

HABITAT COMPENSATION AND MITIGATION ACTIVITIES FITZGERALD LAKE BROOK 2002 - 2003

The construction activities, including culvert installation, on the Antigonish/Guysborough Road at Fitzgerald Lake Brook required the realignment of a natural stream corridor which involved destruction of fish habitat. Several mitigation and fish habitat compensation measures were required as part of the HADD Application/EIS, January 2002.

MITIGATION OF PLUNGE POOL AREA

Establishing vegetation in the plunge pool area for shade, cover and enhanced habitat for fish and other organisms.

- Native shrubs established by dormant live stake and pole installation
- Native shrubs (wetland) by transplanting rooted plants collected nearby
- Herbaceous riparian plantings of grasses, sedges, cattails and wildflowers

OFFSITE COMPENSATION

Offsite compensation to offset the loss of fish habitat at the culvert installation and plunge pool HADD area was based on enhancement of fish habitat downstream by:

- Removal of low flow obstructions and slash
- Establishment of riffle/pool habitat
- Re-establishment of stream meander

HISTORY OF ON-SITE MEETINGS AND WORK

1. Removal of Obstructions and Slash (TPW)

Spring of 2002: all obstructions and slash removed

Summer of 2003: vegetation naturally regenerating

2. Establishment of Vegetation at Plunge Pool (Vegetation Specialist, TPW)

September 11, 2002: Site visit

November 4-5, 2002: Cutting, preparation and installation of dormant stakes and poles of Willows (*Salix spp.*), Alder (*Alnus spp.*), and Wild Raisin (*Viburnum nudum*).

May 27, 2003: Site visit - buds look good on many cuttings

August 14, 2003: Site visit. Monitored survival and met with DFO people - recommended more

riparian plantings around pool.

August 18, 2003: Dug up and transplanted grasses, cattails, sedges, wildflowers, Meadowsweet and Black Elderberry, with roots and soil mass.

Natural regeneration is taking place in native soils adjacent to plunge pool: Mountain Ash, Spruce, Maple, Wild Raisin, ferns, Joe Pye Weed, Asters, Turtlehead

See Tables and attached photos.

3. Downstream Establishment of Riffle/Pool Habitat

August 6, 2003: Site visit with DFO cancelled due to rain

August 14, 2003: Site visit with DFO. DFO specialist measured and marked locations for installation of digger logs (rather than rock sills). Work arranged for August 18.

August 18 and 19, 2003: 15 digger logs with deflectors and ramps installed under direction of DFO specialist.

Photos attached.

POST COMPENSATION INSPECTION AND MONITORING

P-1: Digger Logs and Pools (TPW)

Spring and Fall 2004-2007 - visually inspect they are functioning and that no erosion is taking place; provide photographic documentation

P-2: Fish Habitat Survey (DFO/TPW consultant)

September 2004, 2005 - visually inspect for rearing and spawning habitat, and changes in stream morphology or hydraulics; provide documentation; compensation area and 50 m downstream

P-3: Fish Biomass Survey (TPW consultant)

September 2005 - document productive capacity for one location in compensation area, one downstream and one reference location

P-4: Vegetation (TPW)

Late October 2003:

- Dead stakes and poles to be replaced with live dormant cuttings collected locally.
- Herbaceous transplants (August 18) collected locally monitored for survival
- Additional shrub cuttings to be installed, as locally dug transplants and cuttings

Early and late summer 2004 - monitor (count) all plantings for survival and growth; destroy any unwanted vegetation

Summers 2005 and 2006 - monitor (count) all plantings for survival and growth and destroy any unwanted vegetation

**Fitzgerald Brook Plunge Pool -
Re-vegetation for Enhancement of Fish Habitat
Live Stake and Pole Planting**

Number of Cuttings Inserted - November 5, 2002

Facing Downstream	Species	Stakes to 2 m	> 2 m	Total Planted
Left Side	Willows	13	12	25
	Alder	0	2	2
	Wild Raisin	0	2	2
Right Side	Willows	9	11	20
	Alder	0	7	7
	Wild Raisin	10	0	10

Survival of Cuttings - Leafed out and thriving (August 14, 2003)

Facing Downstream	Species	< 2 m Alive	> 2 m Alive	Total Alive	% Survival
Left Side	Willows	6	5	11 from 25	44%
	Alder		0		0
	Wild Raisin		0		0
Right Side	Willows	4	4	8 from 20	40%
	Alder		0	0	0
	Wild Raisin		0	0	0

COMMENTS, EVALUATION

Due to complete lack of survival of Alder and Wild Raisin, these will be replaced (in the same holes) in the fall of 2003 with additional cuttings of willows. Cuttings from locally available Red Osier Dogwood, Meadowsweet and Black Elderberry will also be planted.

**Fitzgerald Brook Plunge Pool -
Re-vegetation for Enhancement of Fish Habitat
Herbaceous Riparian Plantings
August 18, 2003**

Weather

Cool, misty to rainy

Source of plant material

1. Clumps dug from downstream installation of structures
 - Three clumps of soil and roots with grass
 - Three cattail plants in clumps of soil

2. Clumps from marshy wetland along the roadside, northbound side - all with soil
 - Cattails (*Typha spp.*)
 - Grasses
 - Sedges (*Carex spp.*)
 - Bullrushes (*Scirpus cyperinus*)
 - Meadowsweet (*Spiraea alba*)
 - White Topped Aster (*Aster umbellatus*)
 - Joe Pye Weed (*Eupatorium maculatum*)
 - Black Elderberry (*Sambucus canadensis*)

Technique

10 - 12 clumps of material (soil and rooted plants) planted on each side of pool along water line. Standing in water at edge of pool, rocks pulled away at water's edge until felt soil. Plant clumps dropped in, covered with old hay from the site, and protected with smaller rocks which were used to weigh down the soil clumps.

See photos for planting locations.

Monitoring Times

1. Survival and health will be noted in late October or early November when more dormant cuttings and shrubs will be planted.
2. Summers, 2004 and 2005.

**LIVE STAKE AND POLE PLANTING
NOVEMBER 5, 2002**



Collecting cuttings for live stake and pole plantings



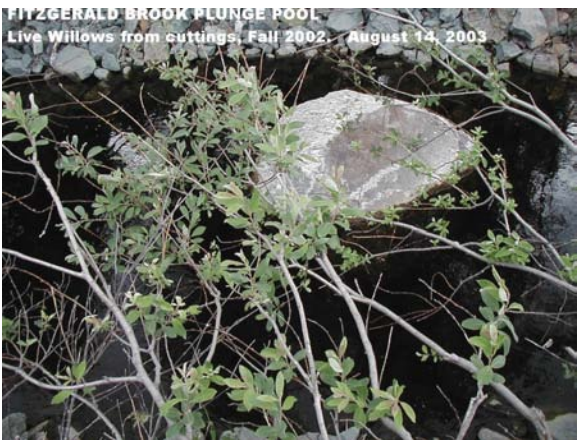
Making holes between rocks for inserting stakes and poles



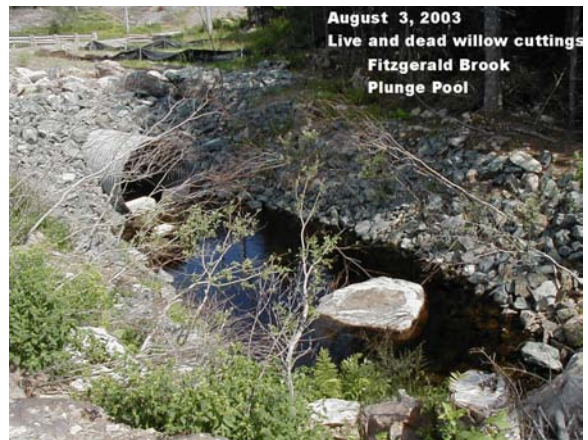
**FITZGERALD BROOK POOL
Live pole and stake plantings,
Fall 2002**



**Indigenous vegetation regenerating: August 14, 2003
FITZGERALD BROOK PLUNGE POOL**

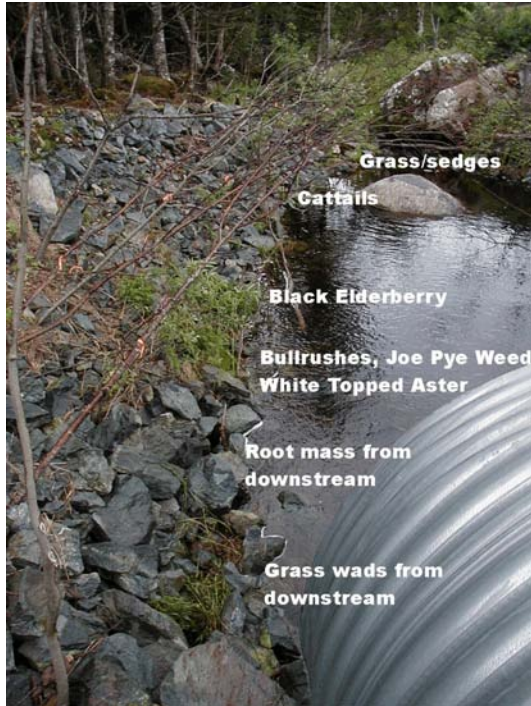


**FITZGERALD BROOK PLUNGE POOL
Live Willows from cuttings, Fall 2002, August 14, 2003**



**August 3, 2003
Live and dead willow cuttings
Fitzgerald Brook
Plunge Pool**

**ROOTED CLUMPS WETLAND PLANTS
PLANTED AUGUST 18, 2003**

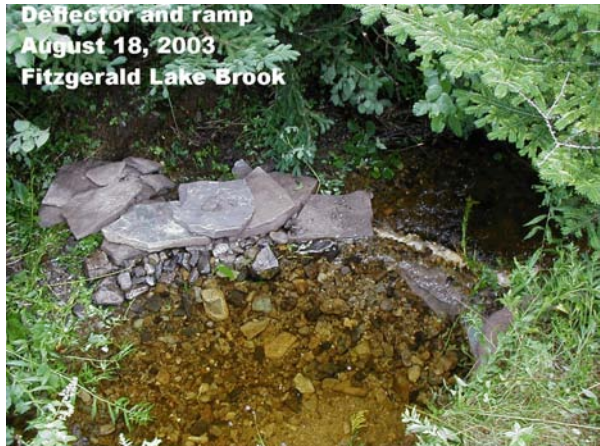
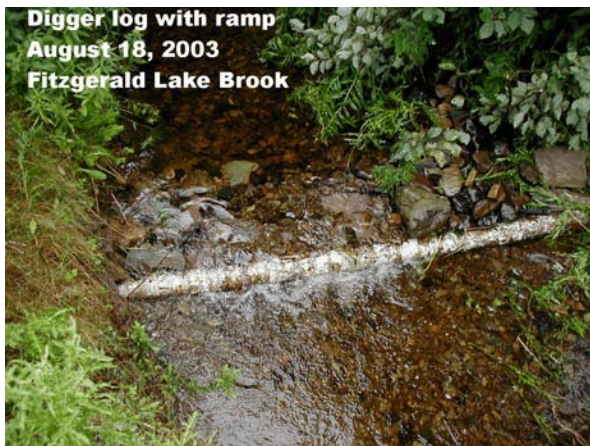
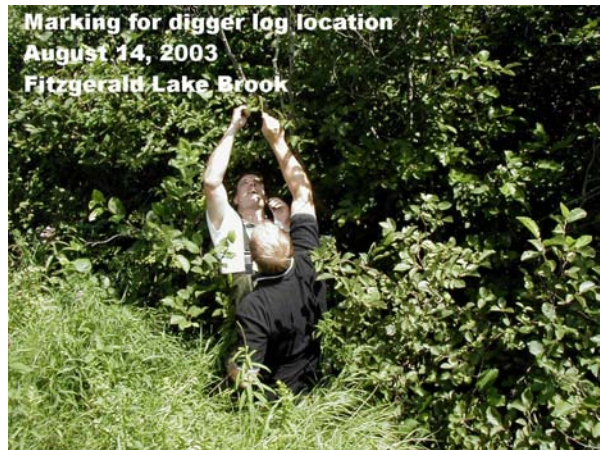


Left side of plunge pool, facing downstream



Right side of plunge pool, facing downstream

**DOWNSTREAM ESTABLISHMENT OF RIFFLE/POOL HABITAT
AUGUST 14 AND AUGUST 18-19, 2003**



Fifteen (15) structures installed in Fitzgerald Lake Brook for enhancement of fish habitat as part of HADD. TPW crew under supervision of DFO. August 18 and 19, 2003.