Appendices

A: Inventory of Natural Values (Hawkes et al., 2007)

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Appendix A: Inventory of Natural Values

EA1988

Appendix A: Inventory of Natural Resources

2008-2012 Management Plan for Englishman River Regional Park
A Conservation Area along the River Corridor

Prepared for

REGIONAL DISTRICT OF NANAIMO
RECREATION AND PARKS

Prepared by

Virgil C. Hawkes, MSc, RPBio.
Marc Gaboury, MSc, RPBio.
and
James. D. Fenneman, BSc.

LGL Limited
environmental research associates
9768 Second Street
Sidney, British Columbia, V8L 3Y8

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LGL LIMITED
environmental research associates

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EXECUTIVE SUMMARY

The Regional District of Nanaimo (RDN) manages about 650 hectares of regional park, trail and conservation lands in the mid-Vancouver Island area along with another 250 hectares of neighbourhood or community parks and trails. A Regional Parks and Trails Plan completed in 2005 identifies the goals of the RDN with respect to land management, stewardship and recreational use of these regionally significant properties. The RDN often acts in partnership with major conservation and trust organizations and the Province when managing its large park properties. Together, the RDN and its partners seek to protect and steward the lands, while at the same time providing for rewarding and educational outdoor recreational experiences. A primary management goal for these lands will always be to strike a sustainable balance between protection and human use.

Using existing information and available orthoimages of the property, we described the natural values of the Englishman River Regional Park and Conservation Area (ERRPCA), including the habitat types of the property and existing flora and fauna. A Species at Risk overview was completed that identifies the species with current conservation designation (either provincial or federal) that do, or could occur in the park. Field visits in July and August 2007 were completed to validate the habitat delineation and to identify the habitats in which species with conservation designation could occur. All flora and fauna observed during those field visits were recorded. Some of the species observed in the ERRPCA included the blue-listed Red-legged Frog (*Rana aurora*), Band-tailed Pigeon (*Patagioenas fasciatus*), Purple Martin (*Progne subis*), Pacific Sideband (*Monadenia fidelis*) and red-listed Common Wood-nymph, pegala ssp (*Cercyonis pegala incana*). An incomplete plant list of 240 species in five broad categories (forbs, grasses sedges and rushes, ferns and fern-like plants, shrubs, and trees) was compiled. None of the plants observed has current conservation status, although several of them are not often encountered.

The Englishman River supports significant populations of chum, coho and steelhead along with other species. Mainstem and side channel fish habitat in the ERRPCA provides high quality rearing and spawning habitat for salmon and trout although the mainstem channel has not been stable since the late 1970's. Within the 16 km anadromous section, erosion and lateral migration of the mainstem channel has been most significant in the reach within the ERRPCA. Forty-one instream structures have been constructed on the mainstem within the park to improve rearing habitats and, in some cases, to provide bank protection. These structures have decreased bank erosion at two chronic erosion bends in the ERRPCA.

Certain areas are identified as having high potential for restoration activities, while other areas, which have been recently modified (e.g., DFO side channel) could benefit from revegetation to the adjacent banks. Park development and use should proceed in concert with recommendations on protection and restoration priorities identified in the Englishman River Recovery Plan and Strategy for Protection and Restoration of the Englishman River Mainstem. In general, the diversity of habitat types that exist within ERRPCA lands contribute to relatively high biodiversity and most of the park should be maintained in its current form so that the natural process of succession can proceed.

Educational and recreational opportunities that combine the existing trail network with a self-guided tour of significant natural areas would help promote the concept of conservation to users of the ERRPCA. This can be extended to the local community through the development of education programs aimed at students in elementary, middle, and high school, as well as students attending post secondary institutions like Malaspina University College. The integration of programs among the various levels of education would contribute to an overall appreciation for natural areas like ERRPCA.

ACKNOWLEDGEMENTS

We would like to thank the Regional District of Nanaimo, in particular, Joan Michel, for providing us with the opportunity to contribute to the development of a management plan for the (ERRPCA. Joan also spent a considerable amount of time providing us with information on the park and adjacent lands. M. Sheng, Department of Fisheries and Oceans, F. Smith, Englishman River Watershed Recovery Plan Steering Committee and J. Craig, BC Conservation Foundation provided their thoughts on future development, protection and restoration objectives for the ERRPCA. Robin Tamasi of LGL Limited generated the maps used in this report. We appreciate the assistance of all of these individuals.

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INTRODUCTION

The Regional District of Nanaimo (RDN) manages about 650 hectares of regional park, trail and conservation lands in the mid-Vancouver Island area along with another 250 hectares of neighbourhood or community parks and trails. A Regional Parks and Trails Plan completed in 2005 identifies the goals of the RDN with respect to land management, stewardship and recreational use of these regionally significant properties. The RDN often acts in partnership with major conservation and trust organizations and the Province when managing its large park properties. Together, the RDN and its partners seek to protect and steward the lands, while at the same time providing for rewarding and educational outdoor recreational experiences. A primary management goal for these lands will always be to strike a sustainable balance between protection and human use.

In October 2003, RDN acquired the Englishman River Regional Park and Conservation Area (ERRPCA) from TimberWest through a conservation partnership led by The Nature Trust of BC that included Ducks Unlimited, the Nature Conservancy of Canada, and the Regional District of Nanaimo, amongst others. The 207 hectare property was subdivided into two pieces to allow the Province of BC to contribute to the acquisition. In late 2004, the Regional District and the Ministry of the Environment concluded a 25-year management lease on the 34 hectare Provincial parcel along with a Sec. 219 conservation covenant and a statutory right of way regarding future potential use of the lands for long-term drinking water supply infrastructure. In 2006, the Regional District concluded a 99-year lease on the 173 hectare main parcel with The Nature Trust of BC, Ducks Unlimited, and the Nature Conservancy of Canada. The two parcels comprising ERRPCA are to be managed together as one regional park and conservation area.

In association with LANARC Consultants Ltd., LGL Limited environmental research associates produced a management plan for ERRPCA. LGL completed the Inventory and Study of Natural Values and prepared recommendations with respect to future land use, conservation, and educational opportunities on the property relating primarily to the existing and future natural values of the park. LGL also provided comment on some potential rehabilitation projects for specific areas of the park that will enhance existing habitats and create new ones with a goal of increasing the biodiversity of flora and fauna of the property.

Objectives

The objective of this project was to provide RDN with a management plan for ERRPCA that aligns with other management plans for other parks in the region, but that is tailored to the unique natural values, recreation opportunities, and land uses of ERRPCA. To this end, LGL Limited had primary responsibility for conducting an inventory and study of natural values associated with the ERRPCA. The inventory and study had the following sub-tasks:

a. Using a habitat stratification approach, compile a list of habitat types and flora and fauna of the ERRPCA.

b. Describe vegetation and wildlife habitat values by property sub-area;

c. Identify fish species within the mainstem and side channel habitats;

d. Describe distribution and timing of habitat use based on life cycles of native fish fauna;

e. Identify any red- or blue-listed species;

f. Assess the extent of invasive species;

g. Describe water sources on the property, shoreline stability, and wetlands;

h. Using available air photo time series, investigate the history of river channel positions and evaluate the stability of the mainstem channel adjacent to the ERRPCA;

i. Situate ERRPCA in the larger context of the Englishman River Watershed Recovery Plan (ERWRP) and Englishman River conservation corridor;

j. Identify ways to increase natural values at the ERRPCA, including restoration of the former gravel pit; and

k. Include all fish works and mainstem habitat enhancement structures in the natural values inventory.

In addition, LGL provided information on how the natural values of the ERRPCA could be integrated with educational and recreational values of the park.

Study Area

The ERRPCA is located southeast of the City of Parksville on Vancouver Island, about five kilometres upriver from the estuary (Figure 1). The ERRPCA consists of 207 hectares of Englishman River floodplain, largely forested, and includes almost five kilometres of river frontage. In the past, the property was used primarily as managed forest; private landowners also permitted minor gravel extraction, salmon habitat enhancement and informal passive recreation to take place there. The ERRPCA forms part of a series of conservation and park lands stretching about 20 kilometres along the Englishman River from the estuary to the falls.

The ERRPCA is wholly contained within the Moist Maritime subzone of the Coastal Douglas-fir biogeogeoclimatic zone, with the ecological indicators (plant species, etc.) suggesting that the ecosystems present are typical of the moister variants of this subzone. The Moist Maritime Coastal Douglas-fir subzone (CDFmm) occurs at low elevations (below 150 m) along southeastern Vancouver Island, north to Comox, and throughout the Gulf Islands. It occurs in the rainshadow of the Olympic and Vancouver Island mountain ranges and has a climate of warm, dry summers and mild, wet winters. The mean annual temperature of the CDFmm subzone ranges from 9.2°C to 10.5°C. Even during the coldest months of the year the average daily temperatures do not fall below 0°C and the absolute daily minimums rarely drop below -10°C. Mean annual precipitation varies from 647 to 1263 mm. Very little precipitation (approximately 5%) falls as snow, most of which melts within a week of falling.

The coastal variety of Douglas-fir (*Pseudotsuga menziesii* var.*menziesii*) is the most prominent tree species on upland sites within this subzone. Other common tree species which co-occur with Douglas-fir on moist to mesic sites include grand fir (*Abies grandis*), bigleaf maple (*Acer macrophyllum*), black cottonwood (*Populus balsamifera* ssp.*trichocarpa*), red alder (*Alnus rubra*), western white pine (*Pinus monticola*), western hemlock (*Tsuga heterophylla*), and western redcedar (*Thuja plicata*), while arbutus (*Arbutus menziesii*), western flowering dogwood (*Cornus nuttallii*), bitter cherry (*Prunus emerginata*), and shore pine (*Pinus contorta* var.*contorta*) occur locally on drier and/or nutrient poor sites. Although it is a locally significant tree species within the CDFmm subzone, garry oak (*Quercus garryana*) is not present in the vicinity of the Englishman River. Almost all forests within this subzone have regenerated following extensive logging that has been ongoing in the region since the turn of the last century and are thus represented by a mosaic of forests of different ages and structures.

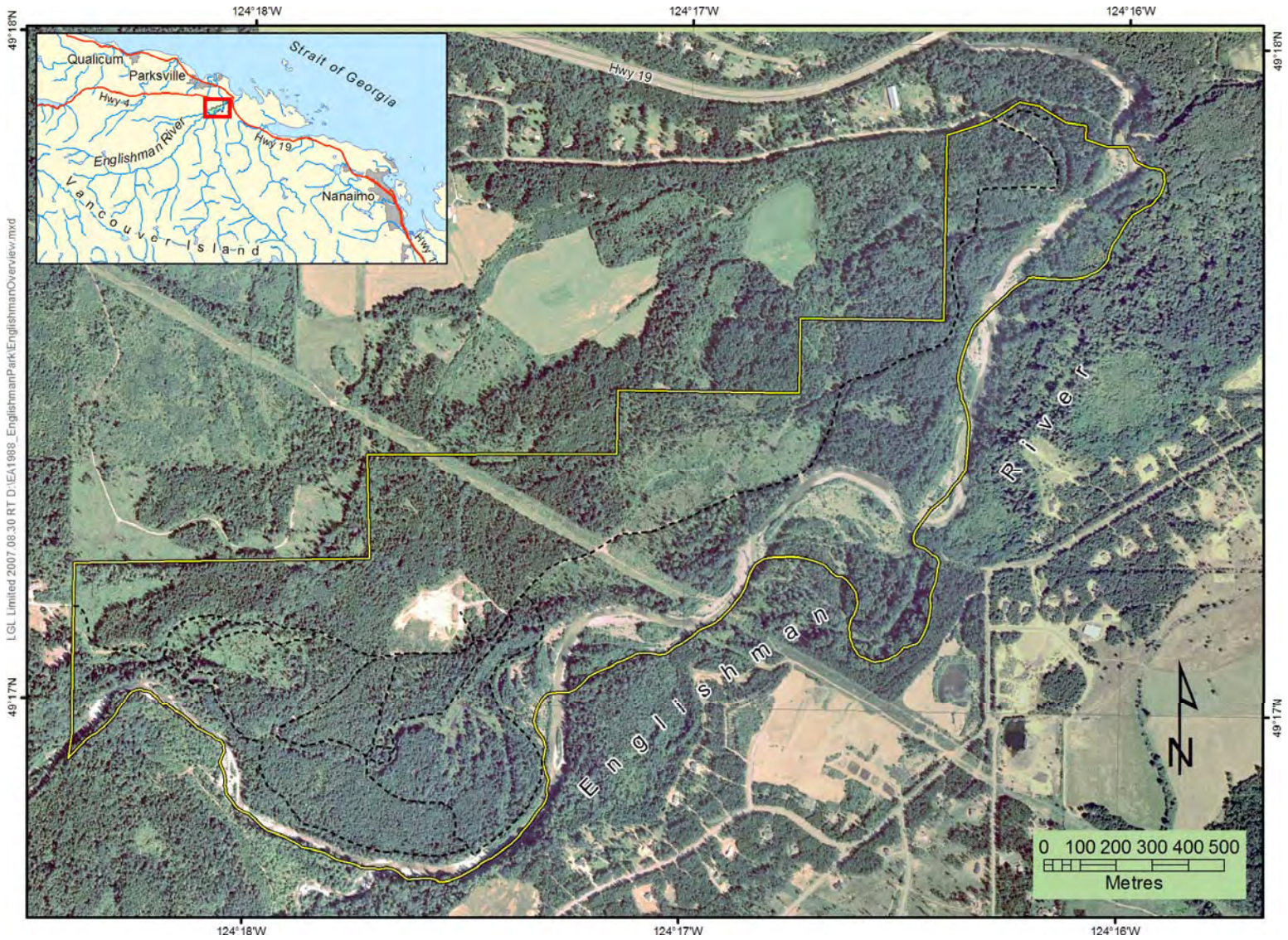

Figure 1. Location and boundary (in yellow) of the ERRPCA relative to Nanaimo, BC. Existing road and trails indicated with black dotted line.

Understory vegetation in the CDFmm subzone is characterized by species such as salal (*Gaultheria shallon*), red huckleberry (*Vaccinium parvifolium*), Oregon-grape (*Mahonia* sp.), oceanspray (*Holodiscus discolor*), and baldhip rose (*Rosa gymnocarpa*), with forbs such as foamflower (*Tiarella trifoliata*), sword fern (*Polystichum munitum*), bracken fern (*Pteridium aquilinum*), sweet-scented bedstraw (*Galium triflorum*), broad-leaved starflower (*Trientalis borealis*), and others dominating the herb layer. The localized distribution of this subzone in British Columbia in combination with the unique climatic and habitat conditions that occur results in a rich biodiversity, including at least 50 plant species that occur nowhere else in the province. Many of the species that occur in this subzone are considered rare by either the British Columbia Conservation Data Centre (CDC) or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

METHODS

This description of the environmental setting of ERRPCA was developed using several steps:

Step 1: Collection and collation of existing natural history information and resources (aerial photography, mapping, and species occurrence data);

Step 2: Delineation of ecosystems at ERRPCA;

Step 3: Development of Species at Risk Overview;

Step 4: Ground surveys to develop a comprehensive inventory of natural values, to assess existing habitat and channel condition, and to verify presence or potential of presence for rare and endangered species;

Step 5: Discussions with stakeholders concerning fisheries resources in the Park and Englishman River; and

Step 6: Development of protection and restoration strategies and prioritization of activities.

The following sections detail the methods used during each phase of this project.

Collection and Collation of Existing Information

Information on the resources within ERRPCA and Englishman River watershed in general was obtained through a literature review of published and unpublished reports. We obtained information on rare and endangered species for the South Island forest district from the British Columbia Conservation Data Centre. These data were used as the basis of the species at risk overview and to identify rare species that could occur at ERRPCA.

Habitat Delineation

The 2005 digital orthophoto of ERRPCA was used as the basis for habitat delineation. Polygons of similar habitat types were delineated on the orthophoto, first by hand, and later these polygons were digitized and a shapefile was generated in our GIS. A representative sample of the various habitat types was then visited in the field to determine, and in some cases, verify the habitat association of each polygon.

Habitat delineation was based on the dominant vegetative cover or site conditions of a given polygon. For example, forest dominated polygons were classified according to leading tree species (e.g., Douglas-fir, bigleaf maple, lodgepole pine) and heavily impacted sites (e.g., the gravel pit) were characterized as disturbed sites.

Species at Risk Overview

A Species at Risk Overview was completed for ERRPCA and involved the development of a list of sensitive species (flora and fauna) that could potentially occur at ERRPCA. The initial species list was obtained from the British Columbia Conservation Data Centre, which provides access to lists of flora and fauna with current conservation designation. The initial list, derived for the South Island Forest District, was reduced through an assessment of which species were likely to occur in the park. For example, marine mammals and reptiles were removed from the list, as were species whose range is not known to include the Englishman River area.

HABITAT AND SPECIES INVENTORY

Habitat Delineation Within Park Lands

Twelve habitat types were delineated for ERRPCA (Table 1). Forest ecosystems dominate the land base of ERRPCA, with Dry Mixed Forest (DMF) covering 62.9 ha, Moist Mixed Forest covering 45.3 ha, and Mesic Second-growth Coniferous Forest covering 33.8 ha. Both the DMF and MMF are comprised of approximately equal components of coniferous and deciduous trees, with the ratio of deciduous to coniferous varying across all polygons assigned to these habitat types. A map showing the distribution of each habitat type at ERRPCA is included in Figure 2.

Table 1. Habitat codes, names, area (hectares) and percentage of total area for each habitat type delineated for ERRPCA.

Code	Ecosystem Name	Hectares	%of Total Area
DMF	Dry Mixed Forests	62.9	30.4%
MMF	Moist Mixed Forests	45.3	21.9%
SCF	Mesic Second-growth Coniferous Forest	33.8	16.3%
RC	Regenerating Cutblocks	25.7	12.4%
RF	Riverine Flats	10.4	5.0%
RI	River	9.2	4.4%
DS	Disturbed Sites	6.8	3.3%
DPF	Dry Pine Forests	4.2	2.0%
RT	Riparian Thickets	4.0	1.9%
SP	Swamps and Ponds	3.7	1.8%
FC	Forest Clearing	1.1	0.5%
EP	Ephemeral Pools	0.1	0.05%
	Total	207.2	100%

Certain habitat types (e.g., DS – Disturbed Sites) have been heavily influenced by human use and are the focus of habitat remediation opportunities, which are discussed below. Of the 12 habitat types, the recently developed side channel, built by the Department of Fisheries and Oceans in 2007, was not taken into account because the final topographic survey was not completed at the time of report writing. Future versions of this plan could quantify the area of side channel habitat once the total area and alignment of the wetted channel is known. An approximate location of the side channel is shown in plan view on the habitat map (Figure 2).

DMF – Dry Mixed Forests

This habitat type was the most abundant on the property, occurring primarily on warm, well-drained, south-facing slopes. It is characterized by an overstory dominated by Douglas-fir with varying amounts of bigleaf maple, bitter cherry, shore pine, and arbutus. The understory is typically dominated by salal, with other shrub species such as oceanspray, red huckleberry,

baldhip rose, and purple honeysuckle (*Lonicera hispidula*) also occurring. This forest type is quite open, allowing more light to reach the forest floor and subsequently a dense shrub layer has developed. Although plant diversity is not particularly high, these habitats provide moderate to good value to wildlife, both as a source of food and cover. In particular, small vertebrate and invertebrate species benefit from the protection of the dense shrub layer.

MMF – Moist Mixed Forests

This second most abundant habitat type is associated with moister soil types, and is the predominant forest habitat along the banks of the Englishman River, as well as along all smaller waterways, ponds, swamps, and wet lowlands on the property. The overstory is co-dominated by a number of tree species, with the wettest microsites being dominated by western redcedar, western hemlock, red alder, and (locally) black cottonwood, while drier areas have increased bigleaf maple, grand fir, and Douglas-fir. Sitka spruce (*Picea sitchensis*), which is considered rare in the CDFmm subzone (Meidinger and Pojar 1991), occurs locally in this habitat type along the banks of the Englishman River. The understory is typically much better-developed than in the mesic second-growth coniferous forest, although it consists of many of the same species. Grasses such as Alaska oniongrass (*Melica subulata*), fescues (*Festuca* sp.), and Columbia brome (*Bromus vulgaris*) are more conspicuous in this habitat type than in more uniform upland forests. The high diversity of plant species, moister soils, diverse canopy layer with a high percentage of deciduous species, abundance of coarse woody debris, and well-developed understory provide high value for wildlife. Red-legged frog (*Rana aurora*), a blue-listed species, requires these moist forests for foraging as adults; several individuals of this species were located on the property.

SCF – Mesic Second-growth Coniferous Forest

This habitat type occupies large portions of the upland forest, and is characterized by homogeneous, even-aged, relatively young second-growth coniferous forest with a very high percentage of Douglas-fir in the overstory. Canopy cover is high in this habitat type, often leading to a reduction in understory development. This sparse understory is occupied by scattered shrubs of salal, Oregon-grape, red huckleberry, sword fern, deer fern (*Blechnum spicant*), and, in many areas, extensive carpets of forest mosses such as Oregon beaked moss (*Eurhynchium oreganum*). Moist microsites and openings within this forest type have increased biodiversity, but overall this habitat is not considered particularly productive from an ecological standpoint. Wildlife use this habitat for cover, but the sparse understory provides few food resources. The overall homogeneity of the habitat combined with its reduced vegetation diversity and minimal structural attributes provide limited ecological value in comparison with other habitat types that are present on the property.

RC – Regenerating Cutblocks

The relatively recent logging history in some portions of the park has resulted in areas of very young regenerating forests. These areas are composed of small coniferous trees (almost all Douglas-fir) within a matrix of dense, overgrown shrubs and herbs. This extensive shrub layer consists of species such as trailing blackberry (*Rubus ursinus*), oceanspray, western trumpet honeysuckle (*Lonicera ciliosa*), red huckleberry, salal, and others, with large amounts of robust herbs such as fireweed (*Epilobium angustifolium*) and introduced thistles (*Cirsium* spp.). The dense shrub layer and open characteristics of the regenerating forest provide very high food and cover value for wildlife and birds. For example, many bird species that do not occur in forested habitats, such as White-crowned Sparrow (*Zonotrichia leucophrys*), MacGillivray's Warbler (*Oporornis tolmiei*), and Willow Flycatcher (*Empidonax traillii*) occur in these early-seral

habitats. Despite their disturbed, early successional conditions, these habitats provide critical habitat for many species that would not otherwise occur in a forested landscape.

RF – Riverine Flats

Consisting primarily of sandy to coarse sediments and cobbles deposited along the banks of the Englishman River, this habitat is unique on the property and was found to support a diverse and specific community of plants and animals. Tree species such as red alder and black cottonwood were locally established as young pioneer groves, with shrubs such as willows forming denser thickets in some areas. A number of locally unusual plant species, such as narrow-sepaled phacelia (*Phacelia leptosepala*), kinnikinnick (*Arctostaphylos uva-ursi*), and marsh paintbrush (*Castilleja hispida*) were found only in this habitat, likely the result of seed deposition from populations further upstream. The warm, coarse substrate was also found to support an unusual abundance of garter snakes (both *Thamnophis elegans* and *T.sirtalis*) relative to other habitats on the property, and songbirds such as willow flycatcher and song sparrow were found to inhabit the thickets and deciduous groves. Where perennial seepage of freshwater occurred in this habitat, flora and fauna that were reminiscent of ephemeral wetlands were established. The local and uncommon dragonfly *Cordulegaster dorsalis* (Pacific Spiketail), a species that is restricted to fluvial systems, was found only in this habitat on the property.

RI – River

The aquatic portion of the river supported a small number of species that were not otherwise associated with any other habitats. For example, birds such as belted kingfisher (*Megaceryle alcyon*), northern rough-winged swallow (*Stelgidopteryx serripennis*), spotted sandpiper (*Actitis macularia*), and common merganser (*Mergus merganser*) were specifically associated with this habitat, while other species such as American dipper (*Cinclus mexicanus*) also likely occur but were not recorded.

DS – Disturbed Sites

This habitat type occurs locally on the property along roadways and powerline rights-of-way as well as throughout the large central gravel pit area. The vegetation communities that occupy this habitat are generally composed largely or completely of exotic, introduced species that are able to out-compete native species on these very early seral sites. Species that were found in abundance in this habitat on the property include Scotch broom (*Cytisus scoparius*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), clovers (*Trifolium* sp.) and a large diversity of grasses and small annual forbs. Although the value of these habitats to wildlife is generally low, in some areas they do provide moderate cover and forage values. The red-listed butterfly species Common Wood-nymph (*Cercyonis pegala incana*) was found to be restricted to this habitat type on the property, and the only northern alligator lizard (*Elgaria coerulea*) seen during the survey was found along a weedy roadside.

DPF – Dry Pine Forests

This forest type is rare on the property and is most extensive along the main road between the gravel pit and the fish hatchery. The soils in this area are very coarse and subsequently well-drained, allowing for shore pine, which is well-adapted to grow in such poor sites, to become established as the dominant tree species. Few other tree species occur in conjunction with these shore pine forests, although Douglas-fir, bigleaf maple, and other dry-forest species may occur sporadically. The shrub layer is similar to that found in Dry Mixed Forest habitats, and is

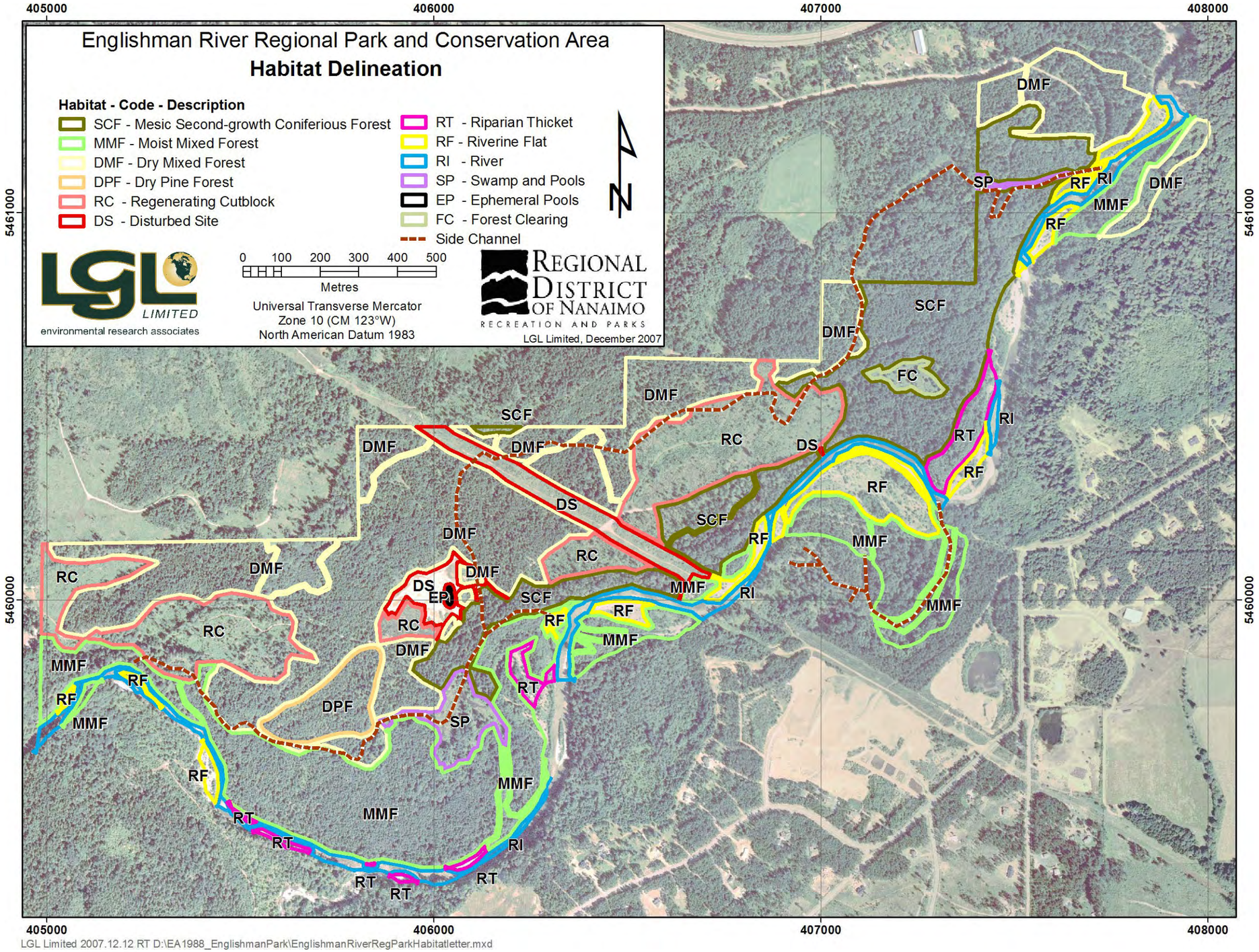

Figure 2. Habitats delineated in the ERRPCA.

dominated by species such as salal, red huckleberry, oceanspray, baldhip rose, and purple honeysuckle. These forests are relatively open and, in many areas, the understory vegetation is reduced to a layer of mosses and lichens (particularly in xeric openings). A number of herb species that are more typical of very dry forested habitats occur in this habitat such as vari-leaved collomia (*Collomia heterophylla*) and Scouler's harebell (*Campanula scouler*). This habitat type provides moderate value for wildlife, and many small vertebrate and invertebrate species of drier habitats likely occur here in greater abundance than elsewhere on the property.

RT – Riparian Thickets

This diverse habitat type, which consists of a variety of moist shrub communities, occurs locally but widely throughout the property. The most extensive examples are in association with the established wetland communities. The plant composition of these habitats is variable but includes species such as Pacific crabapple (*Malus fusca*), black twinberry (*Lonicera involucrata*), cascara (Rhamnus purshiana), and willows (Salix spp.). Below the shrub layer, the herb layer is a combination of wetland species (i.e., various sedges, Carex spp.; reed canarygrass, *Phalaris arundinacea*) and species that are typical of moist upland sites (i.e., lady fern, *Athyrium filix-femina*). These habitats are of high value to birds and wildlife because of their location adjacent to wetlands, which provide extensive food and water resources, as well as to upland forests that provide cover. A number of bird species, including song sparrow (*Melospiza melodia*), common yellowthroat (*Geothlypis trichas*), and cedar waxwing (*Bombycilla cedrorum*), use these thickets extensively throughout the year.

SP – Swamps and Ponds

Several well-established wetland complexes are located on the property and offer exceptional value to wildlife as well as support unique assemblages of plants and animals. Two classes of wetlands occur in the park: grass-dominated and cattail-dominated. The grass-dominated wetlands, such as the large wetland complex in the southwestern portion of the park, had a more-or-less continuous cover of reed canarygrass (*Phalaris arundinacea*) with scattered shrubs (black twinberry, cascara, Pacific crabapple) occurring on drier humps and some small areas of open water. Cattail-dominated wetlands, such as the roadside marsh in the eastern portion of the park, have a fringing community of common cattail (*Typha latifolia*) and hardhack (*Spiraea douglasii*) around deeper open water. Aquatics such as pondweeds (*Potamogeton* species) and yellow pond-lily (*Nuphar lutea*) occur in these deeper waters, while species such as Cusick's sedge (*Carex cusickii*), blue skullcap (Scutellaria lateriflora), and northern water-horehound (*Lycopus uniflorus*) grow on floating woody debris and on hummocks around the edges of the wetland. These wetland communities have particularly high vegetation diversity and provide habitat and resources for a wide variety of large and small animals. Birds such as common yellowthroat, song sparrow, and mallard breed and feed in these habitats and utilize the fringing thickets for cover. Similarly, pond-breeding amphibians such as Pacific Treefrog (*Hyla regilla*) and Red-legged Frog require these wetland habitats for egg-laying.

FC – Forest Clearing

The forest clearing habitat type occurred in only one polygon and appears to have persisted across time, being first noted on the 1949 orthophoto when the habitat type appeared to be a grassy slope bordered by large coniferous trees (probably Douglas-fir). Over time, the clearing persisted and at times, was part of a logged area (1977 orthophoto). By 1984, much of the logged area had regenerated; however, the clearing continued to be void of heavy timber growth. In 1996, the clearing is again visible and it has persisted through 2007. It is not clear why this particular area

has not become forested over time, as much of the surrounding land now supports an extensive stand of second growth Douglas-fir forest.

EP – Ephemeral Pools

This habitat type is extremely rare on the property, and is essentially restricted to several remnant pools of water in the centre of the large gravel pit that gradually dry over the course of the growing season. Although these pools and the surrounding terrestrial landscape are highly disturbed habitats, a unique plant assemblage has become established on the site that is not represented elsewhere in the park. Early-successional wetland species that can tolerate heavy disturbance, including common cattail, common spike-rush (*Eleocharis palustris*), blunt spike-rush (*Eleocharis obtusa*), and spike bentgrass (*Agrostis exarata*) grow in profusion in and around the silty water. This habitat was found to provide habitat for some pond-breeding amphibians, particularly Pacific Treefrogs, as well as garter snakes.

Species at Risk Overview

As a result of an increasing awareness of the plight of biodiversity in British Columbia and Canada, ranking schemes have been developed at both the national (Committee on the Status of Endangered Wildlife in Canada [COSEWIC]) and provincial (British Columbia Conservation Data Centre [BC CDC]) levels which assess the current status of threatened or endangered species and provide them with a sensitivity ranking (Table 2). These ranking schemes allow conservationists and biologists to focus their efforts on species that are rare or declining and facilitates further inventory of these species by highlighting their status.

Table 2. Explanation of the ranks used by COSEWIC and the BC CDC when assessing the status of endangered species in Canada and British Columbia, respectively.

National Status (COSEWIC)	
Extinct (X)	No longer known to exist anywhere
Extirpated (XT)	No longer known to exist in the wild in Canada, but known to exist elsewhere
Endangered (E)	Threatened with immediate extinction or extirpation through all or a significant portion of its range, owing to the act of humans
Threatened (T)	Likely to become endangered in Canada if conditions are not reversed
Special Concern (SC)	May become threatened or endangered because of a combination of biological characteristics and identified threats
Data Deficient (DD)	Available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction
Not at Risk (NAR)	Not at risk of extinction given the current circumstances
Provincial Status (BC CDC)	
Red	Species is endangered or threatened under the *Wildlife Act*, is extinct, is extirpated, or is a candidate for these designations
Blue	Species is not immediately threatened, but is of concern because of characteristics that makes it particularly sensitive to human activities or natural events
Yellow	Species is uncommon to common, declining or increasing but is not a candidate for the red or blue lists

The landscape of southern Vancouver Island is diverse and unique. The convergence of dry climates and wet climates, mountainous areas and lowlands, and terrestrial and marine environments has created one of the most biologically rich regions in Canada, harbouring many species which occur nowhere else in the country or, in some cases, the world. Human development and resource extraction, however, have fragmented the habitats of southern Vancouver Island and had significant impacts on a number of threatened or endangered species. Indeed, several of these imperiled species have been lost from the region which, for some, represented their only toehold in the country. The combination of biological uniqueness and development pressures have resulted in a particularly high number of species of concern occurring on southern Vancouver Island.

Vertebrate and Invertebrate Animals

The South Island Forest District is home to many species with federal or provincial status as "Species at Risk." A total of 82 threatened or endangered species of 7 species groups occur in this region, including 11 mammals (including marine mammals), 26 birds, 6 reptiles and amphibians, 5 freshwater fish, 15 butterflies, 5 dragonflies, and 12 terrestrial molluscs (Figure 3). Other species groups have not yet been ranked and it is expected that many more endangered species from these groups occur in this region.

Based on these species lists, a ranking system was developed that would specifically identify the probability of each of these threatened or endangered species occurring in Englishman River Regional Park. This exercise ranked the probability of each species occurring in the park as Not Expected, Possible, Probable, or Confirmed, based on the habitats present and the species' known distribution on southern Vancouver Island.

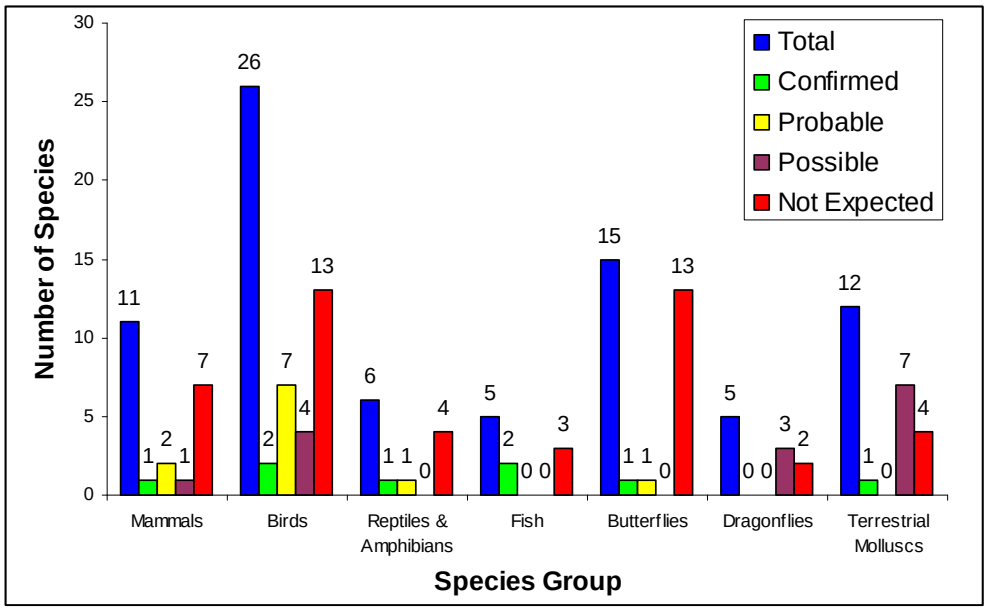

Figure 3. The number of threatened and endangered animal species on southern Vancouver Island and their probability of occurring in ERRPCA.

The Confirmed, Probable, and Possible species comprise the **Valued Ecosystem Components** of this analysis, which are listed in Table 3 and described in detail in the next section. This allows us to screen out the species that are not expected in the watershed and instead focus on those species that have at least some potential to occur.

Vascular Plants

The unique biodiversity of southern Vancouver Island includes flora as well as fauna, and a high percentage of the plant species occurring in the region are similarly threatened by development and other land use practices. For example, the BC CDC (2007) lists a total of 167 rare vascular plant taxa (species and subspecies) from the South Island Forest District, including 88 blue-listed and 79 red-listed taxa. The centre of diversity of these rare species is the east coast of southern Vancouver Island and the Gulf Islands, including areas north to Campbell River. Although no rare plant taxa have been documented from the ERRPCA as of 2007, some species may have gone undetected during the June and August field surveys. Some of the following additional rare plant taxa may occur in the park, based on the habitats available and the presence of these species in areas of similar habitat adjacent to the park.

Anagallis minima
Aster radulinus
Bidens amplissima
Callitriche heterophylla ssp.*heterophylla*
Ceratophyllum echinatum
Claytonia washingtoniana
Epilobium ciliatum ssp.*watsonii*
Epilobium halleanum
Glyceria leptostachya
Hypericum scouleri ssp.*nortoniae*
Juncus occidentalis
Juncus oxymeris
Mitella caulescens
Montia diffusa
Myriophyllum quitense
Myriophyllum ussuriense
Nothochelone nemorosa
Piperia candida
Pleuropogon refractus
Polygonum hydropiperoides
Potamogeton oakesianus
Pyrola elliptica
Rupertia physodes
Sparganium fluctuans
Viola howelli

Significant Observations

Several observations of note were made during the June and August field sessions. Two blue-listed bird species, Purple Martin (*Progne subis*) and Band-tailed Pigeon were observed on the property. Purple Martins were heard vocalizing above the tree canopy at two locations: over the regenerating cutblock at the west end of the park, and along the powerline right-of-way south of the main road. The nearest breeding colony of these birds is in Nanoose Bay, where a number of pairs breed in nest boxes placed atop pilings in the harbour. This species wanders widely during the day in search of food and it is suspected that the flying insect populations that are generated by the wetlands of the ERRPCA provide a significant food source for this species during the summer months.

Band-tailed Pigeons, although blue-listed, have rebounded significantly in the past several decades on Vancouver Island following significant hunting-related population declines in the 1900s. The species is now fairly common to very common across much of the island, including in The ERRPCA, where we detected this species at a variety of locations within the park. This species is most numerous in mixed-wood forests, such as the type that are widespread within the park, and nesting undoubtedly occurs regularly in the area.

Red-legged Frogs (*Rana aurora*) were found at several locations within the park, usually in the understory of moist, mixed forest types. This species is blue-listed in B.C. and is considered vulnerable to habitat degradation and loss due to urbanization and industrial or resource-extraction activities. The wetlands of the property provide excellent breeding habitat for this pond-breeding species and it is expected that the populations inhabiting the property are robust and healthy. This frog population likely helps to maintain some of the large populations of garter snakes that were found on the property, such as those along the sandy riverine flats of the Englishman River. In addition to the Red-legged Frogs, the discovery of a small population of

several introduced Green Frogs (*Rana clamitans*) along the banks of the Englishman River is considered to be significant since this species is known only sporadically from the Coombs area (Matsuda et al. 2006) and this may represent a previously unknown occurrence of the species on central Vancouver Island.

Another blue-listed species which was found to be common and widespread in the park is the large snail *Monadenia fidelis*. This species was found at numerous locations within moist to mesic habitat conditions throughout the upland portions of the park. It is estimated that more than 20 individuals were observed over the course of the two field sessions, and in almost all portions of the park that were visited.

The only other invertebrate of conservation concern that was detected in the park was the rare butterfly *Cercyonis pegala incana* (Common Wood-nymph). This coastal subspecies of this otherwise widespread and common North American butterfly was found in ruderal, grassy, weedy habitats along the main park road, near the former river ford location. This species was detected only during the August field session, which corresponds with its late-summer flight season. This species is expected to occur more widely in the park due to the presence of large areas of suitable habitat that were not surveyed during the August field session (i.e., the powerline right-of-way).

A list of all flora and fauna observed in the ERRPCA in 2007 can be found in Appendices A through F.

Valued Ecosystem Components

The following section outlines the distribution and ecology of the species with federal or provincial conservation status that are known or suspected to occur in the ERRPCA (Table 3).

Vertebrates

Vancouver Island Water Shrew (*Sorex palustris brooksi*)

This subspecies of the wide-ranging Water Shrew is endemic to Vancouver Island and occurs nowhere else in the world. It is weakly differentiated from mainland individuals of the species by its darker colour (Nagorsen 1996). This animal is typical of wet habitats, particularly near fast-flowing streams, and is found in areas where there are rocks, boulders, tree roots, and overhanging ledges along the edge of the watercourse. Other habitats that are occupied include wet meadows, riparian thickets, and bogs. This species preys primarily on aquatic insects and terrestrial invertebrates, but has also been known to consume amphibian larvae, carrion, and even small fish which it captures by diving underwater for up to 47 seconds at a time (Nagorsen 1996). The *brooksi* subspecies is extremely poorly known, and up until 2001 was known from only 11 specimens (Craig and Wilson 2001). That year, however, targeted surveys at numerous locations around Vancouver Island documented an additional 27 locations for this enigmatic animal (Craig and Wilson 2001). During this study, Vancouver Island Water Shrews were detected at 5 sites within the vicinity of Coombs and Errington, including areas of the upper Morrison Creek watershed to the west of the ERRPCA. Numerous examples of suitable habitat for this species exist in the park, including forested creeks and well-vegetated wetlands, and it is expected that one or more populations of this animal may occur in association with these water features. Additional surveys targeting small mammals would be needed to confirm the species' presence in the park.

Table 3. Valued Ecosystem Components of Englishman River Regional Park.

Species	Scientific Name	Species Group	Prob. of Occurrence	COSEWIC[1]	CDC[2]
Vancouver Island Water Shrew	*Sorex palustris brooksi*	Mammal	Probable		Red
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Mammal	Probable		Blue
Vancouver Island Ermine	*Mustela ermina anguinae*	Mammal	Possible		Blue
Roosevelt Elk	*Cervus canadensis roosevelti*	Mammal	Confirmed		Blue
Green Heron	*Butorides virescens*	Bird	Possible		Blue
Great Blue Heron, *fannini* ssp.	*Ardea herodias fannini*	Bird	Probable	SC	Blue
Canada Goose, *occidentalis* ssp.	*Branta canadensis occidentalis*	Bird	Possible		Blue
Northern Goshawk, *laingii* ssp.	*Accipiter gentilis laingii*	Bird	Probable		Blue
Peregrine Falcon, *anatum* ssp.	*Falco peregrinus anatum*	Bird	Possible		Red
Peregrine Falcon, *pealei* ssp.	*Falco peregrinus pealei*	Bird	Probable	SC	Blue
Sandhill Crane	*Grus canadensis*	Bird	Probable		Blue
Band-tailed Pigeon	*Patagioenas fasciatus*	Bird	Confirmed		Blue
Western Screech-Owl, *kennicottii* ssp.	*Megascops kennicottii kennicottii*	Bird	Probable	SC	Blue
Northern Pygmy-Owl, *swarthi* ssp.	*Glaucidium gnoma swarthi*	Bird	Probable		Blue
Purple Martin	*Progne subis*	Bird	Confirmed		Blue
Barn Swallow	*Hirundo rustica*	Bird	Probable		Blue
Pine Grosbeak, *carlottae* ssp.	*Pinicola enucleator carlottae*	Bird	Possible		Blue
Red-legged Frog	*Rana aurora*	Amphibian	Confirmed		Blue
Western Toad	*Bufo boreas*	Amphibian	Probable	SC	Yellow
Cutthroat Trout	*Oncorhynchus clarki clarki*	Fish	Confirmed		Blue
Dolly Varden	*Salvelinus malma*	Fish	Confirmed		Blue
Western Pine Elfin, *sheltonensis* ssp.	*Callophrys eryphon sheltonensis*	Butterfly	Probable		Blue
Common Wood-nymph, *incana* ssp.	*Cercyonis pegala incana*	Butterfly	Confirmed		Red
Western Pondhawk	*Erythemis collocata*	Dragonfly	Possible		Blue
Blue Dasher	*Pachydiplax longipennis*	Dragonfly	Possible		Blue
Autumn Meadowhawk	*Sympetrum vicinum*	Dragonfly	Possible		Blue
Western Thorn	*Carychium occidentale*	Mollusc	Possible		Blue
Evening Fieldslug	*Deroceras hesperium*	Mollusc	Possible		Red
Pacific Sideband	*Monadenia fidelis*	Mollusc	Confirmed		Blue
Threaded Vertigo	*Nearctula* sp.1	Mollusc	Possible		Red
Broadwhorl Tightcoil	*Pristiloma johnsoni*	Mollusc	Possible		Blue
Scarletback Taildropper	*Prophysaon vanattae*	Mollusc	Possible		Blue
Pacific Vertigo	*Vertigo andrusiana*	Mollusc	Possible		Red
Black Gloss	*Zonitoides nitidus*	Mollusc	Possible		Blue

[1] COSEWIC = Committee on the Status of Endangered Wildlife in Canada: SC = Special Concern
[2] CDC = Conservation Data Centre

Townsend's Big-eared Bat (*Corynorhinus townsendii*)

The river, creeks, and wetlands of the ERRPCA provide excellent foraging habitat for a variety of bat species, including the Townsend's Big-eared Bat, while the adjacent forests provide roosting habitat for the animals during the day. This small, highly distinctive bat occurs locally in Canada only on southern Vancouver Island (north at least to Comox) and across southern B.C. where it inhabits a wide variety of habitats, from coastal forests to dry interior grasslands (Nagorsen and Brigham 1993). This species roosts colonially during the winter in caves and buildings, with known winter roosts in southwestern British Columbia generally containing between 40-60 animals (Nagorsen and Brigham 1993). The local distribution of the species, coupled with its reliance on relatively few overwintering sites, renders it susceptible to disturbance from human activities and subsequent population reductions. Although it likely occurs in the park, nocturnal bat monitoring and possible mist-netting would be required to confirm its presence.

Vancouver Island Ermine (*Mustela ermina anguinae*)

This endemic, little-known subspecies of the widespread Ermine occurs only on Vancouver Island, where it is scarce and only rarely seen. Despite its current scarcity on Vancouver Island, however, it occurs widely throughout forested regions of the island. This species inhabits a broad diversity of landscapes, especially riparian areas, where it searches for the small mammals such as voles, shrews, and mice which it preys on. The relatively low density of potential prey animals on Vancouver Island may be responsible for the overall scarcity of the Vancouver Island Ermine (Cannings et al. 1999). Although habitat fragmentation from urban and agricultural development probably poses the greatest threat to this animal on Vancouver Island, the effects of large-scale timber harvest on prey populations is not known and may be detrimental (Cannings et al. 1999). The habitats that exist within the ERRPCA appear to be suitable for this species, but the very low density of the animals and the highly fragmented landscapes surrounding the park may prevent the animals from dispersing into the park from source populations in more remote areas to the west.

Roosevelt Elk (*Cervus canadensis roosevelti*)

The Roosevelt Elk numbers only 3400-3500 animals in British Columbia, of which 3000-3200 occur on Vancouver Island with the rest restricted to small, mostly re-introduced herds on the southern mainland coast (Shakleton 1999; Cannings et al. 1999; Blood 2000). These animals inhabit a range of coniferous of deciduous forested habitats, particularly in areas near wetland, riparian habitats, and other moist or brushy sites with an abundance of potential forage and cover plants (Cannings et al. 1999). Populations of this coastal subspecies of Elk have been significantly impacted by a number of factors such as overharvest, poaching, human settlement, and resource extraction activities and have been locally extirpated from a number of areas of southern Vancouver Island (including the Gulf Islands) as well as the Lower Mainland and most of the southern mainland coast (Cannings et al. 1999). Despite their scarcity on southern Vancouver Island, Englishman River Park is known to harbour a population of Roosevelt Elk.

Great Blue Heron (*Ardea herodias fannini*)

Although still a common component of the avifauna of Vancouver Island, recent declines coupled with the species' sensitivity to human disturbance at its nesting colonies have resulted in the placement of this coastal subspecies of the Great Blue Heron on the provincial blue list (Gebauer and Moul 2001). This colonial species requires forested groves located near freshwater or marine habitats for nesting, where it places its stick nests high in the branches, usually in well-concealed locations within the trees (Gebauer and Moul 2001). This species occurs regularly throughout the Parksville-Qualicum region, both in marine and freshwater habitats. Although it has not been

shown to nest in the park, it likely uses the freshwater habitats for foraging on frogs, fish, and even small mammals.

Green Heron (*Butorides virescens*)

This species spread naturally north along the Pacific coast during the past century and was first detected on Vancouver Island as recently as 1963 (Fraser and Ramsey 1996). Today it occurs in small numbers along the east coast of Vancouver Island (north to Campbell River) and in the Lower Mainland, where it is found primarily in quiet, brushy wetlands such as rivers, sloughs, ponds, and marshes with abundant vegetation present (Campbell et al. 1990). The current population in British Columbia is estimated by Fraser and Ramsey (1996) as containing fewer than 500 pairs, and they show that fewer than 50 pairs are known from regularly-used breeding sites. Although it is unlikely to occur as a breeder or even as a regular non-breeder in the ERRPCA, the wooded wetlands that are present in the park may provide habitat for occasional birds, particularly juveniles during the late summer-fall period when they wander widely before migrating south to the western United States.

Canada Goose (*Branta canadensis occidentalis*)

This dark, north-coastal subspecies of the common and well-known Canada Goose breeds locally in coastal areas of southeast Alaska, including the Copper River delta and some of the islands in the Gulf of Alaska and Prince William Sound, and winters in the Willamette Valley and lower Columbia River valley in southwest Washington and northwest Oregon (Mowbray et al. 2002). Although it doesn't breed in B.C., it does migrate through coastal areas of the province in both spring and fall and is fairly common along the west coast of Vancouver Island at this time. However, because of an overall low global population (fewer than 20,000 individuals as of 2001 [Mowbray et al. 2002]) and the importance of coastal British Columbia as a migration stopover site, it has been given a non-breeding rank on the provincial blue list. During its time in B.C., this subspecies relies heavily on coastal/marine habitats such as mudflats and estuaries and, as such, its occurrence in the ERRPCA would likely be peripheral. Nonetheless, the small wetlands that are present could potentially provide stopover habitat for this subspecies during both spring and fall migration, particularly for single birds or small flocks that associate with flocks of local resident Canada Geese.

Northern Goshawk (*Accipiter gentilis laingii*)

This dark subspecies of the Northern Goshawk is restricted as a breeding bird to the Queen Charlotte Islands, Vancouver Island, the central and northern mainland coast of B.C., and some areas of southeastern Alaska (Squires and Reynolds 1997). Recent surveys have documented relatively few nests in B.C., such as surveys in the mid-1990s that documented approximately 30 nests between Vancouver Island and the Queen Charlotte Islands (Fraser et al. 1999). It is a bird of mature and old growth coniferous forests throughout its range (Fraser et al. 1999) and, as a result, often occurs at low densities and widely scattered across the landscape. It ranges far from the nest site during foraging trips, though, and can be found hunting prey such as medium-sized birds and mammals along forest edges and in riparian areas (Fraser et al. 1999). It is likely that this species occurs sporadically in the ERRPCA, although there is no significant amount of suitable nesting habitat present. Any individuals that frequent the park would probably occur during the spring or fall migratory periods that were not sampled during this study.

Peregrine Falcon, ***anatum*** **subspecies** (*Falco peregrinus anatum*)

This subspecies is Red-listed in British Columbia, where it is restricted as a breeding bird to southeastern Vancouver Island, the Gulf Islands, the Lower Mainland, and a few scattered aeries across the southern interior (Fraser et al. 1999). Fraser et al. (1999) list the population of southeastern Vancouver Island and the Gulf Islands as containing only 7 pairs, although this

number has likely increased slightly during the past 8 years due to significant recovery efforts. This subspecies was formerly much more common and widespread in British Columbia and across much of North America, but massive population declines in association with pesticide contamination reduced the number of breeding pairs to a fraction of what formerly occurred. This raptor nests on cliffs and ledges in southwestern B.C., usually near areas with large bird populations that act as a prey source (Fraser et al. 1999). There is no breeding habitat and only limited foraging habitat available inERRPCA. However, occasional birds may occur in the park during foraging sessions from nesting areas in the Gulf Islands, and occasional birds (mostly juveniles) may occur during post-breeding dispersal or during fall migration.

Peregrine Falcon, *pealei* subspecies (*Falco peregrinus pealei*)

This subspecies designation refers to the dark forms of Peregrine Falcon that inhabit coastal regions of northwest Washington, British Columbia, and southern Alaska west to the Aleutian Islands (White et al. 2002). This subspecies of Peregrine Falcon is largely a bird of marine areas of the Pacific coast, usually nesting atop steep cliffs in close association with seabird colonies that provide the bulk of its diet (White et al. 2002). Migratory birds, though still largely associated with coastal areas, will range farther inland to areas where shorebirds and waterfowl congregate, such as lakes and agricultural fields. Since these prey species, particularly waterfowl, are known to inhabit the areas aroundERRPCA it is likely that the area could provide habitat for this subspecies of the Peregrine Falcon on occasion, particularly during the migratory periods in spring and fall.

Sandhill Crane (*Grus canadensis*)

Although not known as a breeding species on southern or central Vancouver Island, a large migration of Sandhill Cranes regularly passes through the region in spring and, especially, fall (Campbell et al. 1992; Tacha et al. 1992). During migration, most Sandhill Cranes pass through southern Vancouver Island without stopping, heading instead for large stopover sites in Alaska, Washington, and Oregon (Tache et al. 1992). Occasionally, however, particularly during inclement weather conditions or during the night, small groups of individuals will spend some time on the ground where they require large, open habitats such as meadows, fields, and estuaries for feeding and resting (Tacha et al. 1992). It is expected that flocks of Sandhill Cranes regularly pass over ERRPCA during migration, but few if any likely stop in the park due to a lack of suitable open habitats.

Band-tailed Pigeon (*Patagioenas fasciata*)

This shy, forest-dwelling pigeon is widespread throughout Vancouver Island and was recorded during both the June and August survey sessions in the park, where it almost certainly breeds. It generally frequents low to middle elevation coniferous and mixed forests in our region during the breeding season, especially in areas with an abundance of fruiting shrubs, with some flocks moving to higher elevations in late summer and fall in preparation for migration (Keppie and Braun 2000). The Coombs and Errington area is also known to support small numbers of Band-tailed Pigeons during the winter months, although they are seen only rarely. The depressed populations of this species in the Pacific Northwest, and its subsequent placement on the provincial blue list, is largely the result of overharvest during the 1900s; harvest of this species in British Columbia has been closed since the 1990s as a result of these declines (Keppie and Braun 2000) and, in many areas, populations have rebounded significantly.

Western Screech-Owl (*Megascops kennicottii kennicottii*)

This coastal subspecies of the Western Screech-Owl occurs along the mainland coast of British Columbia, as well as on Vancouver Island and south through much of the western United States and northern Mexico (COSEWIC 2002a). In the Pacific Northwest, this species is associated with

a variety of low-elevation forests (coniferous, mixed, deciduous), especially in more open forest types and in riparian woodlands (COSEWIC 2002a). It is dependent on an abundance of snags that provide a suitable location for nest cavities (COSEWIC 2002a). Although it was formerly common throughout Vancouver Island, and historically the most common small owl on the southeast coast of the island, populations of the Western Screech-Owl have plummeted during the past 20 years from Campbell River south to Sooke (COSEWIC 2002a). The species is still relatively common on northern and western Vancouver Island, and near or at historic levels along the mainland coast north of Vancouver Island, but a combination of development, forestry practices, and (most importantly) heavy predation by the recently-arrived Barred Owl (*Strix varia*) have contributed to massive declines throughout the Georgia Depression (COSEWIC 2002a). Nonetheless, this species still may occur in the park since much suitable habitat occurs, although the sighting of Barred Owls in the park during the August field session casts some doubt on the ability of the park to provide sanctuary for this species. Targeted nocturnal owl surveys in early spring would be required to determine if Western Screech-Owls are present inERRPCA and to provide an estimate of the density of predatory Barred Owls in the area.

Northern Pygmy-Owl (*Glaucudium gnoma swarthi*)

This subspecies of the Northern Pygmy-Owl, which is noticeably darker than other subspecies, is endemic to Vancouver Island and occurs nowhere else in the world (Darling 2003). It is generally uncommon throughout the island, from low elevation forests to subalpine areas, and occurs in a wide variety of habitat types including dense old-growth coniferous forests, open woodlands, young regenerating forests, and even recent clearcuts (Darling 2003). The species occasionally ventures into suburban habitats during the winter and is sometimes drawn to bird feeding stations where it preys on the small songbirds that are attracted by the station (J. Fenneman, pers. comm.). Some localized declines of this subspecies have been noted on Vancouver Island, such as in the Comox area, and overall island-wide declines are suspected (Darling 2003). This species is still regularly detected in the Parksville-Qualicum area, however, and likely occurs inERRPCA on occasion.

Purple Martin (*Progne subis*)

The Purple Martin is one of the greatest conservation success stories in British Columbia. Formerly a regular and widespread breeder throughout the Georgia Depression, competition with introduced European Starlings (*Sturnus vulgaris*) reduced the provincial population to a low of 3-5 pairs by the mid-1980s (J.C. Finlay, pers.comm.). Through an innovative nest box program, the provincial population now numbers at around 600 pairs (J.C. Finlay, pers.comm). The species is still limited in distribution by the availability of human-created nesting colonies, the closest one toERRPCA being at Nanoose Bay, but these birds wander widely during hunting forays and, as a result, were detected at two locations in the park during the June field session. Nesting colonies occur over sheltered marine waters where nest boxes are placed atop poles, often in association with wharves, docks, or other structures. Foraging birds feed on flying insects over wetlands, open meadows, and above the forest canopy, often far from the nesting colonies. This species likely occurs widely throughout the park during the breeding and migratory periods, feeding above both forested and open habitats.

Barn Swallow (*Hirundo rustica*)

One of the most widespread bird species in the world, occurring on all continents except Antarctica, this species is common throughout most of North America (Brown and Brown 1999). This species nests largely on man-made structures such as buildings, barns, and bridges, although it will also place its mud nest in natural locations such as cliffs (Brown and Brown 1999). Foraging birds occur in a wide range of open habitats, including agricultural areas, beaches, meadow, estuaries, ponds, and lakes. Although the species has been increasing in the United

States since the 1960s, populations throughout Canada have been declining during the same period (Brown and Brown 1999). Some sources have suggested that these northern populations are more affected by adverse weather conditions and therefore show a greater degree of population fluctuation than populations to the south (Brown and Brown 1999). Nonetheless, the Barn Swallow remains a common summer inhabitant of southern Vancouver Island and, although it was not recorded during the 2007 field sessions, certainly occurs inERRPCA during the breeding and migratory seasons.

Pine Grosbeak (*Pinicola enucleator carlottae*)

Most individuals of this dark coastal subspecies of the Pine Grosbeak breed on the Queen Charlotte Islands, although localized breeding may occur on the northern mainland coast (Adkisson 1999) and northern Vancouver Island (G. Monty, pers. comm.). This species requires open boreal or montane/subalpine coniferous or mixed forests for breeding, with coastal populations often occurring in areas of alder (*Alnus* sp.), especially above treeline (Adkisson 1999). Wintering individuals wander widely, however, and are often found in parks, wooded suburban areas, lowland forests, and other habitats not frequented by breeding birds, particularly where there is an abundance of food plants such as mountain-ash (*Sorbus* sp.), ash (*Fraxinus* sp.), and maple (*Acer* sp.) (Adkisson 1999). This species is rarely encountered on southern Vancouver Island at any time of year, although the number of individuals of this highly irruptive species recorded in the region does vary significantly from year-to-year. This species has been occasionally recorded from the Parksville-Qualicum area in winter, although its presence in the region is considered marginal. It is possible that the subspecies recorded in the region was not *carlottae* but instead was a more widespread interior subspecies such as *montanus*, or even the subspecies *flammula* that breeds in southeast Alaska and northwest British Columbia; however, since the subspecific identity of the birds was not determined, they are assumed to have possibly belonged to the subspecies *carlottae*.

Red-legged Frog (*Rana aurora*)

This blue-listed species occurs widely, but locally, in southwestern BC, including Vancouver Island (Matsuda et al. 2006). It breeds in shallow forest pools, slow woodland streams, and along the shallow edges of forested lakes and ponds (Matsuda et al. 2006). It wanders widely as an adult, often venturing far from water into moist, forested upland habitats where it feeds on insects and other small invertebrates (Matsuda et al. 2006). This species was recorded at a number of locations in the park during the survey and is thought to breed in the wetlands of the property.

Western Toad (*Bufo boreas*)

This widespread and formerly common species has recently undergone significant population reductions throughout its Canadian and United States range, and is now classified as a species of Special Concern by COSEWIC (COSEWIC 2002b). Populations on the southwest coast of British Columbia, including Vancouver Island, appear to be experiencing some of the sharpest declines in the country (COSEWIC 2002b). Although a single cause for the decline has not been discovered, a number of causes such as habitat loss and subsequent population fragmentation, disease, and deformities (COSEWIC 2002b). This species requires small pools or ponds, preferably with a sandy bottom, for breeding and wanders widely in upland areas as an adult, returning to traditional breeding ponds to lay their eggs (Matsuda et al. 2006). Although it was not documented in the park during 2007, there are suitable habitats in ERRPCA for Western Toads and the species may be present in very small numbers.

Cutthroat Trout (*Oncorhynchus clarki clarki*)

This trout is widespread as a native species throughout much of northwestern North America, and occurs in both resident freshwater and migratory anadromous populations (Froese and Pauly

2007). It is restricted to watersheds which drain into the Pacific Ocean from south-central Alaska to northern California (Froese and Pauly 2007; BC CDC 2007), and is usually found within 150 km of the ocean (BC CDC 2007). It typically occurs in small, low gradient coastal streams and estuarine habitats with a water temperature below 18°C (BC CDC 2007). Cutthroat trout occur commonly throughout the Englishman River system (Gaboury 2003).

Dolly Varden (*Salvelinus malma*)

This species of char is native to the northwest coast of North America from Alaska south to Washington (Puget Sound), as well as in the coastal areas of northeastern Asia, and occurs both as resident freshwater populations and as anadromous populations (Froese and Pauly 2007). This species is still widespread in coastal B.C., including Vancouver Island, but has seen some populations impacted by urbanization, dam construction, industrial activity, road building, forestry practices, and over-fishing. Dolly Varden are found upstream of the anadromous barrier in the Englishman River system (Higman et al. 2003).

Invertebrates

Western Pine Elfin (*Callophrys eryphon sheltonensis*)

The coastal subspecies of this small butterfly is restricted in Canada to southeastern Vancouver Island, the Gulf Islands, and the Lower Mainland. It is dependent on Shore Pine (*Pinus contorta* var.*contorta*) and, to a lesser extent, introduced ornamental pines as a larval food plant (Guppy and Shepard 2001). Shore Pine has a localized distribution of southern Vancouver Island and, not surprisingly, so does the Western Pine Elfin. This species can occur anywhere where its larval food plant grows, however, and its presence in outer coastal areas of western Washington indicates that it can occur in habitats that are away from the dry, rainshadow zone where it has been documented on Vancouver Island. Shore Pines were documented from several areas ofERRPCA, including one large area west of the gravel pit, and targeted searches during the spring flight period of this butterfly may reveal one or more populations in the park.

Common Wood-nymph (*Cercyonis pegala incana*)

This Red-listed subspecies of the Common Wood-nymph is restricted in British Columbia to eastern Vancouver Island (Nanaimo north to Campbell River) and several locations on the Sunshine Coast of the southern mainland coast (Guppy and Shepard 2001). It is a species of grassy, often weedy habitats such as roadsides, powerline rights-of-ways, old fields, and other open sites. The flight period of this species is in the late summer, from late July or early August into September (Guppy and Shepard 2001). At least three individuals of this butterfly were encountered in the park during the August field session, and more extensive targeted searches of appropriate habitat (i.e., the powerline right-of-way) would likely yield additional individuals.

Western Pondhawk (*Erythemis collocata*)

This medium-sized, brightly coloured dragonfly is distributed locally in southern BC, where it is restricted to southeastern Vancouver Island, the southern mainland coast, and one population in the Okanagan Valley (Cannings 2002; Klinkenberg 2006). It is characteristically found in and around ponds and marshy lakes, particularly in association with floating plants (Cannings 2002). Although it is distributed locally within the dry southeastern portion of the island, recently discovered populations away from this region (i.e., Courtenay) (J. Fenneman, pers. comm.) suggest the possibility of a wider distribution in moister climates, such as those of ERRPCA.

Blue Dasher (*Pachydiplax longipennis*)

The Blue Dasher, a relatively small dragonfly, is locally distributed in south coastal British Columbia and the Okanagan Valley (Cannings 2002). Although it is most abundant in the drier

climates of southeastern Vancouver Island, the species has also been recorded on northern and western portions of the island in decidedly wetter and cooler climates (Klinkenberg 2006). This species inhabits a wide variety of freshwater habitats but is most common in areas with an abundance of emergent vegetation (Cannings 2002). The Blue Dasher is considered a potential inhabitant of the ERRPCA based on its presence in areas.

Autumn Meadowhawk (*Sympetrum vicinum*)

This small, red dragonfly is uncommon and local across southern British Columbia, including areas of southern Vancouver Island (Cannings 2002; Klinkeberg 2006) where the distribution of populations is closely correlated with the warm, dry southeastern lowlands (Klinkenberg 2006). This species breeds in ponds, slow streams, and lakes where there is prolific emergent vegetation (Cannings 2002). Since mapped occurrences of this species approach the Englishman River (Klinkeberg 2006), and since appropriate habitat is known to exist in the park, it is suspected that the area may harbour populations of this uncommon dragonfly.

Western Thorn (*Carychium occidentale*)

This tiny land snail is restricted to coastal habitats from southern Vancouver Island and the Lower Mainland south to northern California as well as inland in Washington and Idaho (Forsyth 2004). Within this region, it occurs sporadically in the leaf litter of rich, relatively undisturbed low-elevation forests, usually in areas with abundant Bigleaf Maple (*Acer macrophyllum*) in the overstory (Forsyth 2004). The forests inhabited by this snail in British Columbia all contain a deep, rich, moist litter layer and are not subjected to annual flooding (BC CDC 2007). The effects of logging practices and human development on these forests on Vancouver Island has likely impacted populations of Western Thorn on Vancouver Island and this species is on the provincial blue list as a result (BC CDC 2007). Although the nearest known populations are in the Gulf Islands, the Englishman River region contains areas where Bigleaf Maple grows in association with other tree species and, as such, may contain small populations of this rare snail.

Evening Fieldslug (*Deroceras hesperium*)

This rare slug is known in Canada from only a single historical (1887) specimen from Comox on eastern Vancouver Island (BC CDC 2007). Within its native range, which extends south along the coast to Oregon, it is characteristic of moist forests in the coastal fog-belt as well as mature Douglas-fir forests, the destruction of which may have resulted in significant population reductions on Vancouver Island (BC CDC 2007). Specific habitats inhabited by this species in the Pacific Northwest include low-elevation mixed forests with high humidity and continuous understory cover in Washington, although the general ecology of this localized species is very poorly known throughout its range (Forsyth 2004; BC CDC 2007). Although this species is certainly extremely rare, or possibly extirpated, on Vancouver Island, appropriate habitat remains in the Englishman River region and, since terrestrial molluscs have been incompletely surveyed in the area, it is possible that this species will occur in the watershed.

Pacific Sideband (*Monadenia fidelis*)

This large coastal snail, which occurs in southeast Alaska as well as along the Pacific coast of the Pacific Northwest (Forsyth 2004), is restricted in British Columbia to Vancouver Island, the Gulf Islands, and the Lower Mainland (BC CDC 2007). This species inhabits a wide range of habitat types, including coniferous, mixed, and deciduous forests, open woods, and even open grassy sites (Forsyth 2004). Although fairly common within its BC distribution, this snail occurs largely in areas where there is considerable pressure on its remaining haunts for urban development. This species was recorded in many areas of the park during both the June and August field sessions and appears to have a large and stable population in the area.

Threaded Vertigo (*Nearctula* sp.1)

This species is currently undescribed and, to date, has been found at only 2 locations in southwest BC (eastern Vancouver Island [Union Bay] and the Sunshine Coast [Egmont]) (BC CDC 2007). Elsewhere, this taxon has been recorded south along the Pacific coast to central California (Forsyth 2004). The Threaded Vertigo is restricted to rich, continually moist, mature or old-growth deciduous and mixed forests where it occurs within the leaf litter (Forsyth 2004; BC CDC 2007). Clearcut logging practices have undoubtedly impacted this species because of its dependence on moist, mature forests (BC CDC 2007). Although it has not been detected in the vicinity of the Englishman, this tiny species is easily overlooked and, since targeted surveys have not occurred in the watershed and since appropriate habitat exists, it is considered at least potentially possible that this species inhabits the watershed.

Broadwhorl Tightcoil (*Pristiloma johnsoni*)

This small, rare snail is known from only 3 sites in southwest British Columbia, including 2 locations on Vancouver Island (BC CDC 2007), and also ranges south along the coast to Oregon (Forsyth 2004). This species occurs sporadically throughout its range, where it can be found locally in the leaf litter of mature or old-growth coniferous, mixed, or deciduous forests from low to subalpine elevations (Forsyth 2004; BC CDC 2007). This species may exist in small numbers in mature forests of the Englishman River watershed, which has not been adequately surveyed for terrestrial mollusks.

Scarletback Taildropper (*Prophysaon vanattae*)

More common and widespread than the previous species, the Scarletback Taildropper is restricted in British Columbia to Vancouver Island and the upper Fraser River Valley (Chilliwack) (BC CDC 2007). The species also ranges south along the coast to northwest Oregon (Forsyth 2004). It is largely an arboreal species and is found primarily on the moss-covered branches of trees and shrubs of coastal mixed forests (Forsyth 2004) and is susceptible to being impacted by logging practices (BC CDC 2007). It is considered possible (perhaps likely) that this slug occurs in ERRPCA based on the species' distribution and the habitats that are present within the park.

Pacific Vertigo (*Vertigo andrusiana*)

This very small snail, which ranges south to Oregon and California, is known in British Columbia from only 4 sites, all on the Saanich Peninsula (3 sites) or Gulf Islands (Mayne Island) (BC CDC 2007). It is a species of coastal lowland forests throughout its range, and its localized distribution in British Columbia places it in danger of significant habitat loss (BC CDC 2007). It is possible that populations of this easily overlooked species occur more widely than the few confirmed records indicate, and it is therefore considered a potential candidate for occurring in ERRPCA.

Black Gloss (*Zonitoides nitidus*)

This snail is known in BC from only 8 occurrences in the Okanagan Valley, Lower Mainland, and Vancouver Island (BC CDC 2007), although it ranges widely throughout the northern hemisphere (Forsyth 2004); some authorities have suggested that Pacific coast populations may be introduced (Forsyth 2004). This species lives under wood, rocks, and vegetation in wet, marshy habitats and along rivers, lakes, sloughs, and ponds (Forsyth 2004). The widespread alteration and destruction of wetlands in British Columbia places this species in direct danger of habitat loss (BC CDC 2007). Appropriate habitat exists throughout ERRPCA, however, and it is possible that the species exists there.

River Habitat

Four habitat assessments were completed recently that pertain to the Englishman River mainstem. Overview assessments of channel condition (nhc 2002) and fish and fish habitat (Lough and Morley 2002) were conducted as part of the Englishman River Recovery Plan implementation process (Bocking and Gaboury 2001). Weyerhaeuser conducted a watershed assessment to identify impacts of past forest development activities on the condition of the streams and to provide guidance for a Prescription Team to develop management strategies for Weyerhaeuser's future forest operations in the Englishman River watershed (Higman et al. 2003). A protection and restoration strategy was also developed for the anadromous section of the river under the auspices of the Englishman River Watershed Recovery Plan and the Pacific Salmon Endowment Fund Society (Gaboury 2005). The strategy prioritizes activities along the mainstem to protect and restore, over the long term, those processes of the watershed and elements of the ecosystem that salmon and other native fishes require for survival.

Lough and Morley (2002) and nhc (2002) concluded that the mainstem channel is considered to be overwidened with a limited number of high quality rearing pools, particularly in the section of mainstem channel bordering the ERRPCA. The current status of the anadromous section of the Englishman River is regarded as being in relatively poor condition. The authors indicated that although the river is showing signs of recovery in some reaches (i.e., evidenced by re-vegetation of the gravel bars), excessive bank erosion and lateral channel migration along with poor pool-riffle development continues to plague the river. These factors lower fresh water survival of salmonids and the quality of their rearing and spawning habitats.

Weyerhaeuser's Englishman River watershed assessment (Higman et al. 2003) stated that the majority of headwater reaches lack LWD that would normally retain sediment and that this will likely be a long-term problem as the riparian forest is too young for new LWD recruitment. They confirm that as a result of logging, accelerated transport of sediment from upstream reaches has increased deposition below the anadromous barrier.

The large floods in 1980-1983 and 1990 resulted in significant changes to the stream channel; channel destabilization and infilling with fine material (Craig Wightman, Bob Hooton, Dave Clough, pers. comm.). These flows likely resulted in channel widening, riparian damage, and large-scale reduction in large woody debris (LWD). The river is still in a state of recovery from these events.

An analysis of the changes in mainstem channel pattern, length, width and gradient that have occurred over the past 50 years was completed by Gaboury (2005; Figure 4). Based on an analysis of aerial photos for the anadromous portion of the mainstem, the reach bordering the ERRPCA showed the greatest lateral migration and change in channel length. The current channel length (2002) in this reach is about 727 m or 20% shorter than it was in 1949. Most of the shortening in this reach occurred by 1968. The loss of two large and two small meanders accounts for much of the shortening that occurred within this reach. Shortening of the channel has decreased sinuosity and increased channel gradient and has contributed to increased streambed and bank erosion within this reach. Changes in sinuosity and gradient have been much less dramatic in the other reaches downstream of the anadromous barrier.

The greatest change in average channel width was evident in the reach bordering the ERRPCA. Average channel width has increased from 44 m in 1949 to 82 m in 1968 m, an increase of 37 m. In 2002, the width had decreased slightly to 72 m. As average width measurements include gravel bars, the increase in average width in the ERRPCA reach is primarily due to lateral migration of the channel. For example, erosion at primarily three meander bends caused the channel to shift laterally from 60 to 80 m between 1984 and 1996. The instability evident in this reach is of

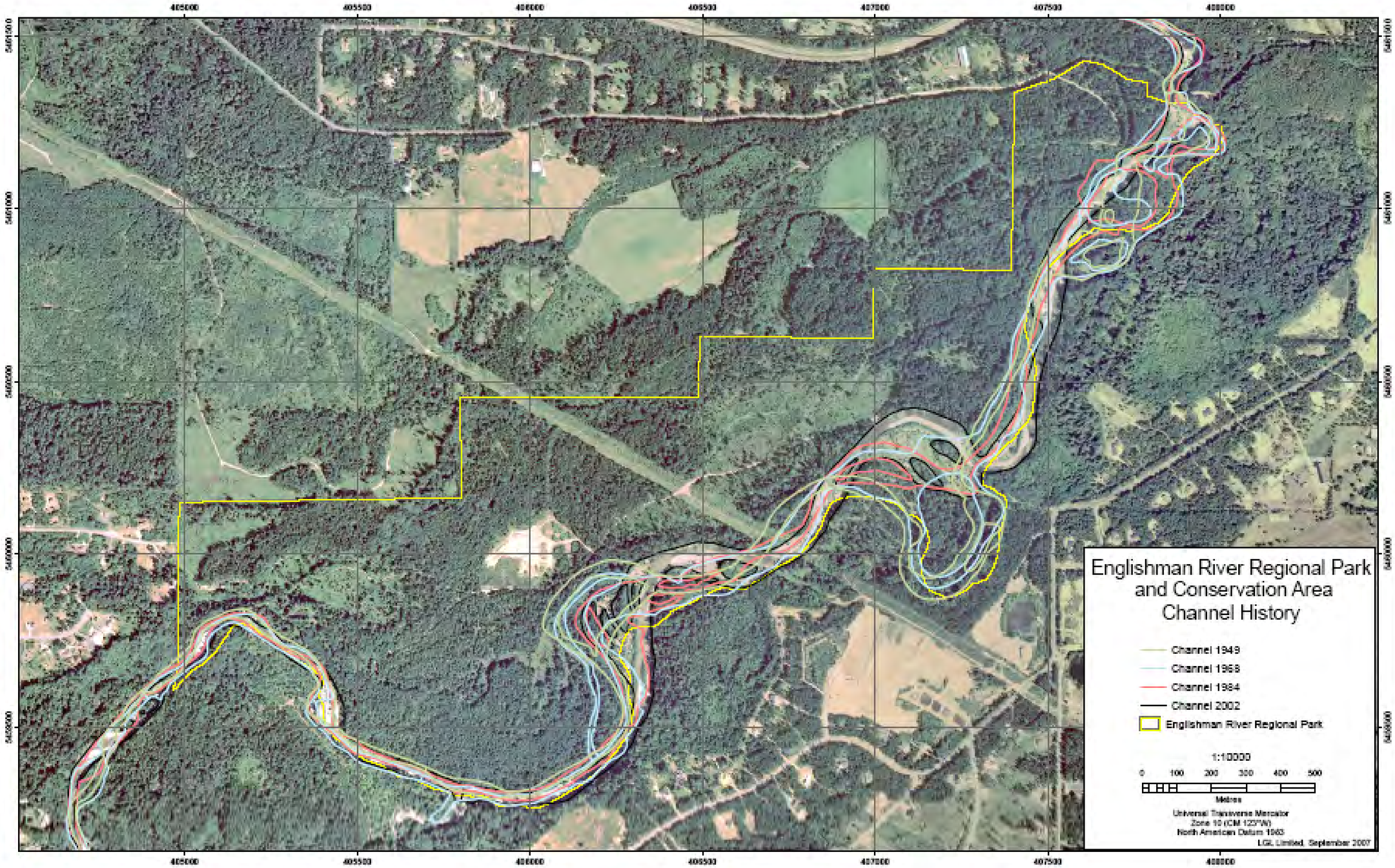

Figure 4. History of mainstem channel positions within ERRPCA.

concern as this reach is a primary spawning and rearing area for anadromous fish within the Englishman River. As such, the ERRPCA mainstem reach was the zone where much of the future restoration effort was focused (Gaboury 2005). For the other reaches within the anadromous zone, the average channel widths have not varied greatly since 1949.

Fish Populations

The Englishman River supports significant populations of salmon. Chum is the dominant species followed by coho. Steelhead, cutthroat, Chinook, pink and sockeye are also present. The anadromous[1] section extends up to Englishman River falls, a distance of about 16 km from the mouth. Resident game species include Dolly Varden and rainbow trout. Table 4 shows when the various life stages for each anadromous salmonid species are present within the Englishman River and estuary.

The entire mainstem reach within ERRPCA is the primary spawning area for all species of anadromous fish within the Englishman River, including chum, coho, Chinook and pink salmon and steelhead (Figure 5). The C.W. Young Channel is used for spawning by the same species as found in the mainstem as well as cutthroat trout. Coho and chum salmon and cutthroat trout use the MB side channel for spawning. The mainstem provides good quality rearing habitat for coho and steelhead while the side channels provide good to excellent rearing habitat for coho, steelhead and cutthroat trout. The mainstem within the ERRPCA has been the primary area of focus for aquatic and riparian restoration efforts over the past decade.

Table 4. Life history timing for anadromous salmonids within the Englishman River and estuary.

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Coho	Eggs	Eggs	Eggs								Eggs	Eggs
	Fry	Fry	Fry	Fry	Fry	Fry	Fry	Fry	Fry	Fry	Fry	Fry
				Smolts	Smolts	Smolts						
									Adults	Adults	Adults	Adults
Chinook	Eggs	Eggs	Eggs								Eggs	Eggs
		Fry	Fry	Fry	Fry							
				Smolts	Smolts	Smolts						
								Adults	Adults	Adults		
Pink	Eggs	Eggs	Eggs								Eggs	Eggs
			Fry	Fry								
									Adults	Adults		
Chum	Eggs	Eggs	Eggs								Eggs	Eggs
			Fry	Fry	Fry	Fry						
									Adults	Adults	Adults	
Sockeye	Eggs	Eggs	Eggs								Eggs	Eggs
			Fry	Fry	Fry	Fry						
					Smolts	Smolts						
							Adults	Adults	Adults	Adults		
Steelhead		Eggs	Eggs	Eggs								
	Fry	Fry	Fry	Fry	Fry	Fry	Fry	Fry	Fry	Fry	Fry	Fry
				Smolts	Smolts	Smolts						
	Adults	Adults	Adults	Adults								Adults

Eggs | Fry | Smolts | Adults

[1] Anadromous defined as fish that breed in freshwater but live their adult life in the sea

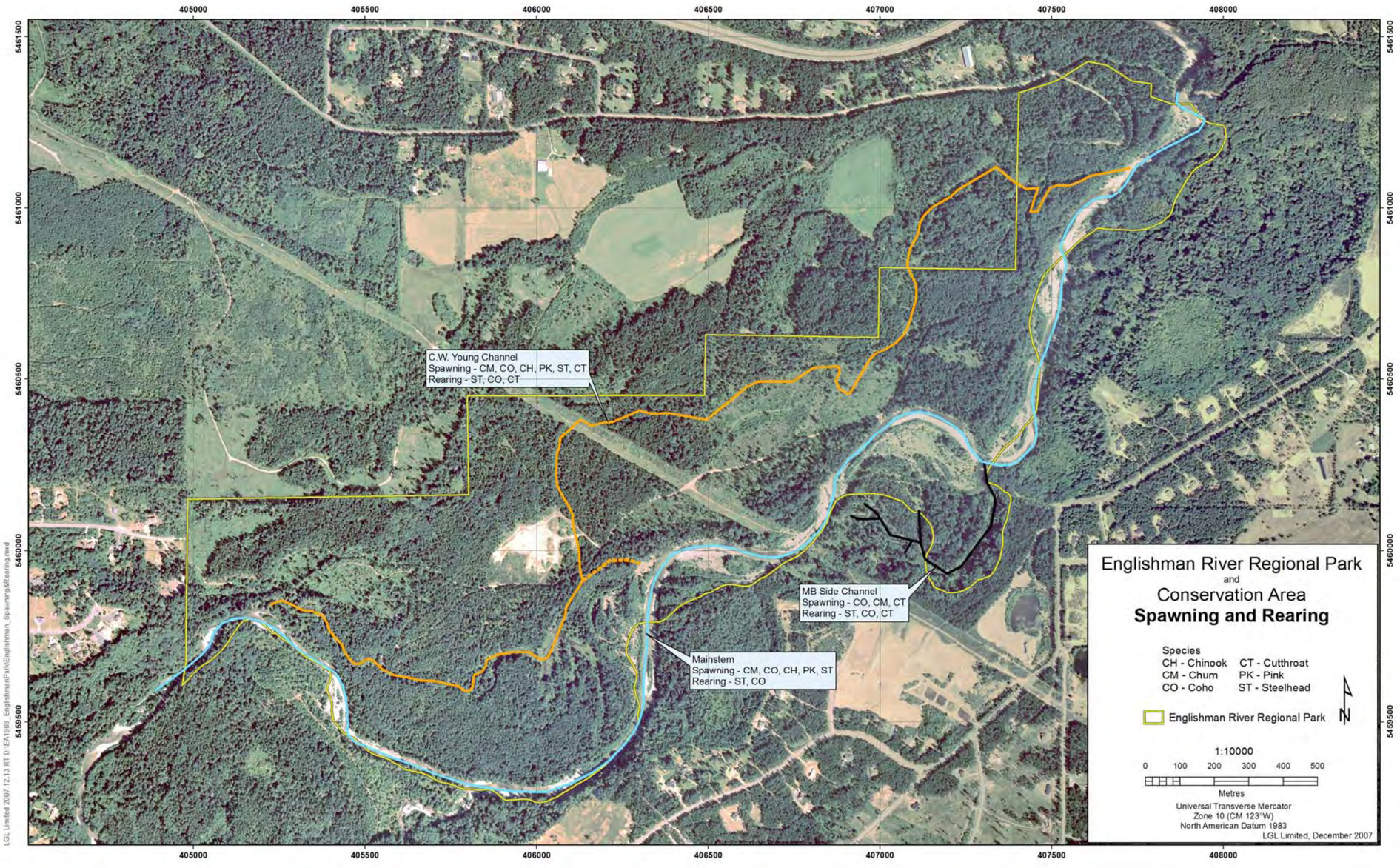

Figure 5. Map of ERRPCA showing distribution of salmon and trout species that use mainstem and side channel habitats for spawning and rearing.

Adult Abundance

Coho

Escapement records for salmon in the Englishman date back to 1953. Prior to 2000, the historical maximum estimate for coho was 3,500 spawners recorded in 1957 (Figure 6). Since then, escapements have reached 5,280 in 2000 and then 8,000 in 2001. Escapement in the most recent count (2005) was 3,700.

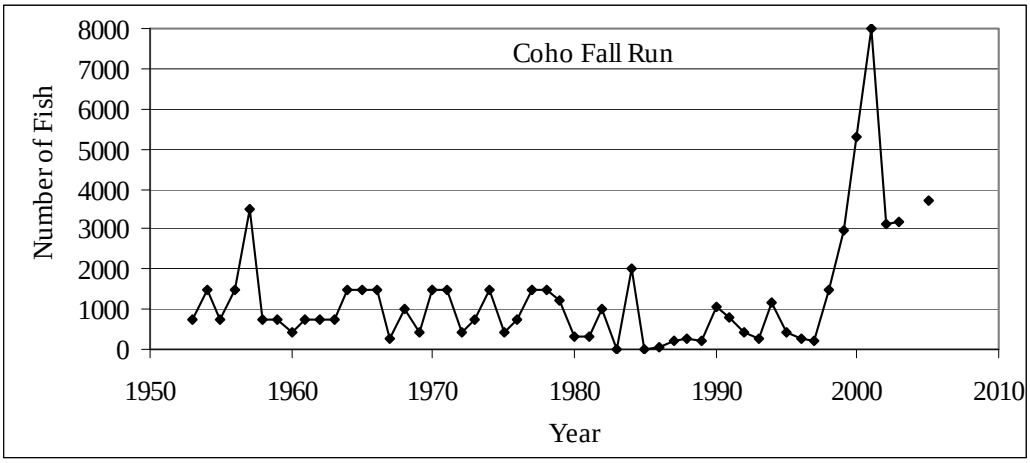

Figure 6. Coho escapements to the Englishman River. (DFO database - http://www-heb.pac.dfo-mpo.gc.ca/maps/maps-data_e.htm).

Steelhead

Winter-run steelhead salmon abundances have declined considerably since 1985 (Figure 3). Historical abundances of wild steelhead ranged from 500 to 2,000 adult returns to the river. During this period, Englishman River steelhead were enhanced and it is difficult to discern the population size of the wild stock. Current abundances of steelhead in the Englishman are at critically low levels (Figure 7; Wightman et al. 1998).

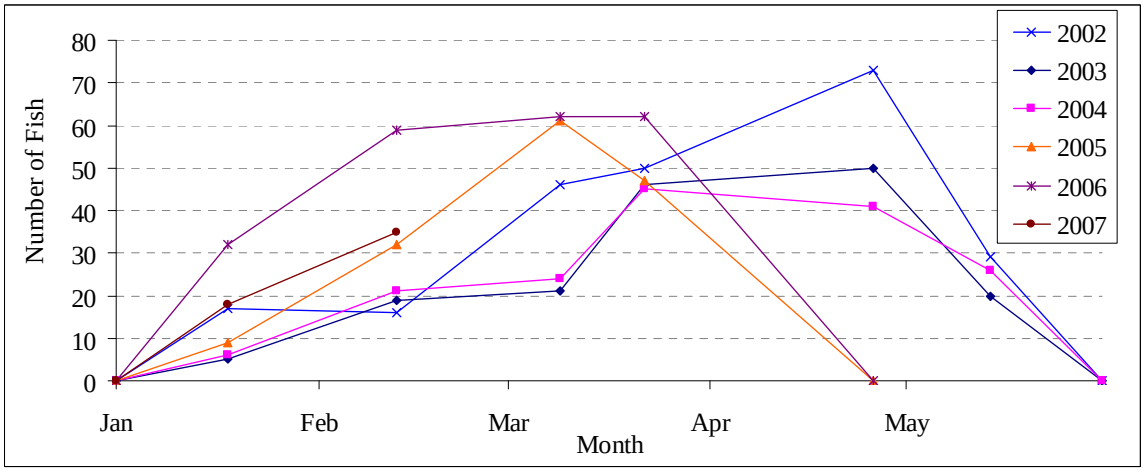

Figure 7. Number of steelhead observed during snorkel surveys in Englishman River by BC Conservation Foundation staff. Data provided by J. Craig, BCCF.

Chum

Chum escapements to the Englishman were as high as 15,000 historically, then declined to as low as 200 in 1987 (Figure 8). Over the past 5 years, the number of chum has been increasing to a record return in 2003 of 34,800 chum. Coho and chum salmon abundances appear to have tracked each other fairly closely.

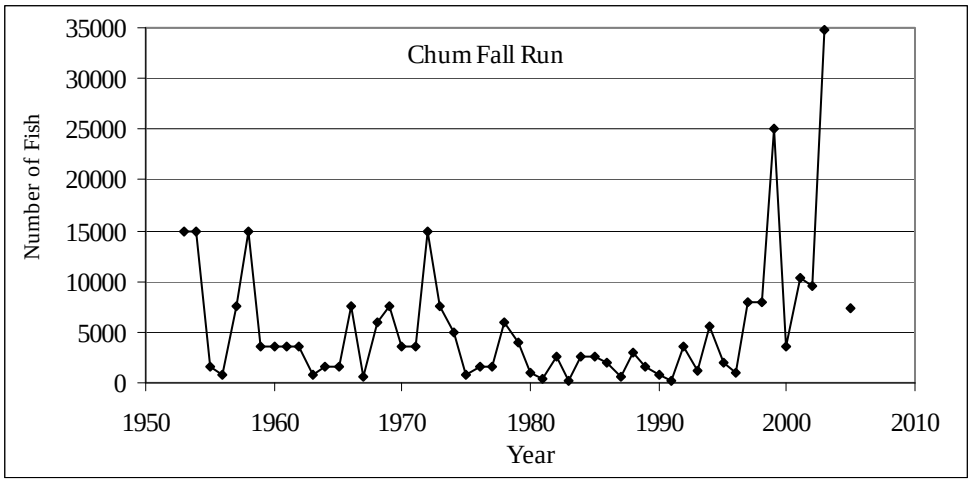

Figure 8. Chum escapements to the Englishman River (DFO database - http://www-heb.pac.dfo-mpo.gc.ca/maps/maps-data_e.htm).

Other Salmon

Historically, abundances of pink (Figure 9), Chinook (Figure 10) and sockeye have always been lower than chum or coho (<500 average). Englishman River pink salmon declined precipitously from 1958-1962 to near extinction levels. In 1992, attempts were made to re-establish the pink run in the Englishman River by transferring eyed eggs from the Quinsam River hatchery. Recently, pink and Chinook escapements have increased significantly with 13,500 pinks and 2,900 Chinook enumerated in 2001. Chinook salmon in the Englishman are now predominantly of Big Qualicum River stock due to enhancement efforts over the past 12 years. There is a small number of stream-type sockeye in the Englishman River but little is known about this population.

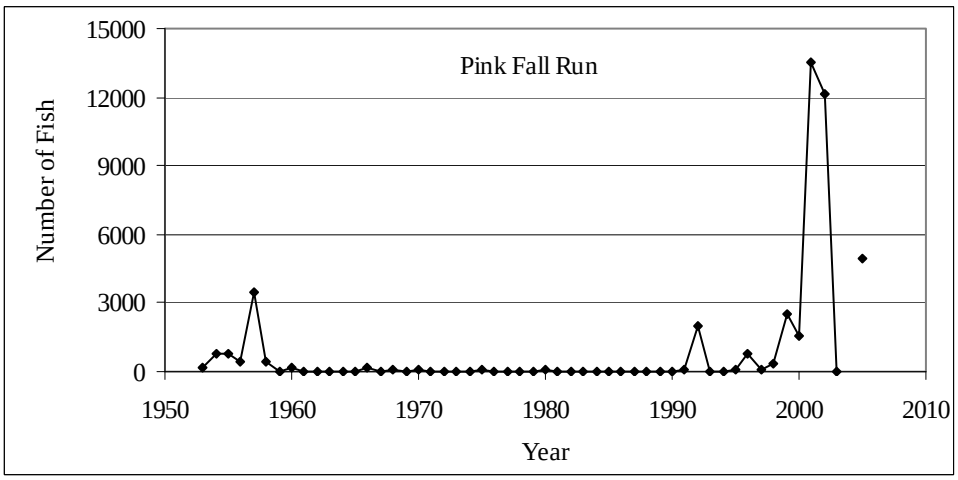

Figure 9. Pink salmon escapements to the Englishman River (DFO database - http://www-heb.pac.dfo-mpo.gc.ca/maps/maps-data_e.htm).

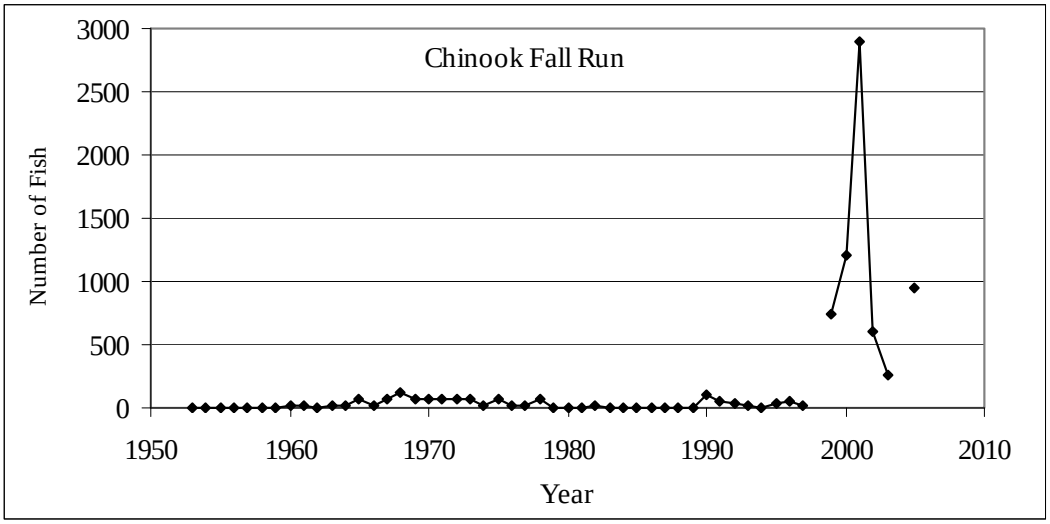

Figure 10. Chinook escapements to the Englishman River (DFO database - http://www-heb.pac.dfo-mpo.gc.ca/maps/maps-data_e.htm).

Juvenile Abundance

Coho and rainbow trout rearing have been confirmed through electrofishing surveys by Lough and Morley (2002). From the brief surveys, the reach within the ERRPCA tended to have higher abundances of coho fry while rainbow trout fry were fairly evenly distributed throughout the anadromous section.

Recent monitoring of smolt production from the system in 1998 and 1999 has generated estimates of 27,000 and 46,000 coho smolts, respectively (Decker et al. 2000). Between 17% and 20% of the smolt production came from the two constructed side-channels within the ERRPCA and the remainder came from natural watercourses.

Densities of steelhead fry in the Englishman River (as for many other Vancouver Island streams) appear to be well below predicted levels based on habitat capability (Ptolemy 1993) and abundance data collected during the 1980's when there was relatively high spawner abundance and catch rates.

Habitat Enhancement and Restoration Projects

In the 1990's, two artificial side-channels were constructed by DFO with support of MacMillan Bloedel (MB) and C.W. Young Channel (formerly TimberWest Channel) on the Englishman River to increase the amount of side channel rearing habitat for juvenile coho salmon (Decker et al. 2000) as well as benefit the spawning and rearing of other native salmon and trout species in the watershed. Both of these channels are within the ERRPCA. The C.W. Young Channel is located on the north bank of the river approximately 7 km upstream from the mouth, just below Morison Creek confluence. The MB channel is located about 1 km downstream of the C.W. Young Channel on the south bank.

Each channel consists of approximately 80% rearing and 20% spawning habitat (Decker et al. 2000). The C.W. Young Channel is 1,300 m in length and consists of 17,700 m^2 of habitat. The MB channel is 950 m in length and consists of 6,000 m^2 of habitat. The MB and C.W. Young channels currently account for approximately 20% of the total coho smolt production from the Englishman River.

In 2007, the C.W. Young Channel was lengthened by another 2 km, with the outlet of the channel a few hundred metres upstream of the Top Bridge Crossing. This brings the total length of constructed side channel habitat in the Englishman River to 4,300 m, or 15% of the total length of accessible riverine habitat. A ten year monitoring program to assess the effectiveness of this channel is currently being planned by DFO (M. Sheng pers. comm.).

Since 2003, large woody debris (LWD) and rock groin structures that provide instream cover as well as some bank protection have been constructed by BCCF at two meander bends within the ERRPCA (Figure 11). The bends have shown an accelerated rate of erosion over the past 50 years (Gaboury 2005). Recent monitoring has shown that these structures have been effective at providing good quality rearing and holding habitats for salmonids, and at reducing the rate of channel bank erosion and meander migration.

In addition to the main road through the ERRPCA, several access trails were developed during structure construction (also shown on Figure 11). Although these smaller trails have been deactivated, re-planted and allowed to recover, the trails may be re-developed if future structure maintenance requires access by heavy machinery.

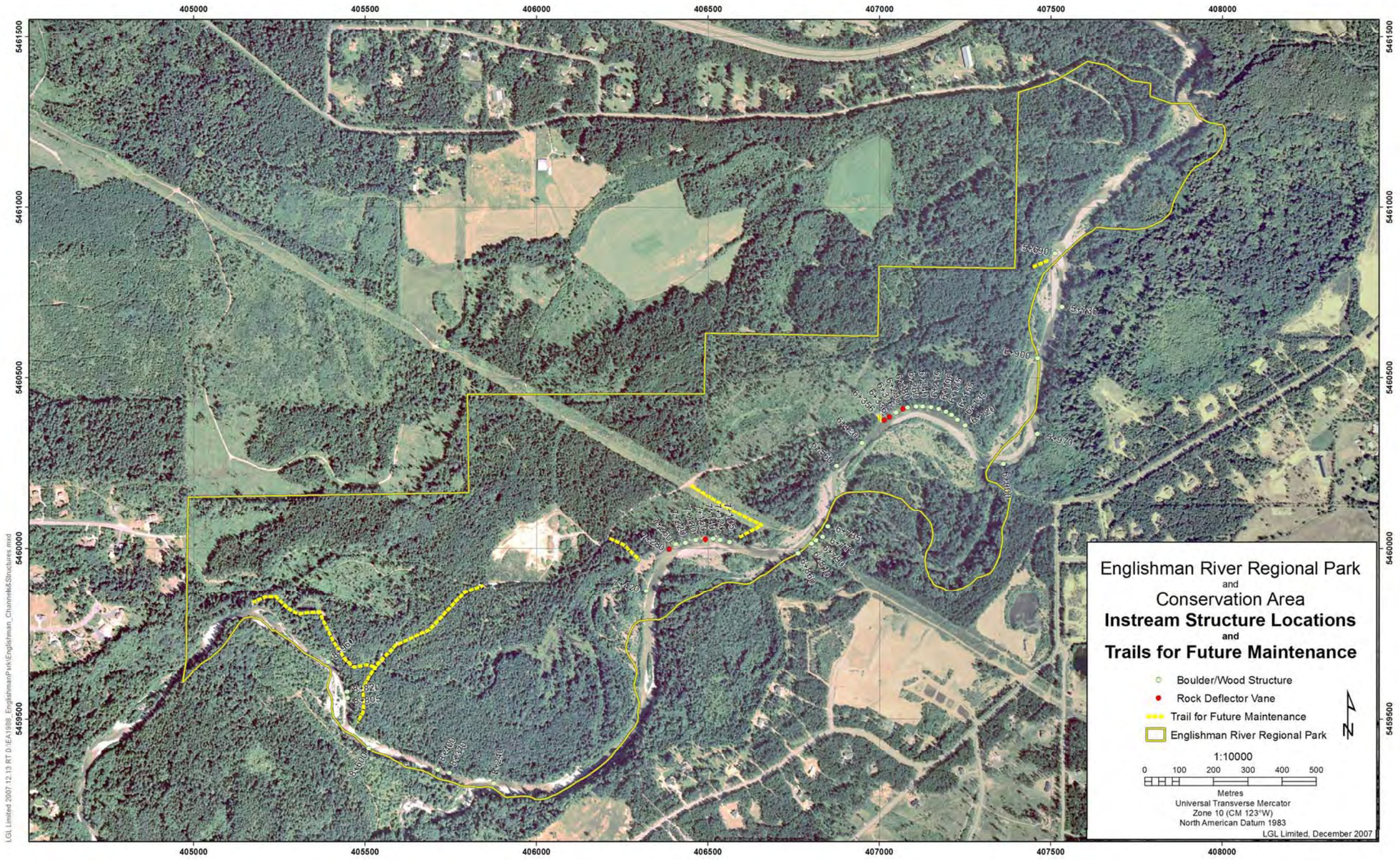

Figure 11. Instream structure locations and trails for future maintenance in the ERRPCA and Conservation Area, 2007.

CONCLUSIONS AND RECOMMENDATIONS

The landscape of the ERRPCA is a mosaic of mature and young forested habitats, wetlands, and disturbed areas. Many of the habitats in the ERRPCA are widespread and common across southern Vancouver Island. Most of the habitats that are present represent either mature forest types or younger regenerating forest types that, if left alone, would mature naturally over the course of several decades. Maintenance of the site as an undisturbed park would allow these habitats to mature into old-growth forest representative of the potential of the CDFmm ecosystem, which, given the rarity of this type of habitat on the Island, would increase the conservation value of the ERRPCA. Nonetheless, even in their current state, these habitats are rich in biodiversity and provide critical habitat to many species that are both threatened and secure in British Columbia.

Prediction of Future Conditions in the Park

If no upland restoration were to occur in the ERRPCA, existing forest types would follow a well-understood and predictable succession with respect to forest age and composition (BC Min. Environment, Lands and Parks and Min. Forests, 1998). Based on our visual assessment of forest age currently, and in the absence of restoration or natural disturbance such as fire, major wind throw and assuming that the Englishman River channel does not migrate markedly from its present location, the majority of the ERRPCA would be mature forest in 20 – 50 years from present. In 100 years, most of the park would be classified as old-growth. Disturbed habitats (e.g., the gravel pit) would develop into a stand of mature and middle-aged forest.

Figure 12 predicts the succession of dominant community types over the next 20, 50, and 100 years in the absence of restoration and major natural disturbance. These processes could provide an excellent opportunity for the public to be exposed to the concept of natural habitat succession. The use of strategically placed interpretive signs along the extensive trail system of the park would be the ideal way to communicate information to the community about the habitats that are present and the ecological processes that are underway in the park.

Susceptibility of Habitats to Human Use

Monitoring the potential impacts of human-caused disturbance on the park's habitats is of particular importance for assessing the overall health and stability of the ecosystems that are present. Some of the identified habitats are especially susceptible to degradation due to increased human traffic and activities while others are less sensitive to these factors (Table 5). Identifying the sensitivity of particular habitat types will inform park officials with respect to the management of ERRPCA as it pertains to human use.

The user groups assessed for potential impacts include hikers, equestrian/horseback riders, and mountain bikers. Impacts associated with unauthorized groups (ATVs, motorcycles) would default to high, not only because ATV's and motorcycles can cause significant modification to the substrate and existing trail systems, but because of the potential negative interactions with hikers, mountain bikers, and equestrian users of the park.

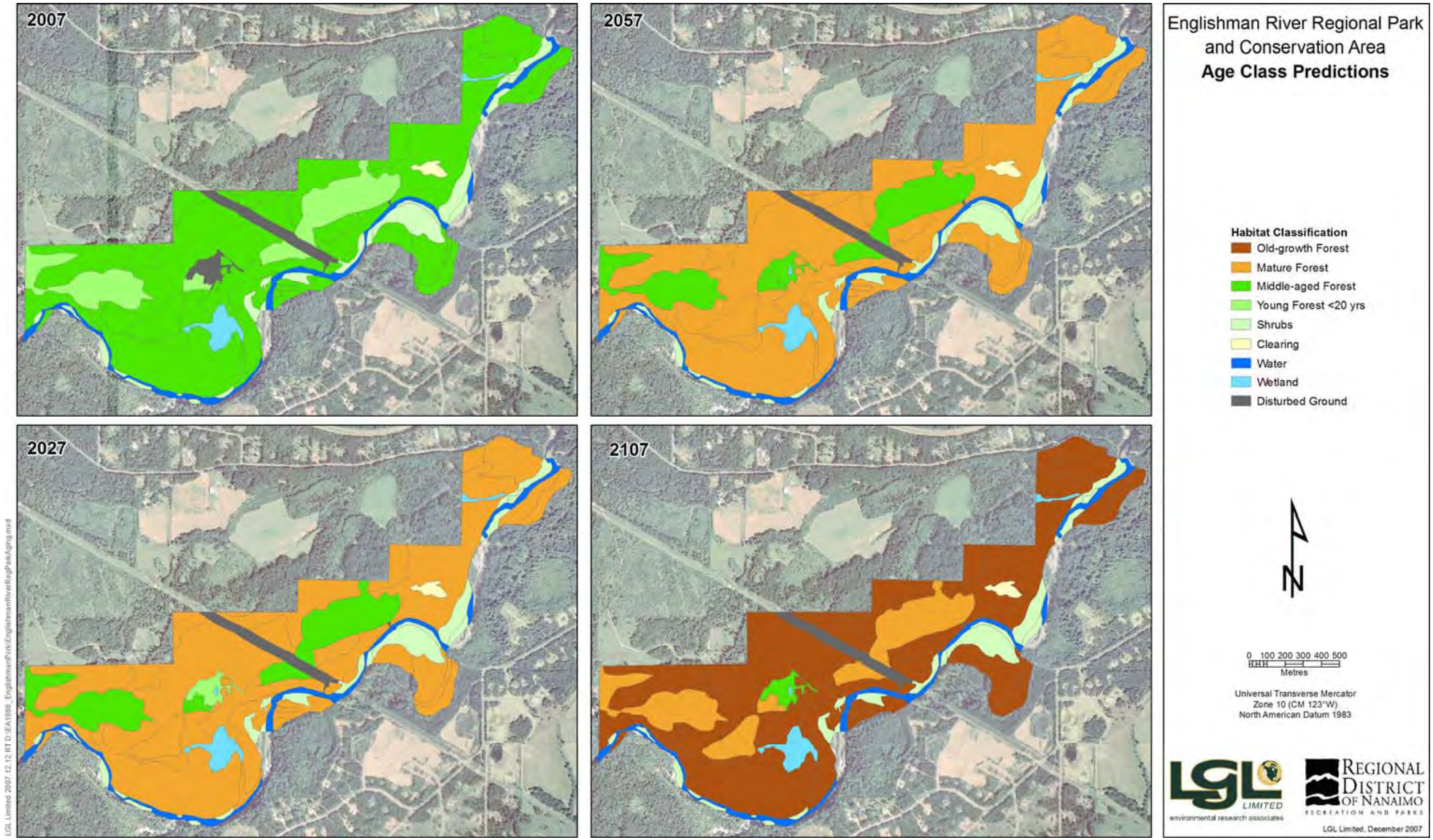

Figure 12. Predicted distribution of major vegetated community types in 2007, 2027, 2057, and 2107 in the absence of restoration or large scale natural disturbance (based on Min. Environment, Lands and Parks and Min. Forests, 1998).

Table 5. Evaluation of the potential negative impacts by human uses on habitat types in the ERRPCA.

Habitat Type	Potential for impact	Rationale
Dry Mixed Forests (DMF)	Moderate	Impacts are contained if use is restricted to authorized trails; some localized potential for erosion, particularly where equestrian traffic is heavy.
Moist Mixed Forests (MMF)	High	Wet, loose soils make this habitat vulnerable to compaction and/or erosion; impacts contained if use is restricted to a minimum number of authorized trails.
Mesic Second-growth Coniferous Forest (SCF)	Moderate	Impacts are contained if use is restricted to existing trails; some localized potential for erosion, particularly where equestrian traffic is heavy.
Regenerating Cutblocks (RC)	Low	Generally densely vegetated, therefore less conducive to human entry; vegetation is largely composed of introduced species, suggesting an already disturbed landscape.
Riverine Flats (RF)	High	Loose soils and sensitive plant communities; open nature of the habitat may also attract greater use. Some trails already exist through this habitat, but additional trail formation could trample the sparse vegetation and allow further establishment of invasive plant species. This habitat is considered one of the most sensitive habitats in ERRPCA.
River and side-channel (RI)	High	Shallow areas are susceptible to streambed compaction and disturbance by users fording the river or channels, particularly by equestrian users. Fording of and movement along the banks can cause bank instability and increase sediment generation, negatively impacting fish rearing and spawning habitats. Maintaining the integrity of riparian vegetation is fundamental to maintaining channel stability and floodplain function. Trails within the riparian corridor of the mainstem should be minimized to reduce the likelihood that the trail becomes a conduit for flood flows leading to a channel avulsion. In particular, the River Trail opposite the Clay Banks is inundated frequently by flood events and is very vulnerable to a mainstem avulsion. Therefore, it is recommended that the River Trail be decommissioned and any new trails built in the Park be set back from the top of the bank (i.e., high water mark) at least 30 m. Furthermore, to minimize disturbance of riparian vegetation and ensure bank stability along the side channels, it is recommended that any additional trails paralleling these channels be minimized and that viewing opportunities be established through short branch trails off the main trails.
Disturbed Sites (DS)	Low	The vegetation on these sites is largely or entirely composed of introduced, often invasive species. It is not expected that any additional public use would be to the detriment of these habitats because the species that are established are well adapted to disturbance.
Dry Pine Forests (DPF)	Moderate	Impacts are contained if use is restricted to existing trails. However, the open nature of some areas may attract off-trail use; such use has the potential to disrupt the fragile ground cover of mosses and lichens and increase the possibility of invasion by exotic plants.
Riparian Thickets (RT)	High	Tends to be thickly vegetated, and therefore, not conducive to exploration away from existing trail networks. However, because it is locally rare, creation of additional unauthorized trails can have a significant impact.
Swamps and Ponds (SP)	High	These habitats are uncommon to rare on the property and provide specialized habitats for species with generally narrow ecological

Habitat Type	Potential for impact	Rationale
		requirements. Impacts are contained if use is restricted to a minimum number of trails adjacent to these sites.
Forest Clearing (FC)	Moderate	The open nature of this habitat would likely expose it to high levels of potential use if trails were established in this area.
Ephemeral Pools (EP)	High	The shallow water body in the centre of the disturbed gravel pit would likely attract the attention of the public, which could have serious impacts on the stability of the habitat. The water is shallow enough to be crossed, which poses the greatest potential threat to the ecological community that has become established. Additional trampling could be a problem in late summer when the water level in the pools drops.

Educational Opportunities and Recreation Values

Self-guided Interpretation

The diversity of habitat types that exist in ERRPCA provide for excellent educational opportunities, particularly with respect to native flora and fauna of the coastal Douglas-fir ecosystem. The existing trail network not only provides recreational opportunities for hikers, bikers, and horse riders, but it also provides an opportunity to develop a self-guided natural history tour of the coastal Douglas-fir ecosystem and ERRPCA. For example, information signage, placed adjacent to unique habitat types, or in habitat types typical of the coastal Douglas-fir forest that describe the flora and fauna unique to that habitat could be erected. Similar signage at key salmon spawning or migration locations could be used to inform the public about the fisheries values of Englishman River. For example, excellent viewing opportunities for salmon spawning exist at bridge crossings on the side channels and, in particular, along Channel Trail immediately downstream of the fish hatchery where coho spawning is concentrated. Also, the fish hatchery provides a focal point for providing viewing opportunities on a working hatchery and delivering ecological information on fish culture, salmon life histories and habitat restoration to park users.

School Groups

Combining recreation with education would create a park that provides recreational opportunities while informing the public about conservation strategies used to preserve native ecosystems. The educational component of the ERRPCA could be delivered to local schools as a conservation module that could include activities like collecting and identifying the leaves and cones of native coniferous and deciduous trees, an introduction to the animals of the coastal Douglas-fir ecosystem, and a component on the importance of conserving our native habitats, not only for animals and plants, but for our own enjoyment. The module could culminate in a field-based learning day that includes walking the trail system of ERRPCA with stops at the various signs to discuss why those habitats are important to the integrity of native ecosystems. This module would be appropriate for elementary and middle schools.

Enhanced programs, suitable for high schools students, particularly those interested in natural history, could be developed that involve completing small-scale studies of various aspects of the ERRPCA. For example, directed studies on plants or animals could be carried out in the various habitat types that occur on the property. These studies could be designed to occur over one or more terms of the school year. Information obtained from these studies could be compiled into a flora and fauna database of ERRPCA.

Post-secondary Education and Research Opportunities

At the post-secondary level, interaction with Malaspina University College could lead to the incorporation of habitats at ERRPCA into larger-scale, regional studies on native flora and fauna of the coastal Douglas-fir ecosystem. The diversity of habitat types on the property provides a unique opportunity to monitor changes in habitat condition or species composition over time relative to various influences, including climate change and adjacent land uses. The establishment and use of these monitoring stations could then be incorporated back into the conservation module developed for elementary and middle schools and the students of Malaspina University College could deliver the material and relate the use of the monitoring stations to the bigger picture of conservation.

Some of the wildlife encountered at ERRPCA are introduced species that could impact local population of native flora and fauna. For example, Green Frogs were observed in ERRPCA. The impact of this species on native amphibians or their habitat is not well understood. Knowing that non-native species like Green Frogs occur at ERRPCA again provides an opportunity for researching the impacts of non-native species on native fauna. Research like this could be carried out at the post-graduate level, and if properly designed, could even contribute to one or more graduate degrees. To inform the public about the presence of non-native frogs in ERRPCA, and in surrounding areas, posters, such as those designed by the Ministry of Environment and Habitat Conservation Trust Fund could be posted at various locations throughout the park. This would make the identification of non-native species easier for the public, and with their help, would help to alert RDN of the presence of non-native species in the park.

The presence of non-native amphibians in ERRPCA can also be incorporated into the conservation module developed for elementary and middle school students, and presents an opportunity for monitoring of amphibian populations, which could be carried out by high school students.

Habitat Restoration

The primary goal with respect to habitat management in the ERRPCA is to protect the current integrity and productivity of the existing habitat into the future by identifying sensitive ecosystem components and sensitive areas, and by implementing measures to ensure that land and water use activities do not have detrimental effects on these components and sensitive areas. The secondary goal is to implement measures that will hasten the restoration of ecosystem components and processes to a condition that maintains high quality instream and riparian habitats.

The potential restoration opportunities within ERRPCA are prioritized as follows:

1. Restoration of the gravel pit area;
2. Revegetation of the banks of the DFO side channel;
3. Riparian treatments along on the river corridor;
4. Bank stabilization on the main river; and
5. Assessment of the clay bank.

Restoration priorities are discussed below under two categories – those related to land-based resources and those associated with the main river channel.

Land-based Resources

Although the efficacy of habitat restoration in many of these areas has been discussed, it appears from our survey of the property that with two possible exceptions, little actual habitat restoration or augmentation needs to be considered for the land-based resources. The habitats that are present are diverse and, in most cases, healthy. The diversity of habitat types provides excellent habitat for a variety of wildlife and contributes to high biodiversity.

Restoration of the Gravel Pit Area

The large gravel pit area near the centre of the park that has been allowed to grow into a disturbed, weedy habitat with many exotic and invasive plant species. Remnant wetland pools within the gravel pit suggest that the area is a natural collection area for runoff and, by developing the site into a productive wetland using this natural runoff, significant improvements to the otherwise degraded habitat could be accomplished. In addition, wetland ponds could be developed as alcoves off of existing side channels.

Revegetation of the Banks of the DFO Side Channel

Similarly, the banks of the nearby side channels that were built by DFO to provide additional salmon spawning and rearing habitat could be revegetated with a variety of shrub species such as willows (*Salix scouleriana, S.lucida, S.sitchensis*), Black Twinberry, and other species that are typical of moist habitats.

River Corridor

Of the 10 priority protection and restoration measures identified in the strategy for the Englishmen River mainstem (Gaboury, 2005), three remain that are applicable to ERRPCA.

Riparian Treatments

Poulin (2005) has recommended riparian treatments for the ERRPCA reach with the objectives of hastening the recovery of a conifer dominated riparian community and stabilizing the streambanks and gravel bars. The treatments, in order of priority, were as follows (see Poulin 2005 for location of polygons):

Polygon	North or South Bank	Treatable Area (ha)	Treatment
13c	North	1.5	Cottonwood release/collection
13d	South	0.8	Cottonwood release/collection
8	South	1.5	Cottonwood release/collection
13b	North	3.8	Uniform thinning/conifer release

In addition to Poulin's riparian vegetation prescriptions, revegetation of eroding banks should occur at existing and future bank stabilization structure sites. Willow and alder are beginning to colonize the streambank area between the existing LWD and riprap structures. Additional willow should be planted between the top of the bank and low water surface at structure sites. Poulin (2005) recommended three techniques to establish vegetative cover around the LWD structures using cottonwood and shrubs. The techniques included palisades, live stakes and brush layering.

Bank Stabilization – Maintenance of Structures

The recommended priority for restoration works in the Park reach, as stated in the protection and restoration strategy (Gaboury 2005), was the north streambank of the mainstem where significant erosion and channel migration into the Park has occurred over the past 50 years (Figure 4). Two banks are of most concern; the north bank along the Long Run and the north bank meander bend upstream of the BC Hydro Corridor. Since 2003, LWD and rock groin structures that provide instream cover as well as bank protection have been constructed by BCCF at these two meander bends (Figure 11). Based on a visual assessment in 2007, these structures have been very effective at stabilizing the streambanks and reducing the rate of channel migration into the Park. In addition, the structures have expanded on the amount of high quality fish rearing habitat by providing a greater frequency of pool habitat with instream cover. Although no new instream structures for bank stabilization or instream habitat are contemplated by DFO or BCCF in the immediate future, ongoing maintenance of these structures is recommended to ensure bank stability and protection of Park resources.

Assessment of Clay Bank

The clay bank located 150 m downstream of the confluence with the South Englishman River has been identified as a potentially significant source of sediment to the river. Even though the clay bank is outside of ERRPCA title lands, the chronic erosion of the bank may have downstream impacts on ERRPCA streambanks and instream fish habitat. From a preliminary analysis of aerial photo mosaics, it appears that migration of the channel into the clay bank has occurred at a rate of about 0.6 m per year (Gaboury 2005). This rate suggests that it may not be a significant sediment source to the river. However, with the changes occurring to land use at the top of the slope and the impacts to the bank as a result of the 2006 floods, further assessment of the rate of erosion and an estimate of sediment contribution should be undertaken in a detailed study. The study should include:

1. An assessment of the clay bank site by a geotechnical engineer,
    a. to determine the composition and stability of the bank,
    b. to quantify the rate of channel migration and average annual volume of sediment generated, and
    c. to provide predictions on the future stability of the clay bank site;
2. An environmental assessment to quantify impacts on fish and aquatic fauna from the current rate of bank sloughing;
3. Field investigations by a river engineer specializing in bank protection to assess the feasibility of stabilization / flow realignment options;
4. If stabilization is deemed feasible, topographic surveys of the clay bank site and the development of a detailed bank stabilization design; and

If restoration works are constructed, a monitoring program should be initiated to determine effectiveness of prescribed treatments.

Future Surveys

The surveys that were completed in ERRPCA during the 2007 field season were able to document only a portion of the flora and fauna that potentially occur in the area. This is due to the fact that the presence and/or observability of many species changes dramatically throughout the year. For example, breeding season surveys such as those done in 2007 are able to record species of birds that occur only during the summer (warblers, flycatchers, etc.), but other species which occur only during the winter or migratory seasons (Ruby-crowned Kinglet, Golden-crowned Sparrow, etc.), are completely missed. In addition, certain species groups (bats, small mammals, owls) require special field techniques to properly document their presence and casual observation, such as was done in 2007, are likely to nearly or completely miss these groups.

The following recommendations for additional surveys in future years are presented (Table 6). If implemented, these surveys would allow for a more thorough assessment of the true biodiversity of this site and would greatly augment the surveys that were done in 2007.

Table 6. Recommendations for species groups not adequately surveyed during the 2007 session.

Species Group	Survey Period	Survey Techniques Required
Wintering birds	Dec-Feb	Casual daytime observation
Migratory birds	Mar-May; Sep-Nov	Casual daytime observation
Owls	Feb-Apr	Nocturnal call-playback surveys
Small Mammals	Mar-May or Sep-Dec	Live-trapping
Bats	Jun-Aug	Nocturnal detection using Petterssen Ultrasound Bat Detectors; Mist-netting
Dragonflies	May-Sep	Live capture and observation
Terrestrial Molluscs	Mar-May or Oct-Nov	Time-constrained searches

Monitoring Program

The diversity of habitats within ERRPCA and the variety of ecological and fluvial processes associated with the Englishman River provide an excellent opportunity to monitor the natural environments of the lower Englishman River watershed. Such programs could potentially work in conjunction with the identified educational and public awareness objectives that have been identified for the park and provide significant opportunities for the public to become involved with environmental restoration and monitoring.

Effectiveness monitoring of existing instream structures and other restoration/enhancement works is fundamental to guiding future expenditures on treatments and implementing timely maintenance. For example, DFO is planning to monitor the outmigration of coho smolts from the newly constructed side channels over the next ten years (M. Sheng, DFO pers. comm.), and BCCF will continue to conduct routine monitoring of mainstem instream structures on an annual basis (J. Craig, BCCF pers. comm.).

Monitoring Protocol

To monitor the natural values of the park, specific objectives for those natural values need to be articulated. At present, the information contained in this document was generated using cursory, reconnaissance-level field surveys of the various habitat types on the property. The development of a monitoring program requires the collection of baseline data against which future data can be compared. Baseline data must first be collected in such a manner that enables quantitative (as opposed to qualitative) assessments of the changes of a given valued ecosystem component. In short, the monitoring program must be based on the assessment of quantitative data that are sampled using repeatable, scientifically defensible methods.

The following steps are recommended for any monitoring programs that may be carried out within ERRPCA:

1. **Outline objectives.** The type of monitoring implemented will depend on the objectives developed for the park, which is crucial to the monitoring program. Without objectives, there is no way to monitor the effectiveness of any management strategy implemented in the park. For example, what are the objectives of creating side-channel habitat in ERRPCA? What monitoring methods, variables, sampling frequency, etc. will be used to determine if the objectives have been met?
2. **Identify and contact potential sources of assistance or data.** Determine who in the community would be appropriate for this type of monitoring and if are they willing to participate. Existing data sets (e.g., Christmas Bird Count data) may also be available that would provide broad perspectives on the ecological integrity of the park. Caution must be exercised when using temporal data sets collected by many people over long time periods because of the inherent bias associated with these data sets. For example, survey effort and duration is rarely, if ever, corrected for in these types of data sets. They do provide a sense of species persistence in an area across time (assuming equal detectability and surveyor ability throughout time).
3. **Develop survey protocol.** Design a monitoring protocol that will allow the researcher to adequately assess the objectives of the monitoring program. For most species groups, the Resources Inventory Standards Committee has developed survey protocols that are routinely used in British Columbia. These protocols should be used, or serve as the basis for the development of survey protocols. Surveys to collect quantitative data following an established protocol can then be repeated over time.
4. **Field set-up.** Effective monitoring requires replication to be statistically reliable. Therefore, it will be necessary to establish, for example, survey plots to monitor vegetation changes or consistent trap locations and survey timing to monitor smolt migration.
5. **Complete a preliminary census.** For monitoring programs that are intended to document any temporal changes, a baseline survey will need to be completed that will serve as a reference point

for future surveys. All baseline data should be collected from permanent plots or sampling locations.

6. **Continued monitoring.** Following the completion of the baseline survey, additional surveys will be required to monitor any changes over time. Again, these surveys should occur at the sites established during the baseline data collection phase of the monitoring program.
7. **Comparison with preliminary results.** The results obtained from the continued monitoring will be compared against the original survey results to provide some indication of the scale and magnitude of any changes that have taken place.

The seven steps identified above describe the steps involved with a generic monitoring study. The duration, timing, and type of sampling for specific groups should be developed as needed and all monitoring needs to be based on written objectives.

For example, if an objective was to reduce the cover of invasive plants in Mesic Second-growth Coniferous Forests through a management strategy that involved manual removal of invasive plants, a monitoring program may involve the following steps:

1. Articulate the objective: To reduce or remove the cover of non-native plants relative to native plants in Mesic Second-growth Coniferous Forest through the manual removal of non-native plants and to evaluate the effectiveness of manual removal in reducing the cover of non-native plants.
2. Establish the study design: X number of 20 m X 20 m quadrats in the SCF. Establish equal numbers of plots in areas that will be treated (i.e., where manual removal of plants will occur) and in control areas (where no removal will occur).
3. Establish a baseline for all plots in year 1, prior to any non-native plant removal.
4. Monitor all plots for a subsequent four years at annual intervals during the growing season. In each year, compare data collected from treated plots to data collected from control plots to determine if the management strategy of manual removal of non-native plants is having the desired effect (i.e., to reduce the total cover of non-native plants).
5. Assess utility of manually removing non-native plants in meeting the stated objective.

Other species groups will require similar approaches, but different survey methods. For example, songbirds are best sampled during the breeding season (spring and early summer) from variable radius count points while amphibians can be sampled using a variety of live-capture techniques and night time auditory surveys.

Monitoring Resources

The local community may be able to provide some of the expertise needed for most monitoring programs. The survey and monitoring of some species groups, however, will likely require the expertise of a specialist due to the specific requirements involved in the detection of those groups. For example, proper documentation of the small mammal fauna of the park would require not only a familiarity with the species and the ability to identify them, but also access to specialized equipment (live traps) that are needed to capture the animals. Similarly, a proper survey of the terrestrial mollusc fauna of the park would require access to one of the few people who have worked with this group of animals on Vancouver Island.

Besides these specialists, however, a number of other sources of potential monitors exist in the community such as school groups (elementary, middle, and high school students), Malaspina University-College students, and the local natural history society (Arrowsmith Naturalists) (Table 7). The efforts of these individuals could provide valuable assistance in designing and, particularly, carrying out detailed monitoring programs. The local naturalists have the ability to identify and monitor birds, either through standardized protocols or general census, and would be ideal for any surveys involving birds in the park.

School groups, especially high school students, may provide the ability to incorporate the monitoring objectives into an educational framework. For example, spring censuses of the wetlands on the property for the egg masses of pond-breeding amphibians would be an ideal tool for introducing the students to natural history and environmental awareness. More specialized monitoring programs, such as those involving ecological processes and requiring the establishment of monitoring plots, may be more suited to high school or university students.

Table 7. Potential species groups and ecological processes for monitoring and suggested sources of possible monitors in the community.

Potential Monitoring Objectives	Possible Monitors
Species Groups	
Wintering birds	local naturalists
Migratory birds	local naturalists
Breeding birds	local naturalists
Owls	local naturalists
Small mammals	specialists
Bats	specialists
Amphibians	school groups
Dragonflies	specialists
Terrestrial Molluscs	specialists
Fish	specialists, streamkeepers, students
Ecological Processes	
Succession / plant establishment	school groups; university students
Invasive plants	specialists; local naturalists; university students
Channel corridor / floodplain	specialists; streamkeepers; university students
Human-caused habitat disturbance	school groups; university students

Suggested Monitoring Priorities

These monitoring objectives have been prioritized based on their importance on the landscape, the scale of their potential impacts, and the availability of potential monitoring personnel.

I. Biodiversity Assessment

The amount of time that was available during the two field sessions to address the biodiversity of the park was not adequate to detect a number of species and species groups that likely occur there. Year-round bird surveys and additional field surveys targeting difficult-to-assess species groups (small mammals, owls, invertebrates) are necessary to fully document the diversity of plant and animal species that inhabit the property throughout the year. This is critical background information for park managers and will serve to increase the quality of future management decisions by providing an understanding of which species and species relationships exist within the park.

II. Human-caused Disturbance Monitoring

The increased use of the park by the public is expected to have some impact on the natural environments that are present. Vegetation trampling, soil erosion, litter, and introduction of invasive plant species are all factors that are commonly associated with high levels of park use. Although these disturbances are not expected to be detrimental to large portions of the park, certain areas along trails and access points will likely be subject to various forms of disturbance as human use increases. Following the identification of particular "problem sites," a monitoring program could be established that would regularly assess the levels of disturbance at these sites. If

disturbance levels reach a point that is considered unacceptable, steps would then be taken to reduce the human impacts at the sites (e.g., informative signs, roped-off areas, etc.). This would allow managers to keep abreast of problem areas and prevent these sites from becoming severely degraded through human use.

III. Invasive Plants Monitoring

This monitoring program is associated with the human disturbance monitoring above. Invasive plant species, most of which are associated with human-caused disturbance of the landscape, have the potential to severely degrade natural habitats. Species such as Scotch Broom (*Cytisus scoparius*), Orchard Grass (*Dactylis glomerata*), Yellow-flag Iris (*Iris pseudacorus*), and Giant Knotweed (*Polygonum sachalinense*) out-compete and displace native species and result in diminished biodiversity. Problem areas should be identified on the property and steps taken to eradicate these species using the most effective methods. Following this attempted eradication, monitoring of the site is critical to prevent the re-establishment of these or other problematic species.

IV. Plant Succession and Ecosystem Monitoring

Following the completed channel creation and potential wetland creation activities, attempts will be made to establish natural and functioning plant communities at these sites. Monitoring of the effectiveness of these attempts and the succession of these plant communities through time are crucial components of these initiatives. Without monitoring and, perhaps, intervention, these sites would undoubtedly become infested with a variety of harmful invasive plant species at the expense of the desired native species. Monitoring activities during the critical stages of community establishment would allow managers to remove invasive species as they occur as well as ensure that the desired native species and communities are becoming established and maturing successfully. Eventually, once these natural communities have become fully established, monitoring activities could be greatly reduced and the ecosystems allowed to function naturally.

V. Bank Erosion Monitoring

Monitoring of bank erosion rates should occur on the north bank near the side channel inlet structure (i.e., west end of ERRPCA). After the large winter floods in the past few years, DFO raised the access trail along the south bank of the C.W. Young Channel upstream of the hatchery and constructed a rock deflector structure in the mainstem immediately downstream of the side channel intake pipe. The objectives of these structures were to reduce the impact of flood flows on the mainstem's north bank, and to allow some floodplain channel flows during floods but prevent overbank flows from the mainstem from entering the side channel. These structures appear to be robust enough to meet these objectives but regular routine monitoring is recommended to assess structure effectiveness and identify any necessary remedial measures.

Monitoring of bank erosion rates should also occur on the right bank downstream of the MB side channel, which lies within The Nature Trust Conservation Area, where up to 30 m of bank erosion occurred in 2006/07. Significant erosion on the south bank may affect channel pattern locally and thus have an erosion impact on the ERRPCA lands on the north bank. Rock groins, LWD structures or rock deflector vanes could be considered if bank erosion accelerates at these sites.

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Appendices

Appendix A. Plant species encountered in ERRPCA. F = forb; G = graminiform (grasses, sedges, rushes); P = pteridophyte (ferns and fern-allies); S = shrub; T = tree. N = native; I = introduced or exotic; N / I = origin uncertain or only some taxa introduced.

Species	Common Name	Native Status
Forbs		
Achillea millefolium	Yarrow	N
Achlys triphylla	Vanilla-leaf	N
Adenocaulon bicolor	Pathfinder	N
Anaphalis margaritacea	Pearly Everlasting	N
Anemone lyallii	Lyall's Anemone	N
Aquilegia formosa	Red Columbine	N
Aruncus dioicus	Goat's-beard	N
Asarum caudatum	Wild Ginger	N
Aster modestus	Great Northern Aster	N
Boykinia elata	Coast Boykinia	N
Callitriche heterophylla ssp.*bolanderi*	Diverse-leaved Water-starwort	N
Campanula scouleri	Scouler's Harebell	N
Capsella bursa-pastoris	Shepherd's-purse	I
Cardamine hirsuta	Hairy Bitter-cress	I
Castilleja hispida	Harsh Paintbrush	N
Cerastium fontanum ssp.*triviale*	Mouse-ear Chickweed	I
Chenopodium album	Lamb's-quarters	I
Circaea alpina	Enchanter's-nightshade	N
Cirsium arvense	Canada Thistle	I
Cirsium vulgare	Bull Thistle	I
Claytonia sibirica	Siberian Miner's-lettuce	N
Clinopodium douglasii	Yerba Buena	N
Collomia heterophylla	Vari-leaved Collomia	N
Comarum palustre	Marsh Cinquefoil	N
Corallorhiza maculata	Spotted Coralroot	N
Crepis capillaris	Smooth Hawksbeard	I
Daucus carota	Wild Carrot	I
Dicentra formosa	Pacific Bleeding-heart	N
Digitalis purpurea	Common Foxglove	I
Epilobium angustifolium	Fireweed	N
Epilobium brachycarpum	Tall Annual Willowherb	N
Epilobium ciliatum	Purple-leaved Willowherb	N
Erigeron philadelphicus	Philadelphia Fleabane	N
Eriophyllum lanatum	Woolly Eriophyllum	N
Erythronium revolutum	Pink Fawn Lily	N
Euphrasia nemorosa	Eastern Eyebright	I
Filago minima	Small Filago	I
Fragaria vesca	Wood Strawberry	N
Fragaria virginiana	Wild Strawberry	N
Galium aparine	Cleavers	N
Galium trifidum	Small Bedstraw	N

Species	Common Name	Native Status
Galium triflorum	Sweet-scented Bedstraw	N
Geranium dissectum	Cut-leaved Geranium	I
Geranium robertianum	Herb-robert	I
Geum macrophyllum	Large-leaved Avens	N
Gnaphalium microcephalum	Small-flowered Cudweed	N
Gnaphalium uliginosum	Marsh Cudweed	I
Goodyera oblongifolia	Rattlesnake-plantain	N
Hieracium albiflorum	White-flowered Hawkweed	N
Hypericum perforatum	Common St.John's-wort	I
Hypochaeris radicata	Hairy Cat's-ear	I
Lactuca muralis	Wall Lettuce	I
Lactuca serriola	Prickly Lettuce	I
Lapsana communis	Nipplewort	I
Lathyrus nevadensis	Purple Peavine	N
Lemna minor	Common Duckweed	N
Leontodon taraxacoides	Hairy Hawkbit	I
Lepidium heterophyllum	Smith's Pepper-grass	I
Leucanthemum vulgare	Oxeye Daisy	I
Lilium columbianum	Columbia Lily	N
Linnaea borealis	Twinflower	N
Lotus corniculatus	Bird's-foot Trefoil	I
Lycopus uniflorus	Northern Water-horehound	N
Lysichoton americanum	Skunk-cabbage	N
Madia glomerata	Clustered Tarweed	N
Madia madioides	Woodland Tarweed	N
Madia sativa	Chilean Tarweed	N
Matricaria discoidea	Pineapple Weed	N / I
Mentha arvensis	Field Mint	N
Mimulus guttatus	Yellow Monkey-flower	N
Mimulus moschatus	Musk-flower	N
Montia parvifolia	Small-leaved Montia	N
Myosotis laxa	Small-flowered Forget-me-not	N
Nemophila parviflora	Small-flowered Nemophila	N
Nuphar lutea	Yellow Pond-lily	N
Oenanthe sarmentosa	Pacific Water-parsley	N
Osmorhiza berteroi	Mountain Sweet-cicely	N
Petasites frigidus var.palmatus	Palmate Coltsfoot	N
Phacelia leptosepala	Narrow-sepaled Phacelia	N
Phlox gracilis	Pink Twink	N
Plantago lanceolata	Ribwort Plantain	I
Plantago major	Common Plantain	I
Potamogeton natans	Floating-leaved Pondweed	N
Potamogeton pusillus	Small Pondweed	N
Potentilla glandulosa	Sticky Cinquefoil	N
Prosartes hookeri	Hooker's Fairybells	N
Prunella vulgaris	Self-heal	N / I
Ranunculus acris	Meadow Buttercup	I

Species	Common Name	Native Status
Ranunculus repens	Creeping Buttercup	I
Ranunculus uncinatus	Little Buttercup	N
Raphanus raphanistrum	Wild Radish	I
Rorippa curvisiliqua	Western Yellow Cress	N
Rumex acetosella	Sheep Sorrel	I
Rumex conglomeratus	Clustered Dock	I
Rumex crispus	Curled Dock	I
Rumex obtusifolius	Bitter Dock	I
Sagina procumbens	Bird's-eye Pearlwort	I
Sanicula crassicaulis	Pacific Sanicle	N
Scutellaria lateriflora	Blue Skullcap	N
Senecio sylvaticus	Wood Groundsel	I
Senecio vulgaris	Common Groundsel	I
Sisymbrium officinale	Hedge Mustard	I
Sonchus asper	Prickly Sow-thistle	I
Sparganium angustifolium	Narrow-leaved Bur-reed	N
Spergularia rubra	Red Sand-spurry	I
Spirodela polyrhiza	Great Duckweed	N
Stachys chamissonis ssp.cooleyae	Cooley's Hedge-nettle	N
Stellaria crispa	Crisp Starwort	N
Stellaria media	Common Chickweed	I
Streptopus lanceolatus	Rosy Twistedstalk	N
Tanacetum vulgare	Common Tansy	I
Taraxacum officinale	Common Dandelion	I
Tellima grandiflora	Fringecup	N
Thalictrum occidentale	Western Meadowrue	N
Tiarella trifoliata var.laciniata	Cut-leaved Foamflower	N
Tiarella trifoliata var.trifoliata	Three-leaved Foamflower	N
Trautvetteria carolinensis	False Bugbane	N
Trientalis borealis	Broad-leaved Starflower	N
Trifolium dubium	Small Hop-clover	I
Trifolium hybridum	Alsike Clover	I
Trifolium pratense	Red Clover	I
Trifolium repens	White Clover	I
Trillium ovatum	Western Trillium	N
Typha latifolia	Common Cattail	N
Urtica dioica	Stinging Nettle	N / I
Veronica arvensis	Wall Speedwell	I
Veronica beccabunga	American Brooklime	N
Veronica officinalis	Common Speedwell	I
Veronica peregrina	Purslane Speedwell	N
Veronica serpyllifolia	Thyme-leaved Speedwell	N / I
Vicia americana	American Vetch	N
Vicia hirsuta	Tiny Vetch	I
Vicia sativa	Common Vetch	I
Viola glabella	Stream Violet	N
Grasses, sedges, and rushes		

Species	Common Name	Native Status
Agrostis capillaris	Colonial Bentgrass	I
Agrostis exarata	Spike Bentgrass	N
Agrostis gigantea	Redtop	I
Agrostis stolonifera	Creeping Bentgrass	I
Aira caryophyllea	Silver Hairgrass	I
Aira praecox	Early Hairgrass	I
Anthoxanthum odoratum	Sweet Vernalgrass	I
Bromus hordeaceus	Soft Brome	I
Bromus inermis	Smooth Brome	I
Bromus pacificus	Pacific Brome	N
Bromus vulgaris	Columbia Brome	N
Carex cusickii	Cusick's Sedge	N
Carex deweyana ssp.leptopoda	Dewey's Sedge	N
Carex hendersonii	Henderson's Sedge	N
Carex pachystachya	Thick-headed Sedge	N
Carex stipata	Sawbeak Sedge	N
Dactylis glomerata	Orchard Grass	I
Danthonia spicata	Poverty Oatgrass	N
Deschampsia elongata	Slender Hairgrass	N
Eleocharis obtusa	Ovoid Spike-rush	N
Eleocharis palustris	Common Spike-rush	N
Elymus glaucus	Blue Wildrye	N
Festuca occidentalis	Western Fescue	N
Festuca rubra	Red Fescue	N
Festuca subulata	Bearded Fescue	N
Festuca subuliflora	Crinkle-awned Fescue	N
Glyceria elata	Tall Mannagrass	N
Holcus lanatus	Common Velvetgrass	I
Juncus acuminatus	Tapered Rush	N
Juncus articulatus	Jointed Rush	N
Juncus covillei	Coville's Rush	N
Juncus effusus	Common Rush	N
Juncus ensifolius	Dagger-leaved Rush	N
Juncus tenuis	Slender Rush	N
Lolium multiflorum	Italian Ryegrass	I
Lolium perenne	Perennial Ryegrass	I
Lolium pratense	Meadow Fescue	I
Luzula fastigiata	Forked Wood-rush	N
Luzula multiflora	Many-flowered Wood-rush	N
Melica subulata	Alaska Oniongrass	N
Phalaris arundinacea	Reed Canarygrass	N / I
Phleum pratense	Common Timothy	I
Poa annua	Annual Bluegrass	I
Poa compressa	Canada Bluegrass	I
Poa nemoralis ssp.nemoralis	Wood Bluegrass	N
Poa pratensis	Kentucky Bluegrass	I
Scirpus microcarpus	Small-flowered Bulrush	N

Species	Common Name	Native Status
Vulpia bromoides	Barren Fescue	I
Vulpia myuros	Rattail Fescue	I
Ferns and fern-like plants		
Adiantum aleuticum	Western Maidenhair Fern	N
Athyrium filix-femina	Lady Fern	N
Dryopteris expansa	Spiny Wood Fern	N
Equisetum arvense	Common Horsetail	N
Equisetum telmateia	Giant Horsetail	N
Polypodium glycyrrhiza	Licorice Fern	N
Polystichum munitum	Sword Fern	N
Pteridium aquilinum	Bracken Fern	N
Shrubs		
Amelanchier alnifolia	Saskatoon	N
Arctostaphylos uva-ursi	Kinnikinnick	N
Cornus stolonifera	Red-osier Dogwood	N
Cytisus scoparius	Scotch Broom	I
Gaultheria shallon	Salal	N
Hedera helix	English Ivy	I
Holodiscus discolor	Oceanspray	N
Ilex aquifolium	English Holly	I
Lonicera ciliosa	Western Trumpet Honeysuckle	N
Lonicera involucrata	Black Twinberry	N
Mahonia aquifolium	Tall Oregon-grape	N
Mahonia nervosa	Dull Oregon-grape	N
Malus fusca	Pacific Crabapple	N
Oplopanax horridus	Devil's-club	N
Paxistima myrsinites	Falsebox	N
Physocarpus capitatus	Pacific Ninebark	N
Ribes bracteosum	Stink Currant	N
Ribes divaricatum	Wild Black Gooseberry	N
Ribes lacustre	Bristly Currant	N
Rosa gymnocarpa	Baldhip Rose	N
Rosa nutkana	Nootka Rose	N
Rubus discolor	Himalayan Blackberry	I
Rubus leucodermis	Black Raspberry	N
Rubus parviflorus	Thimbleberry	N
Rubus spectabilis	Salmonberry	N
Rubus ursinus	Trailing Blackberry	N
Salix lucida ssp.lasiandra	Pacific Willow	N
Salix scouleriana	Scouler's Willow	N
Salix sitchensis	Sitka Willow	N
Sambucus racemosa	Red Elderberry	N
Spiraea douglasii	Hardhack	N
Symphoricarpos albus	Common Snowberry	N
Symphoricarpos hesperius	Trailing Snowberry	N
Ulex europaeus	Gorse	I
Vaccinium parvifolium	Red Huckleberry	N

Species	Common Name	Native Status
Trees		
Abies grandis	Grand Fir	N
Acer macrophyllum	Bigleaf Maple	N
Alnus rubra	Red Alder	N
Arbutus menziesii	Arbutus	N
Picea sitchensis	Sitka Spruce	N
Pinus contorta var.contorta	Shore Pine	N
Populus balsamifera ssp.trichocarpa	Black Cottonwood	N
Prunus emarginata	Bitter Cherry	N
Pseudotsuga menziesii ssp.menziesii	Douglas-fir	N
Rhamnus purshianus	Cascara	N
Sorbus aucuparia	European Mountain-ash	I
Taxus brevifolia	Pacific Yew	N
Thuja plicata	Western Redcedar	N
Tsuga heterophylla	Western Hemlock	N

Appendix B. Bird species encountered in ERRPCA. Species with an asterisk (*) showed some indication of breeding (nest, young, adults carrying food, etc.). Most or all of these species likely breed on the property.

Species	Common Name	Provincial (CDC) Status
Anas platyrhynchos	Mallard	Yellow
*Mergus merganser**	Common Merganser	Yellow
Cathartes aura	Turkey Vulture	Yellow
Buteo jamaicensis	Red-tailed Hawk	Yellow
Actitis macularia	Spotted Sandpiper	Yellow
Patagioenas fasciatus	Band-tailed Pigeon	**BLUE (S3S4B)**
Strix varia	Barred Owl	Yellow
Selasphorus rufus	Rufous Hummingbird	Yellow
*Megaceryle alcyon**	Belted Kingfisher	Yellow
Sphyrapicus ruber	Red-breasted Sapsucker	Yellow
Colaptes auratus	Northern Flicker	Yellow
Dryocopus pileatus	Pileated Woodpecker	Yellow
Contopus cooperi	Olive-sided Flycatcher	Yellow
Empidonax traillii	Willow Flycatcher	Yellow
Empidinax difficilis	Pacific-slope Flycatcher	Yellow
Vireo cassinii	Cassin's Vireo	Yellow
Vireo huttoni	Hutton's Vireo	Yellow
Vireo gilvus	Warbling Vireo	Yellow
Corvus corax	Common Raven	Yellow
Progne subis	Purple Martin	**BLUE (S2S3B)**
Tachycineta thalassina	Violet-green Swallow	Yellow
Stelgidopteryx serripennis	Northern Rough-winged Swallow	Yellow
Poecile rufescens	Chestnut-backed Chickadee	Yellow
Sitta canadensis	Red-breasted Nuthatch	Yellow
Certhia americana	Brown Creeper	Yellow
Troglodytes troglodytes	Winter Wren	Yellow
Regulus satrapa	Golden-crowned Kinglet	Yellow
Catharus ustulatus	Swainson's Thrush	Yellow
Turdus migratorius	American Robin	Yellow
Ixoreus naevius	Varied Thrush	Yellow
Bombycilla cedrorum	Cedar Waxwing	Yellow
Vermivora celata	Orange-crowned Warbler	Yellow
Dendroica petechia	Yellow Warbler	Yellow
Dendroica coronata	Yellow-rumped Warbler	Yellow
*Dendroica nigrescens**	Black-throated Gray Warbler	Yellow
Dendroica townsendii	Townsend's Warbler	Yellow
Oporornis tolmiei	MacGillivray's Warbler	Yellow
Geothlypis trichas	Common Yellowthroat	Yellow
Wilsonia pusilla	Wilson's Warbler	Yellow
Pheucticus melanocephalus	Black-headed Grosbeak	Yellow
Piranga ludoviciana	Western Tanager	Yellow
Pipilo maculata	Spotted Towhee	Yellow
Melospiza melodia	Song Sparrow	Yellow
Zonotrichia leucophrys	White-crowned Sparrow	Yellow
*Junco hyemalis**	Dark-eyed Junco	Yellow
Carpodacus purpureus	Purple Finch	Yellow
Loxia curvirostra	Red Crossbill	Yellow
Carduelis pinus	Pine Siskin	Yellow

Appendix C. Mammal species recorded in ERRPCA. Other mammal species, including beaver (*Castor canadensis*), red squirrel (*Tamiasciurus hudsonicus*), cougar (*Felis concolor*), and the blue-listed (S3) Roosevelt elk (*Cervus americanus roosevelti*), are known to occur on the property but were not recorded during this survey.

Species	Common Name	Status
Sylvilagus floridanus	Eastern Cottontail	Exotic
Odocoileus hemonius columbianus	Columbian Black-tailed Deer	Yellow
Ursus americanus	American Black Bear	Yellow

Appendix D. Reptile and amphibian species encountered in ERRPCA.

Species	Common Name	Status
Elgaria coerulea	Northern Alligator Lizard	Yellow
Thamnophis elegans	Western Garter Snake	Yellow
Thamnophis sirtalis	Common Garter Snake	Yellow
Hyla regilla	Pacific Treefrog	Yellow
Rana aurora	**Red-legged Frog**	**BLUE (S3S4)**
Rana clamitans	Green Frog	Exotic

Appendix E. Butterfly species encountered in ERRPCA

Species	Common Name	Status
Ochlodes sylvanoides	Woodland Skipper	Yellow
Papilio rutulus	Western Tiger Swallowtail	Yellow
Papilio eurymedon	Pale Swallowtail	Yellow
Neophasia menapia	Pine White	Yellow
Celastrina echo	Western Spring Azure	Yellow
Phyciodes mylitta	Mylitta Crescent	Yellow
Liminitis lorquini	Lorquin's Admiral	Yellow
Cercyonis pegala incana	**Common Wood-nymph, *pegala* ssp.**	**RED (S2)**

Appendix F. Terrestrial mollusc species encountered in ERRPCA.

Species	Common Name	Status
Ariolimax columbianus	Pacific Bananaslug	Yellow
Arion rufus	Chocolate Arion	Exotic
Haplotrema vancouverense	Pacific Lancetooth	Yellow
Ancotrema sportella	Beaded Lancetooth	Yellow
Monadenia fidelis	**Pacific Sideband**	**BLUE (S3S4)**

Appendix B: Public Consultations

Appendix B: Stakeholder Agencies and Organizations

The following agencies were contacted regarding the ERRPCA Management Plan. Initial contact was made in August 2007. A second contact was made in October 2007 as a reminder for the October open house, and a third in July 2008 to seek comments on the Draft Management Plan by September 30th, 2008.

Advisory Committees
Regional Parks & Trails Advisory Committee (RPTAC)
Area E Parks and Open Spaces Advisory Committee
Area F Parks and Open Spaces Advisory Committee
Area G Parks and Open Spaces Advisory Committee
Area H Parks and Open Spaces Advisory Committee
District 69 Commission
Funding and Operating Partners
The Nature Trust
Ducks Unlimited
Pacific Salmon Foundation
Fisheries & Oceans Canada
BC Ministry of Environment
City of Parksville
Community Fisheries Development Centre (CFDC)
Englishman River Watershed Recovery Plan Steering Committee (ERWRP)
Neighbouring Landowners
Arrowsmith Water Services
Emergency Services
Arrowsmith Search and Rescue
Errington Fire Department
Oceanside RCMP Detachment
Parksville Fire Department
BC Ambulance, Parksville Station
Coastal Fire Centre, Ministry of Forests and Range
Tourism Organizations
Oceanside Tourism Association
Parksville & District Chamber of Commerce
Qualicum Beach Chamber of Commerce
Community Interest Groups
Arrowsmith Ecological Association
Arrowsmith Naturalists
Arrowsmith Community Enhancement Society
Mount Arrowsmith Biosphere Foundation
Mid-Vancouver Island Habitat Enhancement Society (MVIHES)
North Island Wildlife Recovery Association
Parksville Qualicum Fish & Game Association
Parksville Streamkeepers
Western Canada Wilderness Committee, Mid-Island Branch
Silver Spur Riding Club
Arrowsmith Mountain Bike Club
Greater Nanaimo Cycling Coalition
Parksville Newcomers Club
Mid-Island Volkssport Club
Parksville & District Historical Society
Cycling and Walking Matters

Oceanside Running Association
Education Institutions
School District No. 69
Malaspina University-College
Resident Associations
Errington Resident's Association
Middlegate Resident's Association
Utility Interests
Shaw Cablesystems
BC Transmission Corporation
BC Hydro
Terasen Gas
Forestry
TimberWest
Island Timberlands

Table 4.1a. Stakeholder agencies and organizations contacted

Discussions in person or by phone were conducted with the following organizations:

Regional Parks and Trail Advisory Committee (presentation made at meeting)
The Nature Trust: Tom Reid, Manager, Vancouver Island Conservation Land Management Program; and Jim Hope, BC Conservation Manager
Ducks Unlimited: Les Bogden, Area Manager
Fisheries and Oceans Canada: Margaret Wright, Restoration Biologist; Mel Sheng, Restoration Biologist; and Alain Magnan, Project Assessment Biologist
BC Conservation Foundation: James Craig, Fisheries Technician
BC Ministry of Environment: Dave Forman, Area Supervisor (Arrowsmith)
Community Fisheries Development Centre: Bob Grant, Executive Director; and Ardith Turney, Fisheries Habitat Coordinator
ERWRP Steering Committee (presentation made at meeting)
Arrowsmith Water Services: John Finnie, RDN General Manager Environmental Services
Errington Fire Department: Chief Colin Catton
Oceanside Tourism: Blain Sepos, Executive Director
Arrowsmith Watershed Coalition Society: Trevor Wicks
Silver Spur Riding Club: Barbara Smith (presentation made at meeting)
School District No. 69: Jim Powell, District Principal, Educational Programs
Malaspina University-College: Darren Hebert, Coordinator, Natural Resources Extension Program; Liz Gillis, Professor, Faculty of Science & Technology; Marilyn Funk, Professor, Faculty of Science & Technology; Eric Demers, Professor, Biology/Fisheries & Aquaculture
BC Transmission Corporation: Ray Read, Vegetation/Pest Biologist
BC Hydro: Mike Ciccotelli, Vegetation Maintenance Coordinator
Terasen Gas: Leona Schafer, Land Technician, Property Services

Appendix C: User Survey Results

45 Responses Received

** =Repeated Comment*

1. What is your gender?

58% Female 42% Male

2. What is your age group?

0% 25 & younger 11% 25-44 years 53% 45-64 years 36% 65 & older

3. Which of the following best describes your household?

16% Single adult
47% Family with no dependant children
27% Family with dependant children
11% Other (please describe):
** Grandparents, with both children and grandchildren visiting frequently.
* Retired Qualicum Beach resident.
Very senior! – active 80 years.

4. Which area best describes where you live?

71% Oceanside (greater Parksville-Qualicum Beach area)
2% Nanaimo
22% Other Regional District of Nanaimo. Where?
*** Errington. Nanoose Bay. Deep Bay. Area "G". Area "F". * Coombs. Bowser.
2% Other Vancouver Island. Where?
2% Other. Where?

5. How does your household typically get to the park (please select all that apply)?(allowed more than 1 answer)

62% By car. Where do you park?
***** Allsbrook.
End of road opposite Rathtrevor.
Weigh scale side – beside the road.
**** Top Bridge.
* Industrial Park Area.
** Middlegate.
Chattell Road.
* Parks Parking Lot.
End of Mariner Drive.
End of Grafton.
Wherever there is space.
20% By bike
24% On foot
20% Other (please describe): ***** Horse. *** Truck & Horse Trailer, parking outside the Park and riding in.

6. Approximately how often does your household visit the park?

18% More than once a week
13% Once a week
24% Once or twice a month
38% A few times a year
7% Never

7. What does your household typically do at the park (please select all that apply)?

64% Walk
2% Run
36% Walk our dog
38% Naturalist activities (i.e. bird watch, etc.)
22% Horseback ride
18% Bike
2% Fish

20% Other:

Attend and assist with fund raising events with Club Rides for Cancer Research.

Christmas Bird Count.

** Picnics. * Swim. Sit. Read. Photography.

Hassle illegal trail builders, garbage dumpers, ATV riders, and pot growers.

8. What do you think about the trails in the park?

	Strongly disagree						Strongly Agree				No Answer
I am generally satisfied	11%	1	7%	2	16%	3	38%	4	18%	5	11%
I find the trails easy to find	7%	1	13%	2	13%	3	27%	4	24%	5	16%
I feel safe on the trails	9%	1	7%	2	13%	3	29%	4	24%	5	18%
I wish I could learn more about the park's natural aspects	4%	1	7%	2	22%	3	24%	4	22%	5	20%

Please explain:

- We like the smaller trails (single file mostly) as it's more connected with nature.
- We no longer use the parks because of the fees.
- Would like to know more of the wildlife that also inhabits the park.
- I don't know anything about the parks unique features.
- Regular use will keep many open. Restrict horses on small trails (too much damage), same for motor vehicles.
- The official opening of Top Bridge was my first in-depth visit. I was able to find my way but would not undertake an activity (hike) on my own or take others there until some more signage is installed – especially distances between points.
- I would like a park naturalist – but no building.
- There are too many trails, which have degraded and diminished the greenspace. Encroached on wildlife corridors and habitat. Who is responsible for their right of use? Time to restore wildlife habitat and keep people out of these critical areas adjacent to the Englishman River.
- Resident of Parksville for 2 years. It took months to find Top Bridge Park and others. Why no signs indicating where they are?
- I have been riding the trails there since 1999, when I built my home in Englishman River Estates off Middlegate. I moved here so I would have trails for riding accessible to my home.
- Keep it natural, don't build too much.
- Our club, when riding, if we see a tree over a trail, we will remove it and if a hole is present, mark it. So whoever passes after us will have a safe walk.
- There should be more signage on the work done in the River to enhance salmon spawning. More signs about no quad traffic.
- Trails are great to run on. Please do not harden them – too many trails are hard on the knees.
- It's great that there's still a little territory for the bears and cougars and small animals to exist (the deer have gone to town). However as people increase there will be problems.
- The occasional bear or cougar has never been a problem, but the frequent motorized vehicles (quads, etc.) often are. Unsupervised/out-of-control dogs sometimes a problem for wildlife (or other dogs).

9. Is there anything limiting your use of the park?

60% No

29% Yes. Please select from below.

4% I don't know where the park is.

7% I can't find my way around the park

4% Insufficient parking

7% Lack of facilities (shelters, benches, toilets, play areas, etc.)

0% I don't feel safe at the park

24% Other. Please explain below:

- * Fees.
- I believe the RDN is discouraging my use of the park because I ride Horseback.
- Muddy trails, drainage.
- More interpretation would generate a greater knowledge and appreciation of the area.
- River crossings.
- Terrain difficult for the aged.
- The ATV use in the park can be upsetting.
- When there are windstorms that bring trees down, we have to avoid certain trails or wait until the horse people clear the trails.
- Quads, dirt bikes, noise, garbage.
- I think regional district not crazy about horse usage.
- Trees down by storms block the trails.
- Better signage to the Park and Trails.

10. What would you like to see at the park?

31%	Toilets	51%	Interpretive signs and self-guided tours
42%	Kiosks with trail maps	4%	Nature Centre
20%	Other. please explain below:		

- Don't know the difference between kiosks with maps and interpretative signs.
- Hitching Rails, and rest areas.
- More control over unauthorized motor vehicles using the trail system i.e. quads.
- Use wind thrown trees to construct 'improvements' – build as you go.
- Signs, which recommend to users to leave vegetation and wild life alone.
- Keep buildings and signs minimal. We don't need another biosphere scheme cluttering this greenspace.
- Signs with trail maps.
- The one road leading to the fish hatchery that a machine made a big mess of. The work was done on the little water way. It used to be a smooth grassy road – now it is rocky, bumpy and has potholes.
- Garbage cans and regular collection on both sides.
- Rest areas.
- Horse trails????
- Information on how everyone (horse, bike and foot) shares a trail. Readily available from Horse Council of BC.
- I would like to see the park stay as natural as possible. There is already a toilet/outhouse.
- Ok as is, amenities mentioned here ok too.
- Toilets would be good but vandals make this high cost.
- Vandalism is a serious problem. If it wouldn't get trashed immediately. A sign with trails & flora & fauna one might see could be useful. (Distances should be on map, many people don't seem to realize how far it's between Allsbrook & Middlegate).
- I feel strongly that the emphasis in the Englishman River area should be safe habitat for flora and fauna, and that human impact should be limited. However, it was clear even before the area was officially park that humans will use it to capacity, and it is already beyond a "balance" between conservation, recreation and development uses. This makes it more important to limit the trails, permanent structures, and marketing of the park, and to patrol for (and prosecute) illegal and/or inappropriate activities.
- Traditionally, the biggest problems have been huge parties, fires, vandalism (including gas, alcohol, bombs, etc., thrown in the river: Parksville's water intake is downriver from the problem sites), large-scale garbage dumping, pot plantations, dogs running, other animals, and illegal hunting. Extensive public use of the park may help limit some of these uses, but can eventually have more even more impact on both mega and micro fauna. For example, before Allsbrook Road was paved, thousands of rough-skinned newts migrated across it every year. Now the few ones seen in the area are road kill, along with many snakes, deer, rabbits, birds, etc. Of course, in the case of reptiles and amphibians there are more global factors at work, but it underlines the importance of providing habitat in case populations ever do recover. In summary, I'm pleased that Englishman River Regional Park is a park, but concerned that the conservation importance of the area will be lost.

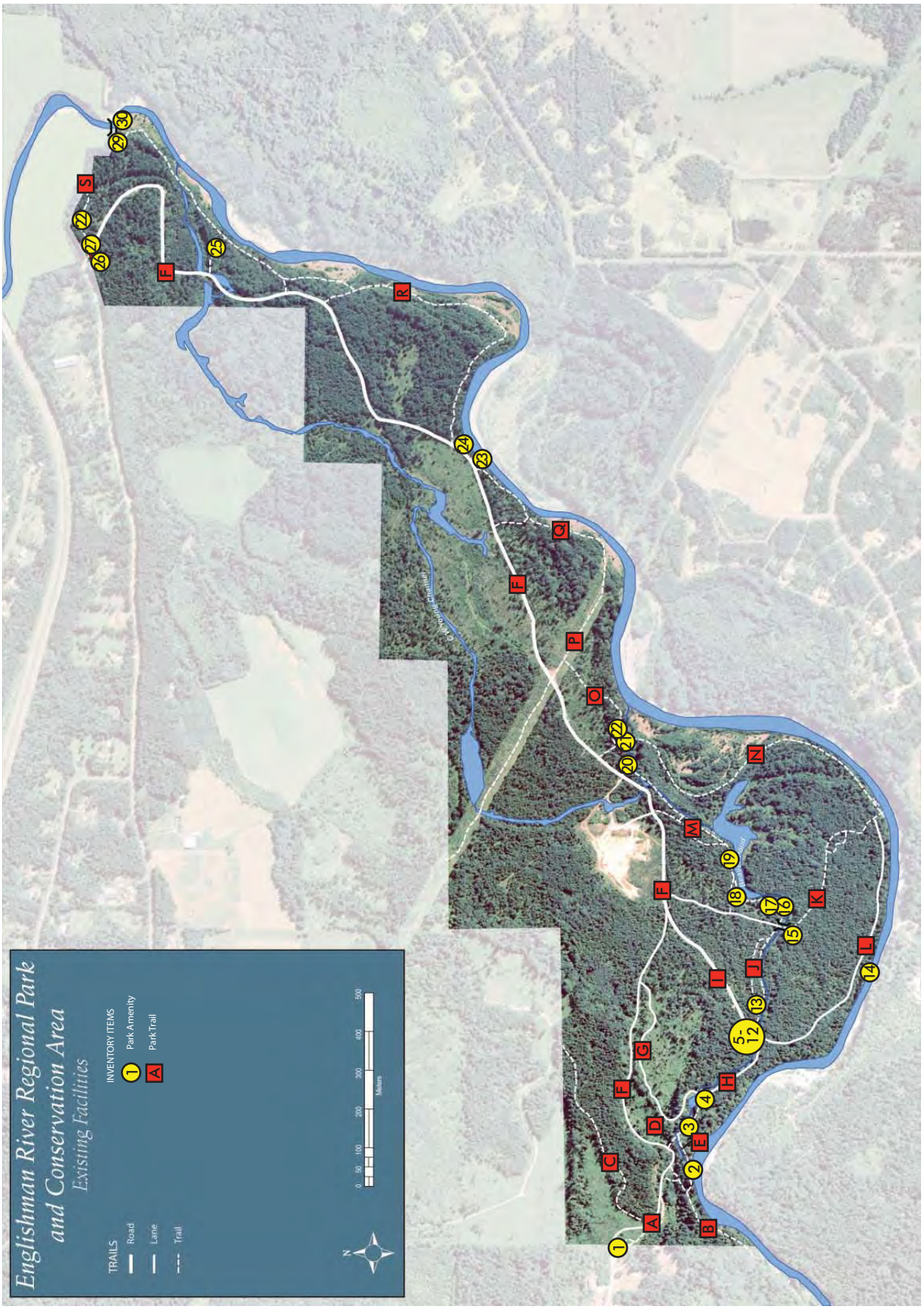
11. Is there anything else you would like to tell us? Complaints? Criticisms? Places in the park are special to you? Other ideas?

- An attached map to this questionnaire that shows the area you're specifically considering would be useful, as we may be talking about different areas. Which side of the river, for example.
- The fees discourage seniors from using the parks, which we paid for during all our working lives through our taxes. We used to walk and exercise in them extensively.
- The park has some of the best trails in the entire Oceanside area. Awesome trails and great scenery. On a negative note, I perceive mounting pressure to limit or remove Horseback riding from the park. Several of the trails actually started out as riding trails long before the Park was established. Yet it seems that the RDN discourages use by horse groups, even for such great causes as the Bob Preuss Memorial Against Cancer. Horseback Riding is as natural on the land as walking yet I feel we are regarded as some kind of threat.
- I would like to see it stay as much as possible as a nature park i.e. no playground, sports fields, etc.
- I walk with my dog in the Englishman River Estuary, Englishman River Prov. Park and top Bridge from Gregg Road in Parksville. The new bridge at Top Bridge in hard on the dog's feet. Perhaps rubber matting could be placed down one side for dogs walking across this new suspension bridge.
- Trail markers, stone & concrete lasts forever. How about some from the quarry on site? Simple shelters at vantage points – it rains a lot.

- Complaint – the last time that my husband and I were there, two people on ATV's approached from the Allsbrook Road side and spent time driving in and out of the river degrading the river's edge and disturbing the salmon. How can this type of activity be stopped or even monitored?
- Just as at ski resort areas and slopes, and particularly because there is no adjacent housing with residents, are you considering a system of wardens at the park who would "sweep" (i.e. go along) the trails each evening? Or after bad weather, to check all is well and users have left, no one is in trouble? Experienced hikers might volunteer for this.
- I would like the barricade on Middlegate to stop ATV's and motorcycles.
- Too much emphasis on Recreation – when is enough, enough? Allowing large horse groups, ATVs, motorbikes, mountain bikes, unleashed dogs free range on trails leads to misuse and abuse of our few remaining natural areas. Make one multi-use trail, away from the wildlife corridors and riverbanks and restrict activities and numbers. When will there ever be enforcement for the abusers?
- I wonder if the person who issued the permit for the Silver Spur Riding Club to host the Bob Pruess Memorial Trail Ride Against Cancer has ever checked to see what damage 100 to 120 (1200 lb) horses can do to a riverbank trail.
- The estuary of the river is important to me. The RDN maps list a 'trail' by the side of Plummer Road. That 'trail' is a sidewalk and increasingly a 'parking area'. The whole trail and boardwalk should be tidied up. Garbage and broom removed. An interpretive sign of birds to be seen, placed on the bird observation deck.
- The Englishman River is, apparently, the 2nd most endangered river in BC. It is a water source that flows to the sea, and increasingly the banks and riparian areas of the river are increasingly compromised by building development, noxious broom and increased foot traffic. Native plant re-introduction is a must. Preserve fish and wildlife habitat. Encourage citizens to be involved in "Friends of Englishman River" on a monitoring basis. Discourage camping or drinking in the estuary area. Signs stating "pack in – pack out".
- The river crossings, (since the bridge is not horse friendly) and trails along the river (with swimming holes) for horseback riding and to link these trails to other systems across the river(s) to Englishman Falls Park (after the logging) is devastated. Would be nice to keep those open for riding and walking. Also to link the greenspace north of Middlegate behind residences to Little Mt. Park and the park by hatchery with trails!
- Everything is pretty good, maybe just a little more care taken after work has been done to leave it how it was.
- Get bylaws or something in place to stop motorized traffic.
- Carry out well-publicized enforcement crackdowns against dirt bikes and ATV's.
- Beautiful park.
- Fees, small annual fee if you live practically next door???
- Management plan will need to address fire prevention steps taken to reduce the risk of unwanted fire starts. Suggest that the BC Forest Service "Fire Smart" Safety initiatives be looked at in order to reduce the risk to the community. Plan should also clearly identify whom? The fire response agency is for fires in the park. Currently the RDN has no agreement in place with the Provincial Government for forest fire response in any of its Parks.
- I have been riding these trails since the late 1980's and they are some of my favourite places to play on my horse. For me, the Park is one segment of the larger area encompassing the Crown Forest, Timberwest and Island Timberlands area (see map). I like to go out for at least a 2-hour ride and will travel 10 miles or so. All of this area is fabulous horse riding area! I am also a member of the Silver Spur Riding Club and we have been using these trails for many events each year and try and maintain the trails for safe and responsible horse use. I want to co-exist with the walkers and bikers along with all the people who live on Middlegate and surrounding areas. I would like to make sure that all users know the "rules of the road" for safe passage.
- I have been riding in the area that is now to be a park for almost 20 years. I would like to make sure that horses will always be able to access the trails. Most of the original trails were put in by horse owners. Of all the areas that I have ridden, that area is one of my favorites.
- Unfortunately, dirt bikes and similar vehicles do not help the condition of the trails; horse traffic is not much better.
- Use has dramatically increased in the park since bridge opening, yet I see few people on the trails even when the parking lots are full. More use of Top Bride Park, but there the people are more concentrated along the riverside trail. (Hope that makes some sense.) It's nice when you can run/walk/bike without constantly running into people & dogs).
- A small sign with for example: "Note that the animals, plants, trees and various forms of life no longer have many of the large timbered acres in which to live. Just this. Be careful with them and co-exist for you can learn and benefit from what they have to show you." PS. No ATV's, motorcycles, etc.

Appendix D: Facility and Trail Inventory

Amenity and Trail Inventory



Inventory of Park Amenities

1 Middlegate Entrance

2 Intake Bench

3 Intake Valves

4 Rearing Pond Dock

5 Hatchery Works

6 Hatchery Bridge

7 Hatchery Building 1

8 Building Signage

9 Hatchery Buildings 1 & 2

10 Hatchery Picnic Table

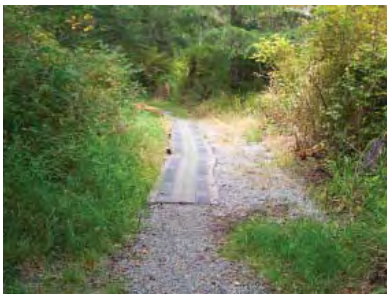
11 Trail Kiosk

12 Pit Toilet

13 Channel Picnic Table

14 Steelhead Trail Bench

15 Clay Banks Bridge



16 Boardwalk

17 Bench

18 Beaver Pond Bridge

19 Bench

20 Signage

21 Counting Station Bridge

22 Counting Station Bench

23 Long Run Signage

24 Long Run Bench

25 Weir

26 Allsbrook Signage

27 Allsbrook Entrance

28 Allsbrook Connector

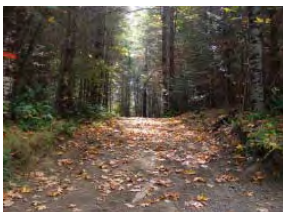
29 Parking Area

30 Top Bridge Crossing

Inventory of Park Trails

	Name	Length	Description	Images
A	For purposes of this report: Park Road, Middlegate Section	230m.	Unimproved loosely surfaced trail with some steep grade as trail travels out of river valley. Section through cut-block connecting to Middlegate Road consists of several smaller webbed trails. Previous landowners constructed ditches in places to limit vehicle access.	
B	For purposes of this report: Morrison Creek Connector	300m	Narrow, unimproved trail. Trail exits ERRPCA into neighbouring Parksville-Qualicum Beach Wildlife Management Area. Trail web located at inter-section with Middlegate Trail. Previous landowners constructed ditches in places to limit vehicle access	 
C	For purposes of this report: Ridge Trail	530m	Unimproved trail. Exits ERRPCA onto neighbouring land within the Forestry Land Reserve.	
D	For purposes of this report: Park Road Connector.	150m	Steep, eroding connection from lower Chinook Pond Trail to Park Road.	

	Name	Length	Description	Images
E	Pipeline Trail	70m	Wide, gravel trail leading to rock groin. Used for maintenance access.	
F	For purposes of this report: Park Road.	3,675m	Existing gravel logging road. Suitable for use by all authorized user groups.	
G	Cutthroat Trail	520m	Existing gravel logging road. Suitable for use by all authorized user groups.	
H	Chinook Pond Trail	225m	Wide gravel trail suitable for use by all authorized user groups.	
I	Hatchery Drive	415m	Wide, gravel road. Serves as main access road for authorized vehicles and special event parking. Suitable for use by all authorized user groups. *Future opportunity to re-surface trail as 'country lane'.*	

	Name	Length	Description	Images
J	Clay Young Channel Trail	Lower: 280m Upper: 210m	Two-tiered trail with narrow, lower gravel trail adjacent to channel and a wider upper sand trail	 
K	Clay Banks Trail	770m	Wide trail on existing logging road. Suitable for use by all authorized user groups.	 
L	Steelhead Trail	750m	Wide trail on existing logging road. Suitable for use by all authorized user groups. No significant changes required.	
M	Beaver Pond Section of Clay Young Channel Trail	670m	Narrow trail in places, surfaced with gravel and lined with logs where required.	

	Name	Length	Description	Images
N	River Trail	950m	Rough trail susceptible to winter flooding. Travels through sensitive riparian habitats.	
O	For purposes of this report: Powerline Connector	325m	Unimproved trail from counting station bridge to powerline. Several sections located close to failing river banks and may be prone to winter flooding.	
P	For purposes of this report: Powerline Trail	925m	Informal use of powerline access road in both directions from park road. Southern route leads to river, Northern route exits park onto neighbouring	 
Q	For purposes of this report: Long Run Trail	425m	Unimproved trail from powerline to Long Run. Several sections close to sensitive riparian habitats failing river banks. Several sections of trail may be prone to winter flooding.	
R	For purposes of this report: Salmon Trail	1500m	Unimproved trail from Long Run to Top Bridge crossing. Several sections impassable due to downed trees. One area pinched by river and steep rock face. Sections of trail prone to winter flooding.	

	Name	Length	Description	Images
S	Allsbrook Connector	165m	Newly constructed secondary trail connector. Parts g ravelled and edged with logs. Suitable for use by all user groups.	 

Total Trails:	13,085m
Total Improved:	7,750m
Total Unimproved:	5,335m
Total Located on Existing Logging Roads:	6,425m