

## **DRAFT REVEGETATION PLAN**

### **BLUE LAKE HYDROELECTRIC PROJECT (FERC NO. 2230) EXPANSION**

*Prepared By:*

**City and Borough of Sitka Electric Department**

**March, 2012**

### **INTRODUCTION and BACKGROUND**

The City and Borough of Sitka, Alaska ("City"), owns and operates the Blue Lake Hydroelectric Project ("Project, FERC No. 2230) located near Sitka, Alaska. The 7.5 megawatt project is located approximately 7 miles southeast of Sitka.

For the past 3 years, the City has conducted engineering and environmental studies to support issuance of a capacity related amendment to the Project's FERC license to modify the Project including but not limited to the following:

- Raise the Project dam by as much as 83 feet to increase reservoir capacity and generating head;
- Construct a new and larger powerhouse and install new turbine generators increasing the Project's installed capacity;
- Construct a new surge chamber near the powerhouse; and
- Construct a new water intake in Blue Lake at a different location from the existing intake.

Since 2007, the City has conducted consultation with Stakeholders regarding plans and other proposals to protect, mitigate and enhance (collectively, PM&E measures) resources potentially affected by the Expansion. The FERC Order Issuing Amendment for the Project was issued on \*\*\*, \*\*\*, 2012.

In the Amendment were Articles requiring various plans and proposals to Protect, Mitigate and Enhance resources potentially-affected by the action. This plan responds to Amendment Article \*\*\*, which states that the City must:

*Develop and implement a Revegetation Plan that includes: (1) identification of areas disturbed during construction; (2); (3) monitoring for successful establishment of native species; (4) criteria for success; and (5) measures for additional plantings, if success criteria are not achieved, to reduce effects of construction on vegetation resources. We recommend the development and*

*implementation of this plan because the revegetation prescriptions included as part of the City of Sitka's Erosion and Sediment Control Plan did not include sufficient detail about the components listed above.*

Among plans already completed by the City is an Erosion and Sediment Control Plan (ESCP), as noted in the FERC request. The City believes that the ESCP is appropriate and is adequate to maintain soils and prevent and minimize erosion and sedimentation throughout the project during and after construction.

As noted in the ESCP, only the areas necessary for construction activities and project facilities will be disturbed during project construction. All existing vegetation will be maintained wherever possible to maintain soil stability. Clearing activities will be limited to only those areas that can be graded and stabilized during the relevant construction seasons.

In US Forest Service (USFS) comments on the ESCP were, among others pertaining to revegetation, the following directives noted applicable USFS Handbooks and Management Supplements:

- × Seeding has long been standard procedure for road construction and all other ground-disturbing projects. It is the most cost-effective erosion control practice available. ([See FSH 2509.22 R10 BMPs](#) 12.17, 14.5, 14.8, 14.20, 14.24, 14.25 for specific references to seeding).
- × The 2008 Tongass Forest Plan Invasive Species Standards and Guidelines and [Tongass NF Invasive Plant Management Supplement](#) (FSM 2080 R10 TNF 2000-2007-1) provide policy for minimizing spread of invasive species.

The USFS also sent a letter on this topic dated June 16, 1999, which is in Attachment I and which largely restates the above material.

This plan has been prepared based on these guidance letters to the City and also on recently approved revegetation plans for similar hydro projects in Southeast Alaska.

## **REVEGETATION PROCESS**

Revegetation will entail diverse processes and measures in the areas potentially affected by construction and long-term operation. Below we list the general steps expected to be taken. After initial evaluation, it may be found that not all steps will need to be taken in all areas. Revegetation will generally include the following 4 major elements:

## **PRE-CONSTRUCTION DETERMINATION of REVEGETATION LOCATIONS and PROCESSES**

Prior to construction, the construction contractor, in association with Environmental Compliance Monitor (ECM) and the City will assess individual construction areas to determine exact utilizations of the revegetation steps described below. This initial reconnaissance will result in a plan comprised of site plan maps, revegetation prescriptions and a schedule for implementation.

### **SOIL PREPARATION AND RETENTION AT SPECIFIED AREAS**

In specific Project areas, as noted in later sections of this plan, soil may be retained after initial grading or removal operations. This soil will be available for redistribution in the areas from which it was derived, or in other project areas, as quantities allow.

### **INITIAL REVEGETATION (Grass Planting)**

The first revegetation action will be to seed exposed areas which might be unstable with a grass seed mixture which is expected to germinate and grow quickly enough to provide short-term stabilization. Since the grasses selected for this purpose are non-native (but not invasive) annuals, they will die off after one or two growing seasons. Details of the Initial Revegetation process are in the following sections:

#### ***Seed Mixture***

A grass seed mix will initially be planted to stabilize the soil until permanent vegetation takes hold. The grass seed mix directed in the Tongass National Forest is:

40% Annual ryegrass<sup>1</sup> (10 lbs.)

40% Boreal red fescue (10 lbs.)

20% Arctared fescue (5 lbs)

Application rate for this mixture is 25 lbs per acre.

The seed mixture shall contain no more than 0.01% other seed, whether identified or not. In the event that Boreal red fescue or Arctared fescue are unavailable, Fawn Tall fescue may be substituted. If this is not available for substitution, then the amounts of the available two may be adjusted to total 100%.

#### ***Seedbed Preparation***

Seedbed preparation can determine the success or failure of seeding efforts. Therefore, soils to be seeded will not be compacted nor have a cemented hardpan, as neither will allow adequate root penetration or aeration for successful revegetation. Soils to be seeded will be left in a roughened condition to allow for the retention and germination of seeds

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<sup>1</sup> Annual ryegrass is also known as *Lolium multiflorum* Lam., *L. L. multiflorum* var. *diminutum* Mutel, *L. multiflorum* var. *muticum* DC., *L. perenne* var. *aristatum* Willd., *L. perenne* var. *multiflorum* (Lam.) Parnell.

and to prevent washing of the seed from the disturbed area. The soils will be evaluated for ability to support revegetation efforts prior to initial seeding. Topsoil from stockpiles will be used when necessary to ensure successful revegetation.

### ***Fertilizer***

Fertilizer will be applied at the total rate of 300 lbs per acre, with the following chemical analysis: 10-20-10 (10% Nitrogen, 20% Phosphorus, and 10% Potassium) 200 lbs per acre, plus urea; 100 lbs per acre. Fertilizer will not be used within 100 feet of any waterbody, and then only if there is a vegetative buffer between the area fertilized and the waterbody.

### ***Mulch and Hydroseeding***

Mulch provides favorable moisture and temperature conditions for seed germination and protects bare soil surfaces from rainfall, minimizing soil loss before revegetation. Wood fiber mulch applied in a slurry mix with a tackifier may be applied on steep slopes if necessary. Other tackifiers may also be considered.

Hydro-seeding with a bonding agent will also allow other vegetation to either germinate or re-grow through this stabilized surface. This is why the reuse of topsoil saved in spoil stockpile sites will benefit the revegetation of the construction site, because native seed and plants (who's root systems has survived in the excavated soil) will be redistributed throughout the area.

### ***Seeding Timeframe***

Application of the seed will ideally occur in late summer and early autumn. Early fall planting typically allows for adequate temperatures and soil moisture necessary for seed germination, and also allows for germination during the same season as application. The window for suitable fall planting conditions will vary from year to year with variable weather conditions. If suitable fall planting conditions exist (e.g. adequate moisture) prior to September, grasses will be planted at this earlier date if construction has been completed. Seed application will be delayed until after the first fall rains if possible. Stabilization of soils on slopes will need to take place immediately after construction is completed regardless of the time of completion. If soil moisture conditions are not conducive for seeding, slopes will be mulched with loose straw or covered with jute matting or plastic until such a time as soil moisture conditions will provide for successful seed germination.

## **LONG-TERM REVEGETATION**

Long-term stabilization will be provided by native and local Sitka alder or Salmonberry (*Rubus spectabilis*) which should reseed naturally and sprout rapidly on disturbed ground. Recent experience in Southeast Alaska has shown that alder is quite aggressive in its growth into disturbed and/or prepared areas.

If natural growth does not provide adequate stabilization, Sitka alder is abundant in the project area and has the ability to rejuvenate from live branches. USFS recommends using live alder branches that have a diameter no larger than the width of a person's thumb and placing them on the ground (in April) so that some of the buds are buried in soil.

## **ADDITIONAL MEASURES**

In areas where vegetative cover alone cannot control erosion, special structural measures such as riprap, geofabrics, etc. may be implemented at the direction of the ECM.

## **CRITERIA for SUCCESS and MEASURES for ADDITIONAL PLANTINGS**

Within ten days after completion of construction in each major project area (see below), the construction manager, City and ECM will evaluate first the success of seeding and the need for additional structural measures if seeding is not effective in erosion control. Often, there is a need for soil re-preparation and reseeded, which can be accomplished quickly if areas are limited.

By late fall (November-December) each construction year, the City, ECM and construction contractor will evaluate all areas for success of both initial revegetation and long-term stabilization. Collectively, these three entities will note whether soil stabilization has been successful, and will prepare a plan for stabilization to be implemented over the following winter. This plan will be of sufficient detail to show locations at which additional preparation, seeding, and alder planting might be necessary, in addition to areas in which the evaluators see the need for mechanical measures such as silt fences, rip-rap, geofabrics, etc. may be required.

## **IDENTIFICATION of AREAS DISTURBED DURING CONSTRUCTION**

In our Final Erosion and Sediment Control Plan (ESCP), the City has shown, in some detail, areas to be disturbed during construction. At the time of this draft plan, there is a possibility that the map of disturbed areas might change slightly after final design of the Project. We doubt, however, that these changes will be significant, and that the revegetation prescriptions in the foregoing plan elements will still apply even if the areas change.

### **Dam and Intake Area**

Most areas in the dam/intake area are located on previously disturbed rock surfaces. There are, however, some high gradient rock areas from which runoff has been identified as a potential problem. These areas, however, are not suitable for either initial grass seeding or long term revegetation and have been identified in the ESCP as areas in which extensive mechanical or non-vegetative sediment control measures will be emplaced during and immediately after construction.

Of concern from a revegetation standpoint in this area, however, is the dam site construction staging area. The ESCP notes extensive drainage and runoff control from the area during the construction period. Also, during early construction as the dam staging area is developed, a prescribed quantity of both topsoil and alder cuttings will be retained and stored for use in revegetation. The exact quantities of soil and alder to be retained cannot be known until construction begins, at which time the Environmental Compliance Monitor and City and Construction crew representatives will develop a prescription for the amount of soil and alder to be retained, as well as a location in which to stockpile these materials.

The side slopes of the staging area may require grass seeding to assure initial stabilization. The presence of alder in the area, however, will assure rapid re-growth and slope protection in the area.

After construction, the stockpiled soil will be redistributed in disturbed areas outside the Dam Staging Area and roads indicated on Project drawing 109-05-005.

### **Fish Valve Unit (FVU) Area**

Because of limited ground disturbance in this area, revegetation is expected to consist primarily of seeding small steep areas and monitoring the success of these seedings. If initial seedings are successful, it is expected that alder and native shrubs will quickly reestablish after construction. The USFS campground will be resurfaced with gravel following project construction.

### **Dam Site Power Distribution Line Area**

As in the area of the FVU, little ground disturbance is expected along the distribution line route. All of the line segments will be buried in the Blue Lake road bed the road will be resurfaced no revegetation is necessary.

### **Powerhouse Area**

This area includes construction activities at or near the proposed new powerhouse, and the new powerhouse access road. Most land surface to be disturbed in this area is expected to remain de-vegetated bed rock or gravel roadway and working surfaces after adequate erosion control measures (described in the ESCP) are implemented. The area referred to as the timber crib at the lower portal will be revegetated as indicated on Project drawings 109-31-003 and 109-31-004.

### **Surge Chamber Portal**

The 100' x 100' area around the surge chamber top portal will be revegetated as indicated on Project drawing 109-30-040

## ATTACHMENT I

USFS letter to City regarding revegetation, June 16, 1999

**File Code:** 2600/2500

**Date:** June 16, 1999

**Route To:** 7700/2300/2400

**Subject:** Revegetating disturbed sites on the Tongass National Forest

**To:** Tongass Leadership Team

Forest policy regarding revegetation of disturbed sites, erosion control, fire rehabilitation, riparian restoration, forage enhancement and other revegetation projects directs us to "Use native species of seeds and plants in revegetation projects where seeding or planting is appropriate. Native plant material sources include commercial nurseries, agency native seed programs and local seed collection" (TLMP 1997 - Watershed Resources Improvements I.3). At this time, there are no known commercial nurseries that supply seed materials native to Southeast Alaska. Tongass N.F. ecology and botany specialists are actively working on the development of commercially available native seed through the Forest's Native Seed Program. Until native seed materials become commercially available, revegetation projects should use the guidance outlined below.

### Native Plants

1. Use native plant materials derived from wild collections for small-scale (10 acres or less) projects including, but not limited to, trails, recreation sites, and riparian and wetland revegetation projects. **This guidance is especially important when projects occur within wilderness, remote, semi-remote or roadless LUDs.**
2. **Only** use the so-called "native" seed mixture listed below for small-scale projects with extensive disturbance (recreation projects, other areas of heavy disturbance less than 10 acres in extent). This mixture, though native to Southeastern Alaska, is composed of seed material originally collected outside our EcoSubregion. Because it is important to ensure that native seed sources be derived from the EcoSubregion in which they will be planted, using this seed mixture should be kept to a minimum.
  - 50% Fawn tall fescue (*Festuca rubra*)
  - 30% tufted hairgrass (*Deschampsia cespitosa*)
  - 20% annual ryegrass (*Lolium multiflorum*)
  - Add bluejoint (*Calamagrostis canadensis*) if available

### Non-native Plants

1. **Do not** use Reed Canary Grass (*Phalaris arundinacea*). This grass has been a standard component in the seeding mixture for the Tongass N.F. for 30 years. Due to its invasive tendencies, **its use will be discontinued entirely. This direction is non-negotiable.** Please ensure this species is removed from all contract language regarding seeding mixtures for revegetation of disturbed sites (i.e. all road and recreation contracts). Ecology and Botany specialists will assist engineering and recreation personnel in writing new contract specifications for seeding requirements.

2. When available, use the following non-native seed mixture for large-scale projects (greater than 10 acres):

- 40% Fawn tall fescue (*Festuca rubra*)
- 20% annual ryegrass (*Lolium multiflorum*)
- 40% alpine bluegrass (*Poa alpinum*)

**Application rates for this mixture is 50 lbs/acre (55 kg/ha).** Application rates greater than this are unnecessary and not advised. A complete fertilizer (20-20-10) should be applied at a rate of 250-300 lbs/acre (270-325 kg/ha). A fertilizer mixture of nitrates ( $\text{NO}_3^-$ ) and ammonium ( $\text{NH}_4^+$ ) compounds (such as ammonium nitrate or urea) may also be used in place of the complete fertilizer.

3. Other non-native seeds that may be used in place of any of the above species are listed below:

- Boreal red fescue (creeping red fescue *Festuca rubra*)
- Arctared fescue (creeping red fescue *Festuca rubra*)

Please consult with the Forest Ecologist or Botanist for information on any species of interest not listed above.

4. For situations where short-term revegetation is needed, but where native plant materials will either invade naturally or will be planted within one to two years, use the following seed varieties:

- a. Annual ryegrass (*Lolium multiflorum*) (50 lbs/ac. or 55 kg/ha)
- b. REGREEN (*Triticum aestivum* X *Agropyron elongatum*) - a sterile wheat hybrid: \$3.00/lb
- c. Buckwheat (non-persistent, short-term soil builder) *Fagopyrum esculentum*: \$.50/lb.

These can be mixed and applied by hydroseeding or by broadcasting. Consult seed distributors for proper application rates for REGREEN and sterile buckwheat.

Please use the above guidance to help determine the best revegetation techniques for your specific project. We are very close to providing more options in terms of using native plant materials. Our first native seed growing contract will be sent out for bid this fiscal year; we may have native seed commercially available in 2002. In the meanwhile, use the above mentioned non-native plant materials sparingly. While we are actively trying to prevent introduced plants from becoming invasive, we still have the need to stabilize our soils for erosion control; using non-native plants is one of our only options at this time. Where there is high likelihood of natural regeneration which will meet management objectives, we suggest no seeding be done, or using the options outlined in number 4 above.