

DRAFT RESERVOIR INUNDATION PLAN

BLUE LAKE HYDROELECTRIC PROJECT (FERC NO. 2230) EXPANSION

Prepared by:

City and Borough of Sitka Electric Department

May, 2011

INTRODUCTION and BACKGROUND

INTRODUCTION

The City and Borough of Sitka Electric Department (“City”) is in the process of applying for an amendment to the existing FERC license for the Blue Lake hydroelectric project (“Project”, FERC No. 2230). The amendment will reflect two significant changes in Project design: 1) construction of a new powerhouse including 3 new turbine generators and decommissioning of the existing turbine generators; and 2) raising the Project dam as much as 83 feet from the existing spillway height of El (elevation in feet above mean sea level) 342 to El 425. Collectively, these changes are referred to as the Blue Lake Project Expansion, or simply "Expansion". Details of the proposed Expansion are described in the Final Amendment Application (City, 2010), available at the City’s Project website (www.cityofsitka.com/departments/electric/bluelakeexpansion).

Raising Blue Lake Reservoir elevation by 83 feet would result in inundation of approximately 362 acres of land, mostly in the valley of Blue Lake Creek, the lake's primary inflow tributary. (Figure 1) The Blue Lake Creek valley within the limits of the proposed inundation is a relatively low-gradient, heavily forested area with extensive stands of old and second growth Sitka spruce and western hemlock. The remainder of the potentially flooded area around the reservoir perimeter is also heavily forested, but has much steeper sides and less soil formation than the areas in the Blue Lake Creek valley.

Because Blue Lake is Sitka’s primary drinking water source, the US Forest Service (USFS) Tongass Land Use Management Plan (TLMP) Land Use Designation (LUD) for Blue Lake reservoir and the surrounding environs is Municipal Watershed. The management goal for the Municipal Watershed LUD is to maintain the included watershed in a manner that meets provisions of the federal Safe Drinking Water Act and State of Alaska Drinking Water Program regulations and associated Water Quality Standards.



BLUE LAKE EXPANSION RESERVOIR INUNDATION MANAGEMENT
 INUNDATED AREA 362 ACRES, BURN AREA 18 ACRES,
 DEBRIS TRANSPORTATION CORRIDOR 3 ACRES

Figure 1 Reservoir Inundation Area

In 1992 the City and Borough of Sitka adopted a Watershed Control Program (City Ordinance No. 92-1091), to obtain a variance to the Surface Water Treatment Rule. The City operates without water filtration based on this program and State water quality standards. Violations of the standards will result in the termination of the variance. So, maintaining drinking water quality is the primary objective in the management of Blue Lake. Concerns were raised by DEC regarding the generation of turbidity in the drinking water as a result of logging activities within the inundated area and it was suggested that the inundated area not be logged and the trees left standing. The City is offering this proposal to address this concern.

INUNDATION PLAN BACKGROUND

The City initially proposed to cut and remove all timber and other vegetation in the potentially-inundated areas prior to raising the reservoir's water level. A Draft Timber Removal and Management Plan (City, 2010b) was distributed for review and comment October 27, 2010.

Stakeholder comments (including those from the Sitka Water Department staff) reflected concern for water quality impacts resulting from timber removal. Generally, these comments proposed that leaving all vegetation in place might reduce the potential for sediment input to Blue Lake Reservoir during both the logging and clearing operations and over long-term project operations.

Discussions among the Electric Department, the Water Department and the Alaska Department of Environmental Conservation (ADEC, the agency responsible for regulating drinking water quality in Alaska), led to the decision to leave the vegetation in the potentially-inundated areas in place during and after reservoir filling. This draft plan presents the City's current proposals for inundating the reservoir and ensuring the water quality of the lake.

RESERVOIR INUNDATION EFFECTS

PRIMARY ENVIRONMENTAL EFFECTS

It is expected that the primary environmental effects of the inundation plan will be on water quality and aquatic resulting from decomposition or disassociation of flooded vegetation. These decomposition products would likely be spruce and hemlock needles, existing dead wood, deciduous leaf pack and tree bark. It is expected that most of the volume of these materials will be produced in the upper (easterly) end of Blue Lake in the early years after inundation. After a few years, total yearly volume of these materials would probably decrease or stabilize, but continue for many years, perhaps decades, after inundation.

The net effect of needle and leaf pack input to the lake would be to increase Total Organic Carbon (TOC) concentrations of which will increase as these materials slowly decompose. Increased TOC concentrations, when treated with chlorine as part of the

City's drinking water treatment program, may result in concentrations of Tri halo methanes (THC) which are prohibited in the City's finished drinking water supply.

Because of the highly restrictive conditions of the Municipal Watershed LUD, prevention and management of water quality effects from these processes will be the primary focus of post-inundation management activities.

OTHER ENVIRONMENTAL EFFECTS

The City expects few other effects from the reservoir inundation plan. It is expected that Blue Lake Creek will, through annual high flow events due to snowpack melting and rain storms, clear itself of needles and other decomposition materials, and will remain viable as a trout spawning area.

The standing timber, exposed to ground level during later fall through spring, will provide more winter cover for wildlife than it would have had the timber been cut and removed.

Recreation may be more difficult amid the standing timber at higher water levels, but it is the City's requirement that there be no increase in recreation level, due to water quality concerns and restrictions from the existing Watershed Control Program.

RESERVOIR MANAGEMENT PROPOSAL

The primary management methods for the proposed inundation will be both preventative and management, as described in the following:

FLOATING MATERIAL MANAGEMENT

Generally, the City proposes to manage decomposition materials in two ways: 1) by installation of booms to restrict movement of floating materials; and 2) by periodically collecting floating material and transporting it to a specified burn area where it will be burned and the ash buried. These methods are described in more detail below.

Boom Installation and Yearly Operation

Most floating debris will be contained by two floating booms installed at the east end of the reservoir. One will contain debris within the burn area for burning and a second larger boom will be installed to contain debris in the inundated area around Blue Lake Creek (See Figure 1). A third boom will be installed in front of the intake structure to prevent debris from being entrained into the intake (Figure 2).

The booms that the city is considering for this project are TUFFBOOM manufactured by Worthington Products Inc. (Figure 3).

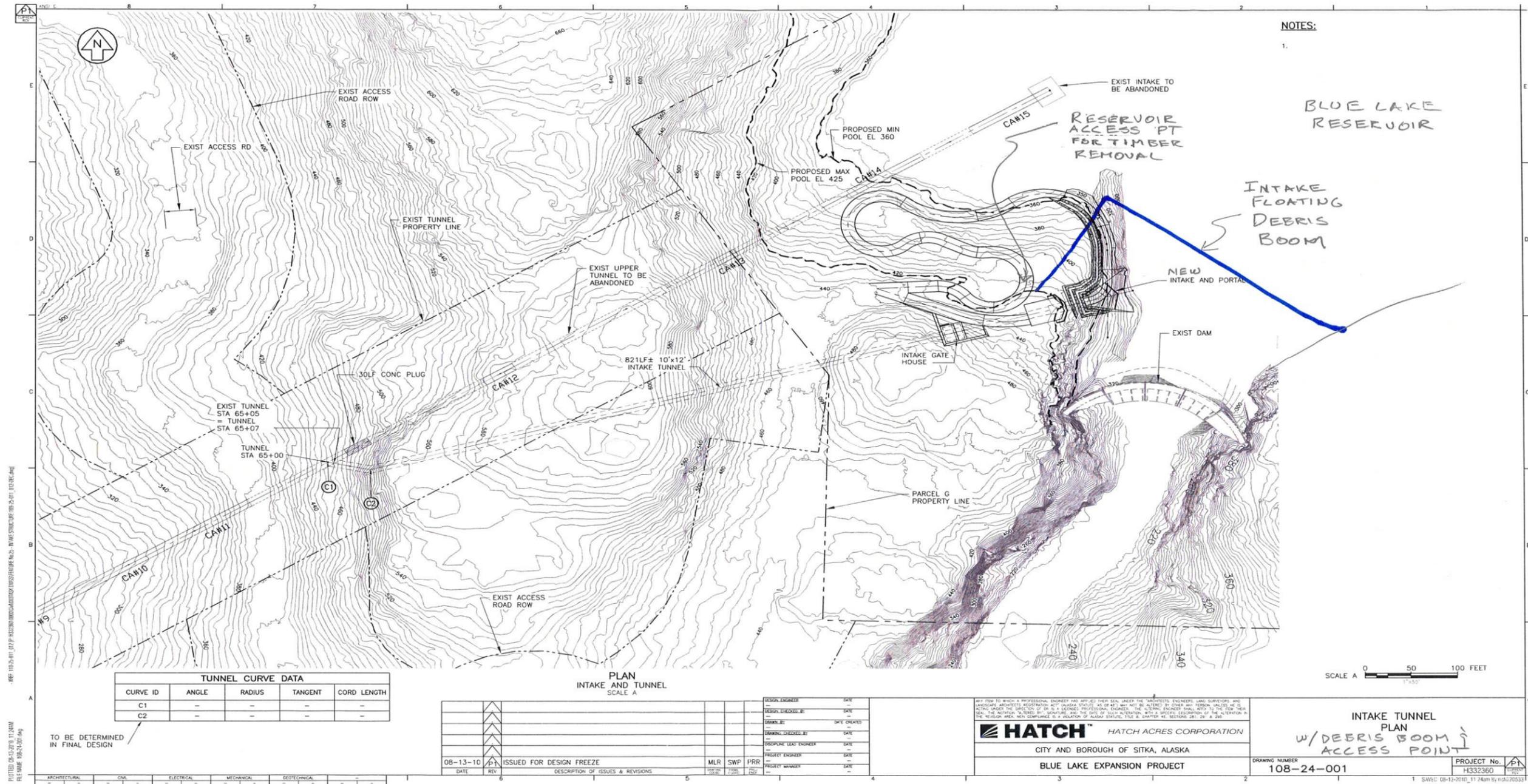


Figure 2. Proposed Blue Lake Intake Boom Location

DEBRIS SCREENS
Underwater Hanging Debris Curtains

WORHTINGTON
waterway barriers

TUFFBOOM barriers excel at collecting or diverting surface trash, debris, vegetation and ice. For those locations where the debris is just below the surface or where water currents tend to push debris under the boom line, we offer a simple, effective debris screen that can be attached to new and existing boom lines.

TUFFBOOM Debris Screens feature a surface facing material mechanically attached to a fabricated galvanized tubular steel frame with vertical reinforcing bars. Standard screen depths are 12", 24", 36" and 48" (31 cm, 61 cm, 92 cm, 122 cm). Facing material options are diamond mesh steel screen (*as shown above*), solid industrial rubber or steel-panel surface screens. Each screen measures 130" (330 cm) long and attaches to the underbelly of the boom via specially designed swivel connector pins. Chain connections on the bottom of each screen reduce the risk of the screens pivoting backwards during higher flows and aid in debris retention.

Call | 800.899.2977 Click | www.tuffboom.com

Figure 3. Tuffboom Debris Screen

Material Collection And Burning

A contractor will be employed to gather floating debris with boom boats and booms during periods when the reservoir level is rising. The burn area will be approximately 21 acres in size. The corridor and burn area will be cleared prior to inundation of the reservoir. Timber and other vegetation cut to clear the burn area and access corridor will be collected and burned during a low reservoir period prior to the onset of filling.

When the reservoir level drops in the winter the debris will remain out of the water to be burned in the early spring. The ash generated during the burning process will be buried on site. This procedure will continue for multiple years, or until all floating debris has been disposed of.

RESERVOIR INUNDATION MANAGEMENT SCHEDULE

Felling and clearing of the debris transportation corridor and burn area are scheduled to be done completed between April and June, 2012, when the reservoir is at about El 270. Figure 4 shows the Reservoir Inundation schedule including estimated times of felling and clearing, boom installation, debris collection and debris burning relative to reservoir stage at specific yearly time periods.

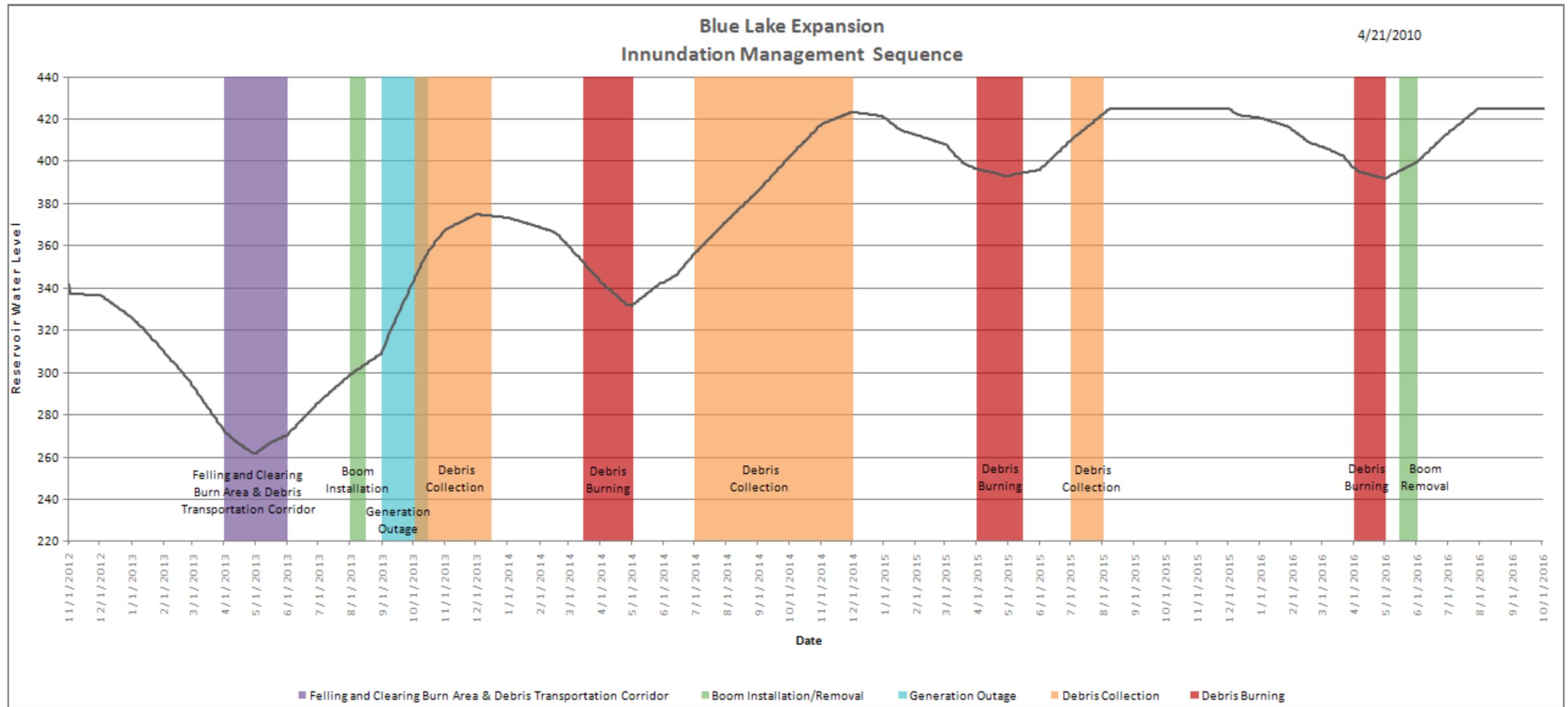


Figure 4. Inundation and Debris Management Schedule.

WATER QUALITY MONITORING

It will be necessary to keep the Blue Lake drinking water system in full operation before, during and after the construction and commissioning of the Blue Lake Expansion Project, except during a 1- to 2-month period when the City will utilize a secondary water supply from Indian River. To detect all changes in Blue Lake water quality, particularly as they relate to drinking water criteria, the City will conduct an extensive water quality monitoring program. A Draft Water Quality Monitoring Plan will be prepared by the City for Stakeholder review in May, 2011.