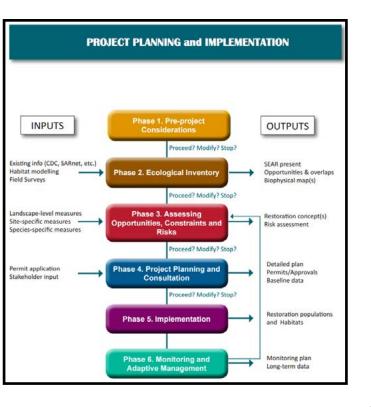


Complexity varies dramatically









Shallow Marsh

at Aldergrove

Regional Park









Goals do not:

The **GOALS** of this project are to:

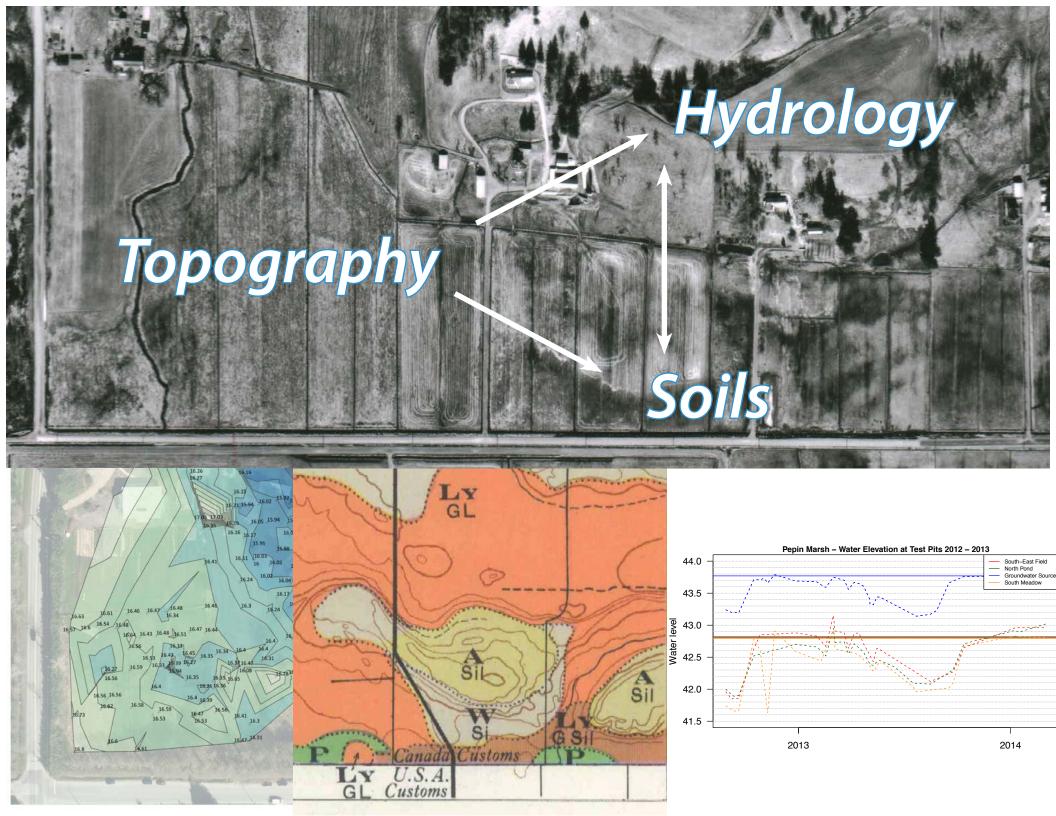
- a) Provide recovery habitat for endangered species X;
- b) Enhance wildlife biodiversity, focusing on Species-at-Risk;
- c) Provide education, stewardship and research opportunities;
- d) Increase our knowledge of marsh restoration techniques.

The **OBJECTIVES** of this project are to:

- 1. Continue implementation of Monitoring and Adaptive Management program of constructed marsh (<u>Phase I</u>) Monitor hydrology, vegetation and wildlife biodiversity (fish, amphibian, avian, odonate) to inform adaptive management plan. Continue invasive species removal, trail maintenance.
- 2. Continue implementation of <u>Upland Forest Reclamation</u> plant, protect and irrigate seedlings in historic raspberry field.
- 3. Implement restoration plan for <u>Phase II</u> (Swamp restoration) Remove invasive species, excavate channels and ponds to increase available aquatic habitat.
- 4. Implement restoration plan for <u>Phase III (Marsh restoration)</u> Remove invasive species, manipulate hydrology and grade to increase available aquatic habitat.
- 5. Develop and implement monitoring plans for Phase II and III.
- 6. Engage the public, volunteers, schools and university / college students in ecological restoration and wildlife management.

Know What you Have







Social Context

Canada

Vancouver 📜





British Columbia Washington



Ministry of Forests, Lands and Natural Resource Operations













PEPIN MARSH

200

300 m

Range Historic





THE KIDS'
CONSERVATION
ORGANIZATION





Fraser Valley Conservancy Placing lands in trust for our future





What Can You Do?

Opportunities & Constraints

Resources







\$\$\$\$!!!

\$\$!!

\$:

Concept, Budget, Propose

PHASE II CONCEPT DRAWING - SWAMP IMPROVEMENT

Existing Conditions:

- · 3.7 Ha target area;
- Historically farmed / grazed, channel filled & replaced with ditches, subsequently replaced with drain tile;
- Historic equestrian riding ring in NE corner:
- Current vegetation dominated by areas of Willow, Red Alder and Himalayan Blackberry;
- Shallow topsoil layer over coarse gravels with seasonal water table;
- Ephemeral swamps dominated by willows surrounded by old Blackberry in higher zones. Saturated soils in winter appear to reduce or prevent new blackberry growth and slow expansion.

Desired Outcomes:

- · Reduce density of invasive species;
- Retain native willows, alders, cottonwoods;
- · Recover water table;
- Increase soil moisture to reduce suitability for blackberry regrowth;
- Increase available aquatic habitat;
- · Improve connectivity between habitats;
- Develop willow farm for provision of willow whips to local wetland and stream restoration projects;
- Provide educational opportunities for students, volunteers, and local community members.

Actions

- Assess soil conditions / hydrology (in progress 2015-16):
- Remove invasive Himalayan Blackberry around swamps using manual and mechanical means (in progress 2015-17)
- Excavate shallow zones, pools, and channels, using spoil to create berms and direct water (2016):
- Alter hydrology to direct water into new channels, ponds, and overland (2016);
- Decomission draintile and design outlet elevations to manage water depth for target species in constructed ponds (2016).

PHASE III CONCEPT DRAWING - MARSH RESTORATION

Existing Conditions:

- 6.2 Ha target area;
- · Historically farmed / grazed;
- Historic channels filled, replaced with ditches, subsequently replaced with drain tile.
- Current vegetation dominated by Reed Canary Grass.
- 0.5 m topsoil layer over clay loam / sandy loam mineral soil.
- · Drain tile present;
- Elevation drop from north-east, dry corner to moist south west;
- Historically flooded central band east-west prior to drain tile installation.

Desired Outcomes:

- · Reduce density of invasive species;
- · Recover raised water table;
- Increase available aquatic habitat, with focus on restoration of marsh conditions:
- Improve connectivity between wetted areas;
- Provide educational opportunities for students, volunteers, and local community members.

Actions

- Assess soil conditions / hydrology (in progress 2015-16):
- Control invasive species growth by chemical and mechanical means (in progress 2015-18);
- Excavate shallow zones, pools, and channels, using spoil to create berms and direct water (2017):
- Remove root mass in select areas to prevent re-growth;
- Using historic and extant topography as a guide, alter hydrology to direct water into new channels, ponds, and overland;
- Decomission draintile and design outlet elevations to manage water depth for target species in constructed ponds (2017)

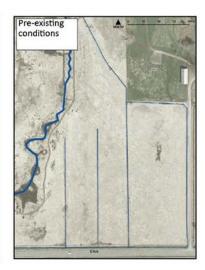


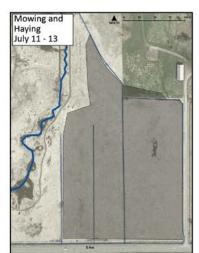


Shallow Marsh Restoration at Aldergrove Regional Park

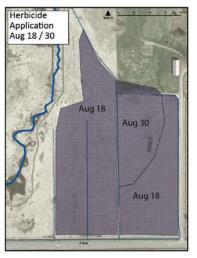
Construction stages July - September 2013 Impacted area: 5.4 Ha

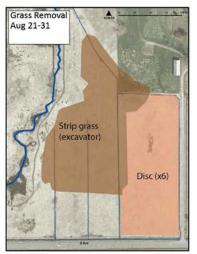


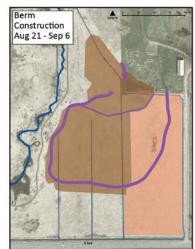


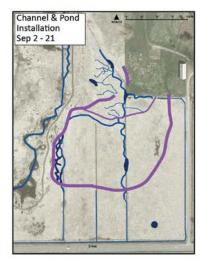


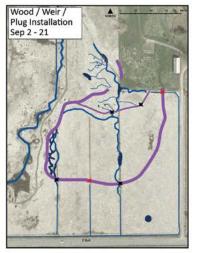


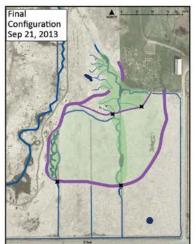


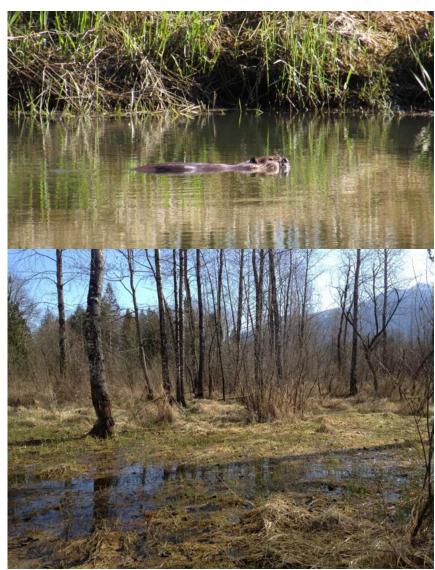














DETAILS!! Hydrology



DETAILS!! Habitat Features



Work with Volunteers



Monitoring & Adaptive Mgmt

- Hydrologic Monitoring
- VEGETATION MONITORING
- 3. AMPHIBIAN MONITORING
- 4. FISH MONITORING
- BIRD MONITORING
- ODONATE MONITORING
- 7. HABITAT FEATURE MONITORING
- 8. MONITORING CALENDAR
- 9. MANAGEMENT SUMMARY DIAGRAM

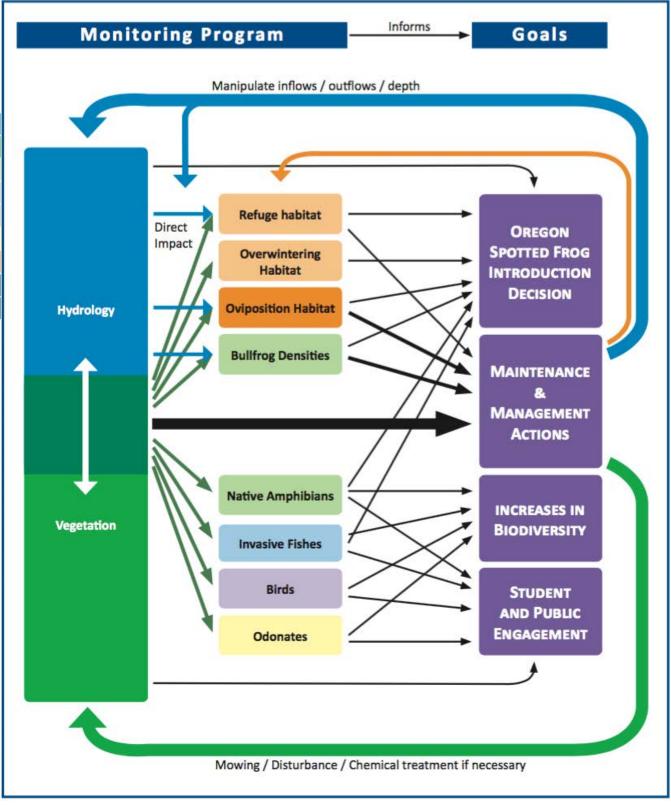
Month	Hydrology	Vegetation	Amphibians	Fishes	Birds	Odonates	Habitat Features	
January	Loggers / Manual				Volunteers		Temp Log	
February	Loggers / Manual				Volunteers		Temp Log	
March	Loggers / Manual	Plots: 1 x 8 h	EMS: 1 x 6 h		Volunteers		Temp Log Hardhack: 1 h	
April	Laggers / Manual		EMS: 2 x 6 h		Volunteers Breed: 1 x 2h		Temp Log	
May	Loggers / Manual			Trap: 2 x 4 h	Volunteers Breed: 2 x 2 h Marsh: 1 x 2 h	Loop: 1 x 2h	Temp Log	
June	Loggers / Manual	Plots: 1 x 8 h	Coll: 1 x 2 h EMS: 1 x 4 h		Volunteers Marsh: 2 x 2 h	Loop: 1 x 2h	Temp Log Hardhack: 1 h	Refuge
July	Loggers / Manual		Call: 1 x 2 h EMS: 1 x 4 h		Volunteers	Loop: 1 x 2h	Temp Log	Refuge
August	Loggers / Manual		Trap: 3 x 4 h	-	Volunteers	Loop: 1 x 2h	Temp Log	Refuge
September	Loggers / Manual	Plots: 1 x 8 h		Trap: 2 x 4 h	Volunteers	Loop: 1 x 2h	Temp Log Hardhack: 1 h	Refuge
October	Loggers / Manual				Volunteers	Loop: 1 x 2h	Temp Log	Refuge
November	Loggers / Manual		2.74		Volunteers		Temp Log	
December	Loggers / Manual	Plots: 1 x 8 h			Volunteers		Temp Log Hardhock: 1 h	

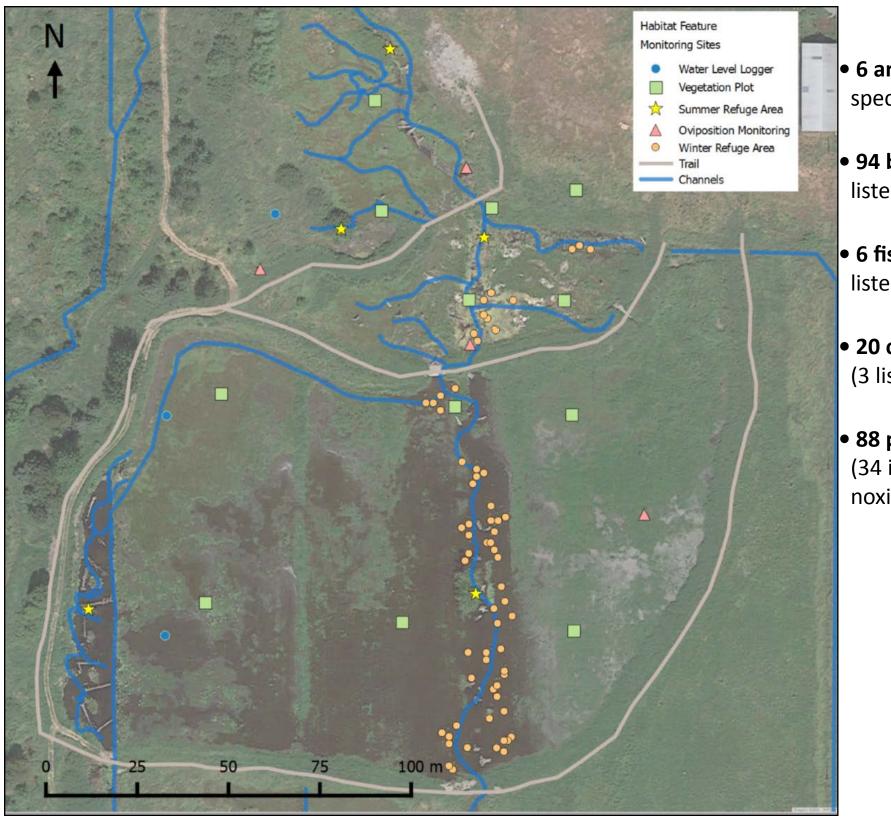
8B. MONITORING CALENDAR - LOW FUNDING MODEL

In the event that funding applications are not successful, monitoring will rely on in-kind contributions by project partners and student participants. The following activities are of highest priority:

- » Automatic loggers provide high quality continuous monitoring data, and water level loggers have already been deployed.
 » Vegetation monitoring is necessary for the provision of mWaintenance recommendations, and will be limited by number of plots assessed during the day.
- » Amphibian and fish surveys are crucial to informing the eventual introduction of Oregon Spotted Frogs to the wetland.
- » Bird species lists will be generated by volunteers.
- » Odonate species lists may be generated by volunteers if suitable volunteers are found.

Month	Hydrology	Vegetation	Amphibians	Fishes	Birds	Odonates	Habitat Features	
January	Loggers				Volunteers		Temp Log	
February	Loggers				Volunteers		Temp Log	
March	Loggers	Plots: 1 x 4 h	EMS: 1 x 4 h		Volunteers		Temp Log	
April	Loggers		EMS: 1x4h		Volunteers		Temp Log	
May	Loggers				Volunteers		Temp Log	
June	Loggers	Plots: 1 x 4 h	Call: 1 x 2 h		Volunteers		Temp Log	Refuge
July	Loggers		Call: 1 x 2 h		Volunteers		Temp Log	Refuge
August	Loggers		Trap: 2 x 4 h		Volunteers		Temp Log	
September	Loggers			Trap: 2 x 4 h	Volunteers		Temp Log	Refuge
October	Loggers				Volunteers		Temp Log	
November	Loggers				Volunteers		Temp Log	
December	Loggers				Volunteers		Temp Log	





- 6 amphibian species (2 listed).
- **94 bird** species (5 listed).
- 6 fish species (2 listed).
- **20 odonate** species (3 listed)
- 88 plant species, (34 invasive or noxious)

