C.W. YOUNG SIDE CHANNEL
BEAVER POND WETLAND ASSESSMENT
PARK USE PERMIT R2378

Prepared for:
Regional District of Nanaimo
Recreation and Parks Department

Prepared by:
Mid Vancouver Island Habitat Enhancement Society

March 13, 2020

ABSTRACT

An assessment of the Beaver Pond wetland in the C.W. Young Side Channel of the Englishman River Regional Park (ERRP) was conducted in the summer of 2019 by Mid Vancouver Island Habitat Enhancement Society (MVIHES). The side channel is a Fisheries and Oceans Canada (DFO) salmon enhancement operation, intended to provide over-wintering habitat for Coho Salmon fry. Abandoned beaver dams within the channel have created the 2.8 ha wetland.

The assessment was the first year of a five-year monitoring program requested by the Regional District of Nanaimo (RDN) Recreation and Parks Department in response to the discovery in 2018 of two infestations in the Beaver Pond of *Iris pseudacorus* (yellow iris), an invasive species that fills in wetlands and displaces aquatic habitats. The RDN contracted the Coastal Invasive Species Committee to remove the yellow iris in summer of 2019 with financial assistance from DFO. MVIHES will monitor the Beaver Pond for five years to document the success of the eradication of the plant and identify other infestations of invasive species. At the same time, MVIHES will collect data on the ecology of the wetland as well as rare and endangered species.

MVIHES adopted a methodology recommended in the 2008 ERRP Five-Year Management Plan for the establishment of Permanent Sample Plots (PSPs) which can be monitored periodically to identify changes occurring in vegetation communities. Seven PSP's were established in the Beaver Pond and assessed using The Wetlandkeepers Handbook as a guideline.

The results of the assessment in 2019 showed that *Phalaris arundinacea* (reed canary grass), an invasive species of wetlands, may be a greater threat to the Coho fry habitat than the yellow iris. Reed canary grass was the dominant vegetation species in all but two PSP's and had formed dense mats. Coho fry were observed only in the two PSP's where reed canary grass did not dominate. A management strategy for eradication or control of the grass in the Beaver Pond should be developed by the RDN in partnership with other stakeholders for conservation of fry habitat.

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1.0 INTRODUCTION

The C.W. Young Side Channel at Englishman River Regional Park (ERRP) is a Fisheries and Oceans Canada (DFO) salmon enhancement operation, intended to provide over-wintering habitat for Coho salmon fry (Lanarc Consultants Ltd., 2008). Abandoned beaver dams within the channel have created a 2.8 ha wetland referred to as the Beaver Pond (Figure 1).

In June 2018, the Mid Vancouver Island Habitat Enhancement Society (MVIHES) informed the Regional District of Nanaimo (RDN) of two small colonies of *Iris pseudacorus* (yellow iris) in the Pond. Yellow iris is defined by the Coastal Invasive Species Committee (CISC) as an invasive species, typically occurring at the edge of wetlands. The iris displaces aquatic habitats and, for this reason, cannot be tolerated by the RDN in the Side Channel.

In July 2018, representatives from MVIHES, RDN, DFO and CISC met at site to examine the colonies and discuss a removal and eradication management plan. It was decided that the RDN would contract CISC to undertake physical removal of the yellow iris which would be overseen by RDN and DFO. Financial assistance for the removal was provided by DFO. MVIHES agreed to monitor the Pond for yellow iris over a five-year period to confirm the plant's eradication and keep the RDN and DFO current on sightings of other invasive species that require attention. This is in keeping with the 2008 ERRP Five -Year Management Plan (Management Plan) which directs the RDN to work with stewardship partners on the management, restoration and monitoring of aquatic and riparian habitat at the Park.

The Conclusions and Recommendations section of Appendix A of the Management Plan recommends the establishment of Permanent Sample Plots (PSPs) which can be monitored periodically to identify changes occurring in vegetation communities. MVIHES supports the creation of PSPs in the Pond since it means the entire Pond area does not require annual assessment while target vegetation, e.g., iris and other invasive species as well as endangered species, will be addressed.

The objectives of the five-year monitoring program by MVIHES are:

1. Confirm successful eradication of current invasive species (ie. yellow iris).
2. Inform the RDN of new infestations of invasive species and monitor the success of their eradication or control strategies.
3. Monitor biodiversity and succession in vegetation communities for changes in the wetland ecology.

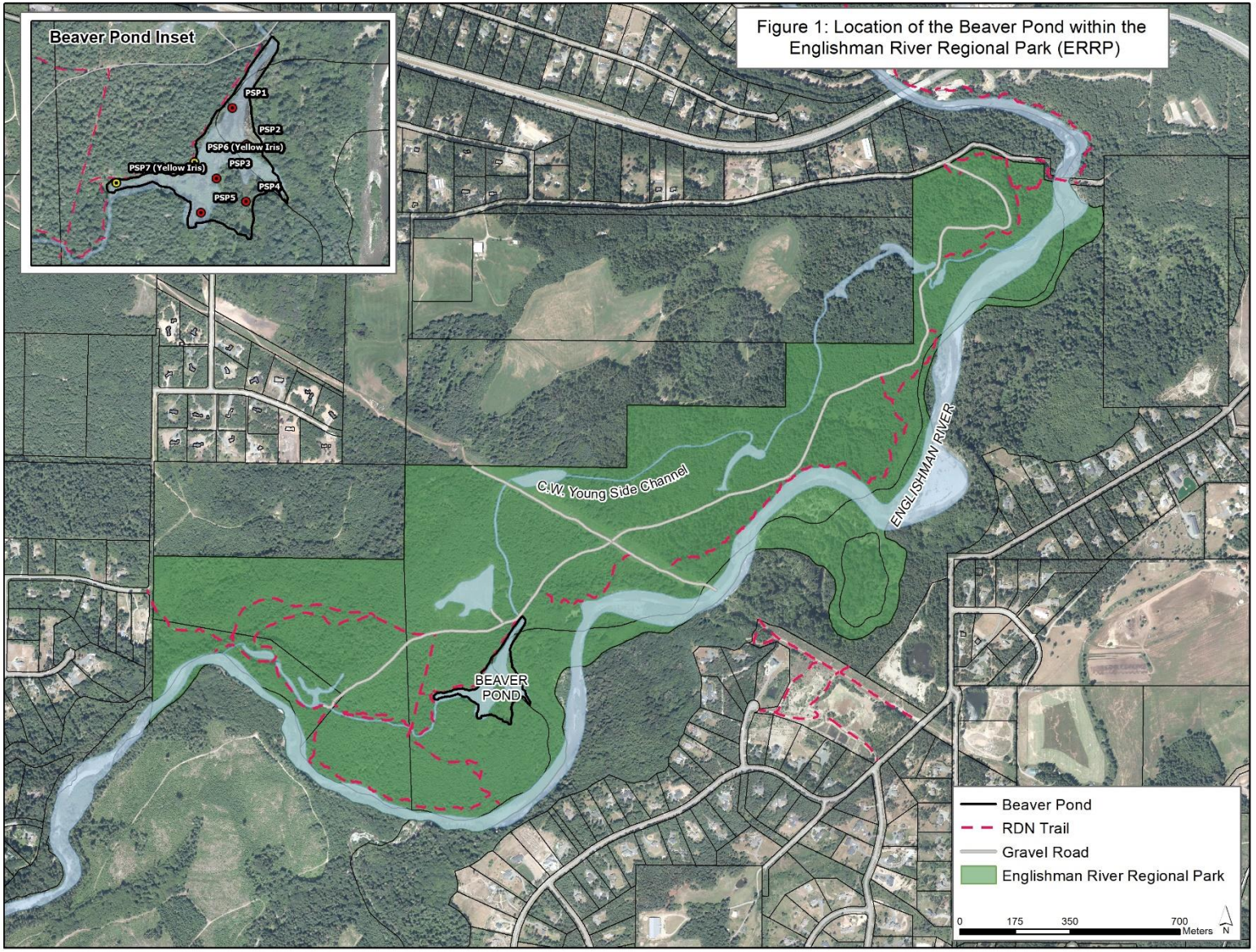

Figure 1: Location of the Beaver Pond within the Englishman River Regional Park (ERRP)

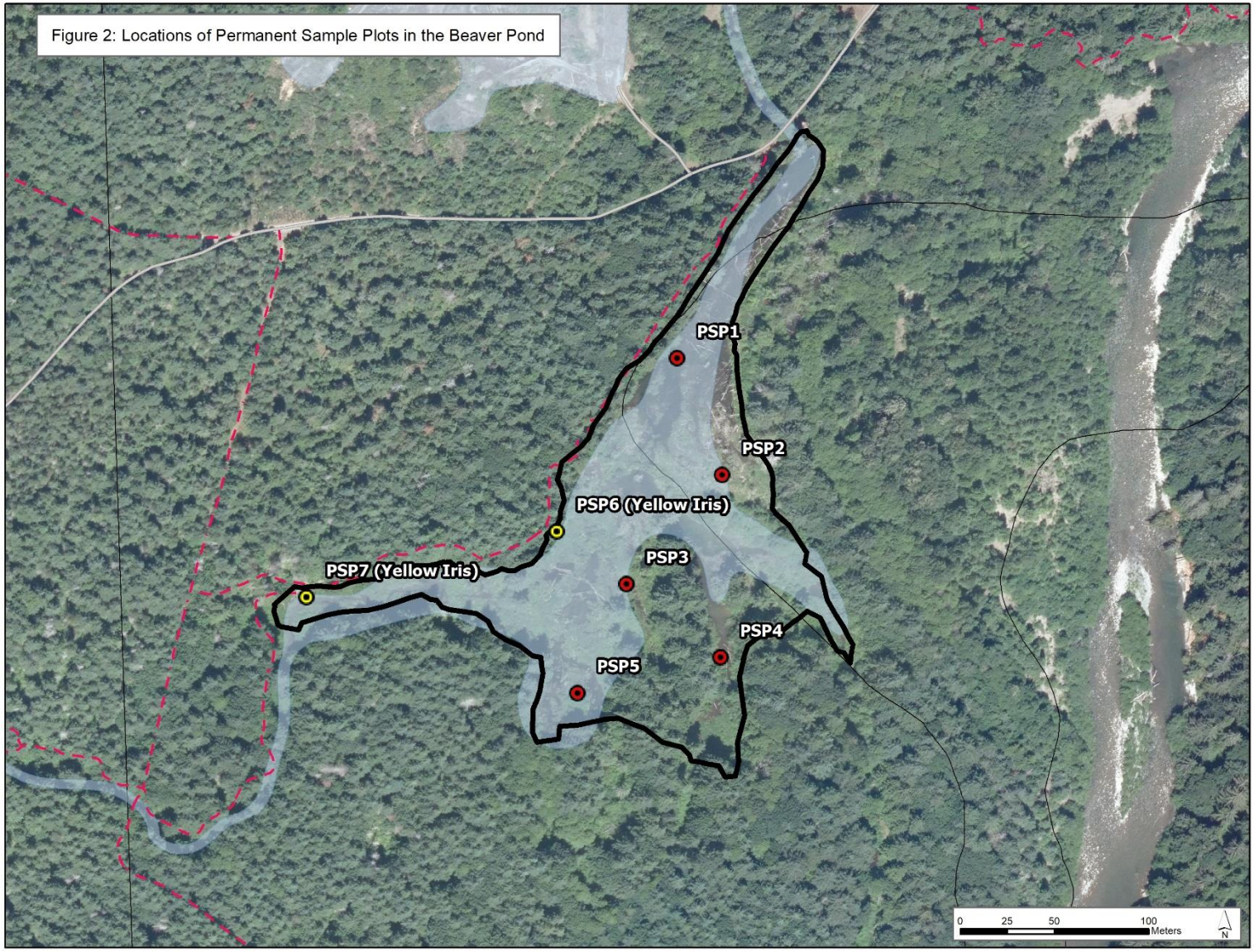
Figure 2: Locations of Permanent Sample Plots in the Beaver Pond
PSP1
PSP2
PSP6 (Yellow Iris)
PSP3
PSP7 (Yellow Iris)
PSP4
PSP5
0
25
50
100
Meters
N

2.0 METHODOLOGY

2.1 Permanent Sample Plots

The boundary of the Beaver Pond wetland used in the Management Plan was updated in 2018 by MVIHES using Google Earth imagery dated August 18, 2016. Areas where the boundary was difficult to identify in the imagery were visited in the field. The location of the boundary separating wetland from upland in those areas were entered into a GPS. The GPS points were used to complete the boundary. The updated boundary is illustrated in Figures 1 and 2.

In March 2019, GPS locations were selected for seven Permanent Sample Plots within the wetland boundary. Locations for two of these PSP's included the yellow iris colonies (PSP's 6 and 7), while locations for PSP's 1 to 5 were randomly selected to eliminate bias in the selection process.

The five randomly selected PSP's were established by placing a ¼ inch grid over the imagery of the Beaver Pond in Google Earth. The imagery was zoomed in until the value on the scale bar in the left-hand corner of the image read 85 m (Google Earth does not provide a scale such as 1:10,000 for its imagery). Each point of the grid that was situated within the wetland boundary was numbered for a total of 132 points. The numbers 1 to 132 were entered in an excel formula for selecting random numbers. The GPS co-ordinates for the selected points were taken from the Google Earth imagery.

A PSP represents a 100 m^2 circular plot centred around the PSP's designated GPS point. Since a 100 m^2 circle has a radius of 5.64 m, each PSP was delineated in the field by one volunteer standing at its GPS point while holding one end of a rope that measured 5.64 m in length. A second volunteer, holding the other end of the rope, travelled out from the GPS point for a distance of 5.64 m and flagged the outer limit of the plot. The second volunteer continued around the GPS point with the rope, flagging the 5.64 m limit, creating a circle around the GPS point. The area within the circle was assessed. This methodology for establishing PSP's was developed by the forestry industry to monitor yield of forest stands and is now also used by the industry to collect ecological data (BC Ministry of Forests and Range, 2007).

2.2 Data Collection

The Beaver Pond is defined as a Marsh wetland according to the 1996 WetlandKeepers Handbook. A Marsh wetland can contain the following two vegetation communities that are best described by the Ontario Wetland Evaluation System, Northern Manual.

- Open Water Marsh Community (Open Water) - contains water less than 2 metres in depth in midsummer and is dominated by submergent, floating or free floating (i.e. duckweed) vegetation. It can be unvegetated as long as it is an integral part of a wetland.
- Marsh Community (Marsh) – contains water less than 2 m in depth in midsummer and is dominated by emergent vegetation or forbs.

The PSP's were visited between July 25 and August 29, 2019 on three sampling occasions. Data were collected on attributes for each PSP, including water depth, percentage of Open Water, and type of substrate. Substrate in marshes is mineral in origin and includes clay, silt, sand and gravel. A layer of decaying wetland vegetation (organic matter) over the mineral substrate can be present (MacKenzie,W.

and J. Moran, 2004). Other attributes include percent cover by vegetation forms (defined in The Wetlandkeepers Handbook); species; percent cover by woody debris, stumps, logs and fallen trees; wildlife sightings/signs; and the presence of invasive, rare and endangered species. A detailed list of attributes is available in Appendix 2.

Photos were taken using a Fuji XP camera from the plot centres in north, south, east, west directions, and straight down. Photos of notable features were also taken. With the exception of an Open Water site (PSP-1), a sketch of each PSP and its surrounding environment was drawn in the field to provide details of the plots not captured in the data sheets or photographs. Photos and sketches are included with the data forms for each PSP in Appendix 3.

When applied to the two PSP's previously identified as containing invasive species (yellow iris), this methodology will provide annual data on changes in the density and size of the infestations after eradication or control activities have been undertaken. When applied to the randomly selected plots, it will provide data on diversity and natural succession, and alert us to invasive species that have spread into these plots and adjacent areas.

When a site containing an invasive species has been identified during an assessment, the flowering bodies or seed heads will be removed and discarded outside of the ERRP in a manner appropriate for the species. MVIHES will immediately notify the RDN who can work with DFO and CISC on best management practices concerning control and eradication.

3.0 RESULTS

PSP-1 was the only site that required access by canoe. The location for PSP-1 was changed in the field because fallen trees blocked access to the site and the water was too deep to portage the canoe over the trees. An alternate site was selected adjacent to the original and entered into the GPS. The location for PSP-4 was also changed in the field because it was on dry land. The alternate site was selected by offsetting the original into the closest wetland environment. The alternate site was also entered in the GPS. The new locations are included in Figure 2.

The yellow iris plots (PSP-6, PSP-7) were assessed before CISC removed the plants on August 6, 2019. Volunteers visited the two plots on August 29, 2019 and found no signs of yellow iris.

3.1 Vegetation Communities and Forms

Tables 3.1 and 3.2 list the percent cover by vegetation communities and vegetation forms for each PSP. The value "<1" was assigned to the percent cover by a vegetation form when only a few plants were observed, to allow the species of plant to be included in the data. Values for dominant vegetation forms in each PSP are in bold.

Table 3-1: Percent Cover by Vegetation Communities in Permanent Sample Plots (PSP)

Vegetation Community	PSP-1	PSP-2	PSP-3	PSP-4	PSP-5	PSP-6	PSP-7
% Open Water	100	20	5	30	30	5	40
% Marsh	0	80	95	70	70	95	60

Table 3-2: Percent Cover by Vegetation Forms in Permanent Sample Plots (PSP)[1]

Vegetation Forms	PSP-1	PSP-2	PSP-3	PSP-4	PSP-5	PSP-6	PSP-7
% Emergent		**70**	**90**	**30**	**65**	**90**	**40**
% Floating				1	<1		
% Submergent	**75**	1		**30**	5		
% Ground Cover				10	10		
% Forb					<1		
% Fern				2	<1		
% Live Shrub		3	5	**30**	5	5	20
% Dead Shrub							
% Live Tree Standing		2	<1				
% Live Tree Fallen							
% Dead Tree Standing							
% Dead Tree Fallen		<1					
% Stumps/dead tree stems	10 (sticking out of water)						
% Logs		10	1	2	10		
% Woody debris	30 (covered in submergent veg)	10 (some submerged)					
% Bare Substrate	15	14	5		25	5	40

[1] Total Percent Cover may exceed 100% if plants form canopy over ground covered by other vegetation (eg. branches of shrubs overhanging emergents); floating plants above submergents; logs and woody debris covered in plants.

A comparison of the quantity and percent cover of vegetation forms among the PSP's indicates that PSP-4 had the greatest diversity, followed by PSP-5 and PSP-2. Although PSP-2 and PSP-5 contained the same number of vegetation forms and greater, the percent cover provided by the different forms in PSP-4 was more evenly distributed, resulting in three co-dominant forms (emergent, submergent, live shrub) as opposed to one dominant form in PSP-2 and PSP-5.

With the exceptions of PSP-1 which is an Open Water site, and PSP-4 which had three co-dominant vegetation forms, emergent vegetation was the dominant form, occupying between 40 to 90 percent of area in the plots. Four of the plots had greater than 60 percent cover by emergents.

Open Water was present in all sample sites but only PSP-1 and PSP-4 contained Coho fry at the time of assessment (Appendix 3). The vegetation attribute common to both sites was submergent vegetation that covered 30 percent and greater of the plot area. The next highest amount of submergent vegetation in a plot was only 5 percent. It is interesting to note that, although PSP-5 and PSP-7 had similar amounts of Open Water as PSP-4 (Table 3.1), the cover by submergent vegetation in those plots was significantly less which might explain the absence of Coho fry.

PSP-1 and PSP-2 had the most physical structure, including live or dead trees, stumps, logs and woody debris. Physical structure provides cover and nesting areas for both aquatic and terrestrial wildlife. PSP-2 was the only plot where bird calls were heard nearby, and PSP-1 contained the most Coho fry (Appendix 3).

3.2 Vegetation Species

Dominant species are listed for the dominant vegetation forms in Table 3.3. *Phalaris arundinacea*, commonly known as reed canary grass, was by far the most dominant emergent species and had formed dense mats. Since most plots were dominated by emergent vegetation, reed canary grass was the dominant species in the assessment. *Typha latifolia*, or cattail, was the second most prevalent emergent species, however, less than half of the area covered by emergent vegetation in the plots contained cattails. Even in PSP-6 and PSP-7 which contained yellow iris, reed canary grass was the dominant species.

Reed canary grass is a perennial sod-forming grass species that prefers wet, poorly drained sites and grows in ditches, along the edges of ponds and lakes, in marshlands, and in wet meadows. The U.S. Department of Agriculture has listed reed canary grass as native in North America, where it is found across the continent in most states and provinces. Cultivars for ornamental use and pasture grasses have been introduced from Europe and Asia. These varieties of reed canary grass are aggressive in the central and western regions of North America, invading and filling in wetlands. As a result, reed canary grass is considered an invasive species (Tu, M., 2004).

As mentioned in section 3.1, PSP-1 and PSP-4 were the only plots where Coho fry were observed. PSP-1 had no reed canary grass while PSP-4 had the next lowest amount of reed canary grass (30 percent cover by emergent vegetation).

Photos 1 and 2 illustrate the prevalence of the grass.

Table 3-3: Dominant Forms and Species in Permanent Sample Plots (PSP's)

Site	Dominant Vegetation Form	Percent Cover	Dominant Species
PSP-1	Submergent	75	Filamentous Algae
PSP-2	Emergent	70	Reed Canary Grass
PSP-3	Emergent	90	Reed Canary Grass
PSP-4	Emergent Submergent Shrub	30 30 30	Reed Canary Grass Chara (Algae) Salmonberry
PSP-5	Emergent	65	Reed Canary Grass
PSP-6	Emergent	90	Reed Canary Grass
PSP-7	Emergent	40	Reed Canary Grass

Photo 1. PSP-3, reed canary grass has filled in spaces between cattails.

Photo 2. PSP-6, reed canary grass dominates both sides of CM Young Side Channel in Beaver Pond.

Table 3.4 contains a list of all species observed in all vegetation form categories. No rare or endangered species were identified. It should be noted that the wetland survey was initiated later in the summer than planned and many plants had finished flowering. Rare or endangered species may have been missed in 2019.

A diversity of natural wetland vegetation species was observed in the Beaver Pond. However, the cover provided by the natural species was significantly lower than the reed canary grass. For example, Table 3.1 illustrates that only two of the plots contained floating vegetation and the cover by that vegetation, and therefore floating species, was only 1 and < 1 percent. Less than 50 percent of the emergent vegetation cover was provided by species other than reed canary grass. The number of plots containing forbs, ferns and ground cover, along with their percent cover, was also low. It appears that reed canary grass is out-competing natural wetland species.

Table 3.4: Species List for Beaver Pond

Vegetation Form	Common Name	Scientific Name	Rare Endangered	Invasive
Submergent	Chara	*Chara sp.*	no	no
	Filamentous alga	*unknown*	no	no
Floating	Floating-leaved Pondweed	*Potamogeton natans*	no	no
	Narrow-leaved Bur-reed	*Sparganium angustifolium*	no	no
	Yellow Pond Lily	*Nuphar lutea*	no	no
Emergent	Reed canary grass	*Phalaris arundinacea*	no	yes
	Cattails	*Typha latifolia*	no	no
	Horsetail	*Equisetum sp.*	no	no
	Skunk Cabbage	*Lysichiton americanus*	no	no
	Slough Sedge	*Carex obnupta*	no	no
	Soft-stemmed Rush	*Juncus effusus*	no	no
	Yellow Iris	*Iris pseudacorus*	no	yes removed by CISC
Ground Cover	Rough moss	*Claopodium crispifolium*	no	no
Ferns	Bracken	*Pteridium aquilinum*	no	no
	Deer	*Blechnum spicant*	no	no
	Sword	*Polystichum munitum*	no	no
Forbs	Hairy Cat's Ears	*Hypochaeris radicata*	no	yes 2 plants, removed by MVIHES
Shrubs	Elderberry	*Sambucus racemosa*	no	no
	Green Alder	*Alnus crispa*	no	no
	Huckleberry	*Vaccinium sp.*	no	no
	Pacific Nine-bark	*Physocarpus capitatus*	no	no
	Salmonberry	*Rubus spectabilis*	no	no
	Snowberry	*Symphoricarpos albus*	no	no
	Spirea	*Spirea douglasii*	no	no
	Twinberry	*Lonicera involucrata*	no	no
	Willows	*Salix sp.*	no	no
Trees	Red Alder	*Alnus rubra*	no	no
	Western Redcedar	*Thuja plicata*	no	no

4.0 DISCUSSION

Although yellow iris was the invasive species that brought attention to the health of the Beaver Pond, it is reed canary grass that may be the greatest threat to the wetland. It appears to dominate most areas with little to no open water between the individual plants which formed dense mats.

Coho fry were only observed in PSP-1 and PSP-4 which contained the least amount of reed canary grass. These plots also contained significantly more submergent vegetation than the others. Some of the plots with little to no submergent vegetation had similar amounts of Open Water to PSP-4 so could potentially support more submergent vegetation. More monitoring is required to determine if the presence of reed canary grass is an impediment to the growth of submergent vegetation in adjacent Open Water communities.

It appears the reed canary grass in the Beaver Pond is an aggressive variety of the species and is filling in Coho fry rearing habitat while displacing the natural wetland plant species. A management strategy for eradication or control of the grass in the Beaver Pond should be developed by the RDN in partnership with other stakeholders for conservation of fry habitat.

Since aggressive cultivars of reed canary grass are known to be used as pasture grass, an assessment by the RDN of the proximity of routes used for horseback riding in relation to the Side Channel may be worthwhile. Horses may be contaminating the CM Young Side Channel and Beaver Pond with seed for reed canary grass. A public awareness program about the impacts of reed canary grass may also be worthwhile for local residents who cultivate pasture grasses for livestock.

Very little wildlife was observed during the assessment. The field work was conducted in mid to late summer when most breeding and nesting activity would be over and amphibians would be in the terrestrial environments. Subsequent assessments should be conducted in early summer to capture the breeding, nesting and other wildlife activity that occurs at that time.

5.0 WORKPLAN FOR 2020

Using the same methodology, the PSP's will be re-assessed in early summer when plants are flowering so identification of rare and endangered species can be included in the data collection. More wildlife signs should be observed in early summer as well.

The status of invasive plants in the wetland will be updated, including examining PSP-6 and PSP-7 for signs of yellow iris regeneration. Flowers and seed heads will be removed from any regenerating plants, and the RDN immediately notified.

The information collected from the PSP's in 2020 will be compared with that from 2019, to identify changes that may have occurred in ecological diversity and physical features. Data from subsequent years will be compiled with current data to determine if a trajectory for vegetation succession can be detected.

REFERENCES

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Lanarc Consultants Ltd. 2008. Englishman River Regional Park Five-Year Management Plan. Regional District of Nanaimo, Recreation and Parks Department and The Nature Trust of British Columbia.

MacKenzie, W.H. and J.R. Moran. 2004. Wetlands of British Columbia: a guide to identification. Research Branch, B.C. Ministry of Forests, Victoria, B.C. Land Management Handbook No. 52.

Ontario Ministry of Natural Resources. 2013. Ontario Wetland Evaluation System, Northern Manual, First Edition, Version 1.2.

Southam, T. and E.A. Curran (eds). 1996. The Wetlandkeepers Handbook: a practical guide to wetland care. B.C. Wildlife Federation, Surrey, B.C. and Environment Canada, Delta, B.C.

Tu, M. 2004. Reed Canary Grass (Phalaris arundinacea L.) Control & Management in the Pacific Northwest. The Nature Conservancy, Oregon Field Office

Appendix 1

Park Use Permit

Permit

REGIONAL DISTRICT OF NANAIMO

Park Services
1490 Springhill Road
Parksville, BC V9P 2T2

PHONE:(250) 248-4744
FAX:(250) 248-3159
EMAIL:recparks@rdn.bc.ca

Permit # R2378
Status Approved
Date Jun 27, 2019 11:04 AM

Organization Name	MVIHES - 297
Customer Type	General Public
Organization Address	Box 935 Parksville, BC V9P 2G9
Agent Name	Barb Riordan
Home Phone Number	(250) 248-0444
Email Address	FMEnvirServ@telus.net
System User	Chrissie Finnie

Rental Fee	$0.00
Discounts	$0.00
Subtotal	$0.00
Deposits	$0.00
Deposit Discounts	$0.00
Total Permit Fee	$0.00
Total Payment	$0.00
Refunds	$0.00
Balance	$0.00

2019-17 MVIHES Beaver Pond Monitoring

1 resource(s) 1 booking(s) **Subtotal: $0.00**

Event Notes:
Permit for Beaver Pond Monitoring from June 1, 2019 to October 31, 2023.
Insurance provided as required.
Please provide RDN Parks Department with study results when available.

Booking Summary

Englishman River Regional Park (No Charge) — **Center: Englishman River Regional Park**

START DATE	START TIME	END DATE	END TIME	ATTENDEE	AMT W/O TAX
Jun 1, 2019	8:00 AM	Jun 1, 2019	8:45 AM	1	$0.00

The licensee agrees to be bound by the terms and conditions that will be sent under separate cover.

If you do not receive the terms and conditions, call the Arena Program Secretary at 250 248-3252, Aquatic/Field Program Secretary at 250 752-5014 or Parks Recreation Programmer at 250 248-4744

X: C. Jurice

Date: March 3, 2020

Park Services
Mailing Address: 1490 Springhill Road, Parksville, BC
V9P 2T2
Phone Number: (250) 248-4744
Fax Number: (250) 248-3159
Email Address: recparks@rdn.bc.ca

X: B. Riordan

Date: June 27. 2019

MVIHES
Customer Type: General Public
Customer ID: 19686
Mailing Address: Box 935, Parksville, BC
V9P 2G9
Authorized Agent Name: Barb Riordan
Home Phone Number: (250) 248-0444
Email Address: FMEnvirServ@telus.net

Appendix 2
Blank Data Forms

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: _____
DATE:_____ **WEATHER:**_____
MVIHES VOLUNTEERS:_____
PHOTOS:_____
CAMERA:_____

PHYSICAL ATTRIBUTES of PSP	
At Centre	
Water Depth: 1.2 m	Bottom Type:
Above water (percent area of plot)	
Beaver Dam – BD	Beaver Lodge- BL
Boulders	Rocks

WILDLIFE SIGNS	**SPECIES**	**NUMBER**
Animal Sighting - AS		
Nest – N		
Den - D		
Tracks - Tr		
Scat - Sc		

Wildlife signs can be recorded within a PSP and for any areas within the wetland outside the PSP's. When recorded outside a PSP, an attempt will be made to get a UTM reading, or proximity to nearest PSP.

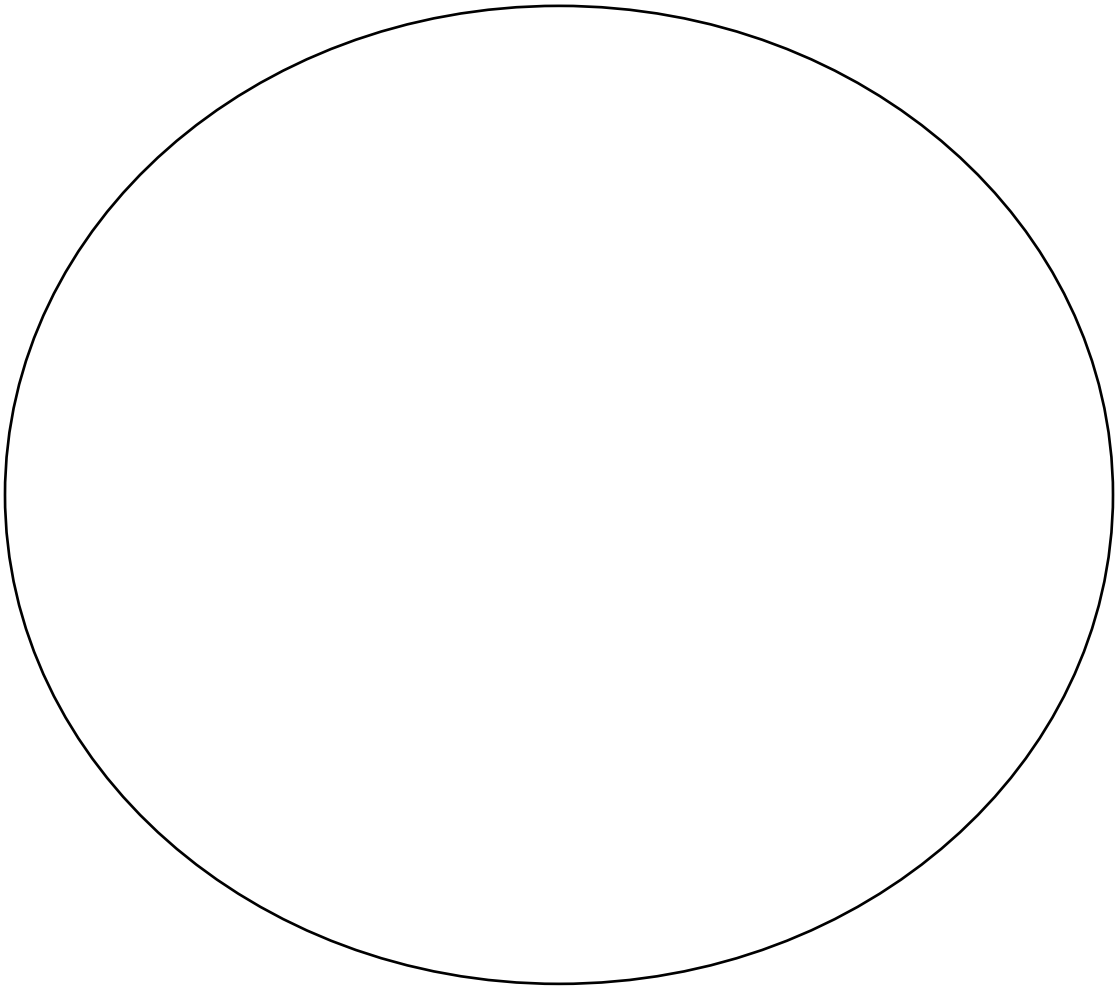
NOTES:_____
_____
_____
_____
_____

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: _____
DATE:_____

Percentage of Plot Area that is Open Water Community:					
VEGETATION TYPE	**PERCENT COVER**	**DOMINANT SPECIES**	**CO-DOMINANT SPECIES**	**INVASIVE SPECIES**	**RARE/ENDANGERED SPECIES**
Bare Substrate - B					
Emergent - E					
Floating - Fl					
Submergent - Su					
Ground Cover - G					
Forb - Fo					
Fern - Fe					
Live Shrub - Sh^{L}					
Dead Shrub - Sh^{D}					
Live Tree Standing - T^{LS}					
Live Tree Fallen - T^{LF}					
Dead Tree Standing- T^{DS}					
Dead Tree Fallen - T^{DF}					
Stumps					
Logs					
Woody debris					

SKETCH OF PSP

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: _____
DATE:_____
DRAWN BY: _____



Appendix 3
Photos, Data and Sketches for Permanent Sample Plots

PSP-1 Photos

North

South

East

West

Down

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP-1
DATE: 7/25/2019 **WEATHER: overcast, occasional drizzle**
MVIHES VOLUNTEERS: Peter Law, Barb Riordan
PHOTOS: North 2403, South 2404, East 2405, West 2406, Down 2407
CAMERA: Barb's Fuji

PHYSICAL ATTRIBUTES of PSP	
At Centre	
Water Depth: 1.2 m	Bottom Type: silt/clay
Above water (percent area of plot)	
Beaver Dam – BD	Beaver Lodge- BL
Boulders	Rocks

WILDLIFE SIGNS	**SPECIES**	**NUMBER**
Animal Sighting - AS	Coho fry	> 20
Nest – N		
Den - D		
Tracks - Tr		
Scat - Sc		

Wildlife signs can be recorded within a PSP and for any areas within the wetland outside the PSP's. When recorded outside a PSP, an attempt will be made to get a UTM reading, or proximity to nearest PSP.

NOTES: due to difficulty in navigating canoe through deadfall in water a new location was selected. 15 % of the plot was unvegetated pond bottom, 75% of plot was pond bottom covered in 2 algal types

10% of plot had tree stumps sticking out of water, 30% of plot had woody debris on pond bottom covered in algae

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP-1
DATE: 07/25/2019

Percentage of Plot that is Open Water Community: 100

VEGETATION FORM	**PERCENT COVER**	**DOMINANT SPECIES**	**CO-DOMINANT SPECIES**	**INVASIVE SPECIES**	**RARE/ENDANGERED SPECIES**
Bare Substrate - B	15				
Emergent - E					
Floating - Fl					
Submergent - Su	75	Filamentous algae	Chara		
Ground Cover - G					
Forb - Fo					
Fern - Fe					
Live Shrub - Sh^{L}					
Dead Shrub - Sh^{D}					
Live Tree Standing - T^{LS}					
Live Tree Fallen - T^{LF}					
Dead Tree Standing- T^{DS}					
Dead Tree Fallen - T^{DF}					
Stumps/ tree stems	10				
Logs					
Woody debris	30				

PSP-2 Photos

North

South

East

West

Down

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP2
DATE: 08/29/19 **WEATHER: clear, calm, warm**
MVIHES VOLUNTEERS: Shelley Goertzen, Barb Riordan
PHOTOS: 2459 N, 2460 S, 2461 E, 2462 W, 2463 down
CAMERA: Barb's Fuji

PHYSICAL ATTRIBUTES of PSP	
At Centre	
Water Depth: 0 m	Bottom Type: organic
Above water (percent area of plot)	
Beaver Dam – BD	Beaver Lodge- BL
Boulders	Rocks

WILDLIFE SIGNS	**SPECIES**	**NUMBER**
Animal Sighting - ASi		
Animals Sounds - ASo	Kingfisher Unknown bird	1 2 or 3
Nest – N		
Den - D		
Tracks - Tr		
Scat - Sc		

Wildlife signs can be recorded within a PSP and for any areas within the wetland outside the PSP's. When recorded outside a PSP, an attempt will be made to get a UTM reading, or proximity to nearest PSP.

NOTES: other species include rush and twinberry, area beyond plot contains many dead standing trees and snags, stream channels and pockets of open water

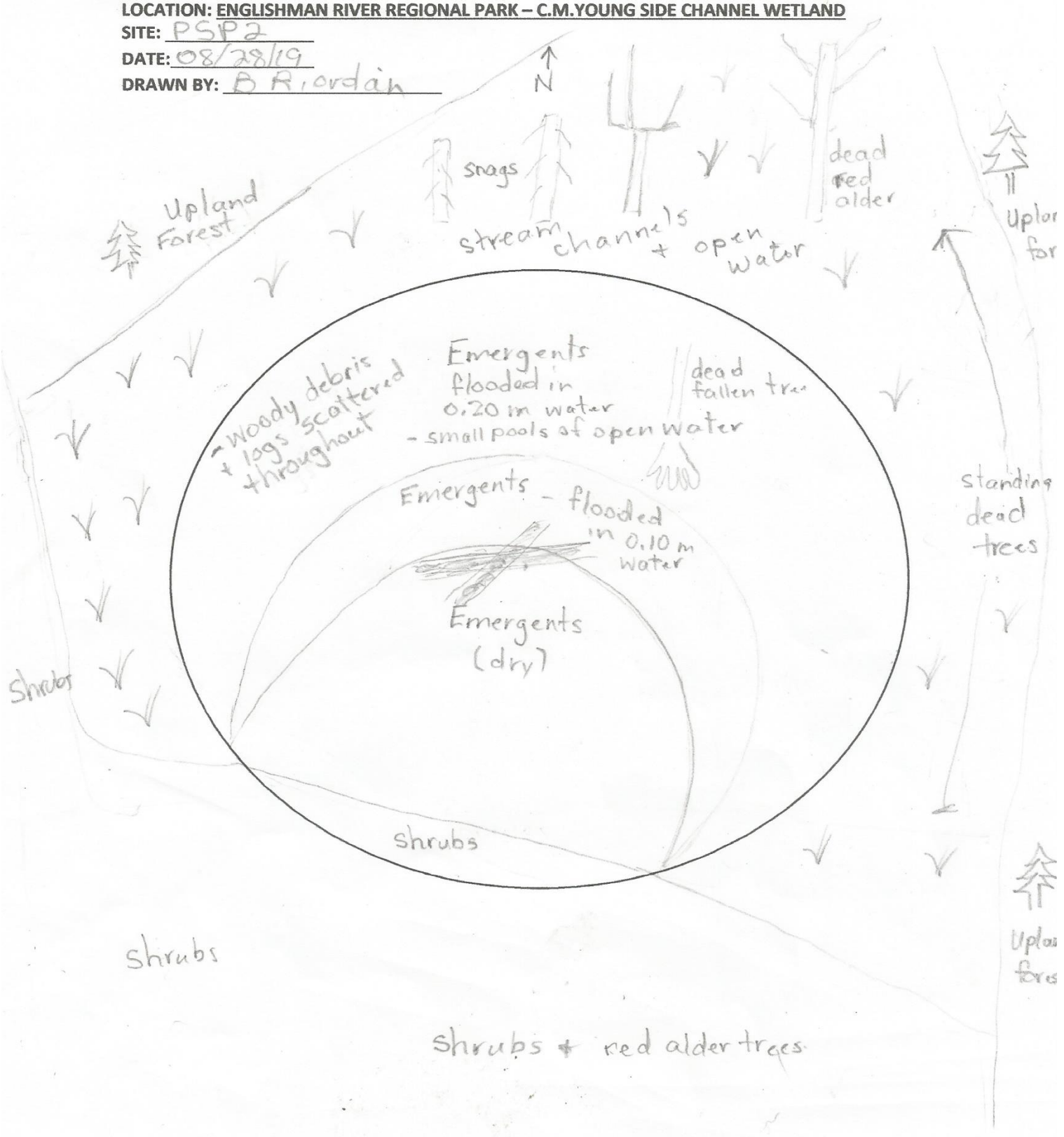
LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP2
DATE: 08/29/19

Percent Area of Plot that is Open Water Community: 20

VEGETATION TYPE	**PERCENT COVER**	**DOMINANT SPECIES**	**CO-DOMINANT SPECIES**	**INVASIVE SPECIES**	**RARE/ENDANGERED SPECIES**
Bare Substrate - B	14				
Emergent - E	70	Reed canary grass	cattails	Reed canary grass	
Floating - Fl					
Submergent - Su	1	Chara			
Ground Cover - G					
Forb - Fo					
Fern - Fe					
Live Shrub - Sh^{L}	3	Spirea	willows		
Dead Shrub - Sh^{D}					
Live Tree Standing - T^{LS}	2	Red alder saplings			
Live Tree Fallen - T^{LF}					
Dead Tree Standing- T^{DS}					
Dead Tree Fallen - T^{DF}	<1				
Stumps					
Logs	10				
Woody debris	10	Some submerged			

SKETCH OF PSP

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP2
DATE: 08/28/19
DRAWN BY: B Riordan



PSP-3 Photos

North

South

East

West

No “Down” photo available

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP3
DATE: 08/28/19 **WEATHER: clear, hot**
MVIHES VOLUNTEERS: Peter Law, Barb Riordan
PHOTOS: 2452 N, 2453 S, 2454 E, 2453 W
CAMERA: Barb's Fuji

PHYSICAL ATTRIBUTES of PSP	
At Centre	
Water Depth: 0 m	Bottom Type: organic
Above water (percent area of plot)	
Beaver Dam – BD	Beaver Lodge- BL
Boulders	Rocks

WILDLIFE SIGNS	**SPECIES**	**NUMBER**
Animal Sighting - AS		
Nest – N		
Den - D		
Tracks - Tr		
Scat - Sc		

Wildlife signs can be recorded within a PSP and for any areas within the wetland outside the PSP's. When recorded outside a PSP, an attempt will be made to get a UTM reading, or proximity to nearest PSP.

NOTES: other species include cattails, huckleberry and elderberry
logs have vegetation growing on them

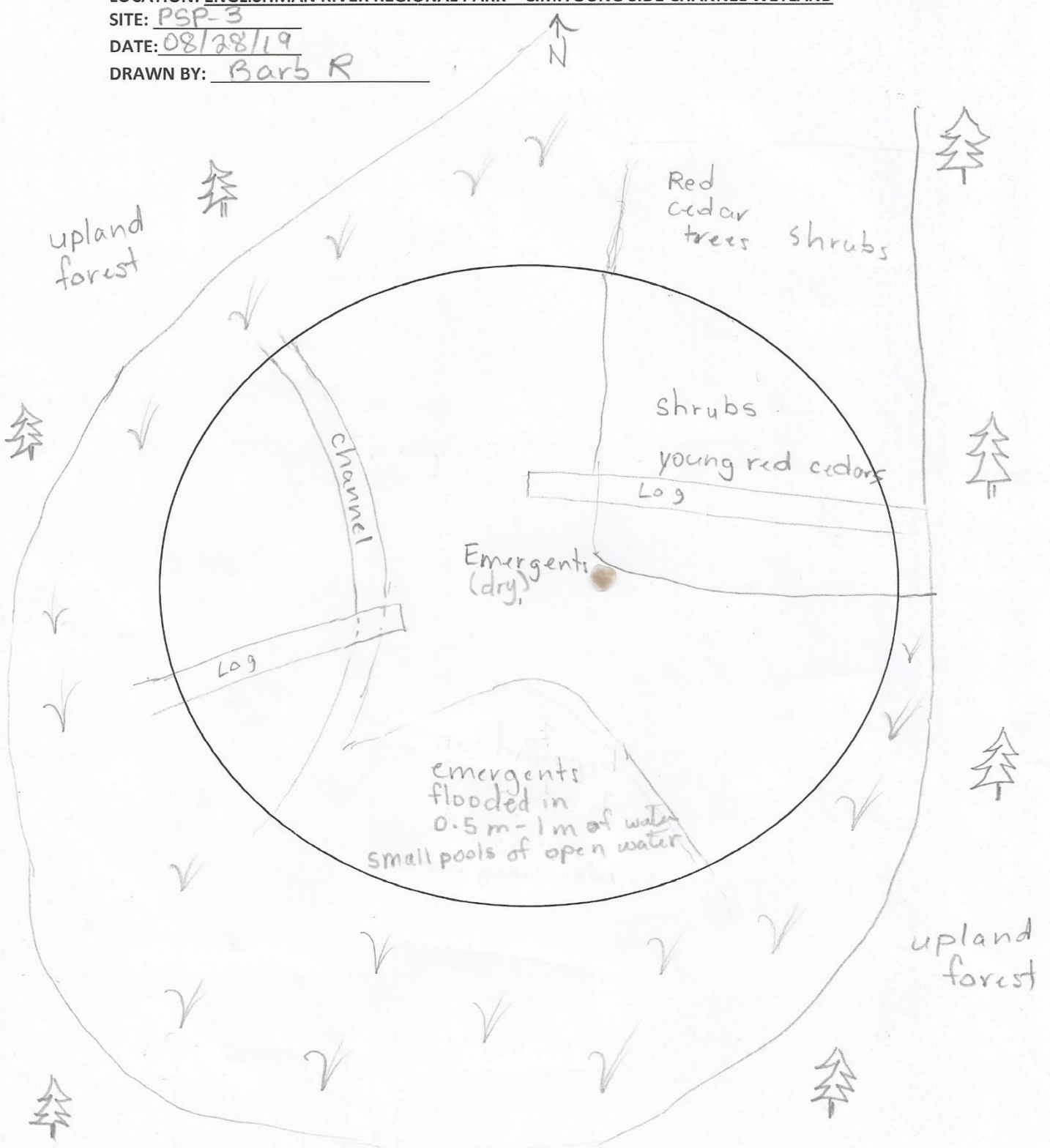
LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP3
DATE: 08/28/09

Percent Area of Plot that is Open Water Community: 5

VEGETATION TYPE	**PERCENT COVER**	**DOMINANT SPECIES**	**CO-DOMINANT SPECIES**	**INVASIVE SPECIES**	**RARE/ENDANGERED SPECIES**
Bare Substrate - B	5				
Emergent - E	90	Reed canary grass		Reed canary grass	
Floating - Fl					
Submergent - Su					
Ground Cover - G					
Forb - Fo					
Fern - Fe					
Live Shrub - Sh^{L}	5	Pacific nine bark	Green alder		
Dead Shrub - Sh^{D}					
Live Tree Standing - T^{LS}	<1	Red cedar			
Live Tree Fallen - T^{LF}					
Dead Tree Standing- T^{DS}					
Dead Tree Fallen - T^{DF}					
Stumps					
Logs	1				
Woody debris					

SKETCH OF PSP

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP-3
DATE: 08/28/19
DRAWN BY: Barb R



PSP-4 Photos

North

South

East

West

Down

Yellow Pond Lily near plot centre

Open Water on east side of plot (2 Coho fry observed)

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP4
DATE: 08/28/19 **WEATHER: clear, hot**
MVIHES VOLUNTEERS: Peter Law, Barb Riordan
PHOTOS: 2445 N, 2446 S, 2447 E, 2448 W, 2449 down, 2450 pond lilies, 2451 pond lilies and log
CAMERA: Barb's Fuji

PHYSICAL ATTRIBUTES of PSP	
At Centre	
Water Depth: 0.2 m	Bottom Type: organic
Above water (percent area of plot)	
Beaver Dam – BD	Beaver Lodge- BL
Boulders	Rocks

WILDLIFE SIGNS	**SPECIES**	**NUMBER**
Animal Sighting - AS	Coho fry	2
Nest – N		
Den - D		
Tracks - Tr		
Scat - Sc		

Wildlife signs can be recorded within a PSP and for any areas within the wetland outside the PSP's. When recorded outside a PSP, an attempt will be made to get a UTM reading, or proximity to nearest PSP.

NOTES: original plot on dry land, selected closest wetland community for new plot
other species included sword fern and deer fern
exposed logs have vegetation growing on them

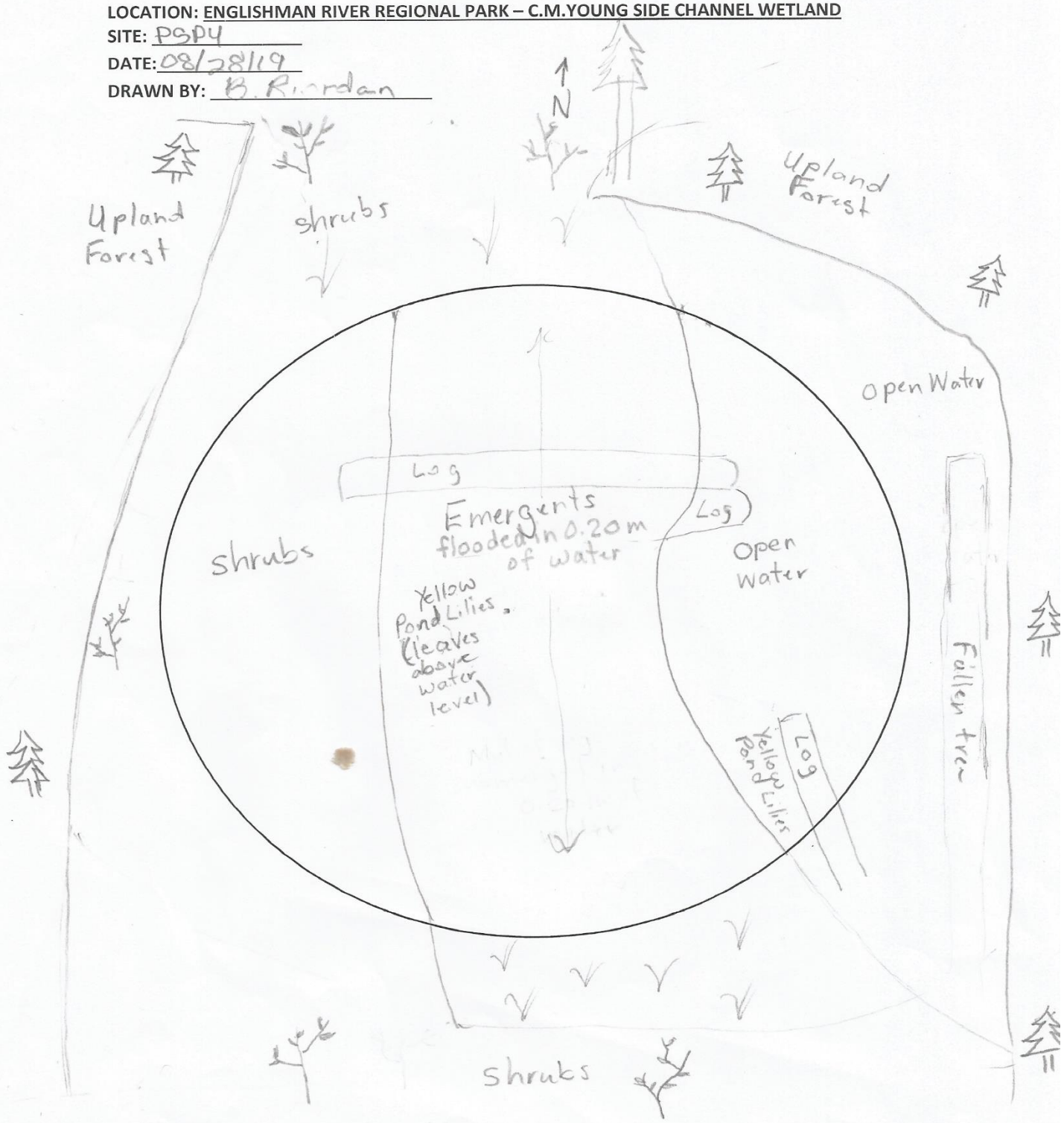
LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: 08/28/19
DATE: PSP4

Percent of Plot Area that is Open Water Community: 30

VEGETATION TYPE	**PERCENT COVER**	**DOMINANT SPECIES**	**CO-DOMINANT SPECIES**	**INVASIVE SPECIES**	**RARE/ENDANGERED SPECIES**
Bare Soil - B	0				
Emergent - E	30	Reed canary grass	horsetail	Reed canary grass	
Floating - Fl	1	Yellow pond lily			
Submergent - Su	30	Chara			
Ground Cover - G	10	Stepping stone moss			
Forb - Fo					
Fern - Fe	2	Bracken fern			
Live Shrub - Sh^{L}	30	Salmonberry	Alder, snowberry		
Dead Shrub - Sh^{D}					
Live Tree Standing - T^{LS}					
Live Tree Fallen - T^{LF}					
Dead Tree Standing- T^{DS}					
Dead Tree Fallen - T^{DF}					
Stumps					
Logs	2				
Woody debris					

SKETCH OF PSP

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP4
DATE: 08/28/19
DRAWN BY: B. Riordan



PSP-5 Photos

North

South

East

West

Down

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP5
DATE: 08/28/19 **WEATHER: clear, warm, moderate breeze**
MVIHES VOLUNTEERS: Peter Law, Barb Riordan
PHOTOS: 2440 N, 2441 S, 2442 E, 2443 W, 2444 down
CAMERA: Barb's Fuji

PHYSICAL ATTRIBUTES of PSP	
At Centre	
Water Depth: 0.05 m	Bottom Type: organic
Above water (percent area of plot)	
Beaver Dam – BD	Beaver Lodge- BL
Boulders	Rocks

WILDLIFE SIGNS	**SPECIES**	**NUMBER**
Animal Sighting - AS		
Nest – N		
Den - D		
Tracks - Tr		
Scat - Sc		

Wildlife signs can be recorded within a PSP and for any areas within the wetland outside the PSP's. When recorded outside a PSP, an attempt will be made to get a UTM reading, or proximity to nearest PSP.

NOTES: other species include soft-stemmed rush, slough sedge and skunk cabbage
2 logs, one covered in vegetation

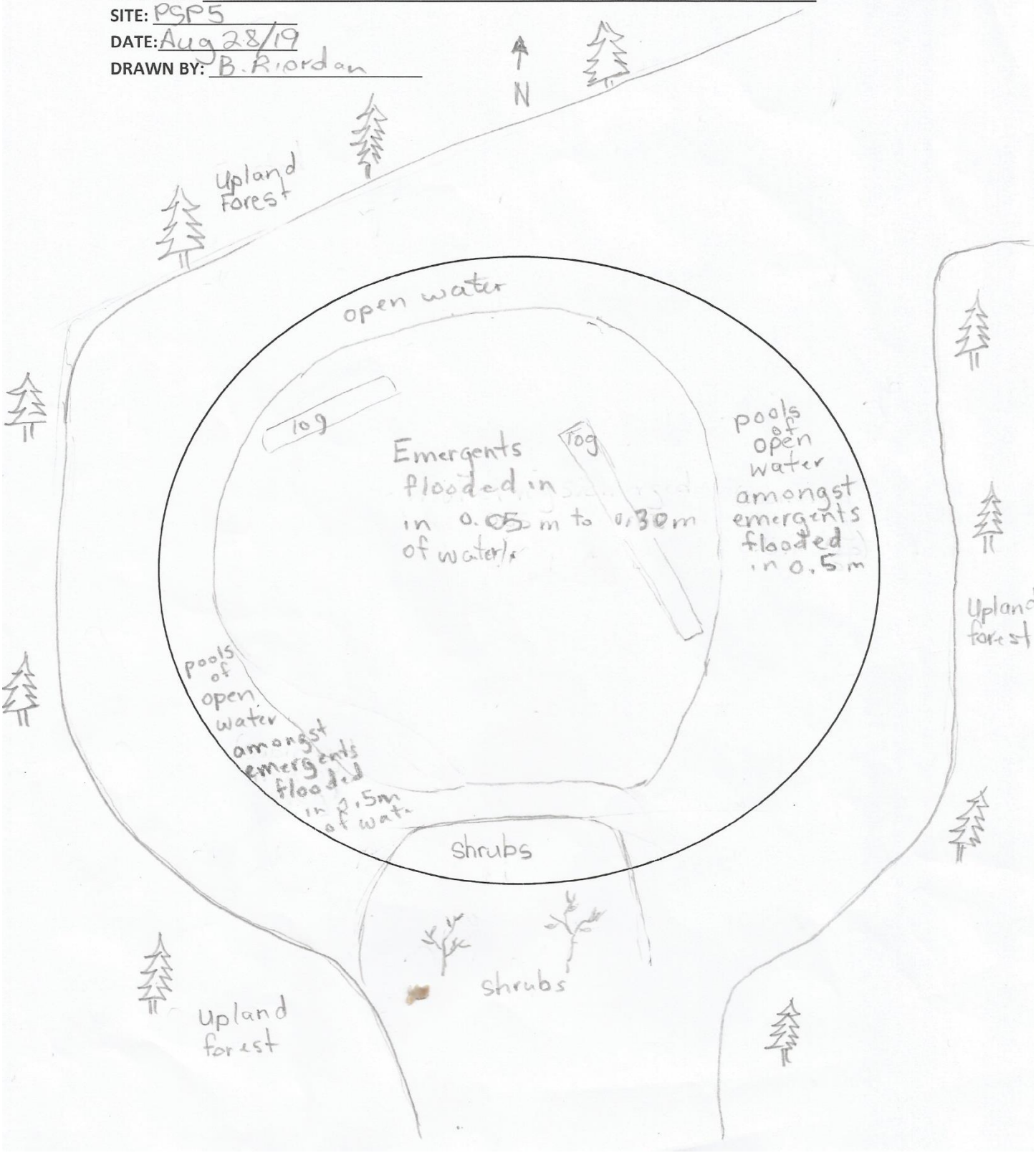
LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP5
DATE: 08/28/19

Percentage of Plot Area that is Open Water Community: 30

VEGETATION TYPE	**PERCENT COVER**	**DOMINANT SPECIES**	**CO-DOMINANT SPECIES**	**INVASIVE SPECIES**	**RARE/ENDANGERED SPECIES**
Bare Substrate - B	25				
Emergent - E	65	Reed canary grass	cattails	Reed canary grass	
Floating - Fl	<1	Floating pond weed			
Submergent - Su	5	Chara			
Ground Cover - G	10	Stepping stone moss			
Forb - Fo	2 plants - removed	Hairy cat's ear		Hairy cat's ear	
Fern - Fe	<1	Bracken fern			
Live Shrub - Sh^{L}	5	Spirea	willows		
Dead Shrub - Sh^{D}					
Live Tree Standing - T^{LS}					
Live Tree Fallen - T^{LF}					
Dead Tree Standing- T^{DS}					
Dead Tree Fallen - T^{DF}					
Stumps					
Logs	10				
Woody debris					

SKETCH OF PSP

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP5
DATE: Aug 28/19
DRAWN BY: B. Riordan



PSP-6 Photos

North

South

East

West

Down

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP-6 (Yellow Iris)
DATE: 7/25/2019 **WEATHER: overcast**
MVIHES VOLUNTEERS: Peter Law, Barb Riordan
PHOTOS: not taken from centre but at 5.64 m from centre perpendicular to shore
North 2408, South 2409, East 2410, West 2411, Down 2412
CAMERA: Barb's Fuji

PHYSICAL ATTRIBUTES of PSP	
At Centre	
Water Depth: 0 m (at shore)	Bottom Type: organic
Above water (percent area of plot)	
Beaver Dam – BD	Beaver Lodge- BL
Boulders	Rocks

WILDLIFE SIGNS	**SPECIES**	**NUMBER**
Animal Sighting - AS		
Nest – N		
Den - D		
Tracks - Tr		
Scat - Sc		

Wildlife signs can be recorded within a PSP and for any areas within the wetland outside the PSP's. When recorded outside a PSP, an attempt will be made to get a UTM reading, or proximity to nearest PSP.

NOTES: dominated by a flooded colony of reed canary grass

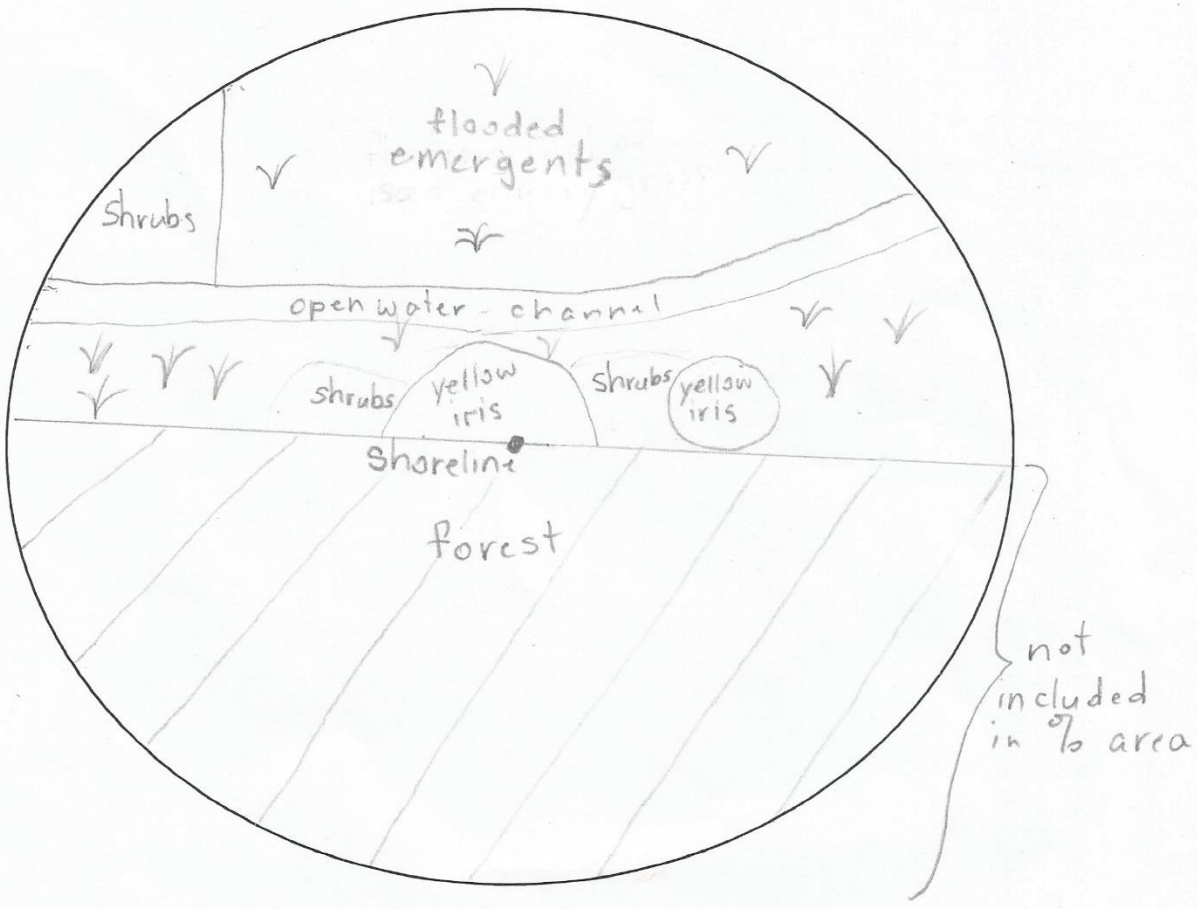
LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP-6 (Yellow Iris site)
DATE: 07/25/2019

Percentage of Plot Area that is Open Water Community: 5

VEGETATION TYPE	**PERCENT COVER**	**DOMINANT SPECIES**	**CO-DOMINANT SPECIES**	**INVASIVE SPECIES**	**RARE/ENDANGERED SPECIES**
Bare Substrate - B	5				
Emergent - E	90	Reed canary grass		Yellow Iris in 2 clumps Reed canary grass	
Floating - Fl					
Submergent - Su					
Ground Cover - G					
Forb - Fo					
Fern - Fe					
Live Shrub - Sh^{L}	5	spirea	Pacific nine bark		
Dead Shrub - Sh^{D}					
Live Tree Standing - T^{LS}					
Live Tree Fallen - T^{LF}					
Dead Tree Standing- T^{DS}					
Dead Tree Fallen - T^{DF}					
Stumps/dead tree stems					
Logs					
Woody debris					

SKETCH OF PSP

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP-6 (Yellow Iris)
DATE: 7/25/2019
DRAWN BY: Barb Riordan



PSP-7 Photos

North – Yellow Iris in view

South

East

West

Down

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP-7 (Yellow Iris)
DATE: 7/25/2019 **WEATHER: overcast**
MVIHES VOLUNTEERS: Peter Law, Barb Riordan
PHOTOS: North 2414, South 2415, East 2416, West 2417, Down 2418
CAMERA: Barb's Fuji

PHYSICAL ATTRIBUTES of PSP	
At Centre	
Water Depth: 0 m (at shore)	Bottom Type: silt/sand
Above water (percent area of plot)	
Beaver Dam – BD	Beaver Lodge- BL
Boulders	Rocks

WILDLIFE SIGNS	**SPECIES**	**NUMBER**
Animal Sighting - AS		
Nest – N		
Den - D		
Tracks - Tr		
Scat - Sc		
Other	Beaver or otter slide	1

Wildlife signs can be recorded within a PSP and for any areas within the wetland outside the PSP's. When recorded outside a PSP, an attempt will be made to get a UTM reading, or proximity to nearest PSP.

NOTES:

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP-7 (Yellow Iris site)
DATE: 07/25/2019

Percentage of Plot Area that is Open Water Community: 40

VEGETATION TYPE	**PERCENT COVER**	**DOMINANT SPECIES**	**CO-DOMINANT SPECIES**	**INVASIVE SPECIES**	**RARE/ENDANGERED SPECIES**
Bare Substrate - B	40				
Emergent - E	40	Reed canary grass	Slough sedge/horsetail	Yellow Iris in 2 locations Reed canary grass	
Floating - Fl					
Submergent - Su					
Ground Cover - G					
Forb - Fo					
Fern - Fe					
Live Shrub - Sh^{L}	20	salmonberry	Spirea		
Dead Shrub - Sh^{D}					
Live Tree Standing - T^{LS}					
Live Tree Fallen - T^{LF}					
Dead Tree Standing- T^{DS}					
Dead Tree Fallen - T^{DF}					
Stumps/dead tree stems					
Logs					
Woody debris					

SKETCH OF PSP

LOCATION: ENGLISHMAN RIVER REGIONAL PARK – C.M.YOUNG SIDE CHANNEL WETLAND
SITE: PSP-7 (Yellow Iris)
DATE: 7/25/2019
DRAWN BY: Barb Riordan