

Marsh Lake Winter Storage Concept



Dec. 2010

Keeping You Up to Date

When Yukon Energy began our research into the possibility of enhanced winter storage on Marsh Lake, we promised to share the results of our studies with the affected First Nation governments, the Atlin and Tagish Local Advisory Councils, other stakeholders and local residents. This newsletter gives a summary of what we've learned so far, what we still need to find out, and what the next steps are in this process.

We are still a long way from knowing whether this is a viable project. We ask that you keep an open mind until we complete all the studies and analyze the data. We are committed to regular and meaningful discussions with you and we will take all your concerns seriously.

Background

Yukon's energy demands are quickly outgrowing our clean energy supply. If we cannot meet the rising energy demands with our renewable generating capacity, we will be forced to burn diesel, which is expensive and harmful to the environment.

On a global basis, climate change is an issue for everyone, particularly Northerners. We feel it is our obligation to ensure, as much as possible, that the power we produce is from clean, renewable sources.

Yukon Energy is looking at all possible sources of renewable energy, including geo-thermal, wind, waste-to-energy, Demand Side Management (energy conservation) and the enhancement of our existing hydro assets. We are looking at three enhancement concepts: one on the Gladstone Lakes that would provide more water for our Aishihik plant, one on Atlin Lake, and one on Marsh Lake.



South M'Clintock

The Marsh Lake Concept proposes to raise the controlled maximum level (known as the Full Supply Level) by 30 centimeters to 656.534 meters above sea level. The additional water would be released over the winter months, giving Yukon Energy the ability to produce more power at our Whitehorse plant during times of greatest energy demand. This could be done without any new infrastructure.

The concept could contribute approximately six to eight gigawatt hours per year of extra winter generation. That's enough to power about 600 to 800 homes. It would displace between 1.6 and 2.2 million litres of diesel fuel and reduce greenhouse gas emissions by up to 5,600 tonnes a year.

The Studies

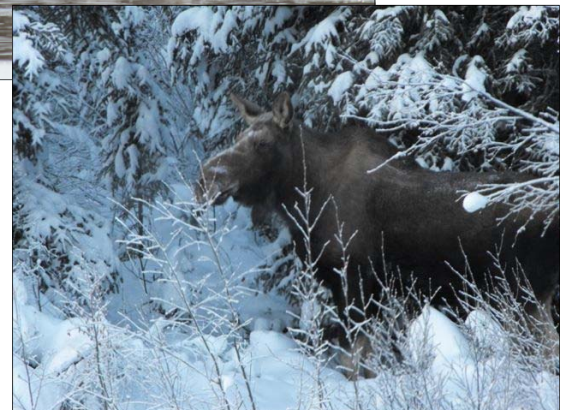
Yukon Energy has begun a number of studies to determine the current status of various aspects of the water system and surrounding area, and its inhabitants. On the next two pages you'll find a summary of the key findings to date.

Aquatics Studies

- Study areas included Marsh, Tagish and Bennett Lakes, and the Yukon River from the Lewes dam to the Takhini River.
- Instream Flow Studies involved measuring water flows and surveying water levels at 30 cross sections of the Yukon River. The studies also looked at the fish habitat available at various flows in the river.
- Biologists found no passage issues with Chinook salmon. Preliminary analysis shows that Chinook spawning and incubation habitat downstream of the Lewes dam would be virtually unchanged between July and December under the proposed concept.
- More research is needed regarding Chinook spawning habitat upstream of the Whitehorse dam.
- Scientists assessed six wetlands along the Yukon River upstream of Whitehorse. Winter drawdown could affect the fish and invertebrates that move into the wetlands in the fall when lake levels are high. This winter the scientists will further analyze the data they collected.
- Extensive wetlands exist at the south and north ends of Marsh Lake, in the Lewes Marshes, and along the Yukon River below the Lewes dam. These are likely productive rearing habitats for juvenile fish. Biologists assessed three representative wetlands to better understand them and their potential to support fish.
- Biologists also studied water quality, gathered temperature profiles, and collected invertebrate and plankton samples at five sites on Marsh, Tagish and Bennett Lakes. They will analyze the data this winter.

Wildlife and Vegetation Studies

- The objective this year was to document the presence of shoreline birds, aquatic mammals, caribou/moose, amphibians and rare plants. Methods included ground and aerial surveys as well as historical data.
- Wildlife relies heavily on the wetlands at Marsh Lake for food. The animals have over the years adapted to fluctuating water levels.
- Biologists observed large numbers of water birds in the spring and fall but few in the summer. Other wildlife species spotted in the Marsh Lake wetlands included spotted frogs and moose.
- Beaver use of Marsh and Tagish Lakes is limited and muskrat use appears to be localized to certain areas of Marsh Lake. Caribou use is also limited although they do travel on Tagish Lake in the winter.
- Further study is needed to understand the effects of higher water on spring water birds and vegetation.



Shoreline Erosion

- Scientists did an aerial survey of the Southern Lakes shoreline (Marsh, Tagish and Bennett Lakes) with areas prone to erosion observed on foot.
- Shoreline erosion is a natural process that occurs within the major headwater lakes of the Yukon River (the Southern Lakes).
- North M'Clintock (Swan Haven) appears to experience significant erosion and may be complicated by the presence of permafrost.
- Erosion at Army Beach appears to have largely been mitigated by armouring the shoreline.
- Evidence of erosion along the west bank of the Tagish River; not very much on the east bank.
- The majority of Tagish Lake appears stable, except for a small silt bluff adjacent to the outlet of Tagish River by California Beach.
- The White Pass and Yukon Railway Line is vulnerable due to low elevation and proximity to Bennett Lake.
- There don't appear to be any erosion problems on the west side of Bennett Lake and the West Arm.
- A modeling exercise is underway to better understand potential for enhanced shoreline erosion. This exercise will help us better identify areas and rate of potential erosion, as well as mitigation options.



Bank protection on Army Beach

Engineering and Hydrology Studies

- Some of the gates at the Lewes dam would be closed earlier in the year so that Marsh Lake could fill and reach the new Full Supply Level.
- We are still studying the magnitude of the potential effect on upstream lakes (Tagish and Bennett).
- An assessment of the Lewes dam indicates it is structurally sound, although we still need to assess stability relative to a new Full Supply Level.
- Issues still to be examined include identifying the minimum downstream flow needed for aquatic ecosystems and determining how operations can be adjusted so that there is an economic benefit while still protecting the environment and users of the lake.

Groundwater Studies

- The objective of the groundwater program is to confirm how groundwater responds to fluctuations in Marsh Lake levels.
- To quantify fluctuations in groundwater, 20 piezometers were installed (nine at Army Beach, five at Old Constabulary, three at Tagish, one at Tagish Estate, and two at California Beach).
- Data from Army Beach is variable. This indicates that results are site-specific and not entirely transferable to other locations such as Tagish or Old Constabulary.
- We will continue with monthly groundwater monitoring at all locations to help us better understand the relationship between the groundwater and surface water, and how it might be influenced by other factors such as snow melt and precipitation.

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