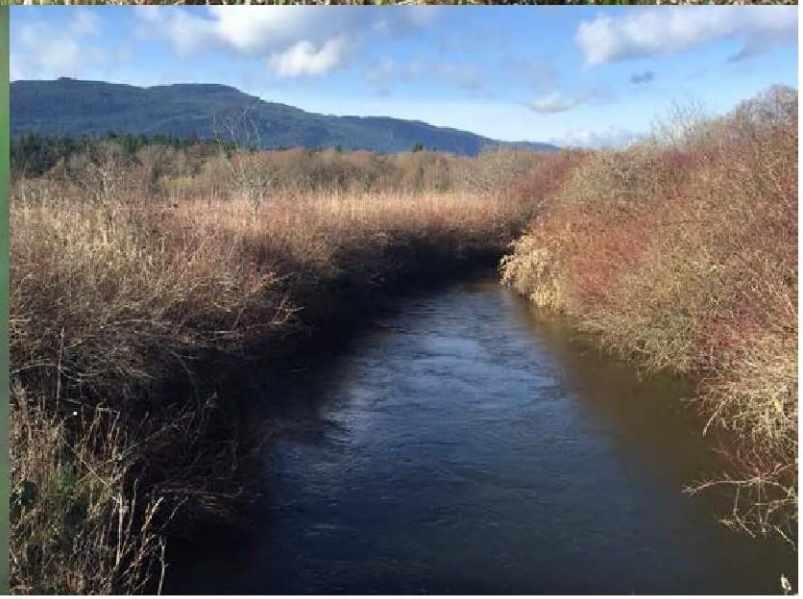
BUTTERTUBS MARSH CONSERVATION AREA MANAGEMENT PLAN

A consolidated review (2004-2015) & Future Directions (2016-2021)



NATURE TRUST BRITISH COLUMBIA

Ducks Unlimited Canada

CITY OF NANAIMO THE HARBOUR CITY

Cover Photos:

Top:	Buttertubs East Marsh
Bottom Left:	Virginia Rail
Bottom Right	Millstone River

Contents

Introduction

The Buttertubs Marsh Conservation Area (BMCA) is a 55ha reclaimed wetland and floodplain habitat adjacent to the Millstone River within the City of Nanaimo (Figure 1). In the 1800's, this shallow flood plain, known then as Pearce's Plain, was originally drained to become seasonal farmland and pasture. Over time, a North-South elevated walkway was created overtop a City of Nanaimo Waterline. This has created two separated wetlands, referred to in this document as the East and West Marsh.

The Buttertubs Marsh Conservation Area is comprised of several parcels of land and includes lands secured by The Nature Trust of British Columbia (TNTBC), Ducks Unlimited Canada (DUC) and the City of Nanaimo; with substantial support received from the local community and funding organizations. Map 1 in Appendix 4 identifies the land ownership makeup within the Conservation Area.

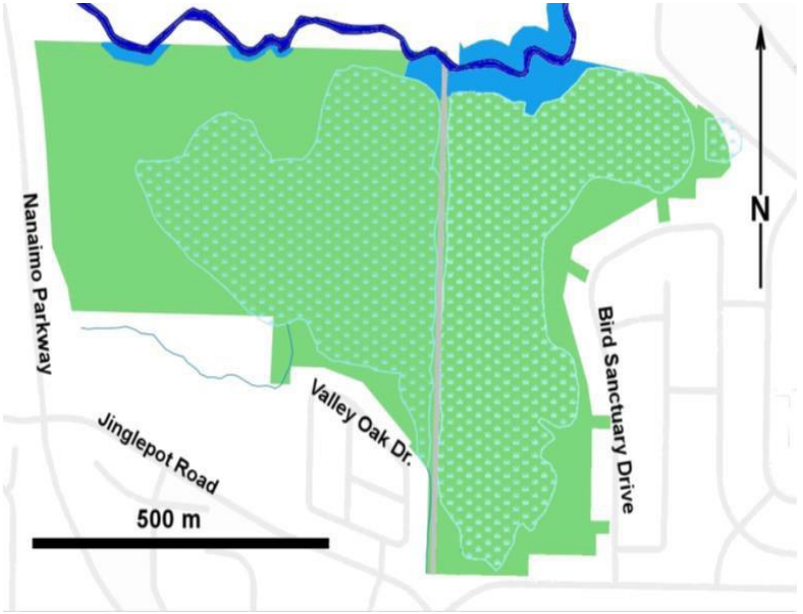


Figure 1: General characteristics of the Buttertubs Marsh Conservation Area (BMCA). Areas in Green are either parks or conservation lands . Dark blue indicates the Millstone River and light blue denotes riparian areas in Conservation Area. The water pipe which bifurcates the two marsh properties is shown as the vertical light grey line just to the right of center of the figure. Areas subject to regular inundation are shown as light blue stippling. This figure was adapted from the City of Nanaimo map server found online at maps.nanaimo.ca/nanaimomap/

Background to Plan Update

The Buttertubs Marsh Co-Management Steering Committee (the Committee) is made up of representatives of the property owners and volunteer organizations involved in managing the Marsh[1]. In 2004 the Committee adopted a Management Plan for the East Marsh that provided recommendations for protecting, enhancing and restoring fish and wildlife habitat while continuing to allow for passive recreation.

[1] Nature Trust of British Columbia, Ducks Unlimited Canada, City of Nanaimo, Friends of Buttertubs Marsh

Since 2004 the Committee has undertaken several projects and initiatives in partnership with community volunteers and more recently Vancouver Island University (VIU), to achieve the goals and objectives of the Management Plan. As a result of these efforts, the conservation area has been expanded; several restoration projects have been completed; more information about the biophysical features and human use of the area has been collected; and several land management issues have been addressed.

In recognition of these successes, the Committee hired Madrone Environmental Services to undertake a strategic review of the 2004 management plan (See Appendix 2). This review, coupled with the Committee's desire to create a plan that reflects the expanded conservation

area, resulted in this updated 5-year strategic plan. While respecting the underlying guiding documents and legal framework of the properties that make up the Buttertubs Marsh Conservation Area, this plan allows for the management of the entire Marsh under one management plan. This plan describes acceptable land use activities to assist with land management decisions and establishes a number of five (5) year targets to meet the overall management goals. The goals and targets will guide our annual work plans moving forward.

This document is not meant to totally replace the original plans; it is a supplementary document that consolidates the East and West Marsh Plan and Madrone's 2015 strategic review of the 2004 management plan. The goal of this document is to update information, highlight achievements and prioritize the next steps through the establishment of management targets.

Guiding Documents

The following background documents provide the guiding direction for the management of Buttertubs Marsh and the development of this strategic plan:

Document	Key Highlights
Agreement between City of Nanaimo & Ducks Unlimited Canada (2012)	Lease agreement between DUC and the City of Nanaimo to manage the West Marsh as Public Park and to provide recreational amenities to the public consistent with the conservation purposes for which the land was acquired.
City of Nanaimo Parks Master Plan	The Master Plan guides City Council with a long range vision and guidance on the development of facilities, parks, open spaces and the delivery of services that best meet the needs of the community. The Master Plan was last updated in 2005.
City of Nanaimo Official Community Plan (2008)	The Official Community Plan provides land use direction for the City. Within the OCP, the Watercourse and Environmentally Sensitive Development Permit Areas restrict development of environmentally sensitive lands and includes guidelines and requirements to protect and enhance environmentally significant lands within the City of Nanaimo.

Ducks Unlimited Canada Conservation Agreement with Province of BC/TNTBC	Renewed in 2007 this conservation agreement allows DUC to construct and maintain a water control structure on Buttertubs Marsh to an FSL of 57.16m geodetic; conduct engineering inspections annually and implement bio-inventory monitoring every 5 years.
"Hyde" Property (1946 Jingle Pot Rd.) Lease Agreement between City of Nanaimo and TNTBC (2011)	The lease compels the City to maintain the property in accordance with the Buttertubs Marsh Conservation Area Management Plan. The Parks and Recreation Department have indicated their intent to maintain the land in its natural state, with little or no public access or improvements for the foreseeable future.
TNTBC and Province of BC Lease Agreement	Assigns management authority for lands owned by The Nature Trust of BC to the Province of British Columbia; these leased lands are managed via the Vancouver Island Conservation Land Management Program.
Utility Right of Way Agreement between City of Nanaimo and Nature Trust of British Columbia (2001)	Right of Way Agreements for Water and Sewer lines within the Buttertubs Marsh Conservation Management Area.
Wildlife Act – Conservation Lands Regulations	Enacted in 2014 these regulations prohibit camping, motorized vehicles, fires and dogs on the provincially managed land at Buttertubs Marsh.
Municipal Natural Assets Initiative	This project establishes the economic value of Buttertubs Marsh to the City of Nanaimo and will be used by the City to invest in the long term maintenance and management of the marsh

Achievements in the Management of Buttertubs Marsh

The original 2004 Buttertubs Marsh Management Plan contained two (2) goals:

GOAL 1: Maintain and, where possible, enhance plant and animal resources of the Conservation Area

Objective 1: Provide wildlife habitat
Objective 2: Control exotic, invasive plant and animal species Objective
3: Gradually increase wildlife habitat and biological diversity

GOAL 2: Provide for compatible public recreational and educational use of the area

Objective 4: Provide controlled public access
Objective 5: Provide wildlife and nature viewing opportunities
Objective 6: Provide public education opportunities

In 2015, Madrone Environmental reviewed the management goals and activities of the original 2004 management plan. This review identified that of the 136 individual tasks listed in the 10 broad categories of the 2004 management plan, the partners have completed 58% of the tasks with another 18% underway; leaving 24% of the tasks not completed to date (Madrone 2015, Appendix 2).

Of the tasks and goals successfully achieved the partners of the Buttertubs Marsh Conservation Area have:

- Resolved several long standing trespass issues;
- Installed new interpretive and regulatory signage;
- Conducted inventories and removals of invasive species;
- Built new viewing platforms;
- Replaced and upgraded the Buttertubs Marsh water control structure;
- Implemented Wildlife Act Regulations to address concerns of motorized vehicles, camping, fires and dogs;
- Secured an additional 0.342Ha of habitat from the Hyde property (1946 Jingle Pot) and 26.13 Ha in the West Marsh;
- Implemented a restoration plan for Western Painted Turtles; and
- Partnered with VIU to undertake public use studies and to create the VIU bird banding station at the West Marsh.

Purpose and Management Goals

The Buttertubs Marsh Conservation Area Management Plan (the "Plan") has been developed for the purpose of consolidating the planning and management of the properties making up the BMCA. The Plan, while respecting the underlying legal jurisdiction of the property owners and lease holders (City of Nanaimo, the Province, The Nature Trust of BC, and DUC), will provide general direction for the management of all the properties within the BMCA.

Guided by the importance to conserve, maintain and enhance the natural processes of the BMCA, the overall management goal for the Plan is to direct the maintenance and enhancement of water, plant and animal resources within the BMCA and provide compatible public recreational and educational use. The management goals for the Plan are:

GOAL 1: **Monitor, maintain and, where possible, enhance the Natural Ecosystems of the Buttertubs Marsh Conservation Area**

Objective 1: Provide wildlife habitat
Objective 2: Control priority exotic, invasive plant and animal species
Objective 3: Gradually increase and improve fish and wildlife habitat and native species diversity
Objective 4: Conserve ecological values in the West Marsh to maintain the integrity of its Eco-gift designation
Objective 5: Over the long-term, work to acquire the remaining lands that make up the natural boundaries of the marsh

GOAL 2: **Provide for compatible public recreational and educational use of the area**

Objective 6: Provide controlled public access
Objective 7: Provide wildlife and nature viewing opportunities
Objective 8: Provide public interpretive and educational opportunities to foster public appreciation for the values and benefits of nature, and an understanding of the need to protect sensitive ecosystems. Physical structures required to support education and passive recreation (e.g. trails, structures, and signage) will be designed and located in a manner that minimizes habitat impacts.

GOAL 3: **Cooperative Management**

Objective 9: DUC and the City of Nanaimo will hold title on the West Marsh property as "tenants in common" and will manage the West Marsh through a management agreement and in the same spirit of collaboration as seen in the East Marsh under the Buttertubs Marsh Management Plan.
Objective10: The principle of co-operative management will include consulting with stakeholders on the East Marsh Committee to plan monitoring work, enhancement activities, and control of invasive species between Buttertubs Marsh and West Marsh.
Objective 11: The Committee will work to encourage key partners, such as VIU, to join the Co-Management Steering Committee.

Partners in Managing the Buttertubs Marsh Complex

The Nature Trust of British Columbia (TNTBC)

The Nature Trust of British Columbia is a leading land conservation organization based in BC with a mandate to:

1. Acquire habitats of high biodiversity values and at greatest risk of being lost; and
2. Manage conservation lands as part of landscapes to ensure ecosystem resilience and connectivity.

Since 1971, TNTBC along with its partners has invested more than $80 million to secure over 70,000 hectares (170,000 acres) of land. This includes over 23,000 hectares (56,000 acres) that is owned, leased or covenanted.

TNTBC as the property owner is responsible for ensuring that the conditions of the 99 year lease agreement with the Province of British Columbia for the East Marsh are being met. TNTBC also responds to requests to upgrade present and future utilities which pass through the East Marsh and provides input towards annual work plans by participating on the Committee.

City of Nanaimo

The West Marsh is co-managed by the City of Nanaimo with DUC as a nature park that provides passive recreation and education opportunities that are consistent and compatible with the conservation purposes for which the Land was purchased. As the property is the subject of an Ecological Gift, any dispositions or changes in use of the property require an authorization from the Federal Minister of Environment and Climate Change Canada.

For the East Marsh, the City is responsible in part for trail and facility maintenance and contributes toward interpretive program development. Under the 1997 co-management agreement between the Province, local conservation groups and the City:

- Maintains trails, public facilities (benches, viewing platforms, etc.);
- Continues maintenance responsibilities over the City dyke which delineates the western boundary of the Conservation Area; and
- Manages land use through its Official Community Plan and zoning processes and works with other government agencies to address storm water management within the municipality.

The City of Nanaimo Parks Master Plan guides park development and acquisition priorities. The Master Plan was last updated in 2005 and involved significant public input. The public suggested that additional waterfront parks and continued trail development are most needed in terms of new and improved facilities, followed by environmentally sensitive areas (ESAs) and natural /passive parks.

Ducks Unlimited Canada

A non profit organization dedicated to the conservation, restoration and management of wetlands and associated habitats for North America's waterfowl. DUC partners with government, industry, non-profit organizations and landowners to accomplish its goals. For the East Marsh, DUC is responsible for the construction, maintenance and repair of the north dyke and associated water control structures as part of a long standing

agreement signed between DUC and the Province of British Columbia. This includes clearing of mud and debris piled around the outlet level control structure each fall, as well as annual inspections of the north dyke and associated structures and repairs or maintenance, as required. For the West Marsh, DUC and the City hold the property as Tenants in Common. As part of the purchase, the former owners agreed to a donation that qualified under the Ecological Gifts Program administered by Environment Canada.

Vancouver Island Conservation Land Management Program

The Vancouver Island Conservation Land Management Program (VICLMP) is an innovative partnership program which involves the management of over 100 conservation areas mostly coastal wetlands and estuaries owned by The Nature Trust of British Columbia (TNTBC), DUC and managed by the Ministry of Forests, Lands, and Natural Resource Operations (FLNRO). Projects are coordinated by the Conservation Lands Manager who assists FLNRO, TNTBC and the other program partners (Habitat Conservation Trust Foundation, DUC, and the Canadian Wildlife Service) with land management, restoration/enhancement projects, and inventory and habitat securement activities.

Friends of Buttertubs Marsh

A volunteer organization dedicated to providing support to the management of Buttertubs Marsh. The group is a direct "descendant" of the Nanaimo Field Naturalists Club which was a prime stakeholder in the formulation of, and signatory to the original 2004 Buttertubs Marsh Management Plan. Since 2005, Friends of Buttertubs has carried out maintenance, enhancement, inventory and public engagement projects and activities throughout the East Marsh. The group's eclectic membership consists of an array of disciplines and backgrounds, all with the single aim of working to ensure the preservation of the values of the expanded Buttertubs Marsh Conservation Area.

Ecological and Wildlife / Habitat Values

Ecological Context

In 2008, Biodiversity BC produced the report titled, *Taking Nature's Pulse - the Status of Biodiversity in British Columbia* (Austin et al., 2008) that listed 23 major findings on the most significant components of biodiversity in the Province and where impacts have occurred and where vulnerabilities will likely be in the future. Below are the relevant findings that are applicable to the Buttertubs Marsh Conservation Area that have a bearing on management activities:

- Of the species assessed to date in British Columbia, 43% are of provincial conservation concern and are concentrated in four biogeoclimatic zones of conservation concern (Coastal Douglas-fir, Interior Douglas-fir, Coastal Western Hemlock, and Ponderosa Pine).
- Significant areas of wetlands in British Columbia have been lost or degraded.
- The flow of water in lakes, streams, wetlands and groundwater systems is being seriously impacted in British Columbia by dams, water diversions, logging, stream crossings and climate change.
- British Columbia has many significant seasonal concentrations of species [e.g., migratory birds, spawning salmon] that are vulnerable to human impacts.
- Alien species are seriously impacting British Columbia's biodiversity, especially on islands and in lakes. Climate change is already seriously impacting British Columbia and is the foremost threat to biodiversity.
- The cumulative impacts of human activities in British Columbia are increasing and are resulting in the loss of ecosystem resilience.
- Gaps in our knowledge of biodiversity in British Columbia create major challenges for effective conservation action.

The protection of Buttertubs Marsh contributes toward fulfilling a key goal in the *Wetland Action Plan for British Columbia* (Wetland Stewardship Partnership 2010): Goal 5. Secure the protection of priority wetlands and the conservation and restoration of natural wetlands throughout the province.

The Buttertubs Marsh Complex conserves wetland, riparian and upland forest ecosystems. The area is within the Moist Maritime Coastal Douglas-fir (CDFmm) Biogeoclimatic Zone and the Georgia Depression (Nanaimo Lowland Ecosection). Currently, only 11% of the CDFmm is protected in either parks or protected areas (Province of British Columbia 2011).

The wetland is clay bottomed and located on the floodplain of the Millstone River. The wetland component comprises 57% of the property with the remaining area function as riparian habitat and upland wooded habitat sections. The entire marsh complex provides an important flood protection zone as it can absorb overflow from the Millstone River during high water events.

City of Nanaimo Parks, Recreation and Culture Master Plan

The last master plan for the department was completed in 2005. Within the plan the following mandate regarding the provision of recreation, cultural and parks services was established: “City Council will use public leisure services as a vehicle for achieving certain socially worthwhile goals and objectives, where such achievement clearly results in indirect benefit to all citizens.”

Many of the goals and desires identified in the 2005 plan, such as access for the public through a managed trail system and protection of environmentally sensitive areas are applicable to the Buttertubs Marsh Conservation Area.

Description of Ecosystems

For the purpose of this plan, the Buttertubs Marsh Complex is made up of 5 distinct management zones based on ecological features and updated Terrestrial Ecosystem Mapping (TEM)() (Map 3 & 4 of Appendix 4). Table 1 provides a description of these zones within both the West Marsh and East Marsh Management Areas.

Table 1: Buttertubs Marsh – Ecosystem Descriptions

Management Zone	Ha*	%	Ecological Features	Anthropogenic Features
West Marsh	30.6	56%	This management area contains a range of habitat types including forested upland, marsh shallow water, riparian and shoreline habitat.	Small access road from south into old field; some limited trails for bird banding station; limited private fencing along south boundary
Millstone River Riparian	0.8	1.0%	30m city designation strip on the riparian bank of identified streams.	Drainage ditches (West Marsh)
Marsh Shallow Water	8.4	15%	Wetland habitats; swamps, ferns, cattail marshes, minimal open water.	Drainage ditch by previous owner
Lower Shoreline	2.6	5.0%	Open areas for passerine species.	Scarified by previous owner – Alder forest
Upper Shoreline	3.1	6.0%	Seasonally flooded agricultural fields; open field habitat for wildlife.	Previously cultivated fields filling in with Hawthorn
Vegetated Upland	15.7	29%	Mix of older second growth conifer forest; deciduous shrub woodlands. Selectively logged.	Trails and Road access. Squatter shack ruins
East Marsh	24.1	44%	This management area contains a range of habitat types including vegetated upland, marsh shallow water, riparian and shoreline habitat.	Open water habitat with significant cattail marsh. English Oak dominates riparian area. Public trail around marsh
Millstone River Riparian	2.1	4.7%	30m riparian setback on the riparian bank of identified streams.	Water control structure
Marsh Shallow Water	15.5	28%	Wetland habitats; cattail, open water.	Osprey nesting platform
Lower Shoreline	1.4	2.0%	Open areas for passerine species.	Benches; viewing platform
Upper Shoreline	0.2	0.3%	Seasonally flooded agricultural fields; open field habitat for wildlife.	Previously cultivated fields filling with non native Hawthorn. City sewer line.
Vegetated Upland	4.9	9.0%	Mix of older forest with deciduous shrub woodlands. Largely non-native.	Trails, benches, viewing platforms, interpretative signs; other historic features; fences. Sewer and water line, Old Dairy Barn Foundation
TOTAL	54.7	100%		

*Areas based on GIS assessment of zone designations.

Millstone River and Riparian Zone

A narrow strip of riparian woodland bordering the Millstone River, dominated by alder and large English oaks with a shrub understory. The wel vegetated riparian strip is the least disturbed area and contains mainly native plant species and represents 5.7% of the Marsh Conservatior Area. Note: Considered to be 30 meters in width but only extends to northern walkway. In West Marsh, the situation is very different with the existing riparian not 30 meters from top of bank due to past farming activity.

Vegetation	Wildlife Habitat Values
• English oaks planted along the river bank in the early 1900's. In the West Marsh, red alder and other native deciduous trees occur with a dense native shrub under storey of ninebark, red osier dogwood, snowberry and willow. The under storey vegetation resembles a mid-late seral native plant association indicative of floodplain sites (CDFmm Site Series 08). The West Marsh has a narrower riparian area dominated by similar native shrubs.	• Habitat provides feeding by Wood Ducks, Band-Tailed Pigeons, hunting and roosting by Barred Owls and several hawk species and feeding and nesting by woodpeckers and numerous songbirds. • Mammals, including deer, raccoons, beaver, muskrat, mink, and river otter feed and/or rest in this area. • This also provides a wildlife corridor linking the Buttertubs area with adjacent upstream and downstream habitats.

Invasive Plants

- Broom and blackberry are invasive species that are no longer the dominant cover in this habitat as there is a sufficient tree-shrub canopy to shade out these invasive shade-intolerant species.
- Reed canary grass is highly invasive along wetland margins where soils are saturated for part of the growing season.

Marsh - Shallow Water Zone

Cattail vegetation and shallow water wetlands occupy about 43% of the surface area of the Marsh Conservation Area.

Vegetation	Wildlife / Habitat Values

• The Marsh consists of open water areas up to 1-2m deep interspersed with emergent cattail marsh, floating cattail islands, hummocks and four small constructed islands with herbaceous vegetation.
• Shallow open water areas support emergent and floating aquatic vegetation, including common mares tail, water smartweed, bladderwort, duckweed, pondweed and yellow pond lily.
• Shallow wetland areas, to some extent isolated from the main marsh, partially dry out during the summer drawdown and have different more diverse vegetation. The dominant vegetation is hardhack, young willows and some red-osier dogwood characteristic of a shrub swamp habitat.
	• The marsh area is used for roosting, feeding and nesting by red-winged blackbirds, common yellowthroats, marsh wrens, mallard ducks, pied-billed grebes, Canada geese, Virginia and Sora rails and formally American bittern (blue-listed). Mallards, wood ducks, hooded mergansers and other waterfowl use these areas for cover while flightless. These areas are also used for feeding and resting by beaver, mink, raccoon and river otter.
	• Open water areas are used for feeding and resting by many waterfowl species, including ducks, diving ducks, grebes, American coots, geese and an occasional trumpeter swan (blue-listed). These habitats are heavily used during fall and spring migration and for waterfowl over wintering in the Nanaimo area.
	• Red-listed - one bird and one reptile species:
	  ○ Purple martin (*Progne subis*)
	  ○ Painted turtle (*Chrysemys picta*)
	• Blue-listed birds:
	  ○ Trumpeter swan (*Cygnus buccinators*)
	  ○ American bittern (*Botaurus lentiginosus*)
	  ○ Great blue heron (*Ardea Herodias*)

Pacific Bleeding Heart
Dicentra formosa

West Marsh – Former hay field with alder forest

Indian Hellibore
Veratrum viride

Upper and Lower Shoreline Zone

Combined, the upper and lower shoreline make up to 13.3% of the Marsh Conservation Area.

Vegetation	Wildlife / Habitat Values
• Lower shoreline = *Cattail-yellow iris plant association* Dominated by cattail and yellow flag iris, growing on saturated soils. Upper shoreline = *Reed canary grass-hardhack shoreline plant association* The area above the full standing water level is dominated in most areas by a dense growth of reed canary grass with scattered clumps of hardhack. Red-osier dogwood, Douglas water hemlock, common rush occur in some areas. This may be the lower extent to the riparian area distinguished by the absence of a tree or shrub canopy.	• Marsh riparian areas are utilized by various bird species, depending on the vegetation type, for cover, foraging and/or nesting, (e.g. red-wing blackbird, marsh wren, Virginia rail, mallard, wood duck, Canada goose, common yellowthroat, song sparrow, willow flycatcher). These areas are also used by a number of mammal species including beaver, raccoon, mink, river otter, voles and shrews. The habitat is important for some life stages of frogs and salamanders (with aquatic larval and terrestrial adult stages) painted turtles (blue-listed) and garter snakes. In general, areas with greater vegetation species diversity and structural Conservation Areaity tend to be utilized by a wider range of species.

Invasive Plants

- The cattail areas are heavily intermixed with yellow flag iris, an invasive non-native species originally planted in the 1970's.
- Purple loosestrife is present but not yet well established.

Vegetated Upland Zone

Approximately 38% of the Buttertubs Marsh Conservation Area is represented by two upland units, one in the East and one in the West Marsh consisting of blackberry, broom/grass, hawthorn shrub land (East Marsh), mixed forest, with English oak in the West Marsh. Most of these uplands exist on remnants of an abandoned farm that was created after dyking.

Vegetation	Wildlife Habitat Values
• Old farm pasture/hay field with a variable shrub cover dominated by common hawthorn, Scotch broom and Himalayan blackberry. • Limited numbers of native tree and shrub species are present. Some were planted by various groups over the past 20 years (primarily conifers) and others re-colonized, (e.g. red alder, arbutus, cascara, mountain ash (non-native), bitter cherry, Pacific crabapple, snowberry, Nootka rose, trailing blackberry, spreading dogbane, spurge laurel (invasive)).	• The upland scrub vegetation areas are utilized by numerous bird species for cover and foraging, including many residents, over wintering and migrating song birds attracted by insects and berry crops (e.g. chickadee, Berwick's wren, kinglets, various warblers, American robin, cedar waxwing, house finch). In spring and summer a number of species also nest although the low habitat diversity likely limits this activity (e.g. American robin, spotted towhee, song sparrow, house finch, Bewick's wren, bush tit, orange-crowned warbler, California quail and ring-necked pheasant). Mammals using this habitat include bear, deer, raccoon, eastern cottontail, deer mouse, Townsend's vole and shrews. Garter snakes are fairly common in summer and Pacific tree frogs are present. The lack of decaying large woody debris likely limits terrestrial salamander abundance.

<u>Recorded Rare-listed Fauna</u>

Blue-listed :

- Green heron (*Butorides virescens*)
- Turkey vulture (*Cathartes aura*)
- Short-eared owl (*Asio flammeus*)

Immature Cooper's hawk

Description of Land Uses & Activities

In developing the Buttertubs Marsh Conservation Area Management Plan , the area was assessed for current and potential land uses. From this, a list of land use activities was developed and defined to form the basis for management direction within each of the 5 defined zones (Table 2).

Table 2 Land Use Definitions for Buttertubs Marsh Conservation Area

Land Use/Activity	Definition
Restoration	Actions to restore natural ecological processes; riparian planting, invasive species removal, fish/ wildlife habitat creation, reforestation with native species.
Enhancement	Actions to enhance or introduce desirable environmental features; wetland creation, water flows/storage, wildlife trees, spawning gravel, nest boxes and placement of woody debris.
Scientific/Research	Inventory for Species at Risk, baseline inventory for fish, wildlife and vegetation monitoring.
Education	Public awareness and appreciation. Educational programming, Interpretative signs, Naturalist, Stewardship, Guided tours.
Public Access/Recreation	Passive activities (i.e. walking, wildlife viewing) appropriate to a nature park.
Water Control Structures	Dams, Weirs, Spill ways.
Fixed infrastructure – conservation	Boundary demarcation, regulatory and interpretive signage; Viewing platforms; Trails.
Linear infrastructure	Trails, bridges, gates, culverts, utility lines (stormwater, sewage, water lines), fences, drainage ditches.
Fixed infrastructure - Heritage	Old Barn Foundation, Archimedes Screw, etc.

Upland area West Marsh (Douglas-Fir, Dull Oregon Grape and Sword Fern)

Millstone River with Riparian Vegetation (primarily Red Osier Dogwood)

Land Management Direction

West Marsh Management Area

This management area is managed between DUC and the City of Nanaimo as Tenants in Common, under the Ecological Gifts Program, which is administered by Environment and Climate Change Canada. Both DUC and the City of Nanaimo are joint recipients of the donation and are responsible for maintaining the conservation values of the land. Management zones within this area include Millstone River Riparian, Vegetated Upland, Marsh Shallow Water, Lower and Upper Shoreline (refer to Appendix 4 – Map 4 – Management Zones).

Land Use Activity	Management Direction*	Priority Management Actions for West Marsh	5 Year Management Target
Restoration	A	- Map invasive species - Invasive species removal - Native species planting - Boundary management along south boundary	- Year 2 – invasive species mapped - Year 5 – 50% reduction in invasive species cover - All boundary issues resolved
Enhancement	A	- Undertake hydrological study of West Marsh to identify opportunities for increased open water habitat and to determine appropriate baseline water levels - Improve habitat for Western Painted Turtle and American Bittern - Enhance 30 m riparian zone along Millstone River. Seek letter of agreement with property owner of Pryde Vista Golf Course to allow for enhancement work within the Millstone River Riparian Area and north of the West Marsh	- Hydrological study completed with multiple stakeholder engagement - Installation of basking logs for Western Painted Turtle - Undertake study to determine American Bittern habitat requirements
Scientific/Research	A/C	- Expand involvement of VIU at West Marsh - Conduct baseline inventory of West Marsh and establish permanent baseline monitoring plots/transects	- Baseline inventory completed in accordance to standardized protocols; 5-year monitoring plan developed - Annual engagement with VIU
Education	A/C	- Support the involvement of VIU or other school groups in conducting research and educational opportunities in the area	- Develop a permit system and protocols for educational and research work in the Marsh Complex with VIU
Public Access/Recreation	C	- Complete a trail and access plan that respects the requirements of the eco-gift	- Approved trail plan developed

Water Control Structures	A	- As part of hydrological study assess whether or not a water control structure would benefit the marsh	- Completion of hydrological study - Implementation of restoration work identified by hydrological study
Fixed Infrastructure - conservation	A	- Support the establishment of a field research shelter - Install boundary fencing and signage	
Linear Infrastructure	C	- Formalize access point to the West Marsh - Construct environmental fencing along boundaries currently unfenced. - Identify appropriate corridors for public use trails - Maintain service road/trail to banding station	- Fencing completed in areas of potential threat of trespass/ incursion

*A	Acceptable use/activity	
*C	Conditional – subject to provisions identified	
*N	Not acceptable	
*N/A	Not applicable	

West Marsh Management Area Comments

- Management must adhere to conditions of Ecological Gift Program
- Currently public access is limited to permission only

West Marsh Bird Banding Shed

East Marsh Management Area

This management area is the eastern portion of the Buttertubs Marsh Conservation Area that has dual land management obligations with the Province of British Columbia (as the lease holder) and The Nature Trust of British Columbia (as the land owner). The City of Nanaimo helps to maintain the trail system and infrastructure features found on the property. The Friends of Buttertubs Marsh coordinate volunteer stewardship activities. Management zones within this area include Millstone River Riparian, Vegetated Upland, Marsh Shallow Water, Lower and Upper Shoreline (refer to Appendix 4 – Map 4 Management Zones).

Land Use Activity	Management Direction*	Priority Management Actions for East Marsh	5 Year Management Target
Restoration	A	- Map invasive species - Invasive species removal - Native species planting - Boundary management	- Year 2 – invasive species mapped - Year 5 – 50% reduction in invasive species cover - All boundary issues resolved
Enhancement	A	- Improve habitat diversity	- Installation of basking logs for Western Painted Turtle and other wildlife
Scientific/Research	A	- Expand involvement of VIU at Buttertubs - Revisit Materi (2004) vegetation report to assess changes	- Annual engagement by VIU Resource Management Officer Training (RMOT) student in conducting field studies
Education	C	- Support the involvement of VIU or other school groups in providing educational opportunities in the area - Upgrade West Marsh sign along public trail	- Increase the number of faculty led projects occurring within Buttertubs focused on fish, wildlife and ecosystem inventory/ research. - Develop an educational brochure/trail guide for Buttertubs Marsh. - The brochure will be printed and regularly updated and easily available to visitors to Buttertubs Marsh. - Annual faculty inspections completed and necessary repairs undertaken.
Public Access/Recreation	C	- Maintain trails cut back tall grass and blackberry - Repair minor surface erosion and maintain drainage	- All trails are maintained to City of Nanaimo standards

		culverts on east and south trails	
Water Control Structures	A	- DUC maintains the water control structure.	- Water control structure maintained annually - Water level managed according to Conservation Agreement with an FSL of 57.16m geodetic
Fixed Infrastructure - conservation	A	- Conduct a sign review and remove old/outdated signs - Install boundary signage as required	- All regulatory signs in the East Marsh will follow provincial template - Interpretive signs are updated as necessary
Linear Infrastructure	C	- Maintain fences along boundaries - Maintain interpretive kiosk signs and replace interpretive kiosk signs adjacent to miner's cottage	
*A	Acceptable use/activity		
*C	Conditional – subject to provisions identified		
*N	Not acceptable		
*N/A	Not applicable		

East Marsh Management Area

- Public access is allowed
- Area is subject to Provincial Wildlife Act Conservation Land Regulations (no dogs, no camping, no motorized vehicles no fires)
- Trails/infrastructure maintained by the City of Nanaimo

Ditch in West Marsh used for drainage by previous owner

Millstone River Riparian Zone

Land Use Activity	Management Direction*	Priority Management Actions	Applies within East or West Marsh Only?	5 Year Management Target
Restoration	A	- Remove invasive species - Plant native riparian cover - Identify and map invasive species - Assess opportunities for instream fish habitat enhancement (e.g. Gravel placement/Large Woody Debris placement)		- 50% reduction of invasive species coverage - 50% increase in native riparian vegetation cover
Enhancement	A	- Re-vegetation of riparian vegetation - Bird habitat enhancement study - Assess opportunities for off channel habitat for fish - Nest box program development focusing on Wood Ducks and Swallows	- West Marsh - West Marsh	- 25% increase in native plant diversity - Off channel habitat assessment complete - Nest boxes installed. Monitoring program in place
Scientific/Research	A	- Establish baseline monitoring plots to gauge effectiveness of riparian restoration projects - Invasive plant inventory - Fish inventory survey		- Establish monitoring plots - Fish inventory survey complete
Education	A	- Provide interpretive opportunities - Assess opportunity for development of viewing platform	- East Marsh	- Platform project completed - Interpretive panel about riparian zone developed
Public Access/Recreation	C	- Public access is limited to existing trails - No new trails into riparian area other than to viewing platform	- East Marsh - East Marsh	- Sensitive areas fenced off - Riparian restoration signs completed
Fixed Infrastructure - conservation	C	- Maintain existing trail network - Maintain water control structure - Fence/sign areas for no public access where required	- East Marsh	- Trails maintained to City of Nanaimo standards - Control structure maintained for conservation needs
Linear Infrastructure	C	- Map right of ways; utility corridors	- East Marsh	
*A	Acceptable use/activity			
*C	Conditional – subject to provisions identified			

Zone Comments

- Goal for the this ecosystem is to have a 30m wide riparian area established

Marsh Shallow Water Zone

Land Use Activity	Management Direction*	Priority Management Actions	Applies within East or West Marsh Only?	5 Year Management Target
Restoration	A	- Maintain open water habitat - Map invasive plant species - Prioritize and remove invasive species	- East Marsh	- 50% removal of priority invasive species
Enhancement	A	- Review and assess water license on Buttertubs (e.g. raise or lower levels) - Assess opportunities to increase open water habitat - Assess opportunity for waterfowl / turtle nesting/loafing areas - Assess feasibility of connecting West Marsh and East Side through hydrological study	- East Marsh	- Install turtle basking logs - Install bird nest boxes - Hydrological study - Assessment, design, implementation of hydrological restoration program completed
Scientific/Research	A	- Resurvey staff gauges, re-set them to standard map/survey datum for the area - Amphibian and reptile inventory (i.e. ongoing Western Painted Turtle work – install wildlife cameras); Egg laying beach effectiveness monitoring - Complete Fish & Wildlife Inventory		- Staff gauges installed - Year 2 and 5 – complete spring/fall amphibian surveys - Year 1, 3 – complete fish presence/absence utilization surveys - Year 2 – establish photo monitoring plots and revisit every 2 years
Education	A	- Work with VIU and local schools to provide educational opportunities - Develop brochure for Buttertubs Marsh	- East Marsh - West Marsh	- Increased partnership with VIU and local school district in providing education and research opportunities - Increased number of faculty lead projects occurring at Buttertubs focused on fish, wildlife, ecosystems inventory
Public Access/Recreation	N	- Fence access to wetland (Former duck feeding area)	- East Marsh	- Access to wetland fenced off

Water Control Structures	A	- Maintain water control structure - Review options to reduce outflow obstruction from beaver activity - Remove beaver material from in front of marsh outlet debris grating	- East Marsh	- Control structure maintained according to Conservation Agreement
Fixed Infrastructure - conservation	A	- Assess Osprey, Swallow and Purple Martin nest site - Check & replace, stucco wire wrapped around trees to protect from beaver	- East Marsh	- Breeding bird habitat condition assessed - Enhancement to breeding bird habitat implemented via nest box program
*A	Acceptable use/activity			
*C	Conditional – subject to provisions identified			
*N	Not acceptable			

North Walking trail along the interface with the Millstone River Riparian Area

Lower Shoreline Zone

Land Use Activity	Management Direction*	Priority Management Actions	Applies within East or West Marsh Only?	5 Year Management Target
Restoration	A	- Map invasive plant species - Assess feasibility of removal of invasive plants - Prioritize removal targets		- 50% reduction of priority invasive species -
Enhancement	A	- Review and assess water license on Buttertubs (e.g. raise or lower levels) - Assess opportunities to increase open water habitat - Assess opportunity for waterfowl / turtle nesting areas - Assess feasibility of connecting West Marsh and East Marsh (hydrological study)	- East Marsh	- Control structure maintained and operated according to DUC/Province Agreement - Implement hydrological study of Buttertubs Marsh including options to increase open water habitat and fish habitat complexity
Scientific/Research	A	- Amphibian and Reptile Inventory - Ongoing Western Painted Turtle work – install wildlife cameras; effectiveness monitoring (mammals) - Complete Fish & Wildlife Inventory		- Staff gauges installed Year 2 and 5 complete spring/fall amphibian surveys - Year 1, 3 – complete fish presence/absence - Year 2 – establish photo monitoring plots and revisit every 2 years
Education	A	- Work with VIU and local schools to provide educational opportunities - Develop brochure for Buttertubs Marsh - Refresh Interpretative signage	- West Marsh - East Marsh - East Marsh	- Increased number of faculty lead projects occurring at Buttertubs focused on fish, wildlife, ecosystems inventory
Public Access/Recreation	N/C			
Water Control Structures	N/C			
Linear Infrastructure	N			
*A	Acceptable use/activity			
*C	Conditional – subject to provisions identified			
*N	Not acceptable			

Upper Shoreline Zone

Land Use Activity	Management Direction*	Priority Management Actions	Applies within East or West Marsh Only?	5 Year Management Target
Restoration	A	- Map invasive plant species - Assess feasibility of removal of invasive plants - Maintain field mowing in West Marsh to maintain habitat and control Hawthorn. Reassess after hydrological study is complete	- West Marsh	- 50% reduction of priority invasive species coverage by year 5 from mapped areas - Follow Provincial Early Detection Rapid Response approach to invasive species control
Enhancement	A	- Assess feasibility of connecting West Marsh and East Marsh (hydrological study)		- Hydrological study completed and recommendations implemented
Scientific/Research	A	- Amphibian and Reptile Inventory - Ongoing Western Painted Turtle work - Install wildlife cameras; establish effectiveness monitoring Program (mammals) - Complete Fish & Wildlife Inventory	-	- Year 2 and 5 – complete spring/fall amphibian surveys - Year 1, 3 – complete fish presence/absence utilization
Education	A	- Work with VIU/local schools to provide educational opportunities - Develop brochure for Buttertubs Marsh - Interpretative signage	-	
Public Access/Recreation	N/C			
Water Control Structures	N/A			
Fixed Infrastructure	N/A			

*A	Acceptable use/activity
*C	Conditional – subject to provisions identified
*N	Not acceptable
*N/A	Not applicable

Vegetated Upland Zone

Land Use Activity	Management Direction*	Priority Management Actions	Applies within East or West Marsh Only?	5 Year Management Target
Restoration	A	- Map invasive species - Invasive species removal - Native species planting - Identify priority restoration - Girdle pine trees - Remove Cypress grove and replant with native species in East Marsh	- East Marsh - East Marsh	- Year 2 – invasive species mapped - Year 5 – 50% reduction in invasive species cover - All boundary issues resolved
Enhancement	A	- Develop and maintain nest box program for swallows - Remove Squatter's Shelter and debris	- West Marsh - West Marsh	- Nest boxes for swallows, wood duck installed
Scientific/Research	A	- Establish baseline monitoring plots - WPT population estimates - Amphibian and Reptile Inventory - Small mammal inventory - Bird banding and Monitoring Program	- West Marsh - West Marsh	- Annual engagement by VIU biology department in conducting field studies - Baseline inventory completed in accordance to standardized protocols; 5 year monitoring plan developed - Year 2 and 5 – complete spring/fall amphibian surveys - Year 1, 3 – complete fish presence/absence utilization surveys - Year 2 – establish photo monitoring plots and revisit every 2 years
Education	A	- Work with VIU/local schools to improve opportunities for learning - Develop new brochure for Buttertubs	- East Marsh	- Increased number of faculty lead projects occurring at Buttertubs focused on fish, wildlife, ecosystems inventory

Public Access/Recreation	A	- Passive recreation continued on existing trails	- East Marsh	- All trails in Conservation Area are maintained to City of Nanaimo standards - Annual facility inspections completed and necessary repairs undertaken
Fixed Infrastructure - conservation	A	- Maintain existing trails, viewing platforms, interpretive signs - Boundary and regulatory signage	- East Marsh	
Linear Infrastructure	A			
*A	Acceptable use/activity			
*C	Conditional – subject to provisions identified			
*N	Not acceptable			
*N/A	Not applicable			

Zone Comments

The Trans Canada Trail should be retained within this ecosystem

Appendix

1. Prior Management Plans
    - Buttertubs Marsh Conservation Area Management Plan (Nov 2004)
    - Management Plan for Buttertubs West Marsh (July 2012)

2. Review of Management Activities in Buttertubs Marsh and Buttertubs West Marsh by Madrone Environmental (2015)

3. Reference Bibliography

4. Maps
    - Properties and Land Ownership
    - Terrestrial Ecosystems
    - Management Zones

Appendix 1 – Prior Management Plans

- Buttertubs Marsh Conservation Area Management Plan (Nov 2004)
  - https://www.nanaimo.ca/docs/recreation-parks/parks-trails/buttertubs-mngt_plan-nov-2004.pdf
- Management Plan for Buttertubs West Marsh (July 2012)
  - https://www.nanaimo.ca/docs/recreation-parks/parks-trails/management-plan-for-buttertubs-marsh-west-july-2012.pdf

Appendix 2 – Management Plan Review

- Review of Management Activities in Buttertubs Marsh and Buttertubs West Marsh by Madrone Environmental (2015)
- https://www.nanaimo.ca/docs/default-document-library/review-of-management-activities-in-buttertubs-marsh-(madrone-report).pdf

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Appendix 4 - Maps

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- Terrestrial Ecosystems:
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