Chapter 9

Terrestrial Resources
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9. Terrestrial Resources

9.1 Introduction

Terrestrial Resources was selected as an Environmental Component because of the potential interaction of the proposed Project with ecological values such as wildlife, birds, vegetation, and Species of Conservation Concern\(^1\), and their importance to Aboriginal groups and the public. Project activities that could affect terrestrial resources include clearing and site preparation during construction and lighting and new buildings during operation.

To minimize the impacts of the proposed Project on terrestrial resources, the PER Submission Requirements stipulate the following studies be conducted related to terrestrial resources:

- biophysical survey
- nesting bird survey
- Species at Risk assessment
- invasive species assessment

The need to conduct a biophysical survey was also confirmed to be a key area of review for the PER process by Aboriginal groups and the public during early engagement on the proposed Project. During the Preliminary Comment Period on the scope of technical and environmental studies for the proposed Project, the majority of respondents supported the need to assess how the proposed Project would affect vegetation and wildlife.

The port authority has developed *Project and Environmental Review Guidelines – Habitat Assessment* (PMV 2015e) (Habitat Guidelines) to assist applicants of projects on lands and waters managed by the port authority in the assessment of potential Project effects on biophysical resources, including terrestrial resources. This chapter summarizes the work conducted (Terrestrial Resources Study) to determine potential changes to vegetation and wildlife habitats that would occur as a result of the proposed Project. The Terrestrial Resources Study was conducted in accordance with the Habitat Guidelines and taking into consideration feedback from early engagement. Some of the key themes from the Preliminary Comment Period that are reflected in the design of the habitat assessment include:

- assessing species and habitats that would be affected by Project activities such as vegetation removal and shoreline modification
- describing current vegetation types, characteristics, and relative abundance, including native, listed, and invasive species

The Terrestrial Resources Study focused on determining the degree of change that could occur and affect Terrestrial Resources through the following:

- removal of vegetation that provides wildlife habitat
- proliferation of invasive plant species
- noise and lighting associated with construction and operation
- loss of habitat for species of conservation concern

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\(^1\) Regulators, Aboriginal groups, and other stakeholders are particularly concerned about species of conservation concern. For the purposes of this report, they are considered BC species:

- listed on Schedule 1 of SARA
- assessed by COSEWIC as endangered, threatened, or special concern
- provincially listed in BC as Red or Blue
The Terrestrial Resources Study looked at the effects of the proposed Project on vegetation and wildlife. Work conducted to support the Terrestrial Resources Study comprised the following:

- reviewing existing information for the Terrestrial Resources Study Area
- conducting a biophysical field reconnaissance level survey of the Site
- identifying the location of plant species, including invasive species, on the Site
- Recording wildlife observations, including locations of old bird nests.

### 9.2 Scope of Review

The scope of review of effects on terrestrial resources is listed in Table 9-1, which includes the following:

- **Project Interactions**: The components and activities of the proposed Project that are part of the review
- **Potential Effects**: The effects associated with the Project interactions that are characterized
- **Study Area**: The geographic extent within which impacts are considered
- **Indicators**: Parameters used to measure the existing state of terrestrial resources and the potential change that could occur as a result of Project effects
- **Guidelines and Threshold References**: The thresholds or limits that are used to characterize the change to Terrestrial Resources as a result of Project effects.

### Table 9-1: Scope of Review – Terrestrial Resources

<table>
<thead>
<tr>
<th>Environmental Component</th>
<th>Project Interaction</th>
<th>Potential Effects of the Proposed Project</th>
<th>Study Area</th>
<th>Indicators</th>
<th>Guidelines and Threshold References</th>
</tr>
</thead>
</table>
| Vegetation              | Construction - Clearing and site preparation of the terrestrial Project footprint | ▪ Vegetation removal or disturbance  
▪ Introduction of invasive plants and noxious weeds | The terrestrial resources within and immediately adjacent to the proposed Project footprint | Plant species present on-site including any Species of Conservation Concern and invasive species | ▪ Species at Risk Act                                                               |
| Wildlife                | Construction - Clearing and site preparation of the terrestrial Project footprint  
▪ Lighting Operation  
▪ Lighting  
▪ New buildings | ▪ Loss of wildlife habitat  
▪ Nest destruction or disruption/abandonment during construction  
▪ Lighting effects  
▪ Bird strikes on buildings (i.e., windows) | Within 250 m of the proposed Project footprint | Presence and distribution of habitats that support wildlife, including habitat used by nesting birds and Species of Conservation Concern | ▪ Species at Risk Act  
▪ Migratory Birds Convention Act |

#### 9.2.1 Geographical Study Scope

The geographic boundaries for characterizing effects on terrestrial resources (Terrestrial Resources Study Area) include the Project footprint and extend 250 m from the edge of that footprint (Figure 9-1). This 250 m area was selected to capture any nearby sensitive environmental features that could be disrupted or disturbed by the Project such as nesting raptors.
9.3 Regulatory Standards and Guidelines

All endangered, threatened, and special concern species listed in Schedule 1 of SARA are protected on federal land; therefore, the study included a review of SARA-listed species that could be present in the Terrestrial Resources Study Area. A reconnaissance survey was conducted to identify SARA species or habitat suited for SARA species.

The *Migratory Birds Convention Act* and associated regulations protect migratory birds, as individuals and populations, and their nests. The Act prohibits killing, injuring, taking, or disturbing migratory birds or damaging, destroying, removing, or disturbing nests of migratory birds. The Act also prohibits deposit of materials on land or into water that may be harmful to migratory birds. The port authority’s Habitat Guidelines (PMV 2015e) were used to structure the biophysical survey and to collect the data necessary to determine whether the proposed Project is likely to have an effect on migratory birds and Species at Risk.

9.4 Study Methods

The study began with a review of existing information for the Terrestrial Resources Study Area followed by a field reconnaissance level survey of the proposed Project Site. Sources of existing information included the City of Vancouver online mapping layer, which identifies trees planted along the boulevards of city streets, including those within the study area. Aerial imagery was used to identify locations of vegetation on the Centerm site. A reconnaissance survey was then conducted by professional biologists from AECOM familiar with the wildlife and vegetation found in Vancouver. The survey took place on February 2, 2016, and included a visit to all areas of the Terminal where the terminal operator indicated vegetation and wildlife had been observed and satellite imagery showed potential vegetation. Information collected during the survey included the following:

- identification and location of plant species on the Site
- wildlife observations, including locations of old bird nests
- photographic records of observations.

9.5 Existing Conditions

The Site is located within Burrard Inlet, which is a heavily developed industrial port. The Centerm site consists primarily of paved surfaces used to store and maneuver shipping containers, roads and rail infrastructure, and administrative and maintenance buildings. The proposed Project would take place on industrial land; however, the lands surrounding the proposed Project include a mix of urban and industrial areas with CRAB Park located just to the west of Centerm. Vegetation and wildlife are typical of an urban/industrial area.

9.5.1 Vegetation

The Site is located within the Coastal Western Hemlock (CWH) biogeoclimatic zone. The CWH zone occurs at low to middle elevations mostly west of the coastal mountains. On average, the CWH is the rainiest zone within BC. This zone has a cool climate with cool summers and mild winters.

The reconnaissance survey confirmed that very little vegetation exists on the Site. The majority of the Site is paved and the vegetation that is present is growing opportunistically. No landscaped areas exist on the Site. Figure 9-2 shows the vegetation observed on the Site during the reconnaissance survey.
The primary types of vegetation observed during the survey were weeds (or invasive plants) and they were found primarily in two areas: on the west and south sides of the Terminal and on the north side near Berth 4 (Photograph 9-1). Vegetation species within the Site included Himalayan blackberry (*Rubus armeniacus*), common tansy (*Tanacetum vulgare*), plantain (*Plantago* sp.), Scotch broom (*Cytisus scoparius*), Canada thistle (*Cirsium arvense*), and pearly everlasting (*Anaphalis margaritacea*). Blackberry has become established in sections along the western edge of the Terminal, providing a narrow fringe of riparian vegetation above the high water mark. All the plants observed are considered weedy or invasive species, except pearly everlasting, which is native to BC.

A few young black cottonwood (*Populus trichocarpa*) trees were observed along the east and south sides of the Terminal, and four larger black cottonwoods on the southern side of the Terminal (Photograph 9-2). A small stand of coniferous trees are located on Port of Vancouver lands in the vicinity of the Clark Street entrance (Figure 9-2). Twelve of the trees are Douglas Fir (*Pseudotsuga menziesii*) and three are Black Pine (*Pinus nigra*). These trees have not yet achieved mature tree height.

No SARA-listed plant species were observed.

**9.5.2 Wildlife**

Burrard Inlet is designated as an internationally IBA (IBA Canada 2016). Burrard Inlet was given IBA status because it provides habitat for globally significant populations of western grebe (*Aechmophorus occidentalis*), Barrow’s goldeneye (*Bucephala islandica*), and surf scoter (*Melanitta perspicillata*) and supports a nationally significant population of great blue heron (*Ardea herodias*). Most birds using Burrard Inlet are water bird species such as loons, grebes, cormorants, geese, ducks, gulls, coots, and alcids; however, birds of prey and shorebirds use Burrard Inlet as well (i.e., osprey, bald eagle, great blue heron, plovers, and western sandpiper) (Haggarty 2001). Marine birds are assessed in Chapter 8.

There are known eagle nests (an artificial nest and a previously used nest) just outside the Lafarge Concrete Plant, which is about 1.7 km from the Site.

The results of the February 2016 reconnaissance survey indicate that the primary wildlife species that could be affected by the proposed Project are birds. The type and limited extent of vegetation on the Site provides very little
suitable habitat for other forms of wildlife except for those that are well suited to the urban environment, such as rats.

In the Metro Vancouver area, 22 bird species have been listed as threatened, rare, or endangered on provincial or federal lists (BC MOE 2016a). During the reconnaissance survey, birds were observed on and in areas around the Site. Table 9-2 lists the four bird species that may be found within and adjacent to the Site and the full list of birds found in Metro Vancouver is provided in Appendix H. Three old northwestern crow nests were observed (Photograph 9-3); Figure 9-2 shows the location of these old nests. No raptor nests were observed and no other wildlife species were observed during the survey. Due to the lack of suitable habitat, the majority of the species listed in Appendix H have a very low probability of nesting within the Site. However, a few of the bird species listed in Appendix H may forage nearby or pass over the study area. The BC Conservation Data Centre (CDC) mapping tool showed no known records of red- or blue-listed bird species within the Site (BC MOE 2016b).

**Table 9-2: List of Birds Documented during Bird Reconnaissance, February 2, 2016**

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Branta canadensis</td>
<td>Canada goose (migratory bird)</td>
</tr>
<tr>
<td>Corvus caurinus</td>
<td>northwestern crow</td>
</tr>
<tr>
<td>Columba livia</td>
<td>rock dove</td>
</tr>
<tr>
<td>Larus glaucescens</td>
<td>glaucous-winged gull (migratory bird)</td>
</tr>
</tbody>
</table>

Photograph 9-3 Old northwestern crow nest, February 2, 2016.

In the Metro Vancouver Regional District, 14 mammals have been identified as threatened, rare, or endangered on provincial and federal lists (BC MOE 2016a). Table 9-3 lists three mammal species that may found within and adjacent to the Site, while Appendix H contains the list of all 14 mammal species found in the Regional District. The species in Table 9-3 are unlikely to live within the Terminal area but may pass through or forage around the Site. The BC CDC data showed no known occurrences of red- or blue-listed mammal species within the Site (BC MOE 2016b).

Several mammals are known to use the foreshore areas of Burrard Inlet: river otter (*Lontra canadensis*), coastal black-tail deer (*Odocoileus hemionus*), black bear (*Ursus americanus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), Douglas squirrel (*Tamiasciurus douglasii*), American mink (*Neovison vison*), red fox (*Vulpes vulpes*), Norway rat (*Rattus norvegicus*), and other unidentified species of bats, voles, and mice (Hanrahan 1994; Zogaris 1980). Considering the lack of suitable habitat present at the Site, it is likely that only Norway rats and possibly raccoons would be present.
### Table 9-3: Wildlife Species of Conservation Concern within Metro Vancouver Regional District, Coastal Western Hemlock Zone

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>English Name</th>
<th>Provincial Listing $^1$</th>
<th>SARA $^2,3$</th>
<th>COSEWIC $^3$</th>
<th>Habitat Subtype</th>
<th>Likelihood of the Species Using the Site</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ardea herodias fannini</em></td>
<td>Great Blue Heron, fannini subspecies</td>
<td>Blue</td>
<td>1-SC (Feb 2010)</td>
<td>SC (Mar 2008)</td>
<td>Estuary; Swamp; Marsh; Vernal Pools/Seasonal Seeps; Riparian Forest; Lake; Pasture/Old Field; Cultivated Field; Hedgerow; Intertidal Marine; Meadow; Deciduous/Broadleaf Forest; Conifer Forest - Mesic (average); Conifer Forest - Moist/wet; Mixed Forest (deciduous/coniferous mix); Marine Island; Beach; Urban/Suburban; Pond/Open Water; Reefs; Eelgrass Beds; Riparian Herbaceous; Mudflats - Intertidal; Sheltered Waters - Marine</td>
<td>May travel through the Site. In Butler et al. 2015, no great blue herons were observed in the area from December 2011 to July 2013.</td>
</tr>
<tr>
<td><em>Hirundo rustica</em></td>
<td>Barn Swallow</td>
<td>Blue</td>
<td>-</td>
<td>T (May 2011)</td>
<td>Estuary; Bog; Fen; Swamp; Marsh; Riparian Forest; Riparian Shrub; Stream/River; Lake; Pasture/Old Field; Cultivated Field; Hedgerow; Meadow; Grassland; Shrub - Natural; Sagebrush Steppe; Deciduous/Broadleaf Forest; Conifer Forest - Mesic (average); Conifer Forest - Dry; Conifer Forest - Moist/wet; Mixed Forest (deciduous/coniferous mix); Urban/Suburban; Pond/Open Water; Riparian Herbaceous; Antelope-brush Steppe; Gravel Bar; Shrub - Logged; Industrial</td>
<td>May forage in area as these birds forage over open areas, including waterbodies</td>
</tr>
<tr>
<td><em>Hydroprogne caspia</em></td>
<td>Caspian Tern</td>
<td>Blue</td>
<td>-</td>
<td>NAR (May 1999)</td>
<td>Estuary; Marsh; Stream/River; Lake; Intertidal Marine; Subtidal Marine; Beach; Urban/Suburban; Gravel Bar; Sheltered Waters - Marine</td>
<td>May forage for fish in the water near the Site, but unlikely to be present in the area</td>
</tr>
<tr>
<td><em>Phalacrocorax auritus</em></td>
<td>Double-crested Cormorant</td>
<td>Blue</td>
<td>-</td>
<td>NAR (May 1978)</td>
<td>Estuary; Stream/River; Lake; Cliff; Rock/Sparsely Vegetated Rock; Intertidal Marine; Conifer Forest - Mesic (average); Subtidal Marine; Marine Island; Urban/Suburban; Sheltered Waters - Marine</td>
<td>May pass through or use the water near the Site</td>
</tr>
<tr>
<td><em>Corynorhinus townsendii</em></td>
<td>Townsend’s Big-eared Bat</td>
<td>Blue</td>
<td>-</td>
<td>-</td>
<td>Riparian Forest; Caves; Grassland; Shrub - Natural; Deciduous/Broadleaf Forest; Conifer Forest - Mesic (average); Conifer Forest - Dry; Conifer Forest - Moist/wet; Mixed Forest (deciduous/coniferous mix); Urban/Suburban; Shrub - Logged; Industrial</td>
<td>May be found foraging insects near the Site</td>
</tr>
<tr>
<td><em>Myotis keenii</em></td>
<td>Keen’s Myotis</td>
<td>Blue</td>
<td>3 (Mar 2005)</td>
<td>DD (Nov 2003)</td>
<td>Riparian Forest; Caves; Cliff; Rock/Sparsely Vegetated Rock; Talus; Conifer Forest - Mesic (average); Conifer Forest - Moist/wet; Hot Spring; Urban/Suburban; Industrial</td>
<td>May be found foraging insects near the Site</td>
</tr>
<tr>
<td>Scientific Name</td>
<td>English Name</td>
<td>Provincial Listing</td>
<td>SARA&lt;sup&gt;2,3&lt;/sup&gt;</td>
<td>COSEWIC&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Habitat Subtype</td>
<td>Likelihood of the Species Using the Site</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
<td>--------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>----------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td><em>Myotis lucifugus</em></td>
<td>Little Brown Myotis</td>
<td>Yellow</td>
<td>1-E (Dec 2014)</td>
<td>E (Nov 2013)</td>
<td>Found throughout BC in a wide range of habitats from arid grassland to northern boreal forest and from sea level to 2288 m</td>
<td>May be found foraging insects near the Site</td>
</tr>
</tbody>
</table>

Source: BC MOE 2016a, 2016b

Dashes (-) indicate not listed

1 Red=Extirpated, Endangered, or Threatened, Blue=Special Concern, Yellow=Not at Risk

2 1 = Schedule 1 Federal Species at Risk, 3 = Schedule 3 Species designated at risk by COSEWIC prior to October 1999 that must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA

3 E=Endangered, T=Threatened, SC=Special Concern, NAR=Not at Risk, DD = Data Deficient
9.6 Potential Project Effects and Mitigation Measures

9.6.1 Vegetation

As previously described, the main terminal area has limited vegetation and mostly consists of weed species. The limited and weedy nature of vegetation on the Site is a direct reflection of the fact that the area has been extensively disturbed and altered through industrial activity back to the late 1800s. However, at the east end of the Centennial Road Overpass at Clark Drive, a group of 12 coniferous trees will need to be removed to make room for the overpass.

The most likely potential effect of clearing the existing vegetation would be the spread of invasive and noxious weeds. No Species of Conservation Concern are recorded on the Site that would require protection during Project construction.

Mitigation measures to protect vegetation include:

- Prevent and control the spread or introduction of invasive plants by:
  - cleaning earth-moving equipment to remove any foreign soil and vegetation prior to arriving at the construction site
  - covering any surficial material taken from any areas infested with weeds and stockpiled on-site to avoid the spread of seeds
  - removing from the site and properly disposing of noxious weeds and invasive plants and soils where these plants were growing
- Use native vegetation if any areas within the Project footprint are to be reclaimed through seeding or plantings (e.g., areas of exposed soils)

The proposed Project does provide the opportunity to improve the riparian habitat along the edge of the Terminal expansion where dykes would be built to contain the infill to create the new landmass. The sections of the dyke above the high tide level and outside the perimeter fence could be designed with planting pockets where suitable native species of shrubs could be planted. Such planting, if properly managed and maintained, would reduce the chance of the re-establishment of invasive species such as Himalayan blackberry that is currently found around the perimeter of the terminal. The final design for this planting would have to be discussed with Port Security personnel to ensure that the planting would not interfere with security requirements.

9.6.2 Wildlife

As described, the habitat within the proposed Project footprint is limited to small pockets of mostly invasive plants and a few trees. The potential environmental effects of site preparation activities include potential impacts on bird nest habitat. During the reconnaissance survey it was evident that migratory birds such as the Canada goose and glaucous-winged gull could nest on the Site. However, with the high level of activity on the Site, only birds that become habituated to the ongoing movement and noise of equipment would attempt to nest within the area (i.e., typically crows and pigeons). However, since birds can nest in shrubs, trees, buildings, and other manmade structures, if site preparation or demolition is to take place during the breeding bird period (March 15 to August 15), a nest survey will be conducted to determine whether there are any active nests in any trees, shrubs, buildings, or other structures that can be used for nesting. If an active nest of a migratory bird, raptor, or SARA-listed species is found, it will be left undisturbed until young have fledged and left the nest.

Birds can also be injured or killed by flying into structures, in particular windows of buildings. However, the Project site is located in a currently built up environment surrounded by buildings, electrical wires, and other hazards. The
additional infrastructure associated with the proposed Project is unlikely to result in a measureable increase in bird mortality or injury.

9.6.3 Summary of Potential Residual Effects

Given the limited extent of vegetation and presence of wildlife on the Site and taking into account mitigation measures to prevent and control the introduction and spread of invasive plants and protect nesting birds, no residual effects on terrestrial resources are anticipated.

9.7 Monitoring and Follow-Up

The following monitoring is proposed:

- Any vegetation that is planted as a result of the Project should be monitored and survival rates determined. Invasive plants becoming established should be monitored and recommendations provided, including weed control and re-planting as required to achieve the original objectives of the planting.

- If invasive plants are removed from areas, those areas should be monitored and if any invasive plants try to re-colonize in the site appropriate measures should be taken to control the invasive plants to allow native plants to become established.

- If riparian planting is provided above the high water mark along the riprap dyke, the areas should be monitored as described above.