require more study and discussions with the Lummi Tribe, and Washington Department of Natural Resources to better understand the management of those tideland areas. Monitoring and mapping of the heron's use of Portage and Brant Island shorelines specifically is recommended and also greater Bellingham Bay and Chuckanut Bay to update existing data is needed.

6.2.6. Alternate Nesting Locations

The 2012 WDFW Management Recommendations – HMA assessment includes the identification and preservation of alternate nest stands. The landscape specifications suggested by WDFW include:

- 10 acre minimum
- Dominant trees of 56 ft. or more in height
- Stand with similar structure and tree species composition as current nest stand
- Possible location of satellite nest

- Possible location of former colony
- Within 0.62 miles of current colony and 1.9 miles of foraging habitat

The alternate nesting locations identified in 2003 included the Chuckanut Community Forest, Hoag's Pond, the northern toe of Chuckanut Mountain Arroyo Park and Clark's Point. After re-examining these sites for habitat suitability, isolation, protection from prevailing winds and proximity to foraging areas, Clark's Pt would be dropped due to exposure and negative nest stand characteristics and Arroyo Park would also be dropped for the latter reason. Chuckanut Bay, inside the railroad trestle at Chuckanut Bay Open Space may be a suitable nesting site but would require further evaluation. The Chuckanut Community Forest contains about 20 acres of suitable nesting substrate, however not all of this acreage is contiguous and most is associated with wetland complexes and also a high density of public trails (Eissinger 2015). To confidently identify suitable alternate nesting areas for Great Blue Heron, a more thorough examination of available habitats is recommended.

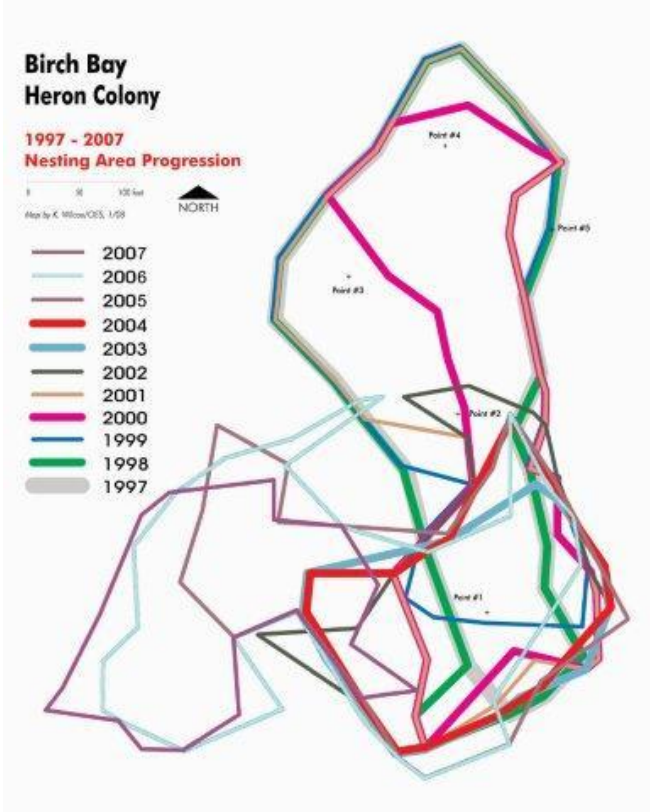
6.3. Buffer Recommendations

Buffers or set-back distances are used as a management tool to create separation between sensitive wildlife areas and human activity. Buffers reduce disturbances to sites where herons (or other species) assemble to nest or feed and aid in the reproductive success of colonies (Vos et al., 1985)(Rodgers and Smith 1995) (Vennesland 2000) (Vennesland, Butler 2011). Vegetated buffers retain the natural forest vegetation around heron colonies, which provide visual screening, physical barrier, protection from wind and storms, maintains the microclimate and if dense enough reduces noise and discourages human entry.

A heron colony buffer is applied as a radius measured from the outer perimeter of a heron colony's nest trees and is set on a horizontal plane (Azerrad 2012, pers. com.). Uniform buffer distances around a colony provide for equal protection assuming there is uniform habitat and conditions distributed on all sides. The buffer line should be applied as a soft boundary, as it will change annually with nest tree use changes or colony expansion or contraction.

Most colonies shift their nests within the nest stand annually, and some may move over 100 ft. in a single season. This movement has been documented through multi-year colony mapping at March Pt. Samish Is., Birch Bay, and Pt. Roberts. An example of colony movement is illustrated in Figure 17, which represents the Birch Bay heron colony perimeter between 1997-2007.

Figure 17. Heron Colony Nesting Area Migration



The vertical height of the nests in trees adds additional vertical buffer from the ground, which vary in height depending on the site and tree species. At Post Point the nest tree height is about 80 ft. It has been observed, that nesting herons situated in taller trees and providing higher nest height tend to solicit less response to human activity on the ground than lower nests (Eissinger pers. obs.). Based on these observations, if a colony is located on a slope, human activity upslope of the colony, or at the same level as the nests, eliminates the buffering effect of the nest height, and is thus likely to cause greater stress or response by the herons. This consideration applies to the Post Point colony (Figure 6).

The nesting heron's line-of-sight is also a factor and disturbance could be amplified if human activity is occurring at the same level or up slope from active nests. Vegetation is also a consideration for screening and varies by site and season. There is no established formula for adjusting buffer distances for slopes; however topography should be taken into consideration when setting buffers, and adjusted to protect the colony from any proposed action may infringe on the colony or associated habitat up slope from the colony.

6.3.1. Post Point 2003 Buffer Recommendations

The 2003 Post Point Heron Management Plan provided a detailed overview of buffers and their application. The buffers applied to the Post Point heron colony in 2003 included the following.

- 100 ft (150 ft*) permanent core area, no-entry buffer – year-round, retain habitat, restrict access with fencing or plantings to form natural barrier.
- 250 ft (300 ft*) permanent non-disturbance buffer, safety zone for herons – seasonal restrictions March 1-September 1, restricted use in designated areas only include: passive recreation and motorized maintenance. Retain habitat screening. Limit further human development.
- 500 ft (550 ft*) restricted application of pesticide (herbicides and insecticides)
- 820 ft (870 ft*) WDFW timing restriction buffer (February 15- September 1) for noise and other activities causing significant disturbance (high magnitude stimuli).

*includes the 50 ft setback from the base of perimeter nest trees.

In addition to the buffers at Post Point, there was a recommendation to designate a permanent heron/wildlife Reserve Area that would include the heron colony and its associated habitat. The proposed reserve area included the existing natural area surrounding the colony, both public and privately owned land. Restoration and enhancement of this habitat area was also recommended. Throughout the 2013 management plan, the protection of the private land adjacent to the colony was also recommended.

6.3.2. WDFW 2012 Buffer Recommendations

In 2012 the WDFW updated its PHS Great Blue Heron Management Recommendations. The update included a more comprehensive account of colony assessment and management options including urban colonies. Buffer recommendations were also updated and tailored to setting and conditions.

As stated in the WDFW PHS 2012 heron recommendations, a buffer's primary function is to:

- provide protection from potentially intrusive activities,
- provide a physical and visual barrier,
- protect colony from tree blow-down (wind-throw),
- provide space for herons to move around the colony area,
- provide space for a colony to move and expand.*

*A colony with *"an adequate buffer, with room to move or expand, increases its longevity and productivity"* (Azerrad 2012). This is an important consideration when adopting buffers or other protections around a colony.

The 2012 WDFW buffer recommendations for herons are focused on nesting areas or colony sites. These include year-round buffers and seasonal buffers. The year-round buffers are prescribed to colonies in one of three settings: urban, suburban/rural and undeveloped. The seasonal buffers are for disturbances of higher magnitude particularly noise.

WDFW Year-round Buffers (core zone):

- 197 ft (60 m)* for urban colonies, urban areas = ≥ 50% built within ¼ mile of colony,
- 656 ft (200 m) for suburban/rural colonies, suburban/rural areas = 2-50% built within ¼ mile of colony.
- 984 ft (300 m) for undeveloped areas = 0-2% built within ¼ mile of colony.

*urban colonies with herons that exhibit behavior indicating a low tolerance to people should assign larger buffers to 984 ft.

WDFW Seasonal Buffers (quiet area):

- 656 ft (200 m) February to September for unusually loud activities with noise reaching the colony exceeding 92 dB.
- 1,320 ft (400 m) February to September for extremely loud activities like blasting.

The buffer distances are measured from the perimeter of the colony nest trees and are usually made on a horizontal plain which does not take into account topography. Buffers need to be designated to protect the colony by providing both a physical and visual barrier, wind screening to protect nest trees from wind-throw, and provide enough area for the herons to move around without disturbance (Azerrad 2012, Vennesland 2017). Heavily vegetated buffers also may reduce noise and inhibit entry to the nesting areas.

The WDFW recommendations for urban colonies are based primarily on the British Columbia Ministry of the Environment for Land Development (2006).

6.3.3. Other Buffer Recommendations

Buffer recommendations vary and are not applicable in all cases, but depend on the site conditions, the heron's sensitivities, location, and in some cases the type of disturbance. Ross Vennesland a professional Wildlife Biologist and author of many scientific papers on Great Blue Heron has noted *"Overall, studies on Great Blue Herons have quoted various buffer widths, with most ranging from 250 m to 300 m. One study recommended buffers of up to 1,000 m.* (see the Great Blue Heron species account in North American Birds by Vennesland and Butler 2011). *It should be noted that most studies do not provide strong evidence-based justification for recommended buffer widths"* (Vennesland 2017).

A more recent and thorough literature review of Great Blue Heron colony buffer recommendations was completed in 2017 by Ross Vennesland and is yet unpublished. The conclusion from his review of existing literature and backed by his own data (Vennesland 2000) was that for colonies within the relatively developed southern mainland coast of British Columbia (Salish Sea), heron colonies require a buffer of 108 meters (350 ft.) for urban settings, and 168 m (551 ft.) for rural settings, to protect from low magnitude disturbance. The geographic area he is referring to is immediately north of the US/Canada border and has similar conditions as the Bellingham area.

6.4. Post Point Heron Colony 2019 Buffer Recommendations

The following buffer recommendations for the Post Point Heron Colony are updated from the 2003 management plan, and are based on WDFW recommendations, as well as, elements of other studies described earlier this document, and site specific considerations which include: habitat condition, screening, wind protection, micro-climate, colony expansion/movement, new nest tree recruitment, topography and human activity. Empirical data and observations from 15 years of colony monitoring also informed the recommendations and their suggested application.

The recommended buffers for Post Point 2019 are illustrated in Figure 18.

The buffer distances are measured from the perimeter of the colony nest trees unless otherwise noted.

1) **197 ft. year-round colony core zone buffer (WDFW minimum buffer for urban colony)**
   This area includes the colony nucleus and buffer which form the colony core zone totaling 3 acres. This buffer is measured from the nest tree perimeter out 197 ft.

   Restrictions (unless listed as allowed actions below):
   - no disturbance to herons, heron colony or associated habitat or vegetation
   - no disturbance to heron or Bald Eagle nests
   - no vegetation alteration, removal or tree cutting or pruning within the forested area unless defined in the recommended vegetation management plan
   - no access into colony nucleus except for authorized personnel and heron monitoring biologist
   - no access into associated buffer area except for authorized personnel and heron monitoring biologist
   - no public access on public property except on designated public trail – pedestrian use only
   - no event activities, marathons, races or other potentially disturbing public trail use
   - no clearing, grading or development
   - no exterior lighting directed at colony area, or high intensity lighting (need to evaluate lighting at PPRRP)
   - no drones

   Allowed actions in buffer area:
   - routine activities inside PPRRP grounds at ambient noise and light levels – minimize activities between January 15-September 1
   - retain all native vegetation unaltered within buffer and on edges
   - a vegetation management plan is recommended to address maintenance activities and timing within buffers and heron habitat areas
   - Protective fence construction between September 2 - January 14

Considerations:

- This is not a fixed buffer or boundary – it changes each year with the heron nesting location and may flex by 50-100 ft., requires annual update.
- This buffer is not large enough to sustain or protect the colony over time, so additional protected area is needed..
- Buffer includes public and private lands.
- Exemptions or provisions for certain actions on private and public areas within the buffer need to be determined by the City of Bellingham.

2) 300 ft. year-round habitat/vegetation protection and seasonal no-disturbance buffer

This buffer is consistent with the 2003 Management Plan, and recommendations from Vennesland 2017. This buffer includes contiguous forest vegetation outside the core zone and is valuable habitat supporting nesting, and provides screening, wind break, and barrier functions. The buffer is measured from the nest tree perimeter creating a buffer of 103 feet between the core zone and the outer perimeter.

Restrictions:

- no disturbance to herons or Bald Eagles anytime,
- no disturbance to heron or Bald Eagle nests anytime,
- no disturbance to, or alteration of, vegetation or associated habitat within nest stand or contiguous forest area,
- no-access restricted area January 15-September 1 (exemptions or provisions for certain actions on private and public areas within the buffer need to be determined by the City of Bellingham)
- no exterior lighting directed at the colony, or no strobe, spot or high intensity lighting,
- no application of pesticides (herbicides and insecticides) without permit,
- no large events or related activities, marathons, races, or other potentially disturbing activities in public spaces or trails,
- no drone use.

Allowed actions in buffer area:

- allow vegetation enhancement or restoration on public property where needed to maximize screening and windbreak, or suitable heron habitat - per vegetation management plan, timing restrictions apply, no work January 15-September 1,
- retain all existing native vegetation unaltered in undeveloped spaces,
- retain all existing trees for screening and wind break,
- a vegetation management plan is recommended to address maintenance activities and timing within buffers and heron habitat areas.

Considerations:

- Consistent with 2003 non-disturbance buffer
- Similar to buffer recommendation for urban colonies by Vennesland 2017

- Exemptions or provisions for developed private and public areas within the buffer need to be determined by the City of Bellingham.

3) **650 ft. (850 ft total from colony perimeter) seasonal quiet buffer – extreme disturbance reduction zone**
   This buffer includes a large area around the colony for seasonal disturbance reduction.

   Restrictions:
   - seasonal restrictions apply January 15 to September 1
   - restrict activities causing loud noises > 92dB at the colony or other activities of high magnitude stimuli causing significant disturbance such as flushing of herons or temporary nest abandonment, or negatively affecting reproductive success
   - no strobe, spot or high intensity lighting
   - no gunning practice (previously experienced off shore >850 ft by US Coast Guard)

   Allowed actions in buffer area:
   - all normal activities outside the 300 ft. no-disturbance buffer that are within ambient sound and activity levels are allowed.

   Considerations:
   - WDFW recommended seasonal buffer for excessively noisy land use activity.
   - Buffer includes public and private lands.
   - The proposed railroad quiet zone would benefit the heron's habitat use at Post Point, support for the quiet zone is recommended. It is recognized that quiet zones require BNSF approval, BNSF construction, Port of Bellingham participation, and all crossings in a zone meeting quiet zone standards
   - Exemptions or provisions for certain private and public areas within the buffer need to be determined by the City of Bellingham.

The WDFW 2012 heron buffer recommendations also include a 1,320 ft. buffer for any extremely loud activities or high magnitude disturbance such as blasting which are unlikely in or near an urban area. Regarding other potential high magnitude disturbances, large commercial or municipal fireworks displays likely qualify. Although guidance specifically for fireworks near heron colonies is not readily available, a precautionary approach to this issue is advisable. The annual Fourth of July fireworks displays launched on Bellingham Bay need review for any disturbance, since these occur at the fledging stage in the heron colony and have not been considered in prior monitoring. The distance from the colony and duration of the display would be important to document in addition to any response by the herons. Monitoring the heron colony prior to and following the event to document any response or observable change would be informative.

Figure 18. Post Point Heron Colony Recommended Buffers

6.4.1. Foraging Area Buffers

Buffers and guidelines for the foraging areas are discussed earlier in 6.2.5 Foraging Area Protection Measures. Please refer to that section for buffer and protection recommendations.

6.4.2. Flyway and Aerial Buffer

Air space over a heron colony and associated flyways are important features that have received little attention or protection. Established colonies, such as Post Point, have specific flight paths that during the breeding season may experience high use or numerous heron flights per hour. In addition, overhead or aerial disturbances by aircraft – manned and unmanned, could cause stress, and require the herons to divert their flights creating an energy deficit. Energy deficits related to long fight distances experienced by adult herons affect their reproductive success (Knight, Vennesland and Winchester 2016). There are also other impacts from low flying aircraft including high intensity noise, and downwash from helicopter rotors causing high velocity turbulence that can dislodge nests and their occupants.

As stated in the 2003 management plan, 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. Although observations are made during monitoring visits to the Post Point colony, no systematic data is collected specific to heron flights or aerial disturbance, however, flight directions were regularly noted. Reports of low flying aircraft have been reported over the heron colony, including helicopters, and the use of drones near the colony has also been reported.

A brief summary of studies related to aerial disturbance (below) were provided in the 2003 Post Point Heron Colony Management Plan, and more recent studies are also available.

> *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).*

The best approach to reducing conflicts with low-flying aircraft near the Post Point Heron Colony would be to discuss this issue with WDFW and also the local flight service professionals, including the US Coast Guard who make frequent flights over Bellingham Bay. Although helicopters are allowed to fly below the 500 ft. minimum altitude set by the FAA, altitudes of no less than 1,000 ft above the colony area would be recommended.

Unmanned aerial vehicles or UAV's, commonly known as drones, are growing in popularity and availability. Many amateur and professional photographers are utilizing drones to photograph wildlife and herons are a common target. Unfortunately, drones also cause disturbance to nesting birds and because herons nest in colonies the disturbance factor is compounded. Unauthorized and unpermitted use of drones in sensitive wildlife areas, such as heron colonies and their feeding areas may be considered harassment by WDFW.

Based on FAA rules, drones are not allowed to be flown in controlled airspace including within 5 miles of an airport such as Bellingham International (BLI), and must be flown below 400 ft altitude in uncontrolled airspace. Because Post Point is just outside the controlled airspace of the airport and flying drones near a heron colony, particularly under 400 feet may be considered harassment, it is recommended that the heron reserve area (Figure 19), and discussed below, be a seasonal no-drone zone from January 15 to September 1. This would also include the shoreline from Marine Park south to Post Point.

6.5. Post Point Heron Reserve

A Heron Reserve area was recommended in 2003 and is again in this 2019 update. The Heron Reserve is the largest spatial tier in the heron management update framework and is recommended as a means for the City to consolidate the heron habitats under one designation and management focus.

The proposed Heron Reserve could serve as the primary management area to protect the heron colony and associated habitats or as a compliment to the buffer areas as described earlier. The creation of a Heron Reserve would put the focus on management of all the heron habitats in a comprehensive manner and place greater emphasis on the combined habitat areas as a unit and supporting this unit as a whole. By doing so, the heron colony would benefit from a more uniform management and stewardship approach.

The Reserve area would encompass the heron colony and associated habitats on undeveloped lands and shoreline within about 1000 ft. of the colony. The reserve would be made up of an estimated 27 acres with 9 acres of upland and 18 acres of lagoon and marine shoreline. The reserve would include: 12 acres east of the railroad causeway, and 15 acres to the west. The eastern portion would include the Post Point Lagoon (3 ac), the heron nest stand (7.4 ac) and wet meadow/shrub/lagoon shoreline (1.6+ ac). The west side would include 2,500 feet of shoreline from Marine Park to Post Point including approximately 15 acres of intertidal habitat.

The Reserve area (Figure 19) closely follows the heron habitat areas that have been described and mapped earlier (Figure 5), which include: the nesting, roosting, loafing, foraging and staging areas. The reserve area as a whole would also protect vital wind break, screening and enough forest cover for the herons to gather needed nest material, find safe locations to rest, move freely throughout the area, and provide adequate space for the nesting colony to move or expand as needed while

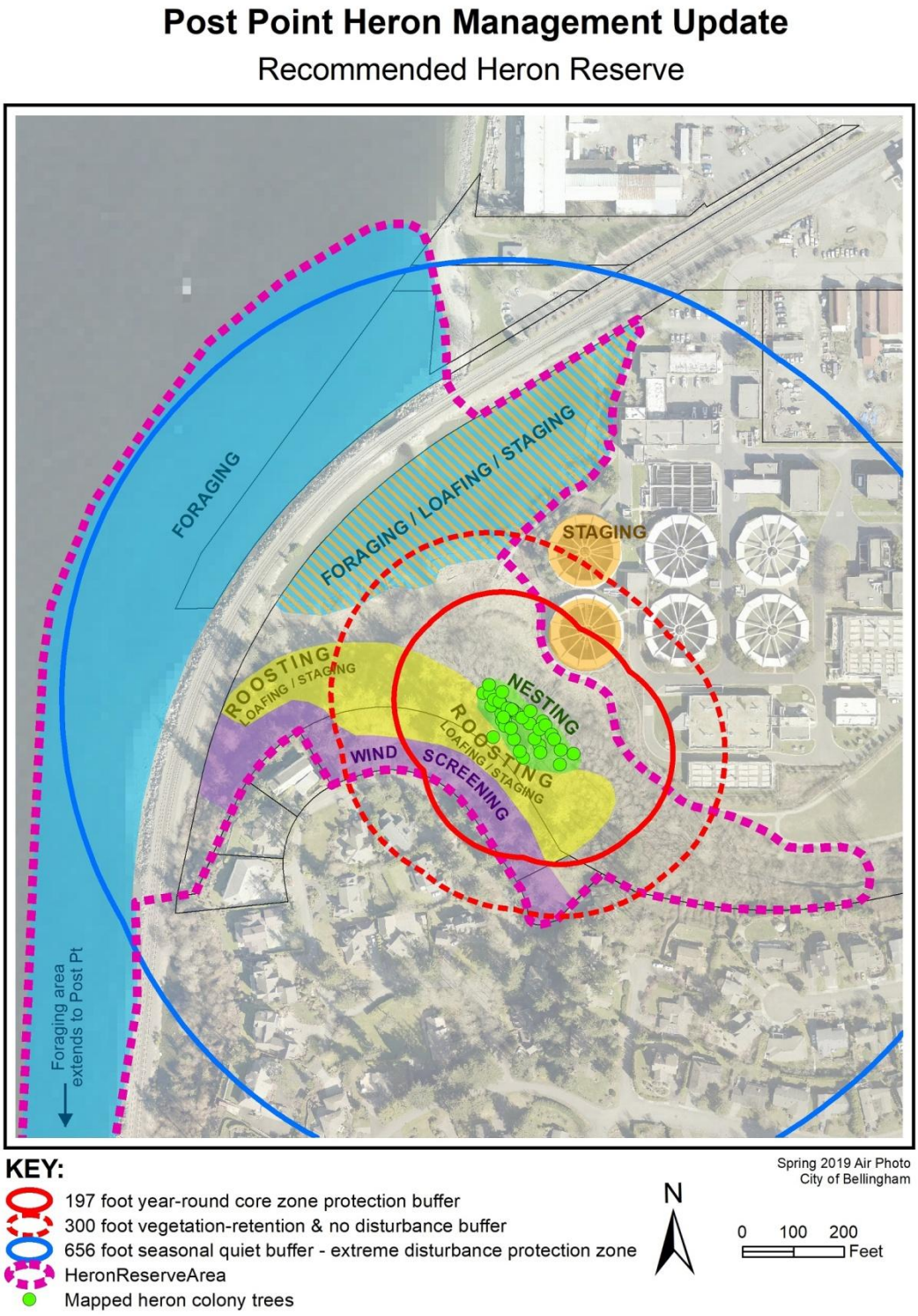
retaining functional screening. Foraging areas would also likely benefit from the Reserve designation and management focus resulting in disturbance reduction.

The Reserve area, as delineated on the map (Figure 19), includes both public and privately owned properties. Property ownerships include, City of Bellingham and private parties. The State of Washington, Department of Natural Resources controls the tidelands. The City property is part of the 30 acre PPRRP and public use area and some marine shoreline, with the railroad right-of-way bisecting the parcel on the west edge. The two private undeveloped properties identified, south and southwest of the colony (approximately 1.8 acres) are zoned for residential use and would require acquisition or some other land conservation mechanism to guarantee it be maintained in a natural state. This area as a whole is recommended for permanent protection as a publicly owned or protected wildlife/natural area.

The proposed Heron Reserve would benefit the heron colony by keeping the nest stand habitat intact and retaining the function and ecological values of the associated habitat areas over time. It would also maintain vital buffer and screening for the heron colony and allow for enhancement of the southern wind break needed to reduce further wind damage in the colony.

In addition to heron habitat, the reserve would also protect a scarce shoreline/upland natural area within the city that serves both terrestrial and marine wildlife. Although a small area, the reserve supports biodiversity from the marine waters to the upland forest. The Post Point Lagoon is considered a Priority Habitat by WDFW and is utilized by juvenile endangered Chinook Salmon. The site has also hosted over 60 bird species based on observations during monitoring visits, including nesting Bald Eagle (*Haliaeetus leucocephalus*), and Green Heron (*Butorides virescens)* and numerous other species such as: Pileated Woodpecker (*Dryocopus pileatus*), Coopers Hawk *(Accipiter cooperii)*, Band-tailed Pigeon *(Patagioenas fasciata)*, Hooded Merganser *(Lophodytes cucullatus)* and Ringed-neck Duck *(Aythya collaris)* just to name a few. This area supports a variety of both resident and migrant species.

Figure 19. Post Point Heron Reserve



6.6. 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 colony core and buffer areas are protected, associated habitat may be identified for restoration and/or enhancement to improve conditions for the colony in the future.

The 2003 management plan provided several suggestions for heron habitat restoration and enhancement. The 2003 recommendations for the site included buffer forest enhancement, and perimeter planting of thorny native shrubs to create 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.

Over the past 16 years, several restoration and enhancement projects have been completed as mitigation for PPRRP improvements projects including:

- Trail relocation and fencing – 2002-3
- Eelgrass enhancement in the lagoon and outer shoreline – 2008
- Tree planting to the west of the colony as part of stream and lagoon restoration – 2008
- Lagoon shoreline restoration and enhancement – 2004-2019
- Wetland mitigation 2012-14
- Ongoing mitigation planting area maintenance - current

Most of these restoration and enhancement projects have provided some benefit to heron habitat; however some habitat has also been lost. In order to determine the net benefit to herons, an evaluation of landscape changes and current conditions from a heron habitat perspective would be useful and informative, and therefore recommended.

With recent significant tree blow down and tree death in and adjacent to the colony (2018-2019) a course of action is needed to restore certain areas of the colony and northern buffer. There also needs to be an evaluation of the wind break to the south of the colony due to the direction of tree fall indicating high velocity wind flowing from the south-southwest and southeast (Figure 16) . Improving the wind break for the colony would be beneficial. An assessment of damages in the nest stand, and consideration of possible restorative action is needed. A site evaluation by a professional arborist to assess tree health, wind break enhancement, and forest restoration options is recommended..

Maintaining forest health of the colony and nest stand should be a priority. No-net loss of forest around the colony could be achieved with a plan involving tree replanting and enhancement both in the stand and on the edges. A plan for restoration informed by the arborists assessment and developed with input from the heron biologist would be useful and is recommended

The wet meadow and grassy areas serves an important roll for herons and other species. The fallow grass dominated 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 the

heron's winter and spring foraging and habitat for the herons primary terrestrial prey the Townsend's vole *(Microtus townsendii)* and other prey species. Restoration of meadow area at Post Point would be beneficial.

A Vegetation Management Plan for Post Point is recommended to help guide restoration, enhancement, maintenance and overall vegetation management for the heron colony, buffers and associated habitat areas. The plan would incorporate information from the forest assessment, prior mitigation plans and heron habitat needs, to provide site specific recommendations and guidelines. The plan would also define seasonal timing and activity restrictions on order to minimize disturbance to herons and the colony.

6.7. Site Management and Security

Concern over the security of a heronry is an important consideration in the management and long term conservation of such a sensitive site. The Post Point heron colony is located on land owned by the City of Bellingham and is part of the larger PPRRP facility grounds which is managed by the Department of Public Works.

Since the herons established their colony at Post Point in 2000, the oversight of the heronry has been the charge of the City of Bellingham's Department of Public Works. The Department of Public Works has also been very supportive and has maintained funding for habitat enhancement work and annual biological monitoring of the colony.

The colony's biological monitoring conducted by Nahkeeta Northwest Wildlife Services, has served as seasonal oversight of the colony during each nesting season since 2005. The weekly or biweekly field visits to the site, coupled with regular reporting directly to the PPRRP supervisor has helped inform management of the heron colony and associated habitat area, and provide recommendations for improvements or needed changes. The relationship with citizens and neighbors has also helped by creating a network of individuals reporting occurrences at the colony.

Oversight of the colony area outside of the nesting season has been lacking with the exception of occasional site visits by PPRRP and other city staff. Overall the colony and nest stand would benefit from consistent stewardship year-round. This issue was also discussed in length in the 2003 Management Plan.

The security of the Post Point heron colony has been a concern over the years as people have camped, built trails and entered the non-disturbance zone without permission and in some cases have caused damage and possible disturbance to the herons. The sudden death of 4 healthy nest trees and the occurrence of golf balls in the colony although likely the result of natural or unintentional causes, could instead indicate intentional tampering or harassment. With the colony's south side boundary directly shared with private property, that portion of the site is open to access and disturbance with little or no control or visibility.

Year-round site management and security is strongly recommended. A long-term monitoring and security plan coordinated by the Public Works Department, the Bellingham Police Department, and involving PPRRP, other city staff and the heron biologist would be useful. The plan could include:

- Year-round stewardship responsibilities of the site – site visits, monitoring and reporting
- Security of the colony core and associated area - buffers and timing restrictions
- Possible fencing, signage and vegetative barriers
- Other species that needed consideration and management or protection such as Bald Eagles
- Public and neighborhood outreach and education
- Public reporting mechanism
- Enforcement
- Defining roles and responsibilities

6.8. Post Point Colony Monitoring

Biological 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 features, defining habitats, observing the nesting cycle, establishing annual chronology, identifying behaviors, patterns, flyways, etc. As a long term tool, monitoring is used to track the colony over time and to ensure the colony is secure and functional. As a scientific tool, monitoring tracks behavior, measures 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 human activities, predation, and record particular behaviors that could indicate stress.

Monitoring of a heron colony is conducted on an annual basis and by a qualified professional biologist with working knowledge of heron life history, ecology and behavior, and have field experience with herons. Monitoring of the Post Point heron colony has been provided by Nahkeeta Northwest Wildlife Services since 2005. All monitoring methods, oversight, and reporting has been the responsibility of the Heron Biologist, Ann Eissinger.

Colony Monitoring - 2014

There are three general types of monitoring schemes, each with a different purpose and application.

- General monitoring: regular weekly or biweekly visits to the colony to document activity, nesting stages, and disturbances 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 on-going monitoring.

- 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 changes in heron behavior that could indicate stress or destabilization of the colony. This method is needed when the colony is exposed to planned disturbances and/or is believed to be at risk of abandonment..

- Seasonal monitoring: seasonal visits to determine occupancy only. This method should include a minimum of three-four visits to the colony, first to establish recolonization in the early spring and dates (in the event that timing information is needed for nearby project planning). Recording or estimating active nest numbers is useful. Hatching dates and productivity count are optional. Confirm full season of nesting and fledging is important. Colonies have been known to abandon mid-season and without a fledging confirmation there is no way to document that the young actually survived to fledge. Finally an annual nest count following the dropping of leaves in the autumn is essential to document actual nest numbers and track growth over time.

Monitoring methods are established and provide structure for data collection and comparison across the region by the scientific community. A detailed monitoring guide and explanation of field protocol is available from Nahkeeta Northwest: Great Blue Heron Monitoring Guidelines for Land Trusts and Other Citizen Science Programs (A. Eissinger 2013). The Heron Working Group – Survey Protocol for Measurement of Nesting Productivity of Pacific Great Blue Heron Nesting Colonies, also provides technical guidance for monitoring heron colonies (R.G. Vennesland and D. M. Norman 2006).

An abbreviated description of monitoring methods is also available in the 2003 Post Point Heron Colony Management Plan. The recommendations of the 2003 monitoring continue to be relevant.

The duration for monitoring the Post Point heron colony is February 1- September 1 or terminating when all the herons have dispersed from the colony. If early season weather conditions are fair, an earlier start date, such as January 15, may be justified to witness staging or pre-nesting heron congregations.

Important monitoring sequence and stages to document during the heron nesting season include the following.

- Pre-Season Colony Assessment
    - Record condition of colony, nests and trees, including a nest count.
- Early Season:
    - Staging
    - Colony reoccupation
    - Courtship and nest building
    - Onset of incubation
- Mid Season:
    - First hatching
    - Rearing of young

- Late Season:
    - Productivity survey – young are about 6 weeks of age
    - First fledging
    - Mass fledging if occurs
    - End of season – all herons have dispersed from colony
- Post Season Assessment
    - Autumn nest count
    - Colony mapping update
- Annual Reporting

Monitoring at Post Point has been conducted annually since 2005. General monitoring methods have been used with the exception of 2012-2014 when intensive methodology was employed due to the PPRRP expansion. The monitoring results have been summarized in periodic reports to PPRRP Supervisor and also complied and reported to the City of Bellingham in annual reports which are available online. (https://www.cob.org/services/environment/restoration/Pages/post-point-lagoon.aspx)

General monitoring of the Post Point heron colony is recommended to continue on an annual basis. The methods employed since 2005 are also recommended to continue for consistency of data, comparative tracking and overall management of the colony. Periodic reporting during the nesting season and annual reporting of results is also recommended.

6.8.1. 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 likely need evaluation by a qualified biologist to provide comment. A mechanism to engage a qualified biologist in landuse project or change proposals would be helpful in the management of the colony and associated habitats.

6.9. Public Education

Recreational wildlife viewing has become a popular North American past time involving approximately 26 percent of the U.S. population in 2016, representing over twice the number of people who hunt and fish (USFWS et al, 2016). Viewing wildlife in an urban environment compounds it value by its accessibility to more people in addition to reaching broader socio-economic groups.

Many citizens of Bellingham have rallied around the Post Point heron colony and support its protection and long term viability, they also care about herons. Individuals and groups both young and old enjoy visiting the colony viewing area from the public trail. No formal survey has been conducted to record visitor numbers, but that would be recommended to inform management and assist the City in educational or outreach strategies.

In 2008 the City of Bellingham developed a series of interpretive signs which were place along the public tail between the dog park and Post Point Lagoon. The signs provided information about the herons, their habitat and life cycle. Other signs were related to pocket estuaries and their ecological value. These signs provide focal points along the trail and an area of contemplation at small viewing deck and bench between the lagoon and colony. The signs have been well received and are still viewed today. Additional information made available to the public or trained volunteers like docents for the Post Point colony would also be beneficial.

In addition to passive public viewing, it would be useful reach out to the neighborhood groups, educational groups and user groups that have a stake in Post Point and other heron habitat areas. These include both nesting and foraging areas. The purpose of meeting with these groups would be to share general information about the herons and stress the need to reduce disturbance by limiting distance from herons if encountered, and reducing potentially disturbing activities.

Due to the increasing use of shoreline areas, a review of issues and conflicts with herons would be useful. Due to known conflicts at Marine Park, an evaluation of that site and discussion related to possible actions is needed. This could include items such as informative signage, markers, barriers or other ideas to separate people from herons.

Providing an informative and educational web-presence would also be useful. An easy to access webpage or site with information about the Post Point heron colony would help inform a broader public and also assist in its protection and management.

Other educational opportunities include a webcam in the colony to stream live views of nesting herons over the internet. This has been done in other colonies in the past, but has been discontinued for various reasons. An exploratory review and feasibility study for this idea would be informative. Considerations would include: applicability and feasibility at Post Point, benefits, limitations, possible disturbance or impacts, cost, equipment, maintenance and responsibility. A reporting of this information would be a good starting point to discuss the concept and formulate next steps.

6.10. SUMMARY OF RECOMMENDATIONS

A summary of recommendations for the Post Point heron colony is listed below and are based on the full descriptions provided in Section 6 - Management and Recommendations of this document. For more detail please refer to the earlier text.

Summary of Recommendations		
Location	Activity	Protection Timing
Nesting Area	This area requires full year-round protection from disturbance and disruption, and should be off limits to unauthorized personnel. The core area requires the surrounding forest habitat to maintain the current habitat function and values.	Year-round
Nest Stand	The current nest stand serves the heron colony well and should be protected fully and kept intact. Access into the forest should be restricted on a seasonal basis.	Year-round/ Seasonal
Roosting and Loafing Areas	The roosting and loafing areas associated with the Post Point heron colony include areas of the forest stand and portions of salt marsh or shoreline around the Post Point lagoon. These areas all should be protected from human intrusion and disturbance year round when herons are present.	Year-round
Staging Areas	The staging areas for the Post Point herons including isolated pockets around the Post Point Lagoon and the western clarifiers at the PPWTP should be protected during staging activities. Seasonal protection of the herons at these locations requires awareness of the heron's presence and accommodation during their staging activities which only last 1-2 weeks in January, February or March.	Seasonal
Foraging Areas	Availability of eelgrass habitat needs to be evaluated, particularly those areas that were enhanced 10 years ago. Recommended setback distances from feeding herons are: 300 ft. for pedestrians on shore, and 590 ft. for small craft on the water. Dogs should be kept on leash when on the beach. Public education, signage and other options may assist in reducing heron disturbance while feeding and are recommended.	Year-round
Alternate Nesting Areas	WDFW Management Recommendations suggest identification of alternate nesting habitat. A minimum of 10 acres is recommended. Three sites were identified and all are located on publicly owned property. These include: Chuckanut Community Forest, Hoag's Pond, and Chuckanut Bay.	N/A
197 ft. buffer	This buffer includes the colony nucleus or nest area and an area of native vegetation, and should be a year-round no-entry/no activity area. Exemptions or provisions for certain private and public areas within the buffer need to be determined.	Year-round

300 ft. buffer	The 300 ft buffer should be a year-round habitat/vegetation protection and seasonal no disturbance zone. This buffer provides additional habitat/vegetation retention around the core zone and limits seasonal access and activity. Seasonal access and activity restrictions should apply between January 15 and September 1. Exemptions or provisions for certain private and public areas within the buffer need to be determined	Year round/ seasonal
650 ft. buffer (850 ft. from colony perimeter)	The 650 ft buffer should be a seasonal quiet buffer and extreme disturbance reduction zone. This buffer is recommended by WDFW as a quiet zone. In this area activities emitting loud noise >92 dB and other high magnitude disturbances should be restricted. The quiet zone is a priority issue for the herons.	Seasonal
Flyway and Aerial Buffer	Precautionary measures to avoid direct disturbance to the herons or damage to the colony by low-flying aircraft/drones are recommended, including: 1) seek guidance from WDFW, 2) discuss issue with local flight service professionals including the US Coast Guard stationed at Squalicum Harbor, 3) request all flights over Post Point maintain a minimum altitude of 1,000 ft, 4) create a done no-fly zone over the Post Point Heron Reserve area.	Year-round
Heron Reserve	A Heron Reserve area was proposed in 2003 and again in 2019. This Reserve would protect all of the immediate habitat necessary to support the Post Point heron colony. Feeding grounds outside of the Post Point site may also be included. The Reserve as a management approach could be applied as a means to augment recommended buffers or as a stand-alone management option focused on heron habitat protection.	Year-round
Site Restoration and Enhancement	Restoration and/or enhancement projects have been ongoing at Post Point since 2002. A thorough evaluation of mitigation actions and areas to improve heron habitat is recommended. There is a need to assess and plan restoration and enhancement of the heron nest stand and northern buffer due to tree loss in 2018-2019. A site assessment and plan development is recommended. A vegetation management plan is recommended to address maintenance activities and timing within buffers and heron habitat areas. There is a strong chemical odor emitted from the PPRRP clarifier that needs evaluation. A passive air sampler to determine the compounds being emitted would be useful. Planting a row of trees around the clarifier to absorb odor may also help mitigate the problem.	Seasonal

Site Management and Security	Site management and security for the Post Point heron colony is vitally important for the heronry's longevity. Management and oversight of the colony area and associated habitats changed in 2019 and will now be the responsibility of the Bellingham Public Works - Public Natural Resources Division. It is recommended that City personnel and heron monitoring biologist meet on a regular basis to discuss heron colony and habitat management, security, requests for access, monitoring results, project proposals, public education and outreach.	Year-round
Site Monitoring	The continuation of ongoing general monitoring of the heron colony is recommended. A foraging area survey update is also recommended.	Seasonal
Public Education	Educational recommendations include: • Survey of public trail users viewing the heron colony. • Educational out-reach to user groups and neighbors of Post Point and Marine Park as information and build appreciation for the herons and need to provide distance when sharing habitat areas, particularly beaches. • Evaluate Marine Park and associated beach for heron protection measures. • Create an easy to access, well informed website about the Post Point herons. • Explore the feasibility of placing a webcam in the heron colony and providing live streaming of the heron nesting area. • Consider a volunteer training and engagement program for heron/naturalist docents – this could be part of a roving naturalist program for the City Parks.	Year-round

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