



**PROJECT: Trail relocation and bridge construction across Little Anderson Creek.**

*Prepared for:*

- Kitsap County Parks and Recreation
- Newberry Hill Heritage Park Stewardship Group
- JARPA , HPA and CAO compliance



*Prepared by:*

- Robert F. Stricklin, Wetland Steward

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**Cover Photo courtesy of USFS**

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## Introduction

Newberry Hill Heritage Park is composed of approximately 1000 acres of disturbed habitat. These lands were formerly managed by the Washington Department of Natural Resources for timber production, and held in trust for Kitsap County schools. Best practices for timber production required elimination of competing species. While this was good for timber production efficiency, it was bad for biological diversity.

The north end of the park contains many valuable habitat types, but the most valuable of all are the wetlands. The largest wetland in the north end of the park has a preliminary Category II Wetland rating as determined by application of the Washington State Wetland Rating System for Western Washington<sup>1</sup>. The total Function score was 54<sup>2</sup>, with no Special Characteristics. It is in the Depressional, Hydrogeomorphic Class, and the winter level is augmented about 24 inches by a road impoundment.

There are several Road Impounded Wetlands<sup>3</sup> found throughout the park. Most of these are small and are covered with emerged woody hydrophilic plants and although not currently rated, will likely be rated Category IV wetlands. These impoundments are the result of logging roads constructed circa 1950. They have been impounded long enough for species suited to these altered habitats to become established. In addition to the Road Impounded Wetlands, there are several Category IV Slope, and Depressional wetlands found in the north end of the park. Many field trips were made from January 2010 through January 2011, gathering information on ecosystems, plant and wildlife communities that are currently found within the park. This process will continue.

The large, (12 acres) unnamed, Category II Wetland (hereinafter referred to as the Beaver Pond) forms the headwaters of the most westerly branch of Little Anderson Creek. The wetland is in a topographic depression in which water ponds, with the outlet higher than the interior, and hence is in the Depressional Class. Major habitat functions include: winter rafting and feeding for migratory waterfowl, spring nesting sites for cavity nesting birds, hunting ecotone for raptors and storage for runoff and sediment<sup>4</sup>. There are currently no fish present in the Beaver Pond, but Coho, Chum and Searun Cutthroat are found downstream. Waterfowl use the pond's open water during the winter, with Bufflehead being the dominant species. Wooducks have success in breeding and rearing on the pond in early spring due to the presence of standing dead trees at the

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<sup>1</sup> Thomas Hruby PhD, Washington Department of Ecology

<sup>2</sup> Rated by Frank Stricklin, not trained by Wa. DOE

<sup>3</sup> Road Impounded Wetland Planning Guidance, Bob Barnard, WDFW October 11, 2002

<sup>4</sup> Washington Department of Ecology, 303(d) list

shoreline and abundant insects in the pond. Beaver are active and are currently altering habitat on the north and south end of the Beaver Pond.

The depth of the Beaver Pond is such that it does not meet the requirements of a lacustrine environment, although it has open water for about six months of each year, and some small areas are deeper than 2 meters. The open water forms when rising water from winter rains drown emerged macrophytes. The entire 12 acres was evaluated as one contiguous Depressional wetland, Palustrine.

- Delineation of most wetlands found in the north 250 acres of the park is relatively easy due to a marked change in elevation and plant species dominance at the transitional area from Scrub Shrub to Unconsolidated Bottom. Hardhack dominates the wetland proper, with Salal dominating the transitional area to the evergreens in the uplands.

Currently the trail crossing the low stream gradient on the north end of the Beaver Pond is under water about 5 months of each year. Several repair options were considered, and input was gathered from as many sources as possible. It was assumed, any solution must include the beaver as a stakeholder. All options were presented to the stewardship group, and Option 3 (relocate trail, build a bridge), was selected for implementation. For a list of all options considered, refer to Appendix A.

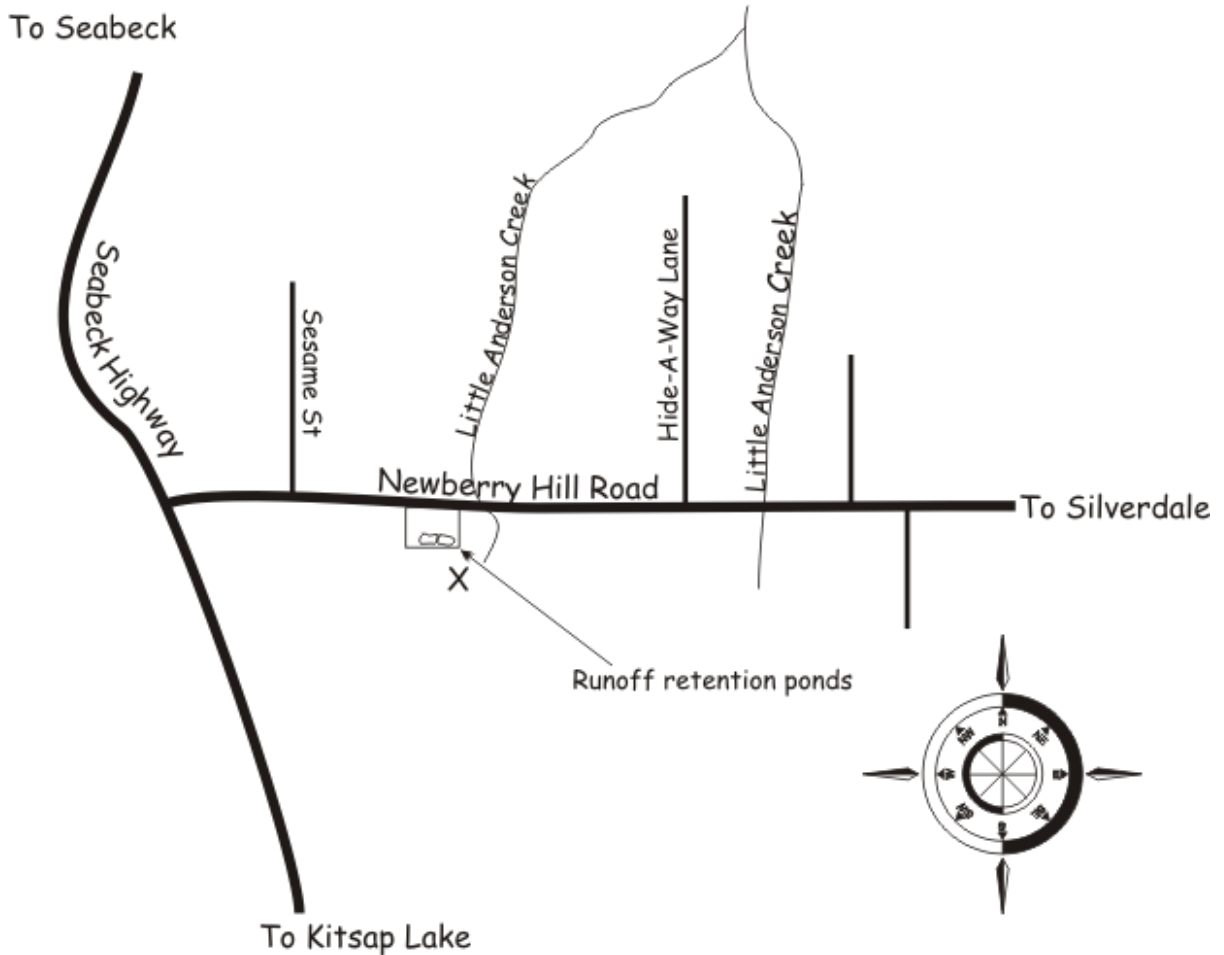
There are no Anadromous or introduced fish present in the Beaver Pond (blocking culvert at Newberry Hill Road), but Coho and Steelhead salmon are downstream approximately 900 meters.



**Beaver Loop Trail underwater. Beaver are damming right shoulder of old logging road, and building a new dam downstream. Photo courtesy Aryah Campbell.**

**Project Location  
Vicinity Map**

**Bridge and trail relocate.**

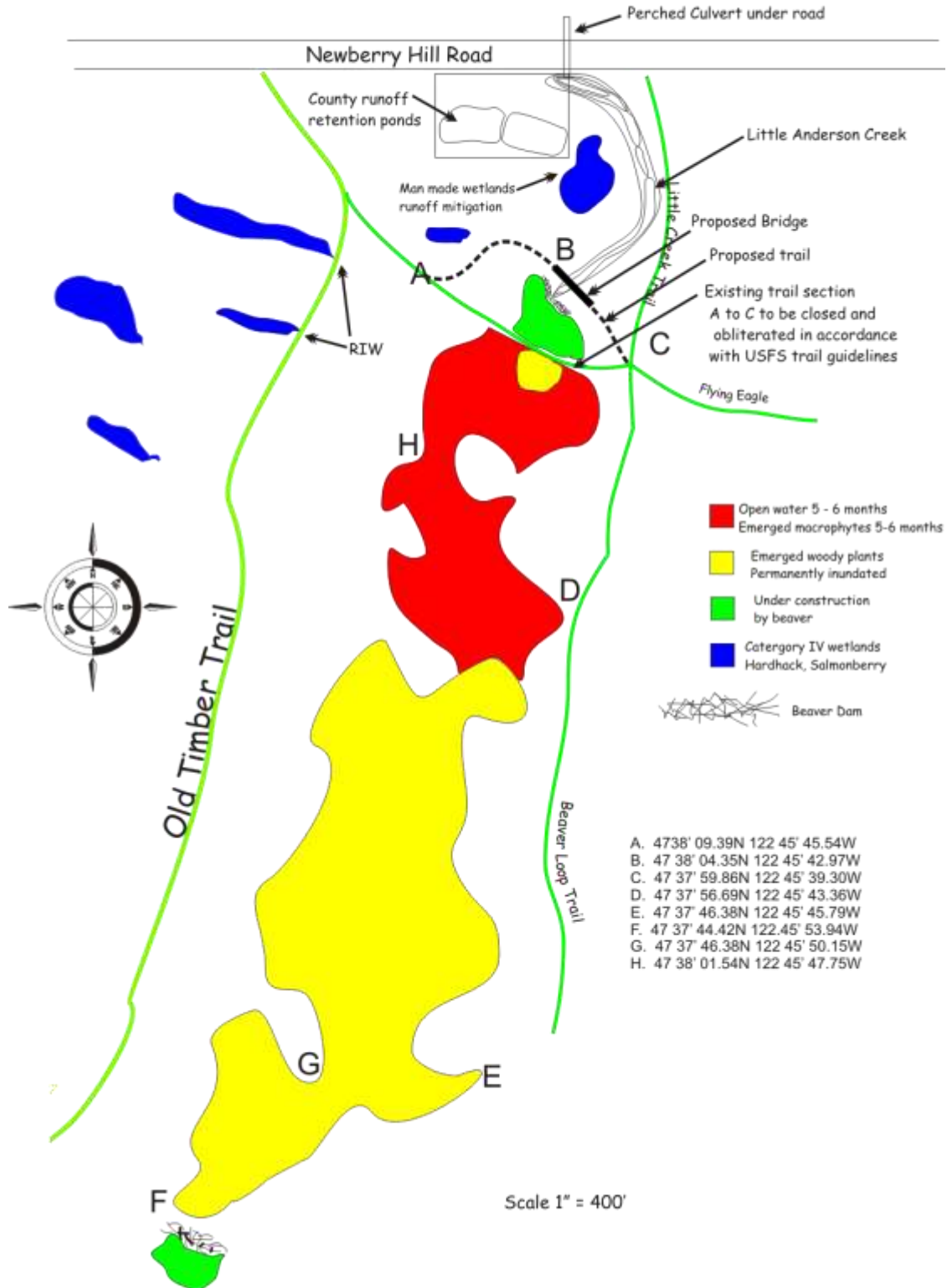


**SOIL**

Due east of the Beaver Pond the soil is primarily Alderwood<sup>5</sup>, very gravelly sandy loam, with a slope between 15-30%. Due west Shelton soil lies on the moraine and till plane. Farther west, on the upland terrace between the Anderson and Big Beef watersheds, is Kapowsin soil. Distric Xerorthents are found along the Little Anderson creek sidewalls, all along the length of the stream. Most of these soils were formed in glacial till, with the entire area influenced by repeated glaciations.

<sup>5</sup> Soil survey of Kitsap County Area, Washington, US Soil conservation service, WSU and Wa. DNR

**Newberry Hill Heritage Park  
Trail Reroute and Bridge**  
Little Anderson Headwaters  
Category II, 12 acre Beaver pond  
and associated wetlands



# Appendix A

## NHHP North

### Wetland Characteristics

- Historical Hydrogeomorphic Class- Depressional
  - Open water (40%) and emerged woody plants (60%)
  - Subsurface fed
    - Cool year round
    - Filtered
  - Water Chemistry.
    - CaCO<sub>3</sub> 34.2 mg/l
    - CO<sub>2</sub>
    - DO 8ppm
    - pH 8
  - Excellent water quality.
- Current Hydrogeomorphic Class- Depressional augmented by RIW<sup>6</sup>
  - Logging road (circa 1950?)
  - RIW adds about 1-2 feet of additional retention during winter
- RIW Scenario
  - Continuous
    - Fill placed over “low gradient stream reach”
      - Slight increase in water surface elevation
      - Slight increase in open water
      - Produced 2 foot drop downstream
      - Changed little of free flowing stream (headwaters)
- Beaver Activity

The beaver are currently attempting to augment the RIW by damming the downstream shoulder of the logging road during high water events (winter rains), and constructing a dam further downstream of the existing RIW. If they are successful the trail will remain permanently inundated.

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<sup>6</sup> Bob Barnard, Wa Department of Fish and Wildlife



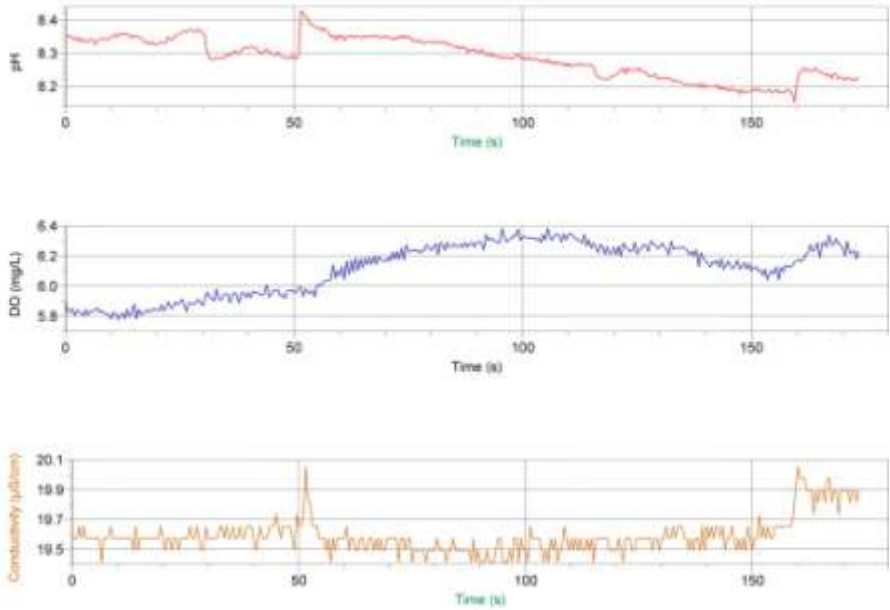
# Water Quality

Klahowya Secondary School students in the 2010-11 Advanced Placement Environmental Science Class analyzed water samples beginning in January of 2011. Probes were calibrated prior to use utilizing standards and two point calibrations to ensure accurate measurements. This cooperative venture between stewards and students will continue.

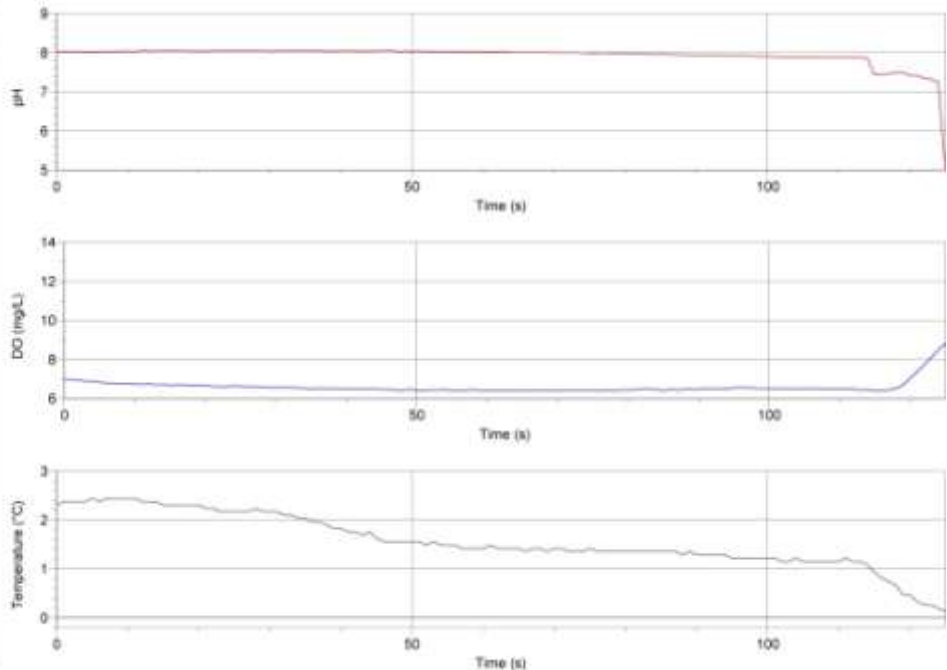


Sta 1 Little Anderson Pond

Remote Data				
Time (s)	DO (mg/L)	pH	Conductivity (µS/cm)	
166	82.5	6.3	6.33	19.4
167	83.0	6.2	6.34	19.5
168	83.5	6.3	6.33	19.3
169	84.0	6.3	6.33	19.6
170	84.5	6.3	6.32	19.5
171	85.0	6.3	6.32	19.5
172	85.5	6.3	6.32	19.5
173	86.0	6.3	6.31	19.5
174	86.5	6.3	6.32	19.5
175	87.0	6.3	6.32	19.5
176	87.5	6.3	6.32	19.5
177	88.0	6.3	6.30	19.4
178	88.5	6.3	6.31	19.0
179	89.0	6.3	6.31	19.4
180	89.5	6.3	6.31	19.5
181	90.0	6.3	6.30	19.4
182	90.5	6.3	6.30	19.4
183	91.0	6.3	6.31	19.4
184	91.5	6.2	6.30	19.5



Remote Data				
Time (s)	pH	DO (mg/L)	Temp (°C)	
1	0	6.02	7.0	2.3
2	1	6.04	7.0	2.4
3	2	6.03	7.0	2.4
4	3	6.03	6.9	2.4
5	4	6.02	6.9	2.4
6	5	6.02	6.8	2.4
7	6	6.03	6.8	2.4
8	7	6.04	6.8	2.4
9	8	6.04	6.8	2.4
10	9	6.04	6.8	2.4
11	10	6.04	6.7	2.4
12	11	6.04	6.7	2.4
13	12	6.05	6.8	2.4
14	13	6.04	6.7	2.4
15	14	6.05	6.7	2.4
16	15	6.05	6.7	2.3
17	16	6.05	6.7	2.3
18	17	6.05	6.7	2.3
19	18	6.05	6.7	2.3
20	19	6.04	6.7	2.3
21	20	6.04	6.7	2.3
22	21	6.04	6.8	2.2
23	22	6.05	6.8	2.2
24	23	6.05	6.8	2.2
25	24	6.05	6.7	2.2
26	25	6.05	6.8	2.2
27	26	6.05	6.8	2.2
28	27	6.06	6.8	2.2
29	28	6.05	6.8	2.2
30	29	6.05	6.8	2.2
31	30	6.04	6.8	2.2
32	31	6.05	6.8	2.2
33	32	6.05	6.5	2.1
34	33	6.05	6.5	2.1
35	34	6.05	6.5	2.0





## Options Considered:

- State law requires land owners provide fish passage at road crossings.<sup>7</sup>
  - Four options, all require permit<sup>8</sup>
    - 1. Lower and enlarge culvert
      - This option reduces size of our wetland
      - This option releases silt
      - This option does not encourage natural stream processes
      - This option may allow fish passage
      - This option will be opposed by the beavers
    - 2. Remove existing culvert and build hydraulic control structures with fish passage
      - This option will maintain or increase current wetland size
      - This option allows fish passage
      - This option does not encourage natural stream processes
      - This option may minimize beaver impacts on trail flooding
    - 3. Move the trail downstream, build bridge over channelized stream
      - This option is preferred by state and federal agencies
        - Permitting process lubricant
        - Best practice
        - Conforms to trail placement criteria
      - This option encourages natural stream processes
      - This option creates additional wetland
      - This option protects existing wetland
      - This option allows fish passage
      - This option should minimize beaver impacts on trail
    - 4. Remove road impoundment, build bridge on existing trail
      - This option allows fish passage
      - This option encourages natural stream processes
      - This option allows fish passage
      - This option reduces the wetland size
      - This option depends on beaver dam downstream of trail
      - This option will be opposed by the beaver
- State law and Federal policy also calls for “a no net loss of wetlands”
  - This conflict of law forces dialogue
    - Landowners concerns

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<sup>7</sup> WAC 220-110-070 Water crossing structures

<sup>8</sup> Hydraulic Code Chapter 77.55 RCW

- Cost
- Land use impacts
- Biologists concerns
  - Habitat enhancement
  - Restoration
- Forces intelligent and legal choices case by case
  - Clean Water Act, Sec 404
  - Kitsap county Critical Area Ordinance
  - ESA

Washington Department of Fish and Wildlife, Region 6 Biologist Gina Piazza, and Little Anderson Creek habitat biologist Ryan Nauer suggested the best option, for fish would be:

- move horse/people and bike trail downstream of beaver activity
- build bridge over stream where stream is channelized on the hardpan below wetlands. (WDFW and Fed preferred option)
- Let beaver build dam upstream and create more natural habitat for fish, birds and mammals.





## Wildlife Inventory

### WATER BIRDS 2010

DATE	Bufflehead	Ring Neck	Mallard	Hooded Merganser	Canada Goose	Wood Duck	Notes
4 March	2M 2F						
5 March	2M 2F	1M 1F	1M 1F				
10 March	2M 2F	1M 1F	1M 1F		1M 1F		
11 March		2M 1F					
14 March	2M 1F		4M 4F	1F			Fowl Weather
15 March	2M 2F						
16 March	2M 2F						
17 March	2M 2F						2 Unknown
18 March	2M 2F						
23 March	3M 3F		2M 2F				
25 March	3M 3F		1M 1F	1M 3F	1M 1F	1M 1F	Fowl Weather
29 March	3M 3F			1F	1M 1F	1M 1F	
5 April	2M 2F	1M	2M				
6 April	2M 2F		1M 1F				
7 April	2M 2F					1M 1F	
8 April	2M 2F			2F			
11 April	1M 2F					1M 1F	
12 April	1M 2F		3M			1M 1F	
21 April	1F					1M	
23 Apr			1M			1M	Eagles present
25 Apr						2M 1F*	*Heard call
26 Apr	1F					2M	
27 Apr	1F		1M	1M 1F*		1M	*Courting
30 Apr	1M 2F					3M	
6 May				1M		1M	
14 May						2M	
16 May				2M			
18 May				3M 1F	1?		
20 May					1?	3M	Eagle present
June 3							Nothing
June 7 <sup>th</sup>						8 chicks	
June 8 <sup>th</sup>				2F			

After the hatch of a clutch of Woodducks in June, the ponds open water closed with the emergence of Spatterdock and Floating Pond Weed. Outlet flow stopped around the first of June. All waterfowl left the pond, and the pond remained void of ducks throughout the summer.

### **Birds Found In NHHP North<sup>9</sup>**

Wood Duck	Mallard	Bufflehead	Ring Neck	Canada Goose
Hooded Merganser	Rufous Hummingbird	Pileated Woodpecker	Red-breasted Sapsucker	Band-tailed Pigeon
Hutton's Vireo	Bald Eagle	Steller's Jay	American Crow	Common Raven
Black-capped Chickadee	Red-breasted Nuthatch	Brown Creeper	Bewick's Wren	
Winter Wren		American Robin	Vaired Thrush	Golden-crowned Kinglet
Cedar Waxwing		Spotted Towhee	Dark-eyed Junco	
Pine Siskin	Northern Flicker	Cooper's Hawk	Tree Swallow	Yellow-rumped Warbler

**The following birds are expected to be present based on observed habitats**

Sharp-shinned Hawk	Great-horned Owl	Barred Owl	Downy Woodpecker
Hairy Woodpecker	Pacific-slope Flycatcher	Cassin's Vireo	Warbling Vireo
Red-eyed Vireo	Swainson's Thrush	Orange-crowned Warbler	Yellow Warbler
Townsend's Warbler	MacGillivray's Warbler	Wilson's Warbler	Western Tanager
Fox Sparrow	Black-headed Grosbeak	Purple Finch	

**This is a conservative list. There will undoubtedly be more as different habitats are explored.**

<sup>9</sup>Courtesy Kitsap Audubon, Vic and Idie Ulsh

## Plants<sup>10</sup>

### Aquatic Vegetation (In or under the water).

Floating Leaved Pondweed Potamogeton natans	Spatterdock Nuphar polysepalum	Hardhack Spiraea douglasii	Salmonberry Rubus spectabilis	Bulrush
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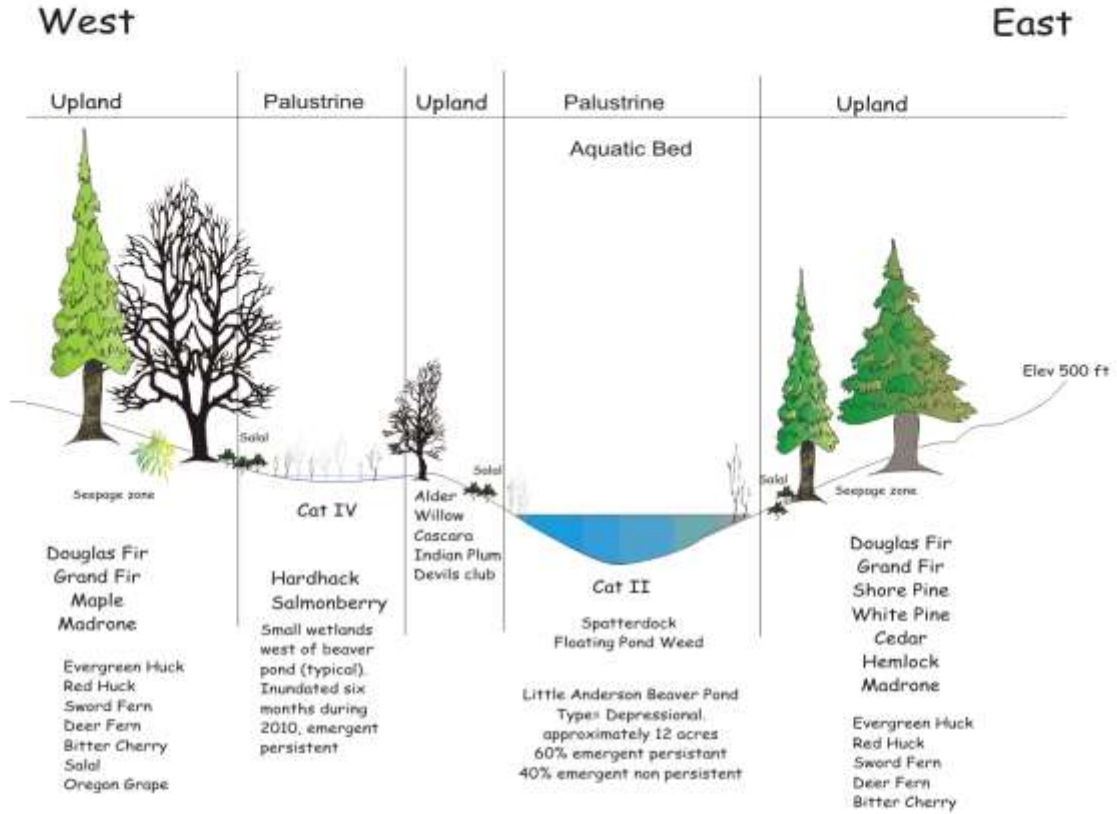
### FLORA In the immediate watershed

<b>Trees</b>	Douglas Fir Pseudotsuga menziesii	Big Leaf Maple Acer macrophyllum	Grand Fir Abies Grandis
<b>Trees</b>	Red Alder Alnus Rubra	Western White Pine Pinus monticola	Hemlock Tsuga heterophylla
<b>Trees</b>	Western Red Cedar Thuja Plicata	Shore Pine Pinus Contorta	Hawthorne
<b>Trees</b>	Bitter Cherry Prunus emarginata	Madrone Arbutus menziesii	
<b>Shrubs</b>	Hardhack Spiraea douglasii	Salmonberry Rubus spectabilis	Cascara Rhamnus purshiana
<b>Shrubs</b>	Arctic Willow Salix actica	Scouler's Willow Salix scouleriana	Sitka Willow Salix sitchensis
<b>Shrubs</b>	Hooker's willow Salix hookeriana	Woodland Strawberry	Bald Hip Rose Rosa gymnocarpa
<b>Shrubs</b>	Evergreen Huckleberry Vaccinium ovatum	Red Huckleberry Vaccinium parvifolium	Trailing Blackberry Rubus ursinus
<b>Shrubs</b>	Red Flowering Currant Ribes sanguineum	Oceanspray Holodiscus discolor	Pacific Rhododendron R. Macrophyllum
<b>Shrubs</b>	Oregon Grape	Salal	Indian Plum Oemleria cerasiformis
<b>Ferns</b>	Deer Fern	Sword Fern	Licorice Fern
<b>Ferns</b>	Lady Fern	Spiney Wood Fern	Braken Fern
<b>Flowers</b>	Trailing Yellow Violet Viola simpervirens	Trillium Trillium ovatum	Candy Flower
<b>Mosses</b>			

<sup>10</sup> Plants of the Pacific Northwest, Pojar and MacKinnon

# Newberry Hill Heritage Park

Cross section of typical wetlands found in north end of park.

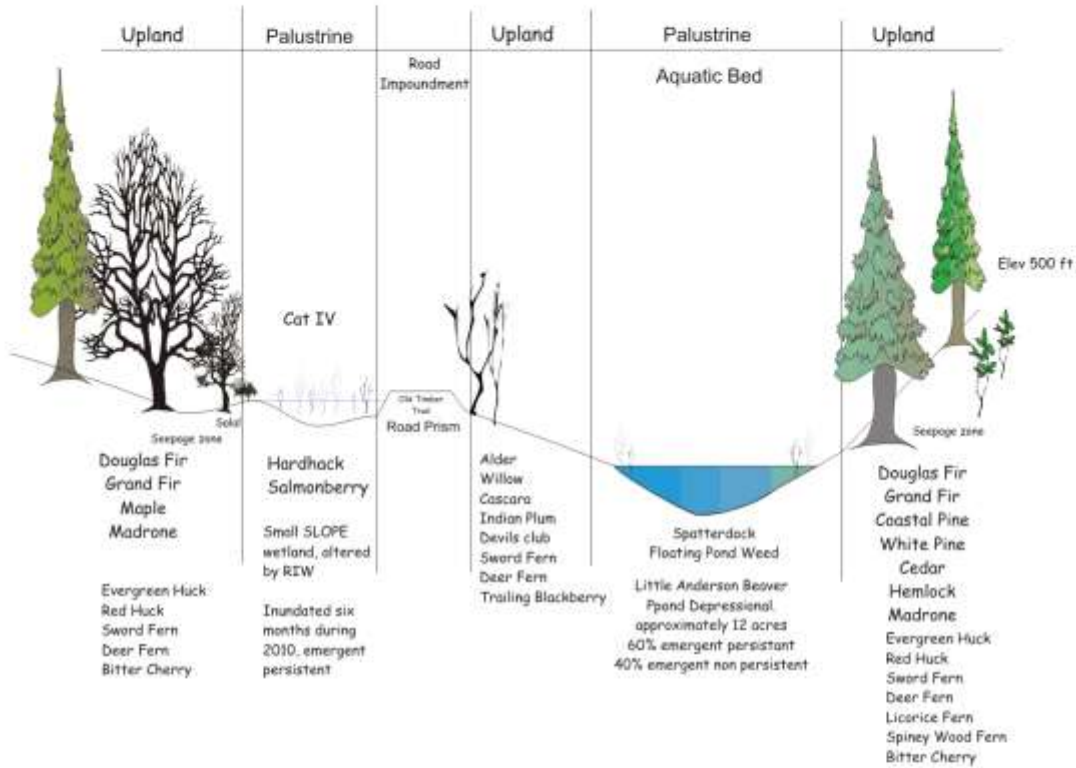


# Newberry Hill Heritage Park

Cross section of Road Impounded Wetlands found in north end of park.

West

East

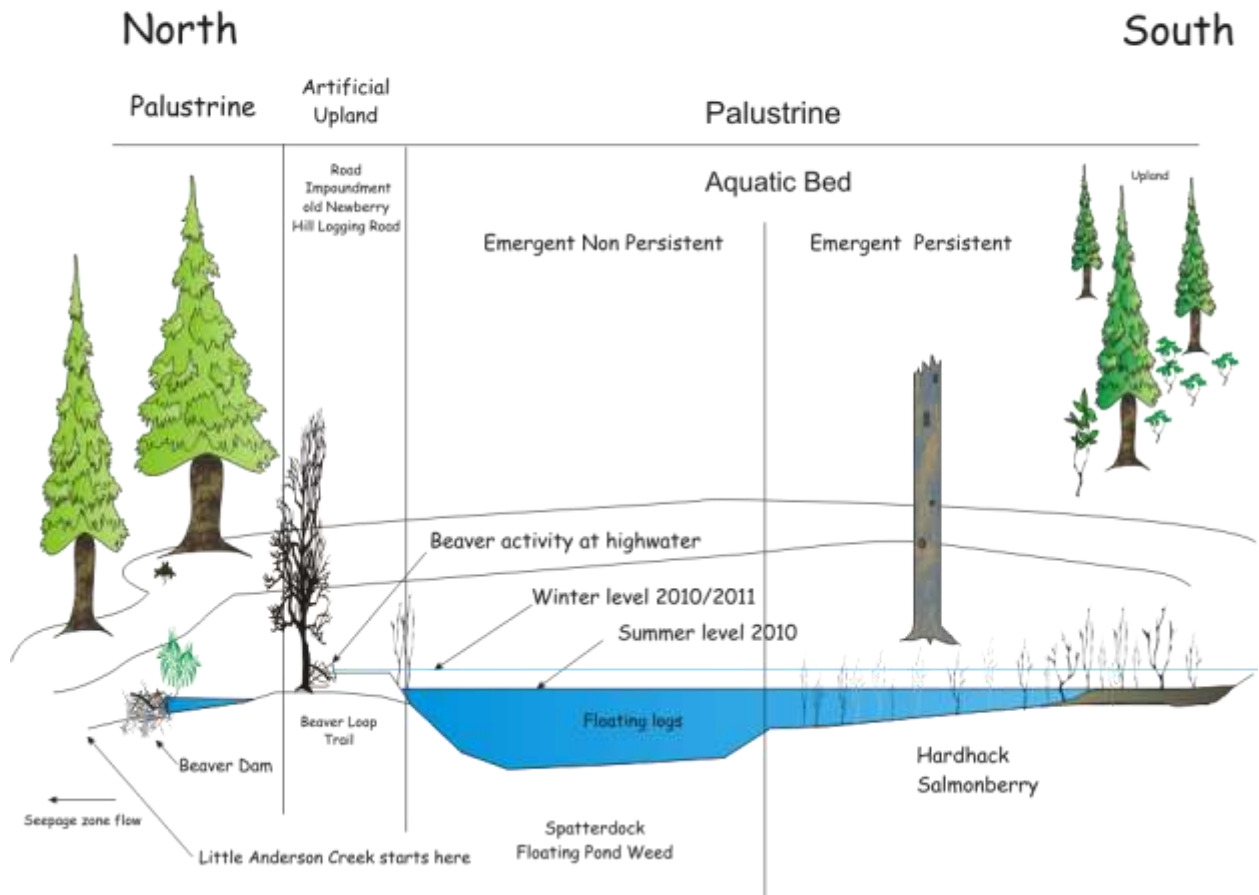




# Newberry Hill Heritage Park

Simplified cross section of Little Anderson Beaver Pond, north end of park.

Category II, Hydrogeomorphic Class Depressional





**Typical Slope Wetland with Hardhack and Salmonberry**



**Little Anderson Beaver Pond Open water area, April 2010**



**Hooded Merganser males, with Spatterdock emerging, May 2010**



**January 2011**

## Websites for technical help

<http://wdfw.wa.gov/hab/engineer/habeng.htm>

<http://wdfw.wa.gov/hab/ahg/>

<http://www.westsoundwatersheds.org/>

<http://wsg.washington.edu/citizenscience/index.html>

<http://www.ecy.wa.gov/>

## References Cited:

Kitsap County DCD Appendix N, Silverdale Critical Areas Ordinance, Christopher W. May Ph.D.

2003 Kitsap Salmonid Refugia Report , Gretchen Peterson

Ryan Nauer, WDFW Habitat Biologist.

Plants of the Pacific Northwest Coast, Jim Pojar and Andy MacKinnon

Conservation Priorities for Landbirds of the Pacific Coast of Oregon and Washington

Anadromous Salmonid Passage Facility design National Marine Fisheries, Bryan Nordlund et al

Sections that contain Natural Heritage Features Associated with Wetlands, Wa. Dept. of Natural Resources. Washington Natural Heritage Program, P.O. Box 47014, Olympia Wa. 98504-7014

Recognizing Wetlands, and Wetland Indicator Plants on Forest land in Washington (Bigley and Hull)

Managing Wetlands , Washington State Dept. of Natural Resources.

Washington State Wetland Rating System for Western Washington, Washington State Dept. of Ecology publication #04-06-025