

Restoration Design

Lab/Studio Design Assignment 4

Assigned 9 & 10 May 2007

Due 16 & 17 May 2007

Overview

Tacoma Power is part of Tacoma Public Utilities. It provides power to the City of Tacoma and operates hydro dams. One set of their dam projects is called the Nisqually River Projects. Included in this are the Alder and LaGrande dams on the Nisqually River. As part of the relicensing of the Nisqually River Projects, Tacoma Power has agreed to provide a number of environmental functions including elk habitat, riparian habitat, wetlands and gravel pit reclamation. The gravel pit project is a 5 acre closed pit on the south side of the Nisqually River directly south of Ashford, Washington (46° 44' 30" N 122° 0' 51" W).

Restoration has been done at the site to meet the relicensing requirements. Because it is a gravel pit, the site contains residual gravel and sand that was not mined out. The original gravel deposit was created some time in the past as the Nisqually River moved across the valley bottom and left well-graded depositional material in a complex pattern. This makes the site very quick-draining. Currently it is too high to be flooded by the river with any regularity. Plants grown on this kind of substrate would experience very dry or droughty conditions. There are, however, some depressions where water stands.

Gravel pits are strip mines that are generally abandoned when they either play out or when the project they were used for is completed. In order to be restored, they need some kind of soil importation, because the overburden containing the original topsoil is gone. On this particular site, because the owner is the City of Tacoma, TAGRO was proposed and used to replace the topsoil.

Re-contouring of part of the pit was also done to achieve a hydrologic connection to the hyporhoetic water flowing along the channel of the Nisqually. Since the site sits in the middle of a recent clear-cut area, and because Tacoma Power will be doing some construction that will create salvageable plants, much plant material and even sod will be available for transplantation.

Your Assignment:

Reconsider the work that was done on this site by the capstone class in 2002-2003. Do you think they have addressed the most appropriate set of FRs? Are they fully meeting them? Have they neglected or failed to meet important Cs? The City of Tacoma, Tacoma Power, is required by the terms of the re-licensing agreement for the Nisqually River Projects to manage their holdings along the Nisqually River to provide environmental services. Re-design this project for them. The power business is big business, and you will have the full resources of Tacoma Power behind you to accomplish novel and creative environmental goals.

There are a number of stakeholders who can apply very strong constraints on, and requirements of, Tacoma Power. Consider them in your design. Alder Dam inundated more than seven miles of riparian habitat when it was built. Consider replacing some of the services lost in that habitat was destroyed. The Nisqually Tribe is concerned about the Nisqually as a salmon stream. Is there anything that you can do in this reach, and with this project, to improve salmon habitat? Consider it, but if it is not feasible to design for salmon habitat, determine that. The National Hydropower Association website indicates that elk habitat was provided, wetlands were restored, riparian habitat was improved. Create a design to meet those goals.

The site is currently a gravel pit, so there are probably a few bulldozers sitting around if you should want to re-contour the site.

Consider the City of Tacoma's decision to use TAGRO liberally to restore the site. Are there other materials that might be more appropriate, considering the close proximity of a salmon-bearing stream and the potential concentrations of undesirable compounds in TAGRO?

Determine what the native vegetation should be at this site. Part of the site could be coniferous forest. Part could be riparian forest. Part could be a grassland or sedge meadow for elk habitat. Select at least five species to fill each one of these groups. Where would you get them? How would you plant them?

Once you have selected your plant material, create a calendar to indicate when your planting window is for each species and form that you select (seed, bare root, container plants, transplants, sod, etc.).

Create a plan view (and any necessary cross-sections) of the 5 acre site to show what you have done to improve environmental services. Show planting zones, regrading, wetlands, standing water, etc. to characterize the newly restored site.

Checklist:

- Riparian habitat
- Salmon habitat
- Elk habitat
- Wetlands
- Re-contour
- TAGRO? Alternative?
- Coniferous forest vegetation
- Riparian vegetation
- Grassland or sedge meadow vegetation
- Plant sources
- Installation methods?

Websites of interest:

Tacoma Power Nisqually River Projects:

http://www.outstandingrivers.org/rivers/nisqually_river/

UWREN Gravel Pit Project

http://depts.washington.edu/uwren/capstone/past/tacoma_power.html

Tacoma Power quick facts

http://www.ci.tacoma.wa.us/Power/AboutUs/QuickFacts_06.pdf

Alder Dam relicensing

<http://www.fwee.org/region/WA/Alder.html>

Nisqually River Hydroelectric Project

<http://www.cwis.org/fwj/41/jbsalmo.html>

Nisqually River Chinook Recovery Plan

http://www.piercecountywa.org/xml/abtus/ourorg/exec/specialprojects/chinookrecovery/nisqually/NCRP_Final%20Report_Aug%2016_.pdf

TAGRO

<http://www.cityoftacoma.org/Page.aspx?nid=306>

Nisqually River Basin

<http://www.ecy.wa.gov/pubs/81irpp11.pdf>

Nisqually River Management Plan

<http://www.nisquallyriver.org/plan.html>