THE FOLLOWING EXAMPLES WILL HOPEFULLY PROVIDE CONTEXT FOR HOW THESE PROJECT COMPONENTS FIT TOGETHER AND INFORM YOUR STRATEGIC PROJECT PLAN.

*(Note that this project is a hypothetical example for demonstrating components of project planning and may not reflect actual project parameters)

Westslope Cutthroat Trout Example

Project Title: Restoring Westslope Cutthroat Trout, Big Fish Creek

Project Background

The Restoring Westslope Cutthroat Trout Project is an ecosystem restoration project that aims to restore spawning and riparian habitat, as well as enhance rearing habitat, for a population of the blue-listed native westslope cutthroat trout in Big Fish Creek, a tributary to Big Fish Lake. This project will restore 1,000 square meters of critical spawning habitat by naturalizing the historic channel shape in the creek and removing fine sediments that currently cover the spawning gravel. Habitat complexing (i.e. large woody debris structures) will be added to a side channel to enhance 1,500 square meters of important juvenile rearing habitat. The project will also restore proper riparian function to a total of 300 square meters of riparian habitat. This two-year project is a partnership between BC Trout Habitat Enhancement Foundation and the Big Fish Lake Stewardship Society.

Hypothetically, we know that the spawning gravels have been covered by fine sediments and is potentially a contributing factor to the decline in Westslope cutthroat trout spawners in Big Fish Creek. Upstream forestry road building practices (threat) and associated culvert washouts have been documented and are likely to contribute to the fine sediment load.

Project Scope

The geographical extent of the project includes 100 m long section of the main tributary of Big Fish Creek, from the mouth of Big Fish Lake, and the 150 m long side channel that bifurcates west from the confluence with Big Fish Creek 100 m upstream of Big Fish Lake.

Project Goal(s)

Re-establish a healthy Westslope cutthroat trout population to pre logging condition within a diverse and complex aquatic habitat and functional riparian zone in the Big Fish Creek main tributary and side channel. This will be accomplished by:

- Naturalizing the historic channel shape of the creek in the 1000 m^2 project area.
- Reducing the amount of fine sediment entering the watercourse from upstream road crossings by 2024.
- Decreasing the depth of fine sediments throughout the 1000 m^2 project area by 2030.

- Habitat complexing a side channel to enhance 1,500 square meters of important juvenile rearing habitat.
- Restore riparian vegetation in a 300 m^2 area of riparian habitat by 2030.

Project Objectives:

- Construct 3 new meander bends and connect to Big Fish Creek.
- Install Best Management Practices (BMP's).
- Install 15 triangular large woody debris structures and 7 boulder clusters in side channel.
- Plant 1000 native plants (cottonwood, spruce, Douglas maple, red osier dogwood, willow).

Monitoring Objectives:

1. Reduce turbidity to within the range of natural variation for Big Fish Creek by 2024.
2. Depth and extent of fine sediment within the first 100 m of Big Fish Creek main stem reduced by 75 % from baseline by 2024.
3. New channel and Large woody debris structures are stable and function as intended. Scour pools created by large woody debris structures will have a minimum area of 4 m2 and residual depth of 0.5 m (based on a bankful channel width of 5-10 m).
4. Survival of 80% native plants or density target based on reference site.
5. Westslope cutthroat trout are spawning within the first 100 m of the Big Fish Creek mainstem.
6. Juvenile Westslope cutthroat trout are utilizing the large woody debris structure scour pools.

Key Performance Indicators are water quality (turbidity), fish use, depth of sediment, stability and function of channel and large woody debris structures, pool depth, plant vigour and density, number of native plant species present.

Effectiveness Monitoring Methods

1. Water Quality

   Method: Survey the four road crossings that have been identified to contribute sediment into Big Fish Creek and ensure mitigation measures that were implemented are functional. Conduct turbidity measurements using a portable turbidity meter during regular surveys and during inclement weather (when possible).

   Spatial scale and location: Establish monitoring stations upstream and downstream of the four road crossings, which have been identified as sediment sources, and collect water samples within the thalweg of the watercourse.

Timeframe: Turbidity monitoring to start once snow melt begins and throughout spring freshet, once a week, particularly during rain events when possible. Continue sampling for two consecutive years or until the threat is abated. This will also be influenced by funding and available resources.

Roles and Responsibilities: Team member X to coordinate road crossing monitoring and turbidity monitoring and manage associated data.

Key Indicator: Turbidity

2. Sediment

   Method: Fine sediment layer (particle size < 2.0 mm) will be measured with a meter stick.

   Spatial scale and location: A total of 10 permanent monitoring locations will be established along the first 100 m of Big Fish Creek mainstem.

   Timeframe: Sediment depth will be measured once pre-freshet and once post-freshet annually for at least 2 years.

   Roles and Responsibilities: Team member X will coordinate sediment depth monitoring and data management.

   Key Indicator: Depth of sediment.

3. Habitat Stability

   Methods: Visual assessment of new channel and large woody debris structures for tension cracks, movement, and/or damage and compare to design drawings.

   Spatial scale and location: Establish a photo monitoring point for each structure to allow for yearly comparison.

   Timeframe: Conduct annual assessment in the fall at low water levels for a minimum period of 5 years.

   Roles and Responsibilities: Team member X will coordinate survey and data management.

   Key Indicators: Large woody debris structures are stable and functioning as per design.

4. Habitat Structures Function

   Methods: Measurement of residual pool depth with meter stick and pool area with elson tape.

   Spatial scale and location: Measure a minimum of 20% of all the structures on a yearly basis.

   Timeframe: Conduct yearly assessment in the fall at low water levels for a minimum period of 5 years.

Roles and Responsibilities: Team member X will coordinate survey and data management.
Key Indicators: Presence of pools

5. Riparian Vegetation
   Methods: Establish survey transects 15 m in length perpendicular to the channel at 25 m intervals. Record the number of trees and shrubs encountered along the transects, and measure height and vigour.
   Spatial scale and location: Conduct survey within the 300 m2 re-established riparian area.
   Timeframe: Conduct yearly assessment in June for a minimum period of 5 years.
   Roles and Responsibilities: Team member X will coordinate survey and data management.
   Key Indicators: Plant vigour and density.

6. Fish Use Spawning
   Methods: Complete a visual survey and assess for the presence of spawning fish during spawning period.
   Spatial scale and location: First 100 m of the mainstream of Big Fish Creek
   Timeframe: Conduct yearly assessment in the spring for a minimum period of 5 years.
   Roles and Responsibilities: Team member X will coordinate survey and data management.
   Key Indicators: Number of spawning fish

7. Fish Use Rearing
   Methods: Conduct snorkel survey and record presence of juvenile Westslope cutthroat trout.
   Spatial scale and location: Survey a minimum of 20% of all the structures on a yearly basis.
   Timeframe: Conduct yearly assessment in the fall at low water levels for a minimum period of 5 years.
   Roles and Responsibilities: Team member X will coordinate survey and data management.
   Key Indicators: Number of juvenile fish present

Here are commonly used Key Ecosystem Attributes and examples of specific measurable indicators:

Absence of threats: elimination of invasive species.

Physical Conditions: Reinstatement of hydrological and substrate conditions.

Species composition: presence of desirable animal or plant species, or absence of undesirable ones.

Structural Diversity: Reinstatement of ecosystem "layers", faunal food webs, and spatial habitat diversity

Ecosystem Functionality: Appropriate levels of growth and productivity, reinstatement of nutrient cycling, decomposition, habitat elements, trophic interactions, disturbance and normal stressors, ongoing reproduction and regeneration of an ecosystems species.

External Exchanges: Reinstatement of habitat linkages and connectivity for migration and gene flow, and for system flows including hydrology, fire, and other landscape level processes.

Key Performance Indicators (KPI)

Indicator – A unit of information measured over time that documents changes in a specific condition.

Examples of KPI:

Species richness: Number/Abundance of native species (plants/wildlife) present.

Number of listed species present/Abundance of listed species present

Invasive species: Number/Abundance of invasive species.

Evidence of use by target species.

Number/Type of habitats present.

Number/Abundance of Invasive species present.

Hydrological function – hydroperiod, water level elevation.

Water Quality (Biological, Chemical, Physical parameters).

Habitat connectivity.

Sustainability: how much effort is required to maintain ecosystem function?

Area Number of ha./m^2 of restored process (i.e. prescribed fire).

Social: Awareness/use by local people.