AVIAN BASELINE INVENTORY REPORT

Gateway Pacific Terminal

Whatcom County, Washington

Prepared for:

Pacific International Terminals, Inc.
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11810 North Creek Parkway North
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June 15, 2012

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PREFACE

Pacific International Terminals, Inc. (Pacific International Terminals), proposes to develop the Gateway Pacific Terminal (the "Terminal"), a multimodal terminal for transfer of dry bulk commodities, at Cherry Point in Whatcom County, Washington. Construction and operation of the Terminal and associated facilities require the approval of local, state, and federal agencies. Agency decision makers are to be informed of the potential environmental impacts of the proposed project by preparation of an Environmental Impact Statement (EIS). The EIS will be prepared under guidelines of the National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) by a lead federal agency and lead state agency or agencies working in cooperation.

This report is one of several technical reports prepared on behalf of Pacific International Terminals that provide scientific technical information about the existing conditions of the proposed project area and in some cases the projected effects of project operations. It is provided to the lead federal, state, and local agencies for their use in preparation of a Draft EIS. Several of the technical reports have also been prepared to support specific project permit applications submitted to local, state, and federal agencies, or as part of the consultation process with resource agencies and affected Indian nations.

A more detailed description of the proposed Terminal, including a complete list of proposed commodities and the phasing plan, is provided in the *Revised Gateway Pacific Terminal Project Information Document* (Pacific International Terminals 2012).

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EXECUTIVE SUMMARY

AMEC Environment & Infrastructure, Inc. (AMEC), conducted a baseline inventory of habitats and avian use of those habitats on a site proposed for the Gateway Pacific Terminal. The study area consisted of approximately 1,200 acres in Whatcom County, Washington at Cherry Point, which is located approximately 18 miles northwest of the City of Bellingham, Washington.

The purpose of the study was to:

- Establish baseline information on terrestrial birds, including breeding species present in the study area;
- Assess species diversity and habitat use;
- Review species of conservation concern, including water birds for the area; and
- Identify terrestrial breeding bird species of conservation concern (i.e., Priority Species) in the study area, such that appropriate conservation steps may be taken to meet statutory requirements of relevant wildlife acts and guidelines.

The proposed Gateway Pacific Terminal study area lies within the Cherry Point Industrial Urban Growth Area. Major industrial facilities currently operate within the Cherry Point Urban Growth Area, including the BP Cherry Point Refinery, the ConocoPhillips Ferndale Refinery, and ALCOA-Intalco Works. Other land use in the vicinity includes a mix of agricultural and residential areas, and areas that are managed by the state and/or County for wildlife, including the Cherry Point Aquatic Reserve and the Whatcom Wildlife Area.

The focus of the survey was on terrestrial birds, however all other birds (e.g., water birds and raptors) observed during the surveys were recorded as incidental sightings, and included in the overall analysis.

A total of 86 bird species in five defined habitat types (forest, shrub, riparian forest, agricultural/grassland, and marine shoreline) were recorded during field surveys that were completed between January 2009 and July 2011. The majority of species recorded during the field surveys were year-round residents, assumed to be breeding within the study area. The study area was also used by long distant migrant species for breeding or wintering, particularly within forest and marine shoreline habitats. During the breeding season (late April through mid-July), species diversity was highest in forest and marine shoreline habitats, and lowest in agricultural/grassland areas. During the non-breeding season, (August through mid-April) species diversity was recorded to be highest in shrub and marine shoreline environments.

Based on their life requirements, and the habitats present in the study area, a total of 18 Washington Department of Fish and Wildlife's Priority Habitat and Species could potentially occur within the study area. Nine of these 18 species were recorded during the field surveys. Of these nine, the study area provides potential breeding opportunities for four species: bald eagle, band-tailed pigeon, pileated woodpecker, and Vaux' swift. Bald eagle nests were identified within the study area, but breeding was not confirmed for the other three species during the field surveys.

No threatened or endangered birds under the Endangered Species Act were recorded during any of the surveys. Spotted owl is listed as endangered in the vicinity, but it is not likely to occur in the study area due to lack of suitable habitat, and was not observed during this study. Marbled murrelet likely is present foraging in the marine waters of the study area, although it was not observed during this study. Listed as threatened under the Endangered Species Act, this species is non-resident in the study area and would not breed in the study area.

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ACRONYMS AND ABBREVIATIONS

AMEC	AMEC Environment & Infrastructure, Inc.
CAO	Critical Area Ordinance
WDNR	Washington Department of Natural Resource
E	Endangered
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
GPS	Global Positioning System
FWHCAs	Fish and Wildlife Habitat Conservation Areas
HMP	Habitat Management Plan
MLLW	Mean lower low water
NEPA	National Environmental Policy Act
PC	Point Count
PHS	Priority Habitat and Species
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
T	Threatened
WAC	Washington Administrative Code
WCC	Whatcom County Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WSDOT	Washington State Department of Transportation

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1.0 INTRODUCTION

AMEC Environment and Infrastructure, Inc. (AMEC), conducted field surveys to assess terrestrial avian habitat (i.e., bird presence and habitats) on a property owned by Pacific International Terminals, Inc. The study area included the proposed location for the Gateway Pacific Terminal in Whatcom County, Washington.

The study area (Figure 1) consists of approximately 1,200 undeveloped acres at Cherry Point, which is a small promontory of land situated along the southeast margin of the Strait of Georgia. The location is approximately 18 miles northwest of the City of Bellingham, 5 miles west of the City of Ferndale, and 17 miles south of the United States – Canada Border.

1.1 STUDY PURPOSE

The avian baseline inventory assessment was undertaken to achieve the following goals:

- Establish baseline information on terrestrial birds, including breeding species present in the study area;
- Assess species diversity and habitat use; and
- Identify Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) in the study area, such that appropriate conservation steps may be taken to meet statutory requirements of relevant wildlife acts and guidelines.

This report is intended to provide baseline information about terrestrial bird species that use the study area in support of project environmental documentation and permitting compliance and for use in preparation of an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA) and Washington State's Environmental Policy Act (SEPA).

1.2 REGULATORY CONTEXT

1.2.1 Laws and Regulatory Authorities that Protect Avian Species

1.2.1.1 Federal Regulations

National Environmental Policy Act (42 U.S.C. §4321, *et seq.*): requires federal agencies to evaluate project effects and if needed prepare a detailed Environmental Impact Study (EIS) to assess environmental impacts and potential alternatives for any major federal (or federally permitted) action that may have significant effects on the environment.

Endangered Species Act **(ESA) of 1973, as amended** (16 U.S.C. §1531, *et seq.*): provides protection for the identification and protection of threatened and endangered plants and animals and

their critical habitats. Federally-listed species are protected under the Endangered Species Act. The ESA directs federal agencies to ensure that actions authorized, funded, and/or conducted by them are not likely to jeopardize the continued existence of any federally proposed or listed species, candidate species, or critical habitats. Compliance with Section 7 of the ESA (as amended in 1978, 1979, and 1982) is overseen by the US Fish and Wildlife Service (USFWS) for terrestrial species, and by the National Oceanic and Atmospheric Administration (NOAA) Fisheries Division for marine species.

Fish and Wildlife Conservation Act (16 U.S.C. §2901): provides for the protection of non-game fish and wildlife by mandating states to make conservation plans that include an inventory of nongame fish and wildlife within the state that are deemed valued for ecological, educational, esthetic, cultural, recreational, economic, or scientific benefits by the public.

Bald and Golden Eagle Protection Act (16 U.S.C. §668a-d): prohibits taking or harming bald eagles (*Haliaeetus leucocephalus*) or golden eagles (*Aquila chrysaetos*), their eggs, nests, or young without an appropriate permit.

Migratory Bird Treaty Act, as amended (16 U.S.C. §703-712): prohibits the taking or harming of a migratory bird, its eggs, nests, or young without the appropriate permit.

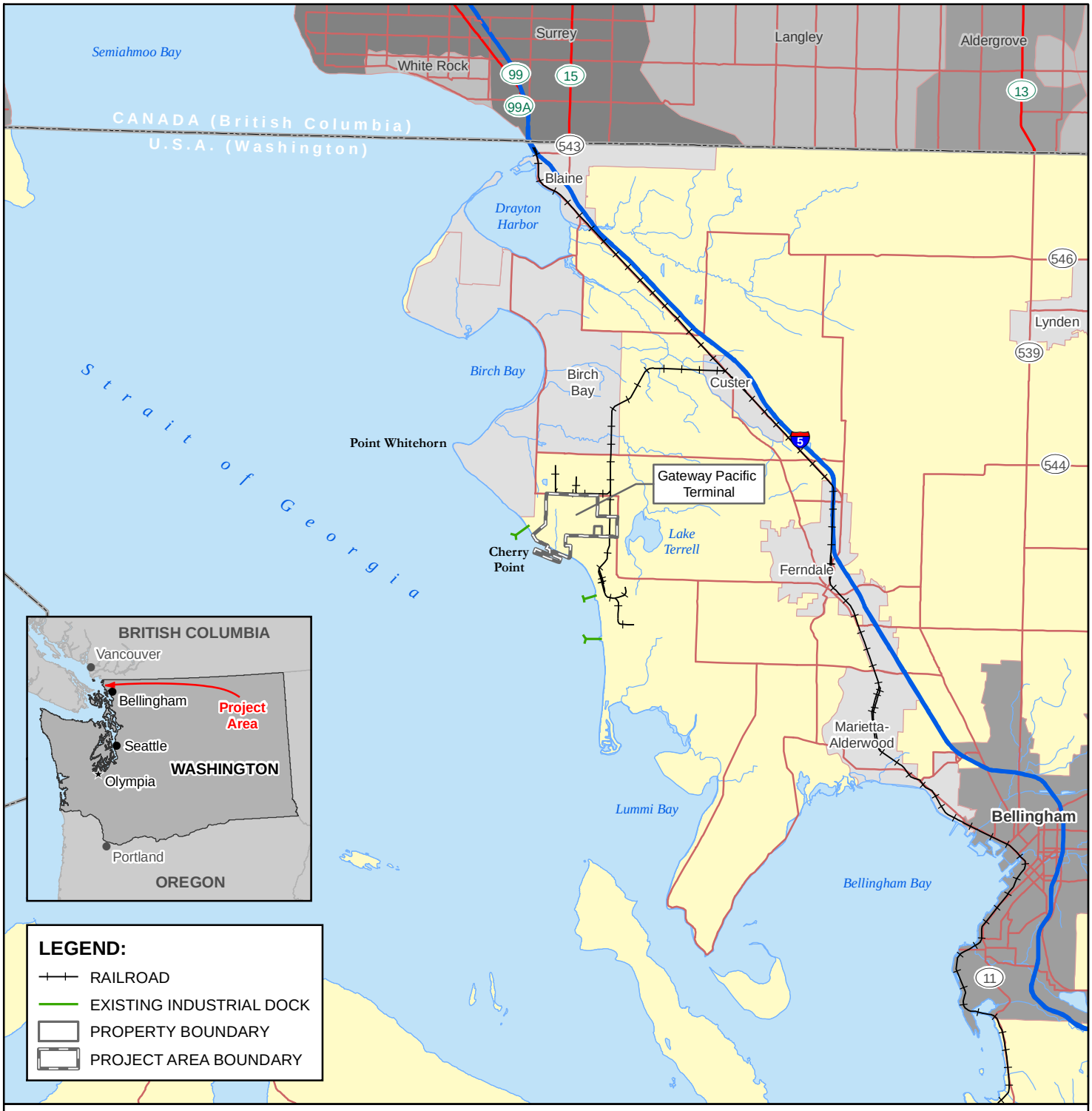
Responsibilities of Federal Agencies to Protect Migratory Birds (Executive Order 13186 - 66 FR 3853): discusses the regulations that apply and the duties of each regulatory agency for implementing the *Migratory Bird Treaty Act.*

Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) (I.L.M. 11:963-976, Ratified 1986): discusses the importance of wetland ecosystems to birds and how they should be protected in these ecosystems.

1.2.1.2 State Regulations

***State Environmental Policy Act* (SEPA)** (Washington Administrative Code [WAC] 197-11): requires state agencies to prepare detailed evaluations that assess potential environmental effects and recommend alternatives to major state (or state-permitted) actions that may have a significant effect on the environment.

Bald Eagle Protection Rules (WAC 232-12-292): protects bald eagle habitat so that the species does not become classified as threatened, endangered, or sensitive in Washington State. Habitat protection is typically achieved through bald eagle management plans.



AMEC 11810 North Creek Parkway N Bothell, WA 98011			CLIENT: PACIFIC INTERNATIONAL TERMINALS, INC.	
PROJECT: GATEWAY PACIFIC TERMINAL		DWN BY: SD	DATUM: NAD83	DATE: APRIL 2012
TITLE: VICINITY MAP		CHK'D BY: KD	REV. NO.: 1	PROJECT NO.: 091515338C-04-01
		PROJECTION: WA SP North, Ft.	SCALE: 1 inch=3 miles	FIGURE No.: FIGURE 1

K:\AMEC US OFFICES\KIRKLAND\15338-0\15338C\T-04-01 - Bird-Wildlife-Plant Assessment\dwg\Revised\Figure 1 - Vicinity Map.mxd

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Bald Eagle Protection Act (Revised Code of Washington [RCW] 77.12.655) requires the establishment of rules defining buffer zones around bald eagle nest and roost sites. The law states that the rules shall take into account the need for variation of the extent of the zone from case to case.

1.2.1.3 Local Regulations

Whatcom County Critical Areas Ordinance (WCC CAO Title 16.16): regulates wildlife and wildlife habitat through a variety of mechanisms required to conserve species listed as federally or locally sensitive or important. The code protects any habitat deemed important to the preservation of the local and regional environment. Whatcom County protects habitats and the species that use the habitat as Fish and Wildlife Habitat Conservation Areas (FWHCAs) (WCC CAO 16.16 – Article 7).

Whatcom County Shoreline Management Program (WCC CAO Title 23): identifies the significance of Whatcom County's shoreline to birds.

1.2.2 Priority Areas, Priority Habitats and Species, and Fish and Wildlife Habitat Conservation Areas

Whatcom County (County), along with WDFW and the USFWS, and NOAA – Fisheries Division assesses the potential effects of proposed actions on Priority Species (i.e., Endangered, Threatened, Sensitive, and Candidate) that could occur at a proposed development site.

Washington Department of Fish and Wildlife protects wildlife through the WDFW Priority Habitat and Species (PHS) program, regulating both species and the habitats they require for life. The PHS program maintains a data base of important habitats and species, develops management recommendations for each priority habitat and species, and provides maps showing the geographic location of documented priority habitat and species.

1.2.3 Priority Species

Priority species in the State of Washington include species classified as endangered, threatened, sensitive, and candidate by both state and federal regulatory agencies, defined as follows (WDFW 2004).

- Federal Endangered: A species which is in danger of extinction throughout all or a significant portion of its range;
- Federal Threatened: A species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range;
- Federal Candidate: Formally proposed endangered or threatened species and candidate species with enough or some information to indicate biological vulnerability and threat;

- Federal Sensitive: A species that is informally considered a sensitive species by the USFWS;
- State Endangered: A species, *native to the state of Washington*, that is seriously threatened with extinction throughout all or a significant portion of its range within the state (WAC 232-12-011);
- State Threatened: A species, *native to the state of Washington,* that is likely to become endangered in the foreseeable future throughout a significant portion of its range within the state without cooperative management or the removal of threats (WAC 232-12-011);
- State Sensitive: A species, *native to the state of Washington,* that is vulnerable or declining and is likely to become endangered or threatened in a significant portion of its range within the state without cooperative management or the removal of threats (WAC 232-011)

Priority species may also include vulnerable aggregations of animals that are susceptible to significant population declines within a certain area or statewide by virtue of their inclination to aggregate. Finally, priority species may include those species of important recreational, commercial, or tribal value (WDFW 2008).

Species are often considered a priority by WDFW within known limiting habitats (e.g., breeding areas, foraging areas, migration corridors), or within areas that support a relatively high number of individuals (e.g., regular large concentrations). These are known as *priority areas*. For example, great blue herons are often found feeding along shorelines, but they are managed as priority species only in areas used for breeding.

Priority Areas that may be designated for each species include the following:

- A = Any habitat
- B = Breeding areas
- C = Regular concentration locations
- F = Foraging areas
- M = Migratory stopover locations
- O = Regular occurrences
- R = Communal roost locations
- S = Occupied mineral sites
- W = Regular occurrences in winter

1.2.4 Priority Habitats

Priority Habitats are described by WDFW as habitats with unique or significant values to many species, with one or more of the following attributes:

- High fish and wildlife density and diversity,
- Important fish and wildlife breeding habitat, seasonal ranges, and movement corridors,
- Limited availability,
- High vulnerability to habitat alteration, and
- Unique or dependent species.

A priority habitat may be described by a unique vegetation type or by a dominant species that is of primary importance to fish and wildlife.

As stated above, the County regulates wildlife through establishment and management of FWHCAs. These areas are defined as habitats/areas that are of critical importance to maintaining certain fish, wildlife, and/or plant species populations.

There are several areas mapped within the study area as FWHCAs. These are regulated by the County with the following goals (WCC 16.16.700):

- Maintain fish and wildlife populations through protection and conservation of the natural distribution, connectivity, and quality of valuable fish and wildlife habitat and the ecological processes that sustain these resources.
- Protect marine shorelines, valuable terrestrial habitats, rivers and streams and their associated riparian areas, and the ecosystem processes that they depend on.
- Avoid creating isolated populations of species, and avoid habitat degradation and fragmentation.

In order to protect the FWHCAs, they are designated with protective buffers that are intended to:

- Protect and minimize impacts to the FWHCA;
- Protect areas with Priority Habitats, and
- Protect areas with Priority Species, as listed in the PHS lists, especially where the species have a primary association with the FWHCA (WCC 16.16.740(C)).

To assess, and if needed mitigate, potential project effects on PHS and FWHCA's it is necessary to complete avian baseline studies. These studies provide an understanding of which avian species use the study area for any or part of their life stages. If Priority species or habitats are present, then appropriate avoidance and/or mitigation measures will be required to offset and/or minimize potential project effects.

2.0 STUDY METHODS

This section describes the methods used to assess use of the study area by birds. An initial background literature search was performed to identify available information on birds for the study area and the vicinity. Field surveys were then performed as described here.

2.1 LITERATURE REVIEW

A background literature search was completed to identify birds and their habitats that could possibly occur within the study area and the vicinity.

Information on birds was compiled based on a review of the following documents:

- *Whatcom Wildlife Area Management Plan* (WDFW 2006): This management plan has several purposes; however it specifically pertains to birds through the maintenance of nesting and wintering habitat for water birds, and the protection, restoration, and enhancement of wetland and riparian habitats in the vicinity.
- *Wetland Determination and Delineation for Gateway Pacific Terminal Property* (AMEC 2008): Wetland areas provide habitat to many species of birds for nesting, roosting and foraging. Wetlands were determined to be present on approximately half of the study area.
- *Cherry Point Natural Resources Technical Reports* (Shapiro 1994): These reports identified important habitats including wetlands and reported results of a bird survey performed in the study area.
- *Priority Habitats and Species List* (WDFW 2008): The document identifies and describes Priority Habitats and Species, and describes priority areas for each listed species.
- *Priority Habitats and Species Database* (WDFW 2012) Prior to the start of the fieldwork in 2008, the WDFW PHS database was consulted for occurrences of PHS-listed bird species in the study area and the vicinity. Where suitable habitat existed, the PHS-listed bird species were specifically searched for during field investigations. Information from the database was verified in 2012 prior to the publication of this report.

- Whatcom County Critical Areas Maps (Whatcom County 2005b): As discussed above, the CAO specifically identifies FWHCAs and Priority Species if they are associated with FWHCAs.
- *Final Environmental Impact Statement for the BP Cherry Point Cogeneration Project,* Appendix F (Shapiro 2004): This technical appendix described the Cherry Point Cogeneration Facility's Wetland Mitigation approach and discussed the Birch Bay Great Blue Heron Colony.
- *The Birds of Lake Tennant* (Whatcom County Parks & Recreation): This document presents a list of common birds that occur at Lake Tennant throughout the year. The lake is located approximately 3 miles east of the study area.

In addition to the background literature searches, information was obtained by reviewing the following databases and websites:

- U.S. Fish & Wildlife Service's Endangered Species database as it pertains to birds for the study area: http://www.fws.gov/pacific/ecoservices/endangered/index.html (most recently accessed February 2012);
- Washington Department of Fish and Wildlife PHS database: http://wdfw.wa.gov/conservation/phs/ (most recently accessed February 2012);
- Summary of wildlife listings for Washington State: http://ecos.fws.gov/tess_public/pub/stateListingAndOccurrenceIndividual.jsp?state=WA&s8fid=112761032792&s8fid=112762573902 (most recently accessed February 2012);
- Washington State Department of Ecology Coastal Atlas: http://www.ecy.wa.gov/ecyhome.html and https://fortress.wa.gov/ecy/coastalatlas/ (most recently accessed February 2012);
- Whatcom County's Planning and Development Services Fish and Wildlife Habitat Conservation Areas: http://www.co.whatcom.wa.us/pds/naturalresources/criticalareas/regulations/functions/habitat/index.jsp (accessed February 2012);
- Washington Department of Fish and Wildlife, Whatcom Wildlife Area, British Petroleum Unit: http://wdfw.wa.gov/lands/wildlife_areas/whatcom/British Petroleum/ (accessed February 2012);
- Marine Density Atlas: http://wdfw.wa.gov/mapping/psamp/ (most recently accessed February 2012);
- Washington Nature Mapping Program: http://naturemappingfoundation.org/natmap/maps/wa/ (most recently accessed February 2012);

- Burke Museum of Natural History and Culture Ornithology page: http://www.burkemuseum.org/ornithology (most recently accessed February 2012); and
- Seattle Audubon Society BirdWeb: http://www.birdweb.org/birdweb/ (most recently accessed February 2012).

2.2 FIELD SURVEYS

Field surveys were conducted to assess use of the study area during both the breeding season and non-breeding season. Surveys were conducted using point count methods at pre-selected survey stations (PC stations). Four surveys were conducted during the non-breeding season (in January and February during both 2009 and 2011) to assess winter use of the study area by birds. Six surveys were conducted during the bird breeding season from late April through mid-July (two in 2009 and four in 2011) to assess use of the study area for breeding. Field surveys coincided with the terrestrial bird breeding season considered to be April to August in any year. The dates when each survey was completed are presented in Appendix A. The surveys on these dates along with existing information regarding bird life cycles, including their known and/or predicted distributions in Washington State, enabled the observed species to be categorized into classes regarding likely migratory and/or breeding status.

The migratory and breeding status of terrestrial birds recorded were classified using distribution maps from the *BirdWeb Database* (Seattle Audubon Society 2008), which was derived from the Washington State Gap analysis (WDFW 2011b). Based on their known and/or predicted distributions in Washington State, birds were classified into the following classes:

- **YR:** Species recorded year-round; however individuals may vary
- **B:** Species recorded present only during the breeding season (April 1 through July 30)
- **NB:** Species recorded present only during the non-breeding season (Aug 1 through March 31)
- **F/D:** Species forages in study area during the breeding season, but considered not breeding within the study area
- **M:** Species recorded during migration, but may breed in the study area
- **PB:** Species has a potential to breed in the study area

All surveys were conducted using point count (PC) methods adapted from the U.S. Environmental Protection Agency (EPA) “Methods for Evaluating Wetland Condition: Biological Assessment Methods for Birds” (U.S. EPA 2002) and the U.S. Forest Service “Managing and Monitoring Birds Using Point Counts: Standards and Applications” (Ralph et al. 1995).

The location of each PC station was determined prior to the start of field investigations. Each station was selected to represent a characteristic habitat structure/vegetation type known to occur in the study area. Each PC station was spaced at least 200 meters from any other PC station.

Surveys were conducted from 18 PC stations for the study. Twelve stations were utilized in 2009 for the breeding and non-breeding seasons. Twelve stations were utilized in the 2011 non-breeding season, and the mid-May to late June 2011 breeding season. Six additional stations (A4 and P11-P15) were added for the late June to mid-July 2011 breeding season based on the previously collected data. The locations of these additional stations were selected to increase the likelihood of detecting uncommon species. Figure 2 shows the locations of each of the 18 PC stations. Note that PC station number "P4" was intentionally eliminated in the field due to overlap with other PC stations.

All surveys began one-half hour after sunrise and ended no later than 12:00 p.m. At each PC station, species of birds seen or heard during an 8-minute interval were recorded. In addition, birds seen or heard between PC stations or flying through the survey area were recorded. However, these individuals were not included in the quantitative analyses. Signs of the presence of birds (i.e., forage holes, nests, etc.) were also noted during the field investigations, but not used in the analyses. Surveys were not conducted during inclement weather. The survey focused on terrestrial birds, including the following groups: game birds, pigeons, goatsuckers, swifts, woodpeckers, kingfishers, hummingbirds, passerines, and near passerine species. Observations of species from other bird groups (e.g., water birds and raptors) were recorded as incidental sightings. Incidental sightings of other bird species flying over the study area were also noted.

2.3 HABITAT CLASSIFICATIONS

Habitats in the study area were identified and mapped using interpretation of aerial photographs and based on vegetation descriptions provided in *Wetland Determination and Delineation for Gateway Pacific Terminal Property* (AMEC 2008). Each habitat area was visually delineated into polygons based on observed plant species composition and vegetative structure.

Point count stations were chosen based on the delineation of vegetation/habitat polygons. Except for a coastal lagoon that contains open water year-round, the composition and structure of vegetation are very similar in both wetlands and uplands throughout the study area (AMEC 2008). Therefore, for the purposes of this study, no distinction was made between forested wetland and forested upland habitats, or between grass-dominated wetlands (wet pastures and hayfields) and grass-dominated uplands (area also used as pastures and hayfields). No distinction between bird species using wetlands and non-wetlands were made in the analysis.

The resulting classification used for this study consists of the following habitat types:

- forest,
- agricultural field/grassland,
- shrub,
- riparian forest, and
- marine shoreline.

Polygon types that were first delineated on photographs were confirmed and described during the first set of field surveys, during which time additional information on special habitat features (e.g., large woody debris) was also collected. The resulting habitat map is shown on Figure 2.

2.4 SPECIES DIVERSITY

Bird species diversity for the five defined habitat types was calculated using the Shannon-Wiener index of diversity (*H'*) (Weaver and Shannon 1949). The diversity parameter was chosen for analysis as it was the goal to compare the relative value of each habitat type for birds using the study area. This approach assumes that there was a direct positive relationship between species diversity and habitat value for birds. The Shannon-Weiner index is a mathematical measure of species diversity in a community, and was calculated using the following equation:

$$H' = \sum_{i=1}^{S} p_i \ln p_i$$

where:

s is the total number of species observed; and
p_i is the relative abundance of each species, calculated as the proportion of individuals of a given species relative to the total number of individuals of all species in the sample.

This diversity index provides information about bird community composition within a study area because it takes the relative abundance of different species into account, along with the number of species observed. Index values (H') can range from 0 to 5. A value near 0 would indicate that every species in the sample is the same. A value near 5 would indicate that the number of individuals is evenly distributed between all the species.

LEGEND

- BIRD SURVEY STATION
- BIRD SURVEY STATION 200M. BUFFER
- BALD EAGLE NEST
- WETLAND 12

BIRD HABITAT DELINEATION:

- AGRICULTURAL FIELD/GRASSLAND
- FOREST
- MARINE SHORELINE
- RIPARIAN FOREST (STREAM 1)
- SCRUB/SHRUB
- PROPERTY BOUNDARY
- PROJECT AREA BOUNDARY

NOTES:
1. PC station number "P4" was intentionally eliminated in the field due to overlap with other PC stations.
2. * = PC station only surveyed in June & July 2011.

Pacific International Terminals
A Cairnix Enterprise

CLIENT: PACIFIC INTERNATIONAL TERMINALS, INC.

AMEC
11810 North Creek Parkway N
Bothell, WA 98011

DWN BY: SD
CHK'D BY: JL
DATUM: NAD83
PROJECTION: WA SP North, Ft.
SCALE: 1 inch = 1,200 feet

PROJECT: GATEWAY PACIFIC TERMINAL

TITLE: BIRD HABITAT DELINEATION
AVIAN HABITAT ASSESSMENT REPORT

DATE: APRIL 2012
PROJECT NO.: 091515338C-04-01
REV. NO.: 1
FIGURE NO.: FIGURE 2

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3.0 RESULTS

This section presents the results of the background literature review and field surveys.

3.1 BACKGROUND REVIEW

This section summarizes the results of the background literature review. This information was first reviewed in 2009 and was reexamined in 2012 for additional information.

3.1.1 Existing Land Use

The study area is zoned for Heavy Impact Industrial use and is located in Whatcom County's Cherry Point Industrial Urban Growth Area. Bathymetry of the foreshore area is unique in that it provides deepwater access for large vessels. As such, three major water-dependent industries are currently located on the shores of Cherry Point. Major industrial facilities currently operating in the Cherry Point Industrial Urban Growth Area include the BP Cherry Point Refinery, the ConocoPhillips Ferndale Refinery, and ALCOA-Intalco Works. The vicinity of the study area also contains several areas managed by the state and/or County as habitat for wildlife, including birds. These areas are discussed in the following sections.

3.2 BIRDS OF THE STUDY AREA AND NEARBY AREAS

Background review showed that the study area is located on the Pacific Flyway, which is a general north-south migration route between breeding and wintering grounds for many terrestrial birds, seabirds, and shorebirds. Piscivorous birds forage near Cherry Point and throughout the Strait of Georgia. In addition to piscivorous birds, a variety of other seabirds use waters in the vicinity of the study area year-round.

Substantial population declines in seabirds have been noted over the past years in the Salish Sea (Bower 2009), which includes the Strait of Georgia. Previous field surveys were conducted in the study area from 1992 through 1993 by Shapiro (1994), who reported relatively low densities of seabirds during most of that survey period. In contrast, in a survey of marine birds in 1978 and 1979, Wahl, et al. (1981) observed large rafts consisting of thousands of individuals of mainly scoters off of Point Whitehorn, immediately north of the study area.

The Birch Bay heron nesting colony was located approximately 1.5 miles northwest of the study area. The Birch Bay nesting colony was reported to be the third largest heron colony in Washington and included more than 300 breeding pairs at one time. It was abandoned from 2008 to 2009, with the great blue herons all dispersed to new locations by 2010. No use for nesting has been noted since that time (A. Eissinger, personal communication, 2012). Because colonies sometimes reestablish in the same location, the area remains protected as a priority area.

3.2.1.1 Cherry Point Aquatic Reserve

The study area lies adjacent to the Cherry Point State Aquatic Reserve located along the shoreline of the Strait of Georgia. The reserve was created in 2000 by the Washington Department of Natural Resources (WDNR) for long-term protection of aquatic resources at Cherry Point (WDNR 2010). Coastal areas of the Strait of Georgia including Cherry Point are considered important wintering ground for a variety of bird species, such as the brant (*Branta bernicla*), harlequin duck (*Histrionicus histrionicus*), loons (*Gavia* spp.) and surf scoters (*Melanitta perspicillata*).

3.2.1.2 Whatcom Wildlife Area

The Whatcom Wildlife Area includes eight land units totaling 4,960 acres in the vicinity (WDFW 2006). A wide variety of birds are known to use the Whatcom Wildlife Area, which consists of open water, wetland, grassland, riparian shrub, and mixed forest. Two of the units lie in close proximity to the study area: the Lake Terrell Unit and the BP Unit. The Tennant Lake unit is the largest and is situated approximately 3 miles east of the study area in the Nooksack River watershed.

The Lake Terrell Unit consists of approximately 1,500 acres just east of the study area. It includes Lake Terrell, a 500-acre shallow lake with two peat bog marshes, as well as a portion of Terrell Creek. The BP Unit consists of 1,000 acres of privately-owned land in agricultural management located just west of the study area.

Within the Whatcom Wildlife Area, the WDFW (2006) has recorded 50 different bird species year-round, 45 during the winter, 40 during the spring/summer breeding period, and 22 migrant species. Large numbers of ducks, geese, and swans are known to winter on Lake Terrell and use the agricultural fields in the area. Waterfowl and shorebirds are known to stop in the Whatcom Wildlife Area during migration. Congregations of waterfowl and shorebirds in turn attract a variety of hawks, falcons, eagles, and owls. Species like the gyrfalcon (*Falco rusticolus*), snowy owl (*Bubo scandiacus)*, and merlin (*Falco columbarius*) are known to forage within the Whatcom Wildlife Area.

3.2.1.3 Priority Habitats and Species

The WDFW PHS database identified 28 priority species known to occur in Whatcom County (Table 1). Based on habitat structure and the life requisites of these priority species, 18 of these 28 species potentially occur in the study area (Table 1).

Table 1 WDFW PHS-listed Species Known to Occur in Whatcom County and Potential Study Area Habitat Use

Common Name	Scientific Name	Habitat	State Status	Federal Status	Potentially Occurring on site and Habitat used
bald eagle	*Haliaeetus leucocephalus*	Forest	Sensitive	None	Forest
band-tailed pigeon	*Patagioenas fasciata*	Forest	None	None	Riparian Forest
Barrow's goldeneye	*Bucephala islandica*	Shoreline	None	None	Shoreline
black-backed woodpecker	*Picoides articus*	Forest	Candidate	None	Unlikely
sooty (blue) grouse	*Dendragapus fuliginosus*	Forest	None	None	Unlikely
Brandt's cormorant	*Phalacrocorax penicillatus*	Shoreline	Candidate	None	Shoreline
brant	*Branta bernicla*	Shoreline	None	None	Shoreline
bufflehead	*Bucephala albeola*	Shoreline	None	None	Shoreline
common goldeneye	*Bucephala clangula*	Shoreline	None	None	Shoreline
common loon	*Gavia immer*	Shoreline	Sensitive	None	Shoreline
common murre	*Uria aalge*	Shoreline	Candidate	None	Shoreline
golden eagle	*Aquila chrysaetos*	Forest/Fields	Candidate	None	Field
great blue heron	*Ardea herodias*	Shoreline	None	None	Agricultural/grassland, Shoreline
harlequin duck	*Histrionicus histrionicus*	Shoreline	None	None	Shoreline
marbled murrelet	*Brachyramphus marmoratus*	Shoreline	Threatened	Threatened	Shoreline
northern goshawk	*Accipiter gentilis*	Forest	Candidate	Species of Concern	Forest
peregrine falcon	*Falco peregrines*	Forest	Sensitive	Species of Concern	Shoreline
pileated woodpecker	*Dryocopus pileatus*	Forest	Candidate	None	Forest and Riparian Forest
purple martin	*Progne subis*	Shoreline	Candidate	None	Unlikely
short-tailed albatross	*Phoebastria albatrus*	Open Water	Candidate	Endangered	Unlikely
snow goose	*Chen caerulescens*	Forest/ Fields	None	None	Unlikely
spotted owl	*Strix occidentalis*	Forest	Endangered	Threatened	Unlikely
trumpeter swan	*Cygnus buccinators*	Fields	None	None	Unlikely
tundra swan	*Cygnus columbianus*	Fields	None	None	Unlikely

Table 1 WDFW PHS-listed Species Known to Occur in Whatcom County and Potential Study Area Habitat Use

Common Name	Scientific Name	Habitat	State Status	Federal Status	Potentially Occurring on site and Habitat used
Vaux's swift	*Chaetura vauxi*	Forest	Candidate	None	Forest, Shoreline
western grebe	*Aechmophorus occidentalis*	Shoreline	Candidate	None	Shoreline
wood duck	*Aix sponsa*	Shoreline	None	None	Unlikely
yellow-billed cuckoo	*Coccyzus americanus*	Forest	Candidate	Candidate	Unlikely

Source: WDFW 2008, 2012

Eight WDFW priority species have been historically recorded in the Lake Terrell Wildlife Unit. These include the bald eagle, common loon, golden eagle, northern goshawk, pileated woodpecker, purple martin, Vaux's swift, and western grebe (WDFW 2011a).

WDFW priority bird species known to occur within the Cherry Point Aquatic Reserve include the marbled murrelet, common loon, Brandt's cormorant, bald eagle, common murre, great blue heron, western grebe, peregrine falcon, and harlequin duck (WDNR 2010).

The Whatcom County Critical Areas Maps show marine waters of the study area as critical habitat for concentrations of seabirds and waterfowl.

Other bird habitats identified by the PHS database and located in the vicinity of the study area (1 mile radius including the study area), include two bald eagle nests and an alcid breeding habitat area on the shoreline (WDFW 2012). Alcid refers to birds that are members of the family Alcidae, including puffins, auks, auklets, murres, razorbills, and guillemots. The PHS database does not indicate which birds are likely to be found in the alcid breeding area, or if the habitat is currently used. The database mapping indicates that there is potential in this location due to landscape conditions. And finally, the southeastern-most portion of shoreline associated with the study area is mapped as part of the Lummi Flats Peregrine Falcon Wintering Area (WDFW 2011a).

3.3 VEGETATION HABITATS IN THE STUDY AREA

The study area lies within the Puget Sound Area of the Western Hemlock Zone (Franklin and Dyrness 1988). Variations in forest composition exist within this zone as a result of local climatic variations and historical disturbance. Although western hemlock (*Tsuga heterophylla)* is considered the climax tree species in this forest zone, deciduous trees such as black cottonwood (*Populus balsamifera*) and red alder (*Alnus rubra*) are often dominant in early successional forests and in special habitats, such as riparian corridors.

Vegetation communities in the study area consist mostly of early seral deciduous forest, areas that are managed, or areas that contain abandoned agricultural fields. A network of roads creates a shrub-dominated forest edge.

Aquatic environments, including streams, wetlands, roadside ditches, and marine shoreline, are also present. These habitats and important wildlife habitat features (e.g., large woody debris and cavity trees) are described in the following sections.

Photos of each habitat type are provided in Appendix B.

3.3.1 Forest Habitat

This habitat type is relatively homogeneous in the study area. The forest habitat is dominated by red alder and black cottonwood trees with few western red cedar (*Thuja plicata*) and Douglas-fir (*Pseudotsuga menziesii*) trees. A dense shrub layer is present in the understory and at the edge of roads and open areas. Common shrub species include salmonberry (*Rubus spectabilis*), twinberry (*Lonicera involucrata*), sword fern (*Polystichum munitum*), vine maple (*Acer circinatum*), and Nootka rose (*Rosa nutkana*). Patches of slough sedge (*Carex obnupta*) and other hydrophytic herbaceous wetland vegetation occur in the forest where the terrain becomes hummocky.

Forest within the study area is in an early seral stage, with a dense, closed deciduous tree canopy where trees seldom exceed 12 inches diameter at breast height. The structural complexity is generally low in interior forests; however shrubs become dense near the forest edge and around gaps in the tree canopy where light is able to penetrate to the floor. Very few snags (standing dead trees) or fallen trees larger than 8 inches diameter breast height are present. The structural complexity in this habitat is slightly greater in older-aged stands. More mature stands are most common along the riparian corridor of Stream 1.

3.3.2 Shrub Habitat

Shrub habitat includes dense thickets of shrubs (less than 20 feet high) along forest and road edges, in some areas of wetlands, and as patches in abandoned fields. Dominant plant species in the shrub habitat include Nootka rose, Himalayan blackberry (*Rubus armeniacus*), Douglas spirea (*Spiraea douglasii*), young red alder saplings, and willows (*Salix* spp.).

3.3.3 Agricultural Fields/Grasslands Habitats

This habitat type consists of several managed areas including hayfields, seasonally active pastures, and mowed areas containing pipelines or power lines. This unit also includes unmanaged abandoned fields.

Hayfields are harvested annually, and re-seeded when needed. In general, hayfield vegetation consists of a dense cover of mixed grass species, including red fescue (*Festuca rubra*), bentgrass (*Agrostis* spp.), sweet vernalgrass (*Anthoxanthum odoratum*), and common velvetgrass (*Holcus lanatus*). Pasture areas generally have more weeds than the hayfields and include other grass species, such as meadow foxtail (*Alopecurus pratensis*), quackgrass (*Agropyron repens*), and orchard grass (*Dactylis glomerata*). In the mowed areas that provide easements for pipelines and power lines, reed canarygrass (*Phalaris arundinacea*) is most common. Abandoned fields have less uniform herbaceous vegetation with patches of shrubs common throughout. The pastures, hayfields, mowed areas, and abandoned fields are generally bordered by forests or roads, and scattered trees and dense shrubs generally grow along these boundaries.

3.3.4 Riparian Forest Habitat

A network of streams, roadside ditches, and other drainages are present in the study area (AMEC 2008). The only riparian area with intact vegetation was the riparian area of Stream 1, and this area was classified as riparian forest habitat. The riparian forest along Stream 1 has a higher degree of structural complexity than other forests in the study area. Trees of various ages with a few as large as 32 inches in diameter at breast height are present, and some large snags and woody debris are present. Trees generally consist of red alder and black cottonwood, with a few western red cedar.

The understory is dense in some sections where the light is able to penetrate the canopy, and sparse where the tree canopy and slopes shade the forest floor. The shrub layer consists of salmonberry, red elderberry (*Sambucus racemosa*), Indian plum (*Oemleria cerasiformis*), and sword fern (*Polystichum munitum*). Throughout this habitat type the ground is often hummocky, supports an abundant moss layer, and has a layer of forest duff.

3.3.5 Marine Shoreline

The southwestern portion of the study area lies along the shore of the Strait of Georgia. The marine shoreline associated with the study area is flat to gently sloping. Steep bluffs border approximately 2,500 feet of beach.

The tidal area consists of cobble and overlying gravels and coarse sand. Below mean low lower water (MLLW), the sediments transition to mixed cobble and gravel, becoming predominantly mixed sand and silt from elevations of -5 to -20 feet MLLW and silt below -20 feet MLLW. No mud flats are present in the study area.

Patches of low, herbaceous vegetation and abundant large woody debris are present in higher elevation areas along the beach, and coniferous and deciduous trees overhang the steep bluffs.

3.3.6 Habitat Distribution

Table 2 shows the land area within the study area for each habitat type. Forest habitat covers the largest area within the study area. Agricultural fields/grassland is the second most prevalent habitat type, followed by shrub, riparian forest, and marine shoreline (Table 2).

Table 2 Study Area Habitats

Habitat	Amount in the Study Area (acres)	Point Counts per Habitat
Forest	817	All
Agricultural fields/grassland	193	10
Shrub	83	11
Riparian forest	27	4
Marine shoreline	23	3

Habitat associated with each 200-meter point count radius is presented in Table 3 and shown in Figure 2. All sampling stations included a portion of forest habitat. Eleven PC stations included shrub habitat, ten PC stations had agricultural\grassland habitat, four included riparian habitat, and three PC stations included marine shoreline habitat (Tables 2 and 3).

Table 3 Habitats Included within 200 Meters of Point Count Stations

	Area per Habitat Type (acres)				
Survey Station	Forest	Shrub	Agricultural	Riparian	Marine Shoreline
A1	5	4	21	—	1
A2	10	4	—	—	16
A3	10	—	18	—	—
A4	8	—	8	—	15
P1	22	—	2	6	—
P2	31	—	—	—	—
P3	29	—	—	—	—
P5	8	14	8	—	—
P6	12	11	7	1	—
P7	27	3	—	—	—
P8	26	4	—	—	—
P9	31	—	—	—	—
P10	18	4	3	7	—
P11	15	8	—	—	—
P12	20	5	—	—	—
P13	25	—	4	—	—

Table 3 Habitats Included within 200 Meters of Point Count Stations

	Area per Habitat Type (acres)				
Survey Station	**Forest**	**Shrub**	**Agricultural**	**Riparian**	**Marine Shoreline**
P14	16	5	7	1	—
P15	10	7	13	—	—
TOTAL	**323**	**69**	**91**	**15**	**32**

3.4 BIRD USE OF THE STUDY AREA

This section presents the results of field surveys conducted in 2009 and 2011. A total of 86 bird species were recorded in 2009 and 2011 (Table 4). A list of bird species recorded during field surveys during the survey period is presented in Table 5. Based on the habitat present in the study area and the life requisites of the birds recorded during the fieldwork, a total of 51 species were identified as potential breeders in the study area.

Table 4 Number of Bird Species Recorded During Surveys

Bird Status	**Number of Species**
Recorded Year Round	46
Recorded during Breeding Season	25
Recorded during Non-breeding Season	12
Recorded only during Migration	2
Recorded only foraging during Breeding Season	1
Total Species	**86**

Table 5 Birds Recorded during Surveys

	Common Name	**Scientific Name**	**Class** [1]
1. .	barn swallow	*Hirundo rustica*	B/PB
2.	black-headed grosbeak	*Pheucticus melanocephalus*	B/PB
3.	brown-headed cowbird	*Molothrus ater*	B/PB
4.	Cassin's vireo	*Vireo cassinii*	B/PB
5.	common yellowthroat	*Geothlypis trichas*	B/PB
6.	MacGillivray's warbler	*Geothlypis tolmiei*	B/PB
7.	olive-sided flycatcher	*Contopus cooperi*	B/PB
8.	orange-crowned warbler	*Oreothlypis celata*	B/PB
9.	osprey	*Pandion haliaetus*	B/PB
10.	Pacific-slope flycatcher	*Empidonax difficilis*	B/PB
11.	rufous hummingbird	*Selasphorus rufus*	B/PB

Table 5 Birds Recorded during Surveys

	Common Name	Scientific Name	Class [1]
12.	savannah sparrow	*Passerculus sandwichensis*	B/PB
13.	Swainson's thrush	*Catharus ustulatus*	B/PB
14.	tree swallow	*Tachycineta bicolor*	B/PB
15.	violet-green swallow	*Tachycineta thalassina*	B/PB
16.	warbling vireo	*Vireo gilvus*	B/PB
17.	Western tanager	*Piranga ludoviciana*	B/PB
18.	western wood pewee	*Contopus sordidulus*	B/PB
19.	willow flycatcher	*Empidonax traillii*	B/PB
20.	Wilson's warbler	*Cardellina pusilla*	B/PB
21.	yellow warbler	*Setophaga petechia*	B/PB
22.	yellow-rumped warbler	*Setophaga coronata*	B/PB
23.	Caspian tern	*Hydroprogne caspia*	F/D/B
24.	harlequin duck*	*Histrionicus histrionicus*	M
25.	turkey vulture	*Cathartes aura*	M
26.	Northern harrier	*Circus cyaneus*	M
27.	red-breasted merganser	*Mergus serrator*	M
28.	bufflehead*	*Bucephala albeola*	NB
29.	common goldeneye*	*Bucephala clangula*	NB
30.	common loon*	*Gavia immer*	NB
31.	golden-crowned sparrow	*Zonotrichia atricapilla*	NB
32.	herring gull	*Larus argentatus*	NB
33.	horned grebe	*Podiceps auritus*	NB
34.	mew gull	*Larus canus*	NB
35.	surf scoter	*Melanitta perspicillata*	NB
36.	varied thrush	*Ixoreus naevius*	NB
37.	Western grebe*	*Aechmophorus occidentalis*	NB
38.	white-winged scoter	*Melanitta fusca*	NB
39.	barrow’s goldeneye*	*Bucephala islandica*	NB/M
40.	ruby-crowned kinglet	*Regulus calendula*	NB/PB
41.	double crested cormorant	*Phalacrocorax auritus*	YR
42.	glaucous-winged gull	*Larus glaucescens*	YR
43.	great blue heron*	*Ardea herodias*	YR
44.	merlin	*Falco columbarius*	YR
45.	pelagic cormorant	*Phalacrocorax pelagicus*	YR
46.	pigeon guillemot	*Cepphus columba*	YR
47.	sharp-shinned hawk	*Accipiter striatus*	YR

Table 5 Birds Recorded during Surveys

	Common Name	Scientific Name	Class [1]
48.	western gull	*Larus occidentalis*	YR
49.	Wilson's (common) snipe	*Gallinago delicata*	YR
50.	California quail	*Callipepla californica*	YR/B
51.	American goldfinch	*Spinus tristis*	YR/PB
52.	American robin	*Turdus migratorius*	YR/PB
53.	Anna's hummingbird	*Calypte anna*	YR/PB
54.	bald eagle*	*Haliaeetus leucocephalus*	YR/PB
55.	barred owl	*Strix varia*	YR/PB
56.	Bewick's wren	*Thryomanes bewickii*	YR/PB
57.	black-capped chickadee	*Poecile atricapillus*	YR/PB
58.	Brewer's blackbird	*Euphagus cyanocephalus*	YR/PB
59.	brown creeper	*Certhia americana*	YR/PB
60.	bushtit	*Psaltriparus minimus*	YR/PB
61.	cedar waxwing	*Bombycilla cedrorum*	YR/PB
62.	chestnut-backed chickadee	*Poecile rufescens*	YR/PB
63.	common raven	*Corvus corax*	YR/PB
64.	Cooper's hawk	*Accipiter cooperii*	YR/PB
65.	dark-eyed junco	*Junco hyemalis*	YR/PB
66.	European starling	*Sturnus vulgaris*	YR/PB
67.	golden-crowned kinglet	*Regulus satrapa*	YR/PB
68.	great horned owl	*Bubo virginianus*	YR/PB
69.	hairy woodpecker	*Picoides villosus*	YR/PB
70.	house finch	*Carpodacus mexicanus*	YR/PB
71.	Hutton's vireo	*Vireo huttoni*	YR/PB
72.	marsh wren	*Cistothorus palustris*	YR/PB
73.	mourning dove	*Zenaida macroura*	YR/PB
74.	Northern flicker	*Colaptes auratus*	YR/PB
75.	Northwestern crow	*Corvus caurinus*	YR/PB
76.	Pacific wren	*Troglodytes pacificus*	YR/PB
77.	pileated woodpecker*	*Dryocopus pileatus*	YR/PB
78.	pine siskin	*Spinus pinus*	YR/PB
79.	purple finch	*Carpodacus purpureus*	YR/PB
80.	red-breasted nuthatch	*Sitta canadensis*	YR/PB
81.	red-tailed hawk	*Buteo jamaicensis*	YR/PB
82.	red-winged blackbird	*Agelaius phoeniceus*	YR/PB
83.	ring-necked pheasant	*Phasianus colchicus*	YR/PB

Table 5 Birds Recorded during Surveys

	Common Name	Scientific Name	Class [1]
84.	song sparrow	*Melospiza melodia*	YR/PB
85.	spotted towhee	*Pipilo maculatus*	YR/PB
86.	white-crowned sparrow	*Zonotrichia leucophrys*	YR/PB

1 See Section 2.2 for definition of class

* On WDFW PHS List.

3.4.1 Species Diversity Index

The calculated diversity index (*H*') ranged from 2.90 to 1.70 across all habitats during the breeding season (Table 6, Figure 3). The highest diversity measured was associated with the forest habitat, followed by marine shoreline, riparian, and shrub habitat. The lowest diversity was recorded in agricultural/grassland habitat.

During the non-breeding season, the diversity was slightly lower overall, and the index ranged from 2.51 to about 1.11, with species diversity highest in marine shoreline habitat followed by shrub, forest, and agricultural/grassland habitats (Table 6, Figure 4). The lowest diversity level was shown to be associated with riparian habitat.

Table 6 Species Diversity during the Breeding and Non-Breeding Seasons.

	Diversity Index *(H')*	
Habitat Type	**Breeding Season**	**Non-breeding Season**
Forest	2.90	1.70
Shrub	2.30	2.34
Agricultural/Grassland	1.70	1.33
Riparian	2.35	1.11
Marine Shoreline	2.85	2.51

3.4.2 Results by Habitat Type

Figure 5 shows a graph of the number of bird species recorded in each habitat type during the breeding and non-breeding seasons. The following sections discuss the findings for each habitat type.

3.4.2.1 Forest Habitat

Forty-three species were recorded in forest habitat during the breeding season (Figure 6). The most commonly observed species included American robin, yellow warbler, Swainson's thrush, song sparrow, black-capped chickadee, Wilson's warbler, Pacific-slope flycatcher, black-headed grosbeak, brown-headed cowbird, and Pacific wren.

Twenty-two species were recorded in forested habitat during the non-breeding season indicating that they are either present all year or use it as winter habitat only (Figure 7). Partial migrant species[1] recorded during the breeding season included American robin, Bewick's wren, black-capped chickadee, chestnut-backed chickadee, dark-eyed junco, song sparrow, and Pacific wren. The most common species recorded was the pine siskin. This bird is very transitory and a vagrant (Bent 1958). The pileated woodpecker was the only Priority Species recorded in the forest habitat.

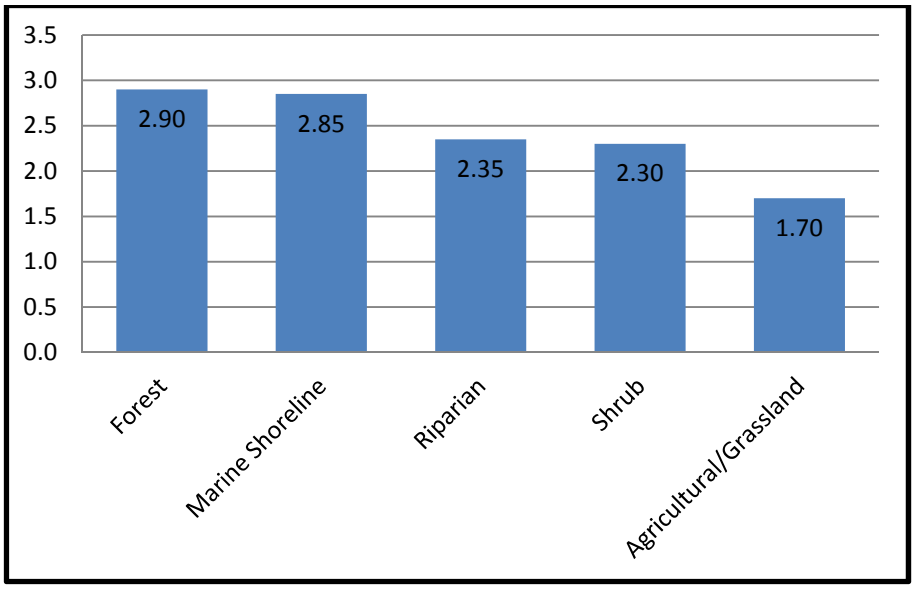


Figure 3 Bird Species Diversity Indices during the Breeding Season

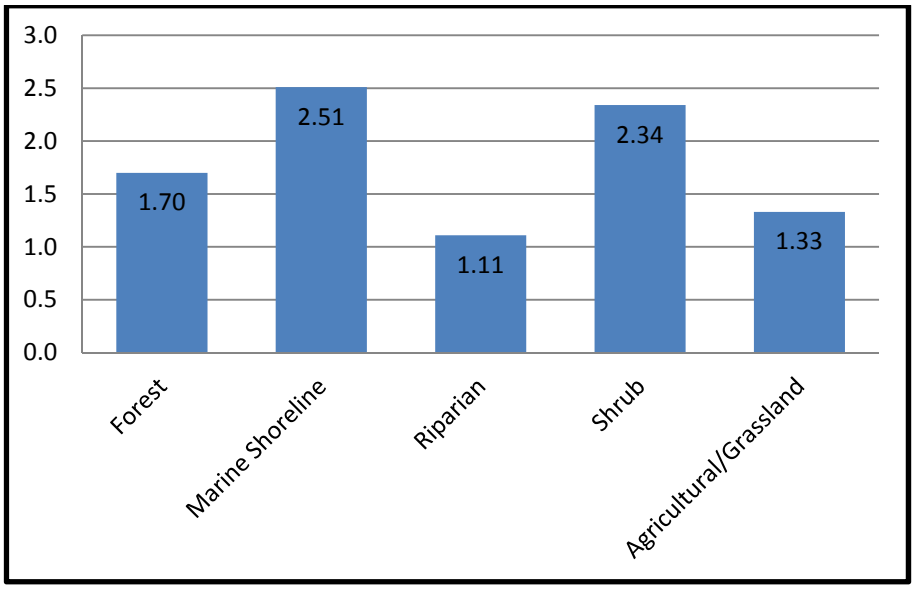
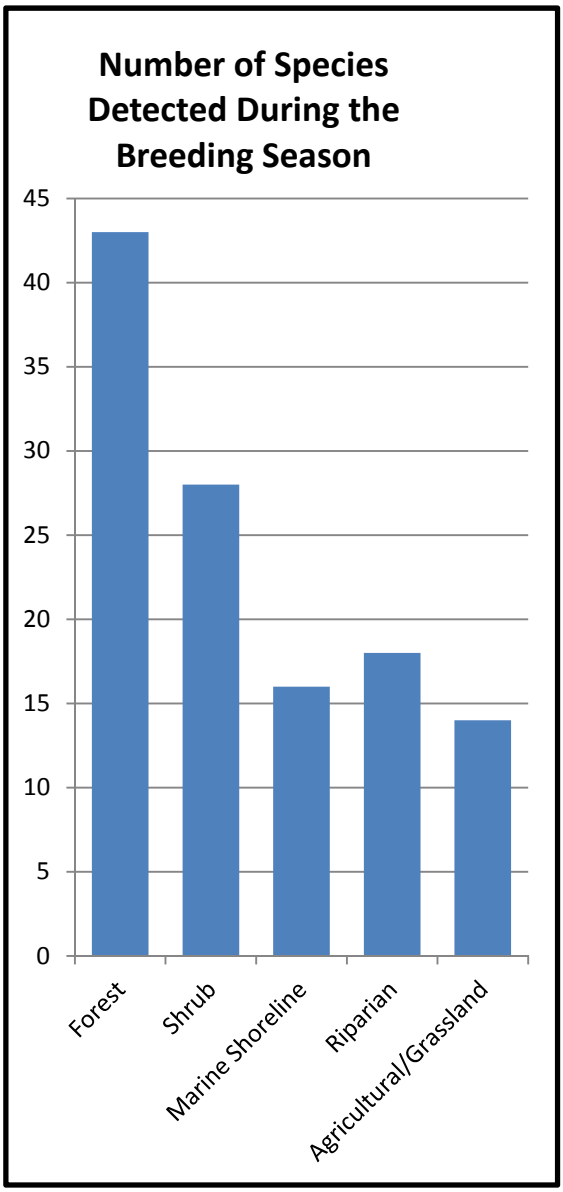


Figure 4 Bird Species Diversity Indices during the Non-Breeding Season

1. Within a species not all populations are migratory and may just move; this behavior is known as "partial migration."



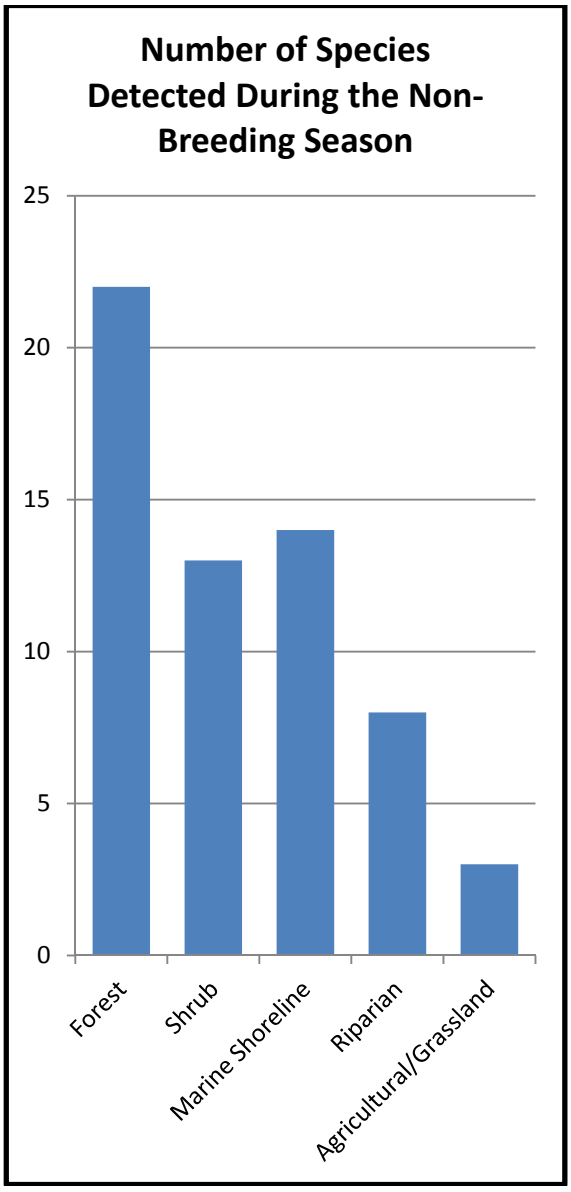


Figure 5 Number of Species Recorded in Each Habitat Type during the Breeding and Non-Breeding Seasons

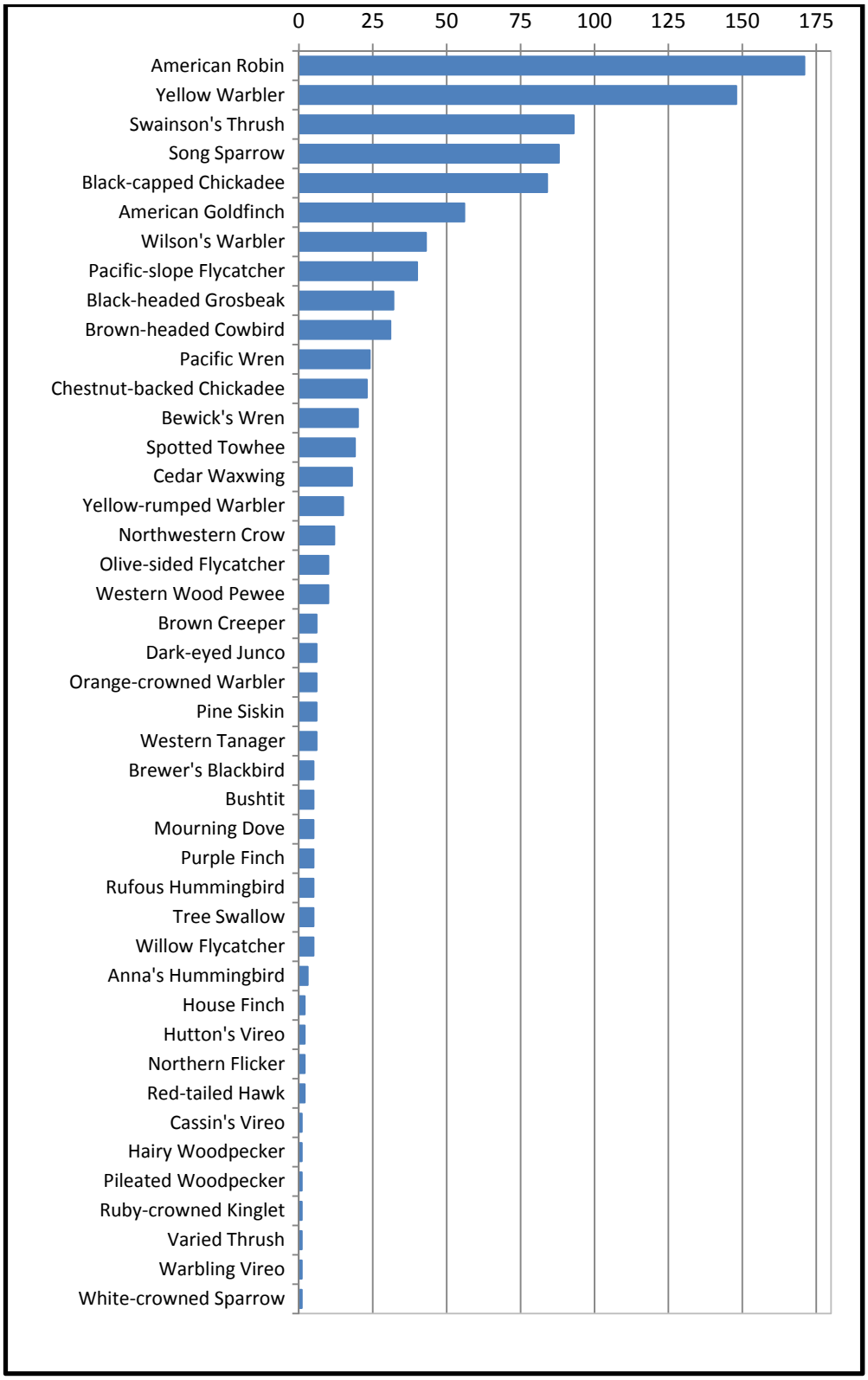


Figure 6 Number of Individuals Recorded in Forest Habitat during the Breeding Season

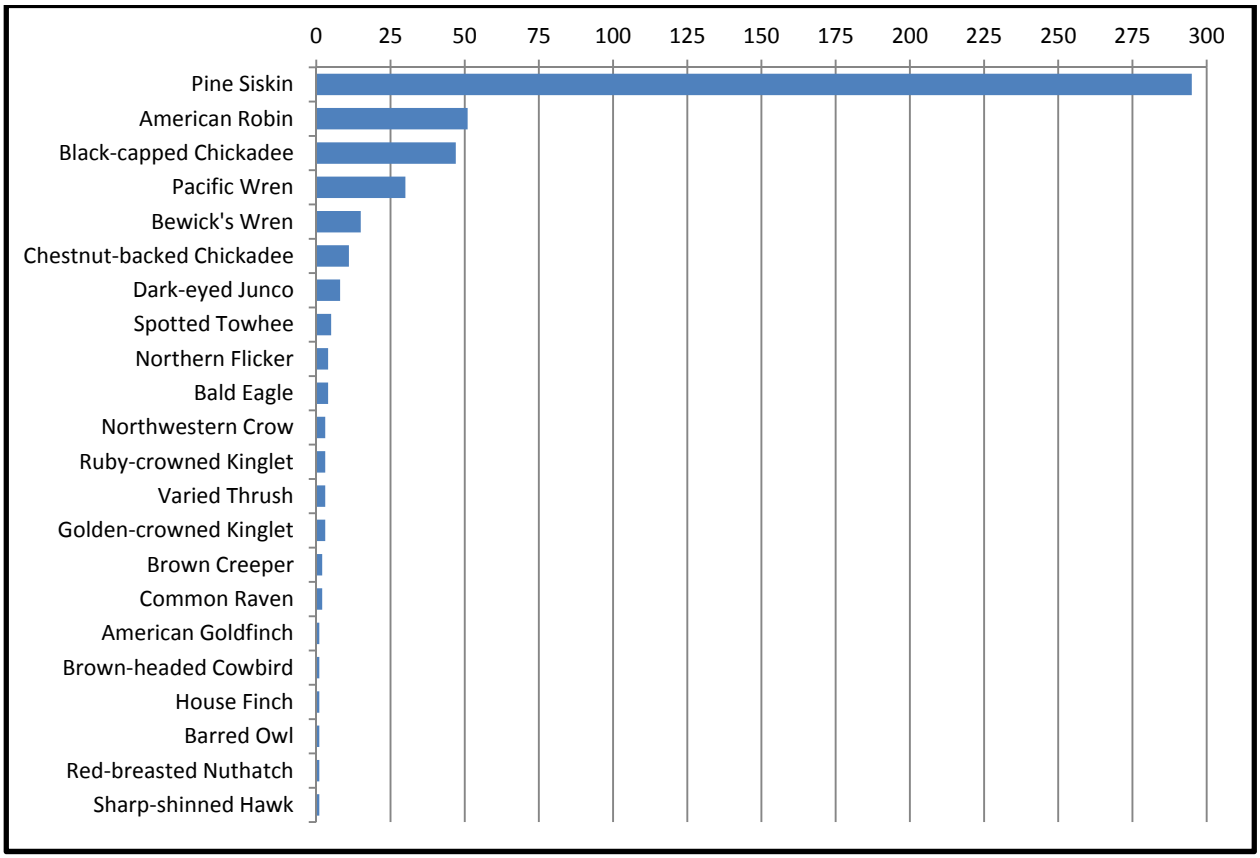


Figure 7 Number of Individuals Recorded in Forest Habitat During the Non-Breeding Season

3.4.2.2 Shrub Habitat

Twenty-eight species were recorded in shrub areas during the breeding season (Figure 8). The most common species included the spotted towhee, black-capped chickadee, American goldfinch, Bewick's wren, house finch, and ruby-crowned kinglet.

Thirteen species were recorded during the non-breeding season (Figure 9). Species observed consisted mostly of resident species similar to those observed in forests during the non-breeding season. Incidental observations of Wilson’s snipe were recorded in some shrub wetlands; however, because wetlands in the study area are usually dry during the summer months, breeding habitat for this species is lacking, and it was not observed during the breeding season. A merlin and a northern harrier were also observed (one sighting each) in shrub habitat during the non-breeding season. No songbird Priority Species were recorded in the shrub habitat on any of the surveys.

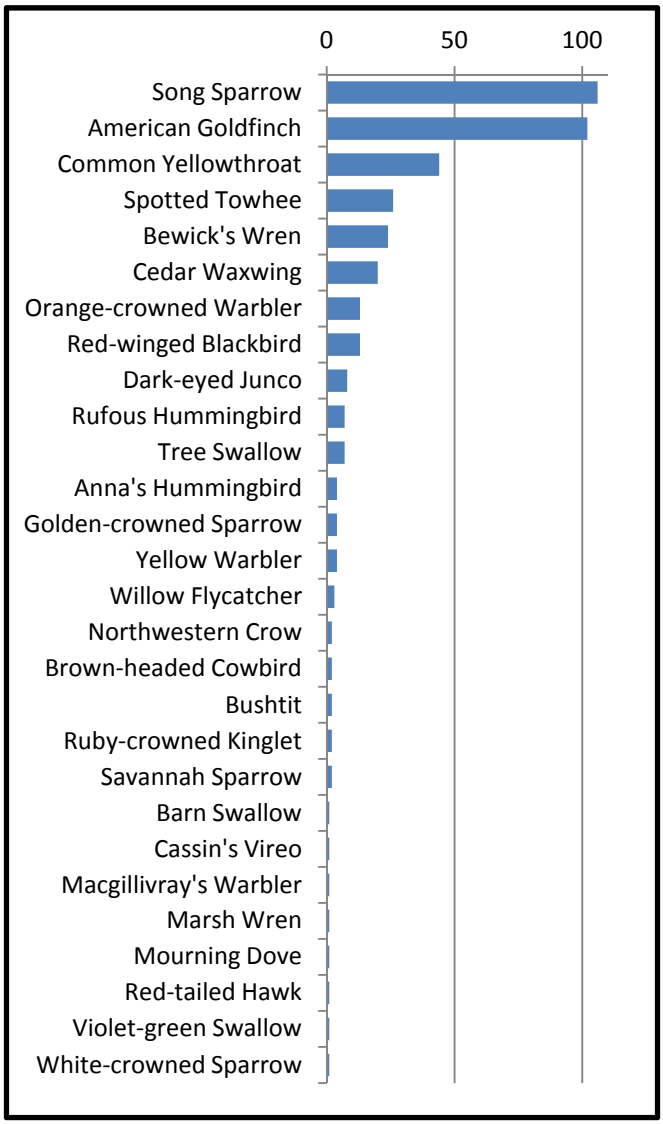


Figure 8 Number of Individuals Recorded in Shrub Habitat during the Breeding Season

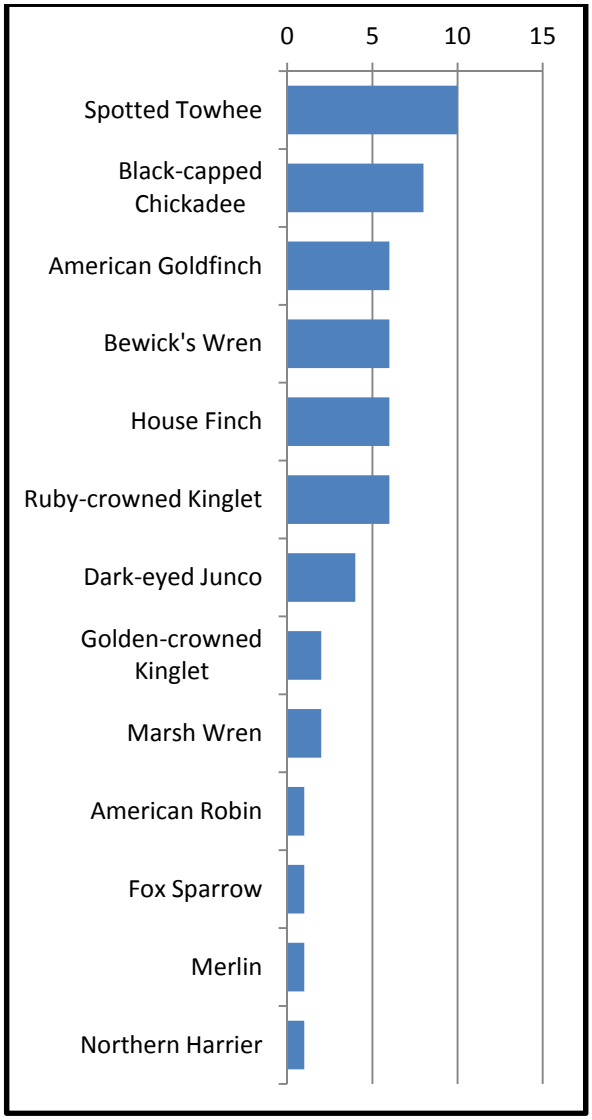


Figure 9 Number of Individuals Recorded in Shrub Habitat during the Non-Breeding Season

3.4.2.3 Agricultural/Grassland Habitat

Fourteen species were recorded in agricultural areas during the breeding season (Figure 10). The most common species observed in the agricultural/grassland areas were the Savannah sparrow and European starling. The Savannah sparrow is a long-distance migratory species. A common species for the area, Savannah sparrow accounted for 30 percent of all individual birds recorded in this habitat type. A large number of Savannah sparrows were observed nesting in hayfields along the west side of the study area.

Other species commonly observed in agricultural areas included a mix of migratory and resident species, including northwestern crow, American goldfinch, barn swallow, Brewer's blackbird, mourning dove, red-tailed hawk, tree swallow, and white-crowned sparrow.

Three species were recorded in agricultural areas during the non-breeding season (Figure 5). They include the Northwestern crow, American robin, and red-tailed hawk. No priority bird species were recorded in the agricultural/grassland habitat during any of the surveys.

3.4.2.4 Riparian Forest

Eighteen species were recorded in the riparian forest areas during the breeding season (Figure 11). The mix of species recorded was similar to that observed in the forest habitat. However, some species, such as the chestnut-backed chickadee and brown creeper, were recorded more frequently during the breeding season in the riparian forest compared to the other forested areas. This finding may possibly be due to the presence of mature and/or coniferous trees along the riparian corridor, required by these species for nesting (Bent 1958).

A nest of a pair of bald eagles was identified in the lower portion of the riparian forest adjacent to Stream 1 and near the marine shoreline in January 2011 (see Figure 2). It was active during the 2011 breeding season.

Eight species were recorded in the riparian areas during the non-breeding season (Figure 12), along with an incidental sighting of a great-horned owl that was observed in the southern portion of the riparian habitat. Other species recorded in the riparian forest during the non-breeding season were similar to those in the forest habitat.

The bald eagle was the only bird Priority Species recorded in the riparian forest habitat during any of the surveys.

3.4.2.5 Marine Shoreline Habitat

During the breeding season 16 bird species were recorded along the marine shoreline (Figure 13). Commonly observed species included bald eagle, double-crested cormorant, glaucous-winged gull, harlequin duck, horned grebe, pelagic cormorant, pigeon guillemot, red-breasted merganser, and white-winged scoter. Bird species recorded along the shoreline areas included the barn swallow, tree swallow, and great blue heron. Osprey and bald eagle were observed perching on trees along the bluff.

During the non-breeding season a total of 14 bird species were recorded along the marine shoreline (Figure 14). Most commonly observed species included bald eagle, surf scoter, Barrow's goldeneye, black-capped chickadee, bufflehead, common goldeneye, common loon, double crested cormorant, horned grebe, and various gulls. Other than the bald eagle, no Priority Species were recorded in the marine shoreline habitat during any of the field surveys.

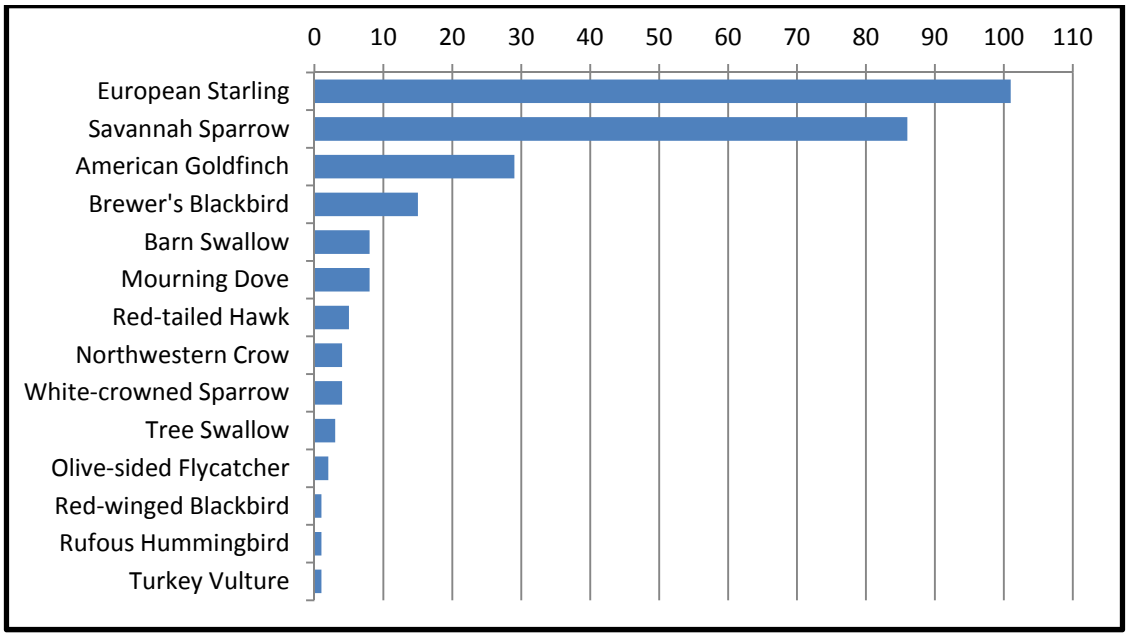


Figure 10 Number of Individuals Recorded in Agricultural/Grassland Habitat during the Breeding Season

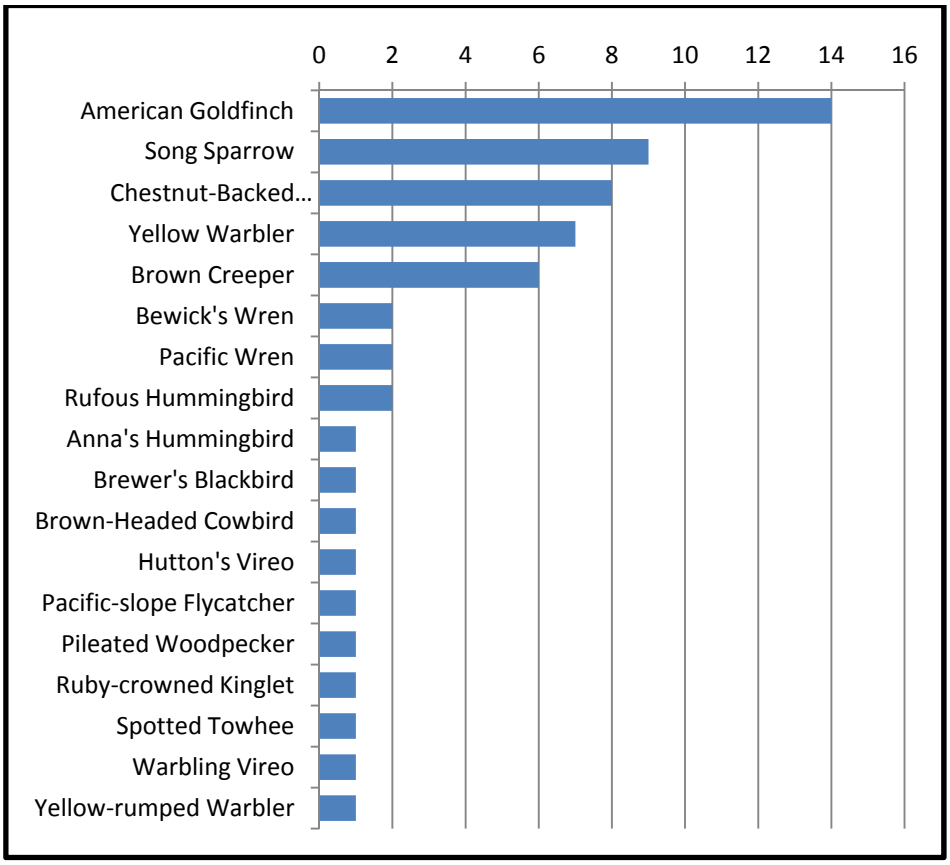


Figure 11 Number of Individuals Recorded in Riparian Forest Habitat during the Breeding Season

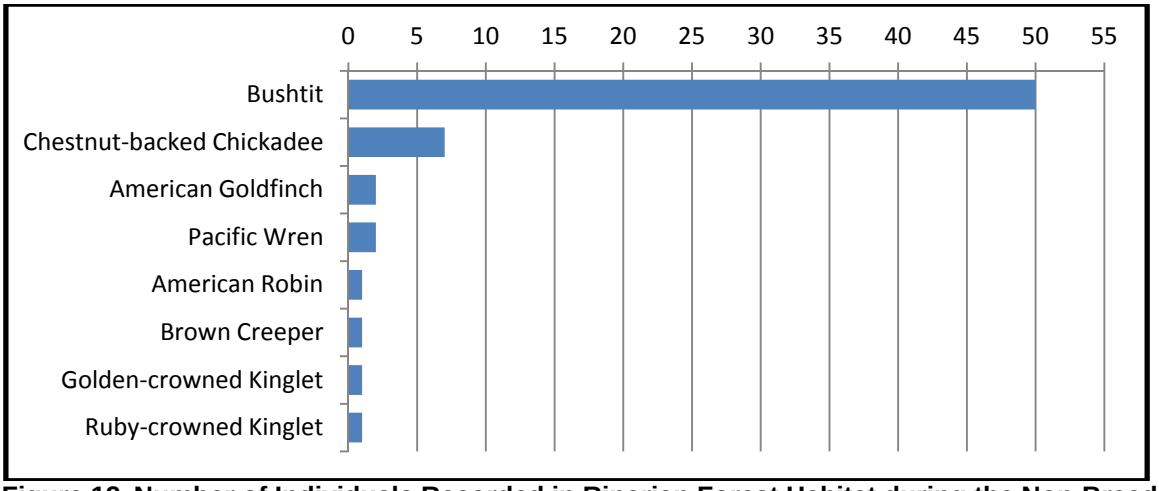


Figure 12 Number of Individuals Recorded in Riparian Forest Habitat during the Non-Breeding Season

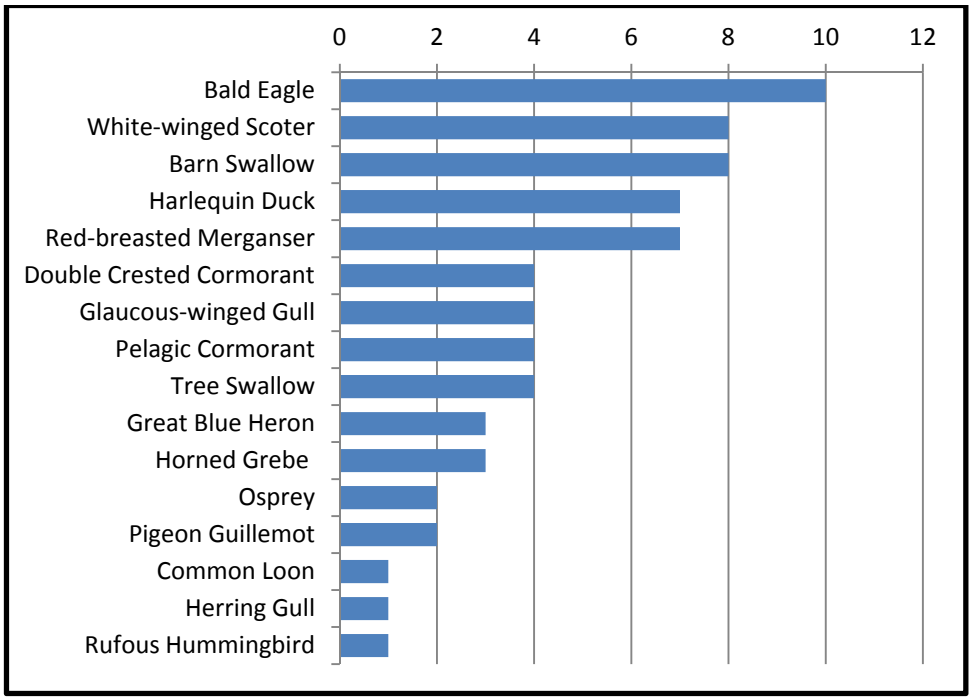


Figure 13 Number of Individuals Recorded in Marine Shoreline Habitat during the Breeding Season

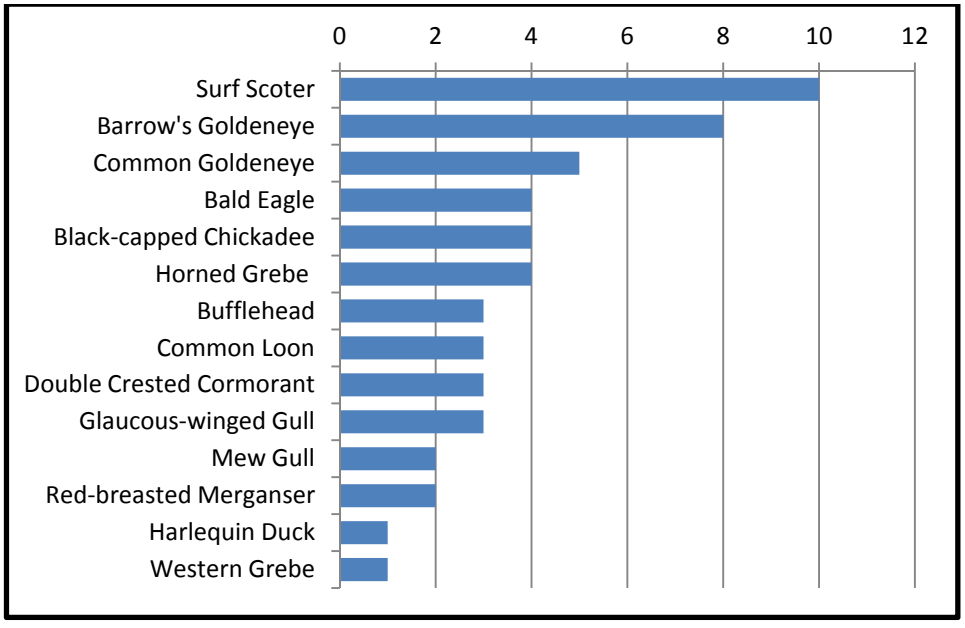


Figure 14 Number of Individuals Recorded in Marine Shoreline Habitat during the Non-Breeding Season

3.4.3 Raptors

A number of raptors were observed during surveys conducted during both the breeding and non-breeding seasons. This section summarizes the potential use of the study area by and identifies raptor species that could potentially use the study area. This section also reports on any incidental observations of raptors during the study.

Raptors are grouped into nocturnal and diurnal categories based on their behavior and activity patterns.

3.4.3.1 Diurnal Raptors

A total of eight diurnal raptor species (i.e., hawks, eagles, vultures, falcons, and accipiters) were recorded during the field surveys as incidental sightings (Table 7). Table 8 presents a complete list of the diurnal raptor species that could potentially occur in the study area based on the habitat present and the life requisites of raptors identified in the vicinity.

Table 7 Diurnal Raptors Recorded during Field Surveys

Common Name	Scientific Name	Date Recorded	Location	Potential Breeder
bald eagle	*Haliaeetus leucocephalus*	01/13/09	A1, P2	Yes
		04/21/09	A1	
		01/10/11	A3, P1, P5, P8	
		04/19/11	A2	
		02/21/11[a]	A2	
		05/18/11	A2	
		06/08/11	A1, A2	
		06/23/11	A1	
		07/14/11	A1	
osprey	*Pandion haliaetus*	07/14/11	A4	Yes
turkey vulture	*Cathartes aura*	06/08/11	I[b]	No
red-tailed hawk	*Buteo jamaicensis*	04/21/09	P6	Yes
		02/19/11	A3	
		05/18/11	A1	
		06/23/11	A1	
		07/14/P13		

Table 7 Diurnal Raptors Recorded during Field Surveys

Common Name	Scientific Name	Date Recorded	Location	Potential Breeder
sharp-shinned hawk	*Accipiter striatus*	04/21/09	I[b]	No
		01/10/11	P8	
Cooper's hawk	*Accipiter cooperi*	01/13/09	A1	Yes
merlin	*Falco columbarius*	01/13/09	P6	Yes
Northern harrier	*Circus cyaneus*	01/13/09	P6	No

a New active nest identified in riparian area of Stream 1 first noted during the 2011 breeding season.

b I = Incidental observation of species flying over the study area.

Five of the eight recorded raptors identified in Table 7 have a potential to breed in the study area. As stated earlier, a large stick nest of a bald eagle was observed in the late winter of 2011 and was observed to be active by early spring 2011.

No nests of any other diurnal raptor species were observed during this study.

Table 8 identifies 12 diurnal raptor species that could potentially use the study area for foraging and/or breeding and presents the habitats they would commonly use for their life requisites during the year. All of these 12 species have the potential to forage in the study area, but suitable breeding habitat is present only for five.

Table 8 Diurnal Raptors Potentially Occurring in the Study Area

Common Name	Scientific Name	Habitat Use	Season of Use	Type of Use[a]
turkey vulture	*Cathartes aura*	Agricultural fields/grassland	Summer	F
sharp-shinned hawk	*Accipiter striatus*	Forest, riparian forest, shrub	Winter	F
Cooper's hawk	*Accipiter cooperi*	Forest, riparian forest, shrub	All Year	B/F
Northern goshawk	*Accipiter gentilis*	Forest, riparian forest, shrub	Winter	F
red-tailed hawk	*Buteo jamaicensis*	Agricultural fields/grassland	All Year	B/F
rough-legged hawk	*Buteo lagopus*	Agricultural fields/grassland	Winter	F
bald eagle	*Haliaeetus leucocephalus*	Marine shoreline	All Year	B/F
osprey	*Pandion haliaetus*	Marine shoreline	Summer	B/F
peregrine falcon	*Falco peregrinus*	Marine shoreline	Winter	F
merlin	*Falco columbarius*	Forest	Winter	B/F
American kestrel	*Falco sparverius*	Agricultural fields/grassland	Winter	F
Northern harrier	*Circus cyaneus*	Marine shoreline, agricultural fields/grassland	All Year	F

a B**:** potential breeding; F: potential foraging

3.4.3.2 Nocturnal Raptors

A single barred owl (*Strix varia) was* recorded during a survey during the non-breeding season, and a single great-horned owl (*Bubo virginianus*) was recorded during a breeding season survey, both in forested habitats (Table 9). Based on the habitats present in the study area and the life requisites of owls potentially using the study area for breeding, the above two species as well as the western screech-owl (*Megascops kennicottii*) are the only three owl species that have a potential to breed in the study area (Table 10). All other owls that could be present in the study area throughout the year would be likely to use the area only for foraging.

Table 9 Nocturnal Raptors Recorded during Field Surveys

Common name	Scientific name	Date recorded	Location
barred owl	*Strix varia*	1/14/2009	Forest near P7
great-horned owl [a]	*Bubo virginianus*	5/9/2011	Riparian forest south of P1

a Observation made outside the duration of point count survey

Table 10 Nocturnal Raptors Potentially Occurring in the Study Area

Common Name	Scientific Name	Habitat Use	Season Use	Use[a]
barn owl	*Tyto alba*	Agricultural fields/grassland	All Year	F
short-eared owl	*Asio flammeus*	Agricultural fields/grassland	Winter	F
long-eared owl	*Asio otus*	Forest, shrub	Winter	F
great horned owl	*Bubo virginianus*	Forest, shrub	All Year	B/F
barred owl	*Strix varia*	Forest shrub	All Year	B/F
northern saw-whet owl	*Aegolius acadicus*	Forest	All Year	F
western screech-owl	*Megascops kennicottii*	Forest, riparian forest	All Year	B/F
northern pygmy owl	*Glaucidium gnoma*	Forest	All Year	F
northern saw-whet owl	*Aegolius acadicus*	Forest	All Year	F

a B: potential breeding; F: potential foraging

Agricultural/grassland and shrub habitats provide foraging habitat for barn owls year-round. Short-eared owls and long-eared owls are known to be present in the vicinity during the non-breeding season (WDFW 2006), and may forage within the study area in the agricultural/grassland and shrub habitats as well. Western screech-owls, northern pygmy owls, and northern saw-whet owls may potentially forage in the forest habitats of the study area.

3.4.4 Water Birds

For this study, water bird use of the shoreline and other portions of the study area were recorded as incidental observations. This section summarizes information obtained from the review of available publications regarding water birds in the project area.

3.4.4.1 Shorebirds

As stated earlier, the study area falls within the Pacific Flyway, which is a general north-south migratory route used by shorebirds for travel to and from breeding and wintering grounds. Large numbers of shorebirds are known to pass through during spring and fall migration, resting and foraging within the vicinity of the study area.

The common snipe (*Gallinago delicate*) was the only shorebird observed during the 2009 and 2011 field surveys; it is not likely to be nesting in the study area. Shapiro (1994) recorded observations of three species of shorebirds, including dunlin (*Calidris alpine*), semipalmated plover (*Charadrius semipalmatus*), and killdeer (*Charadrius vociferus*) in the study area.

The active portions of the beach and intertidal area along the Strait of Georgia in the study area consist mainly of cobbles with smaller numbers of boulders. No mudflats are present. Some areas of sands and silt are present near drainages (i.e., the outlet of Stream 1) and sands form the highest beach elevations. While portions of the shoreline may provide suitable habitat for killdeer nesting, this type of habitat provides only limited shorebird foraging opportunity.

3.4.4.2 Rails

Habitat for rails within the study area is limited due to the relatively small area of permanently inundated well-vegetated wetland. Two rail species have the potential to occur in the study area. The coastal lagoon may provide some habitat for Virginia rail (*Rallus limicola*) during both the breeding and non-breeding seasons. Sora (*Porzana carolina*) may also use the coastal lagoon for dispersal and foraging during the non-breeding season. Both of these species typically breed in large wetlands (Seattle Audubon Society 2008). Neither was observed during this study.

3.4.4.3 Seabirds

Seabirds (e.g., albatross, petrels, shearwaters, etc.) that may be observed in the study area may be considered as incidental or accidental and are not dependent on the study area for any habitats or life requisites.

3.4.4.4 Ducks and Marine Birds

In a 1978 survey of marine birds of the Strait of Georgia, the eastern portions of the Strait of Georgia were observed to have one of the larger concentrations of wintering marine birds occurring in the region, with an especially abundant raft of primarily scoters observed off of Point Whitehorn (Wahl, et al. 1981). Surveys conducted in more recent years have shown declining numbers of wintering populations of marine birds throughout the Straits of Georgia (Wahl 2002; Bower 2009).

Based on the observations made during this study, waters within and beyond the shoreline of the study area appear to be used as foraging habitat for a variety of ducks and marine birds. In particular, bottom-feeding species (e.g., scoters, goldeneyes) and fish-eating species (e.g., grebes and loons; Figure 14) were observed.

A total of 17 ducks and marine birds were recorded as incidental sightings during the surveys (Table 11). Five are listed as WDFW PHS species. All are considered shoreline foragers and are not expected to breed in the area. Habitat for these species is considered important where they congregate, as well as where they breed.

Table 11 Ducks and Marine Birds Recorded as Incidental sightings during Field Surveys

Common Name	*Latin Name*	State Status	Federal Status	Priority Area
bufflehead	*Bucephala albeola*	PHS-Important	No Status	Concentrations
common goldeneye	*Bucephala clangula*	PHS-Important	No Status	Breeding Areas
common loon	*Gavia immer*	Sensitive and PHS-Important	No Status	Breeding Areas & Regular Concentrations
harlequin duck	*Histrionicus histrionicus*	PHS-Important	No Status	Breeding Areas & Regular Concentrations in salt water
Barrow's goldeneye	*Bucephala islandica*	PHS-Important	No Status	Breeding Areas
pelagic cormorant	*Phalacrocorax pelagicus*	No status	No status	Not applicable
double-crested cormorant	*Phalacrocorax auritus*	No status	No status	Not applicable
glaucous-winged gull	*Larus glaucescens*	No status	No status	Not applicable
pigeon guillemot	*Cepphus columba*	No status	No status	Not applicable
red-breasted merganser	*Mergus serrator*	No status	No status	Not applicable
Western gull	*Larus occidentalis*	No status	No status	Not applicable
herring gull	*Larus argentatus*	No status	No status	Not applicable
horned grebe	*Podiceps auritus*	No status	No status	Not applicable
mew gull	*Larus canus*	No status	No status	Not applicable
surf scoter	*Melanitta perspicillata*	No status	No status	Not applicable
Western grebe	*Aechmophorus occidentalis*	No status	No status	Not applicable
white-winged scoter	*Melanitta fusca*	No status	No status	Not applicable

3.4.4.5 Other Water Bird Species

Priority areas have been designated in the study area for non-breeding concentrations of loons, grebes, and cormorants (WDFW 2012). Species identified in the study area during the field surveys included individuals or small groups (e.g., less than five individuals) of double-crested cormorant, horned grebe, and pelagic cormorant (Table 11). Large numbers of these groups were observed in proximity of the study area (i.e., shoreline areas) during field surveys conducted in 1992 and 1993 as well. They are likely to use the foreshore area for feeding and overwintering.

3.5 PRIORITY HABITATS AND SPECIES IDENTIFIED IN THE STUDY AREA

No terrestrial bird species listed as threatened or endangered under the ESA were observed in the study area during the field surveys. Nine bird species identified on the WDFW PHS list were recorded in the study area (Table 12). However, based on the field investigation, suitable habitat appears present for up to 18 WDFW PHS-listed species and species congregations. These species could potentially occur within the study area.

Table 12 presents a list of species that could potentially occur in the study area based on habitat characteristics, whether the species was actually observed during the field investigation and the type of priority area present within the study area. In addition to the species listed in Table 12, small (fewer than 5 birds) non-breeding congregations of Barrow's goldeneye, common goldeneye, and bufflehead and small non-breeding congregations of loons, grebes, cormorants, fulmar, shearwaters, storm petrels, and alcids were identified.

Table 12 WDFW Priority Species that May Be Present at the Study Area

Common Name	Scientific Name	Type of Priority Area[a]	Species Recorded During Surveys?
bald eagle	*Haliaeetus leucocephalus*	B, C, R	Yes
band-tailed pigeon	*Columba fasciata*	C, S	No
barrow's goldeneye	*Bucephala islandica*	B	Yes
Brandt's cormorant	*Phalacrocorax penicillatus*	B, C	No
brant	*Branta bernicla*	C	No
bufflehead	*Bucephala albeola*	B	Yes
common goldeneye	*Bucephala clangula*	B	Yes
common loon	*Gavia immer*	B, C, M	Yes
common murre	*Uria aalge*	B, C	No
golden eagle	*Aquila chrysaetos*	B, F	No
great blue heron	*Ardea herodias*	B	Yes
harlequin duck	*Histrionicus histrionicus*	B, C	Yes
marbled murrelet	*Brachyramphus marmoratus*	A	No

Table 12 WDFW Priority Species that May Be Present at the Study Area

Common Name	Scientific Name	Type of Priority Area[a]	Species Recorded During Surveys?
Northern goshawk	*Accipiter gentilis*	B	No
peregrine falcon	*Falco peregrinus*	B, O	No
pileated woodpecker	*Dryocopus pileatus*	B	Yes
Vaux's swift	*Chaetura vauxi*	B, R	No
western grebe	*Aechmophorus occidentalis*	B, C, M, W	Yes

a Priority Areas: A = Any habitat; B = Breeding areas; C = Regular concentration locations; F = Foraging areas; M = Migratory stopover locations; O = Regular occurrences; R = Communal roost locations; S = Occupied mineral sites; W = Regular occurrences in winter

3.5.1 Bald Eagle

As of 2007 the bald eagle was determined to be recovered (Department of Interior 2007), and under the authority of the ESA, the U.S. Fish and Wildlife Service removed (delisted) the bald eagle from the federal list of endangered and threatened wildlife. This delisting was based on information which indicated that the threats to the bald eagle have been eliminated or reduced to the point that the species has recovered and no longer meets the definition of threatened or endangered under the ESA. Importantly, the bald eagle remains listed as Sensitive on the WDFW PHS list, and they continue to be protected under the Bald and Golden Eagle Protection Act.

Priority Areas listed for the bald eagle include areas of breeding and foraging, such as the forested marine bluff and shoreline.

Sightings of bald eagles during the field surveys are presented in Table 13.

Table 13 Bald Eagles Recorded during Field Surveys

Common Name	Scientific Name	Number of Individuals	Location(s)
Bald eagle	*Haliaeetus leucocephalus*	1	Perched on tree on bluff near A2
		1[a]	Flying over forest near P2
		1	Perched on tree on bluff near A2
		2	Perched on bluff tree north of A1
		3[a]	Single flyovers P3, P1, P5
		2	Perched on tree near P8
		2	Perched on trees near A2
		1	Perched on tree on bluff near A2
		1	Perched on trees near A2
		1	Perched on bluff tree north of A1
		1[a]	Flying over field near A1
		1	Perched on trees near A4

Table 13 Bald Eagles Recorded during Field Surveys

Common Name	Scientific Name	Number of Individuals	Location(s)
		2	Perched on trees near A4
		1	Perched on bluff tree north of A1
		2[a]	Nesting in lower portion of Riparian Forest

a Observed outside of 8-minute point count duration.

3.5.2 Band-Tailed Pigeon

Band-tailed pigeons are common in low- and mid-elevation forests (Seattle Audubon Society 2008). Although they are typically associated with coniferous forests, they will use mixed coniferous/deciduous habitats provided that some large conifers are present. This pigeon eats nuts, seeds, berries, blossoms and insects found in coastal woodland and forest habitat, and also domestic crops, such as cherries, berries, oats, barley, and wheat (Ehrlich et al. 1988). Band-tailed pigeons often congregate at mineral springs and graveling sites during the breeding season. Use of mineral sites is critical for them and most notable in coastal populations, where birds are known to show strong fidelity to these mineral sites (Jarvis and Passmore 1992).

The band-tailed pigeon is listed as a state and federal game species, although hunting season in Washington has been closed since 1991 due to a dramatic decline in the numbers of band-tailed pigeons (Lewis, et al. 2004a). The population appears to be rebounding, but the species remains at risk due to loss of mineral sites and suitable breeding habitat due to land development. Priority Areas listed for band-tailed pigeons include locations of regular concentrations and occupied mineral sites (WDFW 2012).

No band-tailed pigeons were recorded in the study area during any of the field surveys. However, suitable nesting habitat for this bird exists in the riparian forest, where large trees are present. Foraging habitat exists within the forest, riparian forest, and shrub habitats. In addition, this pigeon could obtain mineral salts from the study area near the marine shoreline. Because band-tailed pigeons are known to return to mineral sites year after year (Jarvis and Passmore 1992), they would most likely be able to use the study area for breeding and foraging. The forest areas, riparian corridor, and shrub habitats of the study area may be considered Priority Areas for band-tailed pigeons.

3.5.3 Brandt's Cormorant

Brandt's cormorants nest colonially on rocky shores, primarily on the outer coast and coastal islands, but can also nest on slopes or steep cliffs (Seattle Audubon Society 2008). During the non-breeding season, they are considered common in the vicinity. Brandt's cormorants are considered to be at risk from human disturbance such as pollution and fishing. They are listed by the WDFW as a Species of

Concern in Washington State, and breeding areas and regular concentrations are listed as Priority Areas.

A number of cormorants were recorded during field surveys (Table 14); however, no Brandt's cormorants were observed. No suitable breeding habitat is present in the study area for Brandt's Cormorant due to a lack of rocky shoreline. However, it is likely that this species forages in marine waters along the study area during the non-breeding season, and it may occur in regular concentrations. Priority Areas are locations where regular concentrations occur. Based on field observations, regular concentrations occur within the Marine Shoreline habitat of the study area.

Table 14 Cormorants Recorded during Field Surveys

Common Name	Scientific Name	Date(s) recorded	Number of individuals	Location
Double crested cormorant	*Phalacrocorax auritus*	1/10/2011	3	On water near A2
		7/14/2011	4	On water near A2
Pelagic cormorant	*Phalacrocorax pelagicus*	5/21/2009	1	On water near A2
		6/8/2011	2	On water near A2
		6/23/2011	1	On water near A2
Unidentified cormorant	*Phalacrocorax spp.*	4/21/2009	2	On water near A2

3.5.4 Brant

Brants primarily nest in the coastal tundra of the high Arctic and their range is almost exclusively coastal. In Washington, they are primarily found wintering in shallow bays and salt marshes along the coast. Their winter habitat is closely tied to the presence of marine algae and sea grasses, primarily eel grass. They have been known to diversify their diet in the absence of eelgrass by including aquatic invertebrates or feeding in grasslands (Seattle Audubon Society 2008). The brant is not considered to be at risk by WDFW or the USFWS; however, areas with regular concentrations of foraging brants are considered Priority Areas by WDFW (WDFW 2012).

No brants were observed during these field investigations. No brants were identified in the field studies in 1992 or 1993 (Shapiro 1994).

No suitable breeding habitat is present at the study area for brants because they breed in the summer months in the Arctic. However, non-breeding brants may winter in the marine waters of the study area during the non-breeding season, possibly occurring as concentrations, due to the eelgrass communities in the vicinity. If concentrations do occur, then the shoreline of the study area may be considered a priority area by WDFW.

3.5.5 Common Loon

Common loons breed on or near large, freshwater lakes, building nests on shorelines, islands, or logs and floating debris close to shore (Seattle Audubon Society 2008; Lewis, et al. 2004b). They prey mostly on fish, and typically spend the winter in marine habitats. The common loon is vulnerable to habitat loss as a result of shoreline alteration, development, and logging; fluctuating water levels during nesting; and human disturbance in the vicinity of nesting areas (Lewis, et al. 2004b).

Common loons are listed as a sensitive species in Washington, and Priority Areas include breeding locations and regular concentration areas, and migration stopover locations (WDFW 2012). Management recommendations are provided in the *Management Recommendations for Washington's Priority Species, Volume IV: Birds* (Larsen et al. 2004).

Common loons were observed in the study area during the non-breeding season (February) and again in late April, which is assumed to be the peak period of migration (Seattle Audubon Society 2008; Table 15).

Common loons have been documented breeding at Lake Terrell (Whatcom County 2005b). Common Loons are likely to use the foreshore along the study area for feeding and overwintering, and during migration. Regular concentrations occur within the marine shoreline habitat

Table 15 Loons Recorded during Field Surveys

Common Name	Scientific Name	Date(s) recorded	Number of individuals	Location
Common loon	*Gavia immer*	4/21/2009	1	On water near A2
		2/21/2011	1	On water near A2
Unidentified loon	*Gavia sp.*	2/29/2009	1	On water near A2
		2/21/2011	1	On water near A2

3.5.6 Common Murre

The common murre nests in dense colonies along rocky shorelines along the outer Washington coast and spends the rest of its life on water (Seattle Audubon Society 2008). Being mostly piscivorous, this murre is also known to feed on a variety of sea creatures, including crustaceans, marine worms, and squid. The common murre is listed by the WDFW as a Candidate species in Washington State.

No common murres were observed during these field investigations. During the non-breeding season in 1992 and 1993, more than 85 individuals were recorded in the study area (Shapiro 1994).

No suitable breeding habitat is present at the study area for common murres; however, large numbers were observed previously using the foreshore for feeding and overwintering. Such regular concentrations are considered Priority Areas for the common murre, therefore, the shoreline of the study area may be considered a Priority Area by WDFW. .

3.5.7 Golden Eagle

Golden eagles are uncommon residents of eastern Washington, but are occasionally found within the rain shadow of the San Juan Islands and rarely in other areas of western Washington during the winter (Seattle Audubon Society 2008).

This eagle hunts in open terrain that includes grasslands, deserts, savannahs, and early successional stages of forest and shrub habitats (Carnie 1954; McGahan 1968). They are known to prey on mid-sized mammals, especially marmots, rabbits, and ground squirrels, and occasionally deer and elk carrion (Seattle Audubon Society 2008). Golden eagle nests are found primarily in rugged, open habitats with canyons and escarpments in rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops (Beebe 1974; Beecham and Kochert 1975).

The golden eagle is listed as a State Candidate species (WDFW 2012), and is protected under the Bald and Golden Eagle Protection Act. This species is vulnerable to population declines due to habitat loss and disturbance, loss of foraging areas, and direct human-caused mortality (i.e., poisoning, power lines). Priority Areas listed for the golden eagle in Washington State include breeding and foraging areas.

No golden eagles were observed within the study area during the field investigations, nor have they been documented at the study area during previous studies. Although they rarely occur in the vicinity of the study area (Seattle Audubon Society 2008), they have been documented within the Lake Terrell Wildlife Area Unit (WDFW 2006) and breeding in the San Juan Islands as incidental sightings (Watson and Whalen 2004).

The agricultural fields and shrub habitats in the study area may provide some foraging habitat for this species. However, the likelihood that golden eagles would use the study area is very low due to a high level of fragmentation and the lack of prey. Therefore, the study area is not likely a Priority Area for golden eagles.

3.5.8 Goldeneyes and Buffleheads

Common goldeneyes, Barrow's goldeneyes, and buffleheads are cavity-nesting ducks typically associated with late-successional forests (Lewis, et al. 2004c). They nest in tree cavities. Ideal habitat

is considered to be forested wetlands with moderate to dense tree canopy cover and abundant downed logs and large woody debris or low islands (Lewis, et al. 2004c*).* They are relatively common in Puget Sound, particularly during the non-breeding season when they can be found in large concentrations (Seattle Audubon Society 2008).

Limited numbers of all three species are known to breed in Washington (Lewis et al. 2004c). Species of goldeneyes and buffleheads are considered to be at risk due to habitat loss through forest resource use and shoreline development (Lewis, et al. 2004c). These species are not listed as a federal or state species of concern; however, breeding areas and non-breeding concentration locations of goldeneyes and buffleheads are listed as priority waterfowl (WDFW 2012).

Large concentrations of common goldeneyes and buffleheads were observed at the study area during field surveys in 1992 through 1993 (Shapiro 1994). All three species of duck are known to overwinter in large concentrations in the vicinity of the study area (Lewis, et al. 2004c).

Similarly, common goldeneyes, Barrow's goldeneyes, and buffleheads were all observed within the study area during field surveys conducted during the non-breeding season in 2009 and 2011 (Table 16). They are not expected to breed in the study area due to a lack of suitable habitat. They were incidentally observed as individuals and in small groups of less than five individuals during the 2011 field surveys. Priority Areas for cavity nesting ducks are their breeding areas, which are not likely present in the study area.

Cavity-nesting ducks have been identified by the state as important species group. Washington State's *Management Recommendations for Washington's Priority Species* provides management recommendations and where applicable, these recommendations are to be implemented to protect this species and its habitat.

Table 16 Goldeneyes and Buffleheads Recorded during Field Surveys

Common Name	Scientific Name	Date(s) recorded	Number of Individuals	Location
Barrow's goldeneye	*Bucephala islandica*	1/13/2009	5	On water near A2
		4/21/2009	1	On water near A2
		1/10/2011	1	On water near A2
		2/21/2011	1	On water near A2
common goldeneye	*Bucephala clangula*	2/19/2009	5	On water near A2
bufflehead	*Bucephala albeola*	1/10/2011	2	On water near A2
		2/21/2011	1	On water near A2

3.5.9 Great Blue Heron

The great blue heron is common in the region and can be found foraging for a variety of prey items along marine shorelines, and along slow-moving rivers, sloughs, marshes, ponds, ditches, and agricultural fields (Seattle Audubon Society 2008). This heron eats fish, amphibians, reptiles, invertebrates, small mammals, and other birds. Great blue herons are colonial breeders that nest in tall (greater than 23 feet high) deciduous or evergreen trees near fresh and saltwater wetlands. Nests are typically located from 29 to 85 feet above the ground (Quinn and Milner 2004). They are not listed as a federal or state species of concern, but heron rookeries are considered vulnerable aggregations (WDFW 2012).

WDFW has provided management recommendations for the great blue heron (Azerrad 2012). Great blue herons are vulnerable to human disturbance, especially during the breeding season, and an entire colony may abandon their nests if disturbed (Quinn and Milner 2004).

A total of three great blue herons were recorded as incidental sightings along the marine shoreline during the breeding season in 2009 and 2011 (Table 17). They were also reported in low numbers during the 1992 through 1993 field surveys, primarily during the non-breeding season (Shapiro 1994).

No heron colony was identified in the study area. Habitat suitable for heron foraging is considered to exist along the marine shoreline, at the coastal lagoon, in some ditches, and seasonally in the wetter portions of pastures and fields.

Table 17 Great Blue Herons Recorded during Field Surveys

Common name	Scientific name	Date recorded	Number of individuals	Location
Great blue heron	*Ardea herodias*	5/21/2009	1	Wading in water near A2
		7/14/2011	2	Wading in water near A4

3.5.10 Harlequin Duck

Harlequin ducks are a Washington state game species that breeds near secluded rocky, fast-moving mountain streams with vegetated banks (Lewis and Kraege 2004). They are not known to breed in the lowlands; however, significant numbers of harlequin ducks that breed in Washington's mountains also over-winter in the Strait of Georgia and associated waters. Harlequin ducks prey primarily on invertebrates; in coastal environments, mollusks and crustaceans make up the bulk of the diet (Seattle Audubon Society 2008). In coastal areas, harlequin ducks are vulnerable to loss of prey species as a result of shoreline development, overhunting, and pollution. They are not listed as a

federal or state species of concern; however, breeding areas and regular areas of concentration are listed as Priority Areas (WDFW 2012).

A small flock of seven individuals was observed along the foreshore of the study area in January 2009, and a single individual was observed during a January survey in 2011 (Table 18). This species is likely to use the foreshore area for feeding and overwintering. Therefore, it may be considered a Priority Area for congregations.

Table 18 Harlequin Ducks Recorded during Field Surveys

Common name	Scientific name	Date recorded	Number of individuals	Location
Harlequin duck	*Histrionicus histrionicus*	1/14/2009	7	On water near A2
		1/10/2011	1	On water near A2

3.5.11 Marbled Murrelet

The marbled murrelet is a small seabird that nests in the coastal, old-growth forests of the Pacific Northwest. They have been known to fly as far as 45 miles inland to nest in older coniferous forests, and they exhibit high fidelity to their nesting areas (Marks and Bishop 1999). Nests are built on the branch of a mature conifer, up to 150 feet off the ground in dense, old-growth stands (Seattle Audubon Society 2008). The marbled murrelet feeds relatively close to shore on small fish and invertebrates.

The marbled murrelet is listed as Threatened under the ESA and by WDFW. Marbled murrelets are threatened because of habitat loss and fragmentation, as well as disturbance from other human activities, such as gill netting, overfishing, oil spills, and other types of pollution (WDFW 2005). Priority areas for marbled murrelets include any occurrence of the species in a suitable habitat.

No marbled murrelets were observed during this study. However, they have been recorded in waters in the study area (Shapiro 1994). No suitable breeding habitat is present at the study area due to a lack of required forested habitat structure (i.e., age and species of trees). The nearest known breeding location for the marbled murrelet is located approximately 37 miles from Cherry Point at Canyon Creek. The marbled murrelet may forage in waters in and around the study area during the non-breeding season. The area may be considered a Priority Area by WDFW because individuals have been observed in suitable habitat (WDFW 2008).

3.5.12 Northern Goshawk

The Northern goshawk is uncommon in Washington year-round (Seattle Audubon Society 2008). Nesting habitat for this accipiter includes stands of large, old trees, with dense canopy cover and relatively open understories (British Columbia Environment 1998). Home ranges generally consist of three parts: the nesting area, post-fledging area, and foraging area (Reynolds et al. 1992). Goshawks build multiple nests within nesting territories (Desimone and Hays 2004) and they are typically located in mature or old coniferous forests with a high density of large trees that contain closed and multiple canopy layers.

Northern Goshawk forage in a variety of forest types and are opportunistic feeders that take a variety of prey, including small and medium-sized birds and mammals. Goshawks avoid open habitats when foraging, and prefer to use sites with large trees and canopy closure (British Columbia Ministry of Environment 1998). They are known to utilize edge habitats, including riparian zones, but to a lesser degree than old-growth forests (Campbell et al. 1990; Cooper and Stevens 2000).

The Northern goshawk is listed as a federal species of Concern and a Candidate species in Washington due to declining populations (Desimone and Hays 2004). Priority Areas listed for the Northern goshawks include breeding areas.

Northern goshawks were not observed within the study area during the field surveys, and it is unlikely that suitable habitat exists for nesting in the study area due to the lack of structural complexity required by this bird. No Priority Areas are considered to exist within the study area for this species.

3.5.13 Peregrine Falcon

Peregrine falcons can be found year-round in the Puget Sound region and are known to occur in the vicinity of the study area (WDFW 2011a). The shoreline of the study area is part of the Lummi Flats Peregrine Falcon Wintering Area (WDFW 2011a) and is the most likely location to contain this bird regularly throughout the year as a migrant or a forager.

Peregrine falcons typically nest near water on cliffs, cliff-like structures such as buildings and bridges, but have been known to occasionally nest on tree snags or the abandoned nest of another large bird. They are known as the world's fastest bird, and typically hunt on the wing, with other birds, including ducks and shorebirds, comprising the bulk of their prey.

This falcon species has declined worldwide (Hays and Milner 2004). Historic causes of mortality and extirpation have included pesticide contamination (Peakall 1976; Peakall et al. 1990), disturbance by road construction, human activity close to nest sites, removal of young from nests for falconry, and removal of eggs from nests by collectors (Herbert and Herbert 1969). The peregrine falcon is listed as

a federal species of Concern, and a Sensitive species in Washington. Priority Areas are listed as breeding locations and regular occurrence areas.

No peregrine falcons were recorded during the field surveys, and no cliffs or other suitable nesting structures were observed within the study area; none are believed to occur. Therefore, the marine shoreline habitat of the study area is not likely to be considered a Priority Area for this species.

3.5.14 Pileated Woodpecker

Pileated woodpeckers are relatively uncommon forest residents throughout the Puget Sound region, but where present, they occur year-round (Seattle Audubon Society 2008). These large woodpeckers inhabit mature and old-growth forests, and second-growth forests with large snags and fallen trees (Lewis and Azarrad 2004). They forage primarily in forests, excavating characteristic large rectangular/oval excavations in snags (Lewis and Azarrad 2004), and feed primarily on tree insects, and occasionally on fruits and nuts in more open areas (Seattle Audubon Society 2008). Pileated Woodpeckers nest in tree cavities, which they excavate in large snags or dying trees (Lewis and Azarrad 2004). As a result they create important habitat for other species through their foraging and nesting activities, and they are considered a keystone forest species (Lewis and Azarrad 2004). They are listed in Washington State as a Candidate species (WDFW 2008). Breeding locations are listed as Priority Areas.

Recommendations for the protection of the pileated woodpecker are provided under the Washington State *Management Recommendations for Washington's Priority Species.* Where applicable, these recommendations are to be implemented to protect this species and its habitat. They should be put into practice consistently across a landscape to be most effective.

Pileated woodpeckers were recorded in the study area drumming and/or foraging during the breeding season (Table 19), and numerous forage holes were observed throughout the study area. Suitable breeding habitat for this species of woodpecker is present in the older forest and riparian forest habitats, especially where large trees and snags are present. They are likely to breed in the study area. Therefore, the study area may include Priority Areas associated with the forest and riparian corridor.

Table 19 Pileated Woodpeckers Recorded during Field Surveys

Common Name	Scientific Name	Date Recorded	Number of Individuals	Location
Pileated woodpecker	*Dryocopus pileatus*	4/21/2009	1	Riparian forest east of A1
		7/14/2011	1	Forest near A3

3.5.15 Vaux's Swift

The Vaux's swift is a common breeder in forested areas throughout the Puget Sound region (Seattle Audubon Society 2008). They are highly dependent on large hollow trees and snags for nesting and roosting; although they are strongly associated with old-growth forests, the availability of suitable nesting or roosting structures determines whether this species will inhabit a forest (Lewis et al. 2004d).

This species of swift is known to breed in coniferous and mixed coniferous/deciduous forests (Seattle Audubon Society 2008) where nest trees have been recorded to approximately 82 feet high and 27 inches in diameter. Their nest areas include hollow trees excavated by pileated woodpeckers (Lewis, et al. 2004d). The Vaux's swift is also known to nest or roost in chimneys. They forage for flying insects in open areas over fields, woodlands, lakes, and rivers (Seattle Audubon Society 2008). This species is listed as a Candidate species in Washington State, and breeding areas and communal roosts are considered Priority Areas (WDFW 2008).

No Vaux's swifts were recorded within the study area during field surveys; however, they are known to occur in the Lake Terrell Wildlife Area, and suitable habitat for this swift appears to exist in the study area. Large trees and snags within the older forest stands and riparian forest habitats provide the most suitable locations for this swift's breeding. They may also forage in adjacent forest and shrub habitats of the study area. Priority Areas may include breeding and roosting areas in riparian forest and forest habitats of the study area.

3.5.16 Western Grebe

The Western grebe is a piscivorous bird that breeds in freshwater wetland habitat, primarily in arid steppe regions (Seattle Audubon Society 2008). In winter, Western grebes are found mostly on saltwater bays. The Western grebe is considered to be at risk from fluctuating water levels, oil spills, gill nets, poisons, and human nest disturbance. They are listed as a Candidate species on the WDFW PHS list (WDFW 2008). Priority Areas include breeding locations, regular concentration locations, migratory stopover sites, and areas that have regular occurrences of this bird in the in winter.

One Western grebe was observed within the study area during the field surveys in February 2009 (see Table 20). More than 900 individuals were recorded at the study area during field studies in 1992-1993 (Shapiro 1994). The Western grebe is likely to use the foreshore at the study area for overwintering and during migration. Any sites that have this species occurring in concentrations or for use during migration and/or over-wintering habitat are considered Priority Areas (WDFW 2008). The marine foreshore of the study area may be considered a Priority Area by WDFW.

Table 20 Grebes Recorded during Field Surveys

Common Name	Scientific Name	Date(s) Recorded	Number of Individuals	Location
Western grebe	*Aechmophorus occidentalis*	2/19/2009	1	On water near A2
Horned grebe	*Podiceps auritus*	1/13/2009	3	On water near A2
		4/21/2009	3	On water near A2
		1/10/2011	1	On water near A2

4.0 CONCLUSIONS

A total of 86 bird species in five defined habitat types (forest, shrub, riparian forest, agricultural/grassland, and marine shoreline) were recorded from 10 field surveys that were completed between January 2009 and July 2011. The majority of species recorded during the field surveys were year-round residents, assumed to be breeding within the study area. The study area was also used by long-distance migrant species for breeding or wintering, particularly within forest and marine shoreline habitats. During the breeding season (late April through mid-July), species diversity was highest in forest and marine shoreline habitats, and lowest in agricultural/grassland areas. During the non-breeding season, species diversity was recorded to be highest in marine shoreline and shrub habitats.

Of the 86 species identified from the field surveys, no bird species listed as threatened or endangered under the *Endangered Species Act* were recorded; however, the foreshore area of the study area provides suitable foraging habitat for the threatened marbled murrelet. Nine recorded species are included on the Priority Habitat and Species list. The study area habitat types provide some of the required life requites for these nine species.

The highest diversity measured was associated with forest habitat, followed by marine shoreline, riparian, and shrub habitats. The lowest diversity was recorded in agricultural/grassland habitat. Forty-two species were recorded in the forested habitats during the breeding season, and 22 species were recorded during the non-breeding season indicating that they are either present all year in the study area or use it only for wintering habitat. Twenty-eight species were recorded in shrub areas during the breeding season, and 15 species were observed during the non-breeding season. Fourteen species were recorded in agricultural/grassland areas during the breeding season, and three species during the non-breeding season. Eighteen species were recorded from the riparian forest areas during the breeding season and eight during the non-breeding season. During the breeding season 16 bird species were recorded along the marine shoreline, and during the non-breeding season a total of 14 species were recorded along the marine shoreline, mostly as incidentals.

Non-migratory species commonly observed throughout the year in almost all habitats included American robin, Pacific wren, black-capped chickadee, and spotted towhee. Common long-distance migrant species assumed to be breeding at the study area included a variety of warblers, thrushes, sparrows, flycatchers, and swallows. Some non-migratory species (i.e., pine siskins and northern flickers) were commonly observed during the non-breeding season, but were not recorded during the breeding season, which was likely due to a lack of suitable breeding habitat (i.e., tree cavities, large conifers) for these species.

No terrestrial bird species federally listed as threatened or endangered under the ESA were observed in the study area during the field surveys. Nine species identified on the WDFW PHS list were recorded. Based on the habitat present for their life requisites and the habitat present in the study area, a total of 18 WDFW PHS-listed species could potentially occur within the study area where suitable habitat exists.

5.0 REFERENCES

AMEC Earth & Environmental (AMEC). 2008. Wetland Determination and Delineation for Gateway Pacific Terminal Property. Prepared for Pacific International Terminals. Kirkland, Washington.

Azerrad, J.M. 2012. Management recommendation for Washington's Priority Habitats and Species. Great Blue Heron (*Ardea herodias*). Washington Department of Fish and Wildlife, Olympia, Washington. Accessed on April 16, 2012, at http://wdfw.wa.gov/conservation/

British Columbia Ministry of Environment. 1998. Northern Goshawk. British Columbia Ministry of Environment, Lands and Parks, Wildlife Branch. 2 pp.

Beebe, F.L. 1974. Field studies of the Falconiformes of British Columbia. BC Prov. Mus., Victoria, BC Occas. Pap. No. 17.

Beecham, J. J., and M. N. Kochert. 1975. Breeding biology of the golden eagle in southwestern Idaho. Wilson Bullitin 87:506-513.

Bent, A. C. 1958. Life Histories of North American Weaver Finches, Blackbirds, Orioles, and Tanagers, February 27, 1958.

Bower, J.L. 2009. Changes in marine bird abundance in the Salish Sea: 1975 to 2007. Marine Ornithology *37: 9–17.*

Campbell, R.W., N.K. Dawe, I. McTaggart-Cowan, J.M. Cooper, G.W. Kaiser, and M.C.E. McNall. 1990. The Birds of British Columbia. Volume II. Non-passerines, diurnal birds of prey through

woodpeckers. Royal British Columbia Museum, Victoria, and Canadian Wildlife Service, Delta, British Columbia, 636 pp.

Carnie, S. K. 1954. Food habits of nesting golden eagles in the coast ranges of California. Condor 56:3-12.

Cooper, J.M., and V. Stevens. 2000. A review of the ecology, management and conservation of the Northern Goshawk in British Columbia. British Columbia Ministry of Lands and Parks, Wildlife Branch, Victoria, British Columbia Wildlife Bulletin No. B-101. 31 pp.

Desimone, S.M., and D.W. Hays. 2004. Northern Goshawk. *in* E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Department of Interior. 2007. Federal Register Volume 72, No. 130. Monday, July 9, 2007. Rules and Regulations.

Ehrlich, P., E., Dobkin, D. S., and D. Wheye. 1988. The birder's handbook: A field guide to the natural history of North American birds. 785 p.

Eissinger, Ann. 2012. Nahkeeta Northwest Wildlife Services. Personal communication with J. Gray, AMEC Environment and Infrastructure. April 16, 2012.

Executive Order 13186 (66 Federal Register 3853). Responsibilities of Federal Agencies to protect migratory birds. Federal Register Volume 66, No. 11. Wednesday, January 17, 2001. Presidential documents.

Franklin, J. F. and C.T. Dyrness. 1988. Natural vegetation of Oregon and Washington. Oregon State University Press, Corvallis, Oregon.

Hays, D.W. and R.L. Milner. 2004. Peregrine Falcon. *in* E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Herbert, R.A. and K.G.S. Herbert. 1969. The extirpation of the Hudson River peregrine falcon population. pp 133-154 *in* J. J. Hickey (ed.) Peregrine Falcon Populations: Their Biology and Decline. University of Wisconsin Press, Madison, WI. 596 p.

Jarvis, R. L., and M. F. Passmore. 1992. Ecology of band-tailed pigeons in Oregon. U.S. Fish and Wildlife Service Biology Report 6. 38 pp.

Larsen, E., J.M. Azerrad, N. Nordstrom, eds. 2004. Management recommendations for Washington's priority species. Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, WA.

Lewis, J.C., and J.M. Azerrad. 2004. Pileated Woodpecker. Pages 29-1 to 29-9 *in* E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Lewis, J. C. and D. Kraege. 2004. Harlequin Duck. Pages 5-1 – 5-4 *in* E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Lewis, J.C., M.Tirhi, and D.Kraege. 2004a. Band tailed Pigeon. Pages 22-1 to 22-5 *in* E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Lewis, J. C., M. Whalen, and D. Kraege. 2004c. Cavity Nesting Ducks. Pages 4-1 – 4-6 *in* E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington.

Lewis, J.C., M. Whalen, and R.L. Milner. 2004d. Vaux's Swift. Pages 25-1 to 25-5 *in* E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Lewis, J. C., M. Whalen, R. Milner, and M. Whalen. 2004b. Common Loon. Pages 1-1 – 1-4 *in* E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Marks, D. and M.A. Bishop. 1999. Interim Report for Field Work Conducted May 1996 to May 1997: Habitat and Biological Assessment, Shepard Point Road Project – Status of the Marbled Murrelet Along the Proposed Shepard Point Road Corridor [online report]. U.S. Forest Service, Pacific Northwest Research Station, Copper River Delta Institute, Cordova, Alaska. http://www.pwssc.gen.ak.us/shepard/docs/reports/final/crdi/96mur.html

McGahan, J. 1968. Ecology of the golden eagle. Auk 85:1-12.

Pacific International Terminals, Inc. Revised 2012. *Project Information Document*, Gateway Pacific Terminal, Whatcom County, Washington.

Peakall, D.B. 1976. The peregrine falcon and pesticides. Canadian Field Naturalist 90:301-307.

Peakall, D.B., D. Noble, J.E. Elliott, J.D. Somers and G. Erickson. 1990. Environmental contaminants in Canadian peregrine falcons, *Falco peregrinus,* a toxicological assessment. Canadian Field Naturalist. 104(2):244-254.

Quinn, T. and R. Milner. 2004. Great Blue Heron 3-1 to 3-7 *in* E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Ralph, J.C., S. Droege, and J.R. Sauer 1995. Managing and Monitoring Birds Using Point Counts: Standards and Applications. USDA Forest Service General Technical Report PSW-GTR-149

Reynolds, R.T., R.T. Graham, M.H. Reiser, R.L. Bassett, P.L. Kennedy, D.A. Boyce, G. Goodwind, Jr., R. Smith, and E.L. Fisher. 1992. Management recommendations for the Northern Goshawk in the southwestern United States. Gen. Tech. Rep. RM-217.

Seattle Audubon Society 2008. BirdWeb. Accessed July 1, 2011 at http://www.birdweb.org/birdweb/browse_birds.aspx

Shapiro & Associates, Inc. (Shapiro) 1994. Cherry Point Natural Resources Technical Reports. Prepared for Pacific International Terminals. Seattle, Washington.

Shapiro & Associates, Inc. 2004. Final BP Cherry Point Cogeneration Project, Environmental Impact Statement. Appendix F – BP Cherry Point Cogeneration Facility, Wetland Mitigation and the Birch Bay Great Blue Heron Colony. Prepared for the Bonneville Power Administration and the Energy Facility Site Evaluation Council.

U.S. Environmental Protection Agency (EPA). 2002. Methods for Evaluating Wetland Condition: Biological Assessment Methods for Birds. Office of Water, U.S. Environmental Protection Agency, Washington, DC. EPA-822-R-02-023.

U.S. Fish and Wildlife Service (USFWS). 2006. News release. Revised critical habitat proposed for marbled murrelet. September 12, 2006. Accessed June 27, 2007. www.fws.gov/pacific/marbledmurrelet/MAMU_PCH_finalNR_091206.pdf

Wahl, T.R. 2002. Trends in numbers of marine birds wintering on Bellingham Bay. *Washington Birds 8: 29–40*.

Wahl, T.R., S.M Speich, D.A. Manuwal, C.V. Hirsch, and C. Miller 1981. Marine bird populations of the Strait of Juan de Fuca, Strait of Georgia, and adjacent waters in 1978 and 1979. Washington, DC: Environmental Protection Agency. 384 pp.

Washington Department of Fish and Wildlife (WDFW) 2005. Washington's Comprehensive Wildlife Conservation Strategy. Final Draft. Submitted September 19, 2005. Available online at: wdfw.wa.gov/wlm/cwcs/cwcs.htm]

———. 2006. Whatcom Wildlife Area Management Plan. Wildlife Management Program, Washington Department of Fish and Wildlife, Olympia. 86 pp.

———. 2008. Priority Habitats and Species List. Olympia, Washington. 177 pp.

———. 2012. Priority Habitats and Species database. PHS on the Web. Accessed at http://wdfw.wa.gov/mapping/phs/

———. 2011a. Washington GAP Analysis Program - Vertebrate Distribution Models: Birds. Accessed July 1, 2011 at http://wdfw.wa.gov/conservation/gap/birds.html

———. 2011b. Bald Eagle Management and Protection in Washington State. Accessed on September 16, 2011, at http://wdfw.wa.gov/conservation/bald_eagle/

Washington Department of Natural Resources (WDNR) 2010. Cherry Point Environmental Aquatic Reserve Management Plan. Olympia, Washington.

Weaver, W. and C. E. Shannon 1949. *The Mathematical Theory of Communication,* Urbana, Illinois: University of Illinois Press. Republished in paperback 1963.

Whatcom County 2005a. Critical Areas Ordinance effective September 30, 2005. Accessed online on July 7, 2011 at http://www.codepublishing.com/wa/whatcomcounty/

Whatcom County 2005b. Critical Areas Maps – Article VII Wildlife Habitat Conservation Areas (FWHCA). Accessed online on July 21, 2011 at http://www.co.whatcom.wa.us/pds/pdf/planning/caomaps/posters/cao_wildlife_05_34x46_final_reduced.pdf

Whatcom County Parks & Recreation (undated). The birds of Tennant Lake. Whatcom County, Washington, USA.

Whatson, J and M. Whalen. 2004. Golden Eagle. Pages 8-1 to 8-7 *in* E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

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APPENDIX A

Field Survey Dates

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Surveys conducted from January 13 – February 22 (non-breeding season)

Survey Date	Stations
January 13-14, 2009	A1, A2, A3, P1, P2, P3, P5, P6, P7, P8, P9, P10
February 19-20, 2009	A1, A2, A3, P1, P2, P3, P5, P6, P7, P8, P9, P10
January 10-11, 2011	A1, A2, A3, P1, P2, P3, P5, P6, P7, P8, P9, P10
February 21-22, 2011	A1, A2, A3, P1, P2, P3, P5, P6, P7, P8, P9, P10

Surveys conducted from April 21 – July 15 (breeding season)

Survey Date	Stations
April 21-22, 2009	A1, A2, A3, P1, P2, P3, P5, P6, P7, P8, P9, P10
May 21-22, 2009	A1, A2, A3, P1, P2, P3, P5, P6, P7, P8, P9, P10
May 18-19, 2011*	A1, A2, A3, P1, P2, P3, P6, P7, P8, P9, P10
June 8-9, 2011	A1, A2, A3, P1, P2, P3, P5, P6, P7, P8, P9, P10
June 23-34, 2011	A1, A2, A3, A4, P1, P2, P3, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14, P15
July 14-15, 2011	A1, A2, A3, A4, P1, P2, P3, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14, P15

*P5 not sampled due to bull in pasture.

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APPENDIX B

Habitat Photographs

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Photo 1. Forest in the vicinity of P7

Photo 2. Forest in the vicinity of P9

Photo 3. Riparian Forest in the vicinity of P1

Photo 4. Forest in the vicinity of P3

Photo 5. Scrub-shrub in the vicinity of P6

Photo 6. Scrub-shrub in the vicinity of P8

Photo 7. Marine Shoreline and bluff in the vicinity of A3

Photo 8. Agricultural/Grassland in the vicinity of A1