



Summary of Findings

YUKON ENERGY, SOUTHERN LAKES ENHANCEMENT CONCEPT



WHAT COMMUNITY MEMBERS HAVE SAID

January 1, 2013 to December 31, 2014

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COMMITTEE SUMMARY

In 2009 Yukon Energy Corporation (YEC) proposed the Southern Lakes Enhanced Storage Concept which envisions raising the controlled maximum level (known as the Full Supply Level) by 30 centimeters (12 inches) to approximately 656.534 meters above sea level and lowering the Low Supply Level by 10 centimeters (4 inches).

This concept had previously been presented by YEC in 2006 and a decision was made to remove it from their planning due to overwhelming and steadfast resistance from the Residents of the Southern Lakes (Appendix D).

At a community meeting held by YEC the summer of 2012 in Marsh Lake Community Center, attendees expressed a desire to develop a committee to better inform the community members of the concept. A similar desire was expressed at subsequent meetings in Tagish and Carcross that same week. Hence the Southern Lakes Water Level Committee (SLWLC) was formed.

The people of the Southern Lakes, Yukon Energy, and the general public require careful examination and clear understanding of the potential effects, their significance, and what means of mitigating is necessary before a decision can be made by Yukon Energy on whether to proceed with the project. Therefore a more focused and intensive engagement between YEC and the community is necessary to ensure adequate understanding and consideration of community interests and concerns.

Through public input and information review the SLWLC identified the following community interests and concerns:

1. Understanding The Concept
2. Water Ethics, Hydrology / Flooding
3. Erosion
4. Groundwater
5. Wildlife / Vegetation
6. Mitigation (YEC meeting)
7. Climate Change

Once the interests or issues were identified; independent consultants reviewed the YEC studies and information within their field of expertise to;

- a. Review the data
- b. Summarize the results
- c. Identify data gaps
- d. Present their findings at a public meeting in a manner the general public and Community Members would understand.

The community meetings were audio recorded, and some were attended and recorded by various media including; radio, newspaper and television. The committee then developed minutes from audio recordings and notes which were reviewed internally and by YEC and posted to a public website (www.slwlc.org). The minutes depict actual discussions that took place during public meetings and

these have been compiled into this final report. Comments, received risks, data gaps, questions and answers were extracted from these minutes and have also been compiled into this report.

Questions asked were grouped into categories and placed on the same website. Some have been answered by independent consultants and YEC. The Question and Answer page of the website can be found in Appendix B. Copies of minutes, presentations, Q&A, data and photos can be found on the website www.slwlc.org.

The Community Members of the Southern Lakes include:

- Fish, wildlife and their habitats
- The communities of Carcross, Tagish, Marsh Lake
- Citizens of Carcross/Tagish (CTFN) and Kwanlin Dun (KD) First Nation
- Citizens of the Southern Lakes
- White Pass and Yukon Route Railway
- Commercial and recreational user groups
- Various NGO's and other interest groups

Overall the Community Members expressed over and over they are not in favour of this project. They expressed this in 2006 and repeatedly over the last 2 years. There are data gaps that require more information and some may not have answers. Residents have had many challenges in the past few years with high water and they want to know what can be done about current effects. They also asked to consider alternatives so the full supply level increase could be lessened or avoided altogether.

ACKNOWLEDGEMENTS

The Southern Lakes Water Level Committee would like to thank Yukon Energy Corporation for providing the opportunity and resources to review current studies, summarize them, and present them in a manner community members understood. We would like to thank community members for their continued support, interest and valuable information provided. We would especially like to thank Carcross / Tagish First Nation members and Government for providing a very valuable member to our team and collaborating in the process. We would also like to thank the communities, Local Advisory Committees, the Community centers and staff of Carcross, Tagish and Marsh Lake.

PUBLIC MEETING #1 – THE CONCEPT

APRIL 30/13 CARCROSS

The dam was constructed in 1922; then reconstructed in 1950 and 1975. It allows 2.43 m (8 ft.) of enhanced water storage in the period between August 16 and May 14. The project proposes to increase the maximum water level by 0.3 m (1 ft.) and reduce the minimum water level by 0.1 m (0.25 ft.) to a total of 2.83m (9.4 feet) water storage. The current full supply level is 656.23 m above sea level; the proposed is 656.53 m above sea level. Winter power generation is achieved by releasing water from Marsh Lake, starting in November through to early May. The plant in Whitehorse has limited water availability in winter and occasionally requires peaks to be picked up by diesel use. The additional water available from this project would displace or avoid the need for some of that diesel – up to \$2M per year, every year.

YEC operates under Yukon Water Board current water License HY99-010 (Appendix C). This license went into effect on January 14, 2000 and will expire on May 31, 2025. There are 30 gates at the upper control structure on the Lewes River must remain open from May 15 and August 15 annually and the project has little or no effect on lake levels in this freshet period. The current water license allows enhanced water storage in the period between August 16 and May 14. The proposed project would maintain the same schedule. **Please Note: The previous license was amended in 1996 to allow for early closing of the gates at the Lewes Dam Control structure (Appendix C) should the levels in Marsh Lake be below certain elevations. This amendment was carried over into the current water license. Thus Clause 21 allows for early gate closure; as early as July 7th depending on lake elevations (Appendix C).**

At this public meeting, YEC expressed open ended willingness to do it right or not at all with the support and cooperation of the community at large. *‘We need a workable solution or nothing’* as defined together.

COMMENTS

- The effects on high water are becoming more and more erratic, fall weather conditions.
- Increase impacts on shorelines. Overall community comfort level ‘Uneasy’.
- Historic environmental losses and lack of confidence building leaves the community ‘worried’.
- First Nations to consult with local and traditional advisory representatives.
- Different affects are felt within the whole region resulting from causal action.

DATA GAPS

- Effect of change to full supply holding period, until freeze up. Re: Increased erosion and effects from ice conditions. Effect of change to low supply level 0.10 m/4 inches.
- More conclusive results needed on the affects to: muskrats, swans, glaciers, watersheds, ice thickness, water table impacts, climate change, weather related impacts, wind/wave, groundwater flow and more as required.
- Further studies required: Western Science plus Traditional Knowledge.

- Overview of power generating alternatives for Yukon, benefits of upgrading Whitehorse Turbine for efficient use and enhanced output.
- Request for risk and costs analysis all options.

PUBLIC MTG #2-ETHICS HYDROLOGY/FLOODING JUL 25/13 CARCROSS

ELEANOR HAYMAN PRESENTATION: "STORYTELLING WATER: WHOSE WATER? WHOSE STORIES? WHOSE KNOWLEDGE?"

The Western water management policy is based on ideas and cultural attitudes of what the world is and what water is, yet even when we put a high value on water culturally, we may operate with unquestioned assumption that water is a resource to be managed by the government for economic purposes. Yet in fact the concept of water as a "Resource" (of economic value, and therefore scarce and needing to be dominated and controlled) dates back only to 1909 and isn't working as we face water shortages worldwide.

So why should we be yanked along by that "resource" version of what water is when we all know that arguably water is more valuable than oil; it is required for life?

Yukon River is a particularly interesting river due to existing within; both the Western, Cartesian reading of water as a resource to be measured and utilized economically, and the strong, thousands-year old First Nations cultural context and value system. Eleanor is embarking on a 3 year "Participant Action Research" project to work with CTFN to gather their traditional understanding of the full meaning of water. She suggested we need to allow a pluriverse (many forms of knowledge, ie including story and traditional understandings as well as scientific measurement) to inform us fully about what counts with water, so that our understanding is more democratic and mindful, rather than just measuring it hydrologically.

RICHARD JANOWICZ PRESENTATION "HYDROLOGY TODAY AND TOMORROW"

Marsh Lake water levels have been measured for 40 years. Both water and snow levels are rising with 2007 being the maximum. In 2013 the May snowpack was 134% of normal (by contrast, 2007 snowpack was 159%). This summer the average temp has been 2.1 degrees above normal after a cool spring. Precipitation was below normal until 19 July when we had 40mm of rainfall at once (the largest downpour in 10 years), which now puts precipitation at 129% of normal.

The plan for Marsh Lake: instead of spilling out water, YEC want to save it in the autumn for winter power generation. All the extra water should be used so by spring, the water levels would be the same. Schwatka Lake levels have no effect on the level of Marsh Lake, as the water gets held up in the bottleneck of Miles Canyon. The Lewes Dam gate supports and sill have an effect on lake levels of 10cm. Marsh Lake levels are measured by satellite.

The original purpose of this structure in the 1920's was to impound water in Marsh Lake to flush out ice downriver for the paddle wheelers to start operations earlier in spring.

QUESTIONS AND COMMENTS

WPYR has measured water levels at Carcross for a long time. It is still at end of the dock although the pilings got pushed up.

Local remembers Carcross River being smaller.

Local said his grandparents recall that muskrats used to come to the river but no longer do, due to river being higher so the water level change HAS had an impact that affects the animals and it matters when during the season the water peaks, rather than just how high it gets.

Richard Janowicz (RJ): I'm sorry about the muskrats. To close gates 15 August to hold water 30cm higher from then on, won't affect following summer's flood level: as stated already, as the main point of the presentation.

Local: But higher fall water affects fall wind and wave action, increasing erosion, plus water will freeze higher affecting ice level and thus swans in spring.

RJ reply: Erosion

- Wind effects data 2013 shows that wind starts picking up in July and there is a 10cm surge from wind.
- A 0.3m increase could impact erosion rates significantly, and if we add in impact of wind it could affect things (e.g. septic fields could be affected more than they already are).
- Boat wake is recorded on the gauge as they go by, e.g. Tagish River, and in fact the department did notice deleterious effect of Yukon Queen's wake on shoreline and that's why it went out of business.

RJ reply: Climate Change

- There has been a change in averages: summer temp has dropped slightly, winter temp has risen by more than summer temp dropped; summer and winter precipitation have both risen.
- Log Cabin Snow Station – Snow/Water Equivalent measurements 1958-2013 show gradual rise in snowpack levels with 2012/2013 being record snowpack.
- Increasing peak flows due to precipitation at Atlin River.
- Marsh Lake annual maximum stage 1950-2013 has been going up, so yes there has been more flooding on Marsh Lake.

Q: The depth of Miles Canyon, does it vary?

RJ: I don't know exactly, though cross sections exist and the canyon does have a slope.

Q: Please comment on how the source of the Yukon River is unclear?

RJ: Yes source is likely the Teslin River as it is the longest branch, and that starts in a moose pasture. The farthest south, highest tributary is the glacier at top of Atlin River. Note: The Yukon River name came in to being when Whitehorse was made capital of the territory, so the river would sound more important. Before that, it was Lewes River.

Travis Richie (TR) Comments:

YEC license renewal occurs every 25 years; we must make a request to the Yukon Water Board for an amendment to the existing water use license, if we want to make changes such as the proposed 0.3m water level project it must be done before the license expires.

YEC have done detailed studies since 2009, of erosion plus high water at representative places (ie: with dwellings), which they are following up annually.

Ric's observations on the potential for water related effects as a result of pursuing this concept echo Yukon Energy's Baseline data collection work and our preliminary effects assessments, which show that yes, there is potential for increased erosion and other effects. Yukon Energy shared such information in the series of public presentations/workshops at MLCC in winter 2011/12 and at other meetings with the communities of Carcross, Tagish and Marsh Lake, so YEC have to figure out what to do about that. They have mitigation concepts but haven't yet had an opportunity to discuss these with the residents. We have rough costs of mitigation dependent on scenarios: ground water mitigation (septic), shoreline impact and others.

We have looked at where erosion is, and the scope of erosion. The scope of mitigation may depend on whether the affected area is crown land or heritage resource. It depends whether people perceive value in a particular location and want to protect an area. Traditional, scientific and local knowledge are used to determine value. We have completed preliminary effects assessment. Analysis suggests they still have a viable project at Marsh Lake, but mitigation measures and project acceptability after consideration of mitigation still needs to be evaluated by the communities and Yukon Energy collaboratively.

Ninety-nine percent of power is generated from hydro, the rest from diesel.

This project envisions increasing the licensed operating range on the Southern Lakes by up to 40 cm (up to 30cm top storage and 10cm bottom storage). This water is used for winter generation and it is achieved by releasing water from Marsh Lake, starting in November through to early May. The plant in Whitehorse has limited water availability in winter and occasionally requires peaks to be picked up by diesel use. The additional water available from this project would displace or avoid the need for some of that diesel.

Q: Why not reduce demand by installing a smart grid in Whitehorse, such as they have in Juneau (followed by another audience question on "customer-based considerations" and how do we come up with creative solutions)?

TR: YEC considers itself a renewable energy company so the management and Board of Yukon Energy do want to find alternative options to meet the energy needs of Yukoner's. Demand side management, in addition to numerous other renewable energy projects Yukon Energy is evaluating, is a newer program for the Company. Along with ATCO Electrical Company Ltd., and the Yukon Government we are working to roll out a number of energy conservation and efficiency programs to the public. The plan is currently before the Yukon Public Utilities Board. In regards to energy saving (peak avoiding) opportunities associated with smart metering or time of day/use rates, we would have to go to the Yukon Utilities

Board to have such a change to our rate structure considered. The current phase on this particular enhancement project is to get to a point where we can collaboratively start discussing mitigation to find if the project should go ahead from looking at what those costs will be and if the impacts are thought to be acceptable after considering the proposed mitigation measures. If Yukon Energy sees potential signs of serious irreversible harm, then they won't go ahead with project.

Q: How accurate is our science? We have lost the salmon that used to be here, when were told there would be no impact before. Eighty percent is not an acceptable risk factor. When you add all the risks together, is it OK to proceed? When do we have a broader based discussion?

TR: The issue is that a single energy solution is not going to do it (i.e., meet all Yukon energy needs). We need a basket of solutions, but the solutions need to strike an acceptable balance between reliability, affordability, flexibility, and environmentally responsibility.

Q: Why do we follow the assumption that we must keep providing as much energy as people want cheaply? Should new industrial developments be required to provide their own power?

Q: Maybe there is a need to switch to customer side management (e.g. in Ontario, electricity costs 3x's during business hours as it does in evening so people can choose to do laundry at non-peak times to spread out use).

TR: YEC has a duty to supply energy to Yukoner's who want to connect to our grid. In fact, only about 12% is for industrial use currently (and any new potential customers on this scale are evaluated for potential electrical supply by Yukon Energy on a case by case basis), all other use is residential, commercial, and institutional (e.g., hospitals). The population isn't necessarily growing significantly in recent years, but more houses are being built as kids stay in Yukon, and these are driving up residential consumption to a considerable degree.

Q: What we need is to monitor over time and see changes to things such as fish populations, such as RJ has shown us with records of snowpack and precipitation levels changes. Only with populations monitoring will we see what changes have occurred and be able to do adaptive management. Lots of monitoring requirements have to be built in for YEC, i.e. if this happens then that must change. We must do this for more things as without scientific monitoring we do not know what an acceptable risk is and we lack the information we require to know what is actually going on.

Q: The unquestioned following of a culture of unsustainability needs to be changed. Hudson Bay Company license granted by Charles II stated if HBC did not use the license to harvest fur they would lose it, so they went after fur harvest thus creating unsustainable environment in Canada, and that is the model we still uphold in our thinking and planning. How legislation evolves from here will determine how we deal with changes.

PERCEIVED RISKS

- A 0.30m higher water level and wind in fall will result in increased wave action and erosion.
- Unknown effects of water freezing at a higher level and how swans would be affected in spring.

- How accurate is our science? We have lost the salmon that used to be here, when were told there would be no impact before.

DATA GAPS

- When we add all the risks together, is it OK to proceed?
- When do we have a broader based discussion?
- Historical water levels at Carcross.
- Carcross River was smaller and there used to be muskrats in river but they are no longer there.
- Storm surge increases water levels by 10cm but levels vary by area.
- Effect of boat wakes.
- Climate Change (temperature, precipitation, snowpack).
- Wind and rate of erosion.
- Mitigation costs on crown, heritage, and private land.
- There is a need for long term monitoring of things like fish populations, snowpack and precipitation. With long term data we can then see changes and do adaptive management. Without this long term monitoring we do not understand what is going on and cannot determine acceptable risk.
 - YEC have done detailed studies since 2009, of erosion plus high water at representative places (i.e. with dwellings), which we are following up annually.
- Long term elevation levels of other lakes within the watershed.

SUMMARY

At the end of the meeting there was a sense of residents' frustration at the apparent lack of YEC innovation for energy conservation. The general feeling is that local area people do not support the raising of the lake level.

PUBLIC MEETING #3 – EROSION

NOVEMBER 7/13 TAGISH

MIKE MILES, M.Sc., P. GEO. INDEPENDENT GEOMORPHOLOGIST

Mike reviewed documents made available by Yukon Energy Corporation, imagery or notes provided by local residents and a compilation of historical air photos for representative locations. YEC concept data gathered over the past 3 years was reviewed and summarized into his presentation. Mike emphasized that this meeting is for the benefit of the residents, urging all to engage in the process, submit their testimonials, photos, studies, etc. and provide direction to the committee on the path forward. There were 67 attendees, including 58 from the communities of concern.

All water level data gathered on the Southern Lakes storage area by the Water Survey of Canada [WSC] has been collected since these controls were put in place. **As a consequence we do not have baseline data which can be used to determine how the existing project affects natural water level elevations. These data are needed to evaluate the effects of the existing project and to determine the incremental or cumulative effect of the proposed increase in storage capacity.**

The higher water elevations from late summer to freeze up have the potential to further increase shoreline erosion during the open water period. There is extensive distribution of fine textured soil in the southern lakes, which erodes easily. There is also evidence of erosion, bank collapse from melting permafrost, and flooded riparian areas on other northern reservoirs as well such as Aishihik Lake and Mayo Lake.

Atlin Lake levels drop quickly. Marsh Lake levels remain high because it is a controlled reservoir. **The natural late-summer and fall water levels on Marsh Lake would be much lower and this would reduce the potential for shoreline erosion during this open water period.**

The proposed full supply level has only been achieved 16 times in 49 years period of record (once every 3 years) and the proposed low supply level has only been reached 3 times. YEC needs to provide additional analyses to describe how the frequency and duration of proposed changes in lake elevation will be affected by the proposed project.

YEC's consultant AECOM have surveyed representative beach profiles and calculated if the elevations of wind-driven waves would intersect potentially erodible sections of shoreline. These analyses are based on predicted wind velocities for return periods of 2, 5 and 10 years, based on data from Whitehorse. The significant wave height calculations are the average of the largest 33% of the predicted waves and individual waves will significantly exceed this value. **The lack of local wind data is a significant concern, as is the limited number of representative cross sections.**

QUESTION PERIOD DURING AND FOLLOWING PRESENTATION

NORTH MCCLINTOCK/ ARMY BEACH:

Question: Lloyd Atkinson (LA), McClintock Contracting has performed much of the erosion control at Army Beach. The water comes in earlier now than it did 20 years ago to low level areas such as the day use area. However, water does not get to the current high banks due to extensive prior erosion. Some bank still exists further down Army Beach. Army Beach has several different heights. The chart shown shows only 1 elevation and thus one 1 behaviour whereas, we know the situation varies from location to location.

Mike Miles (MM): The bank cross-section surveyed in 2011 was selected by AECOM as a representative location. Other sites could have different bank elevations or profiles.

McCLINTOCK BAY (PAGE 19)

Mike Miles illustrated how soil bio-engineering using willow cuttings has been undertaken to help stabilize this eroding bank.

Mike Miles discussed potential wave effects. (diagram, bottom of page 19, "Pre & Post proposed concept Lake Levels together with the Significant Run-up Elevation for October") Waves presently hit just below the bank now. Waves will hit the bank at an elevated and steeper point when lake levels are raised in the fall. Extreme waves would also be higher than the values depicted on this graph

Q: Does this graph include storm surge?

MM: No, changes in lake level elevations as a result of prolonged wind are not considered.

Mike Miles reference: (chart, top of page 20: "Run-up Elevations for 2, 5, 10 year storm Return Period). A 2 year storm has 50% chance of occurring in any one year, a 5 year return period event has a 20% chance and a 10 year storm has 10% chance of occurring every year. The analyses assume the wind is from the south; blue shaded boxes on the summary table indicate that the predicted wave heights do intercept erodible sections of bank, white boxes don't.

Comment: S. McClintock: there are different winds today than in the past, i.e. we get wind from the west more often than in the past.

MM: AECOM analyses have used Whitehorse wind data. LOCAL wind data is however needed as Marsh Lake or Bennett Lake winds could be different from Whitehorse. It would be useful if local residents could install staff gauges (like a yard stick, but with large numbers) and measure water levels at different locations. Photographs, or ideally videos, could be taken to measure wave heights.

NEW CONSTABULARY:

Comment: Trees have died and fallen down; bank now goes straight down where there was an extended sloped beach previously.

Q: One thing that is lacking in the discussion to this point is the fact of all the sedimentation that has been dumped into the reservoir, or somewhere. Where ever it happens. How much does that stuff settles out in the reservoir and how much does that affect the storage volume etc? My fear here is that by a project raising it this additional height, we just exacerbate the erosion and make more erosion at

the high water levels, and then the water drops and it starts settling out? If you go back to the 1950's, probably even before the dam was built at Whitehorse, I am sure you would find the Marsh Lake flats down from the Lewes Structure would have a totally different presentation than today. It suggests to me that a lot of siltation has dropped out and has increased in a very important area of reservoir storage, for running turbines. How can something like this be figured out? Is there a way to do it? I firmly believe that when you start impeding water flow, sedimentation starts filling in lakes, it fills in rivers and changes the whole perspective of the countryside adjacent to the volume of water and the body of the reservoir. I think we have reached that impact in the Southern Lakes, in the northern end siltation has started creating a problem that no one knows anything about.

MM: I have thoughts but no answers. (Compares two photos) 1958 photo we have a big sediment plume. Current day we still have big sediment plume. The sediment plume pre dates the current structure. I don't know how much that has changed.

Q: But if you have an impeded outflow, that stuff is carried down somewhere. Look at the difference in this land between 1958 and today there has been a lot of erosion. Where has all that sediment gone?

MM: My guess is the very finest sediment in places close to the lake outlet, would have been carried downstream. (Lake Laberge etc). At places like this where the McClintock River is bringing in sediment, I suspect you would find the imagery, the elevation of lake water there is different, in some reservoirs it can be dramatic. There are ways of trying to quantify this. You could take a core. The thing I don't know is what the difference in water level is, between these 2 pictures. There are just lots of things I don't know here. You can take a core, drive a pipe in, and the core goes in the pipe, and date the ages of the sediment, sometimes by looking at the bars or layers in it, e.g. : at Chernobyl with radioisotopes like Cesium137. No one has tried to do anything like that.

TAGISH LAKE: 3 SITES WHERE THERE IS DATA P22 TOP DIAGRAM

Q: My question is about Groundwater levels since 2007. I live at the beach and it used to be dry in the springtime. Now in spring, the ground is so wet a loader would sink. I'll be sunk if the supply level rises and remains high longer.

Comment: **My father bought our property in 1937.**

Comment: Since 2007 my ground is super saturated. Water is not going back to the lake. It seems the water is higher than it's ever been.

MM: It would be useful to measure lake and ground water levels with a recorder and determine how one affects the other.

YEC Travis Ritchie (TR): The water level is not due to our control structure so we can only speculate. This can be measured, people can buy a gauge; \$500.00 is the price of a reasonable gauge.

YEC TR: Suggestions were made for private mitigation measures such as i) subsurface improvements such as sump pumps ii) build-up of septic beds.

Q: Has anyone supported your FSL concept?

YEC TR: We have had a mix of reactions from the public. Some have unaffected property, some withhold comments until they hear more while others affected say no.

Comment: Tagish Beach: If project goes ahead, we sure hope for some mitigation. From the YEC 2012 visit, there is lots of erosion, this kind of erosion does not occur at current high level but at the +30cm proposed level it would, so I am very concerned.

MM: (Top diagram page 24: Tagish/Taku Subdivision - North Run-up Elevations Toe of Bank) Note that all boxes for 2, 5 and 10 year return periods are blue and projected wave heights all hit the bank. (Diagram top p 25 California Beach). The predicted 10 year return period wave height is 1.08m/3ft 6.3 inches which indicates the exposed position and large fetch at this site.

Comment: The water level and wind has increased at Tagish over the last 20 years.

MM: (page 27 Carcross) Banks are medium coarse sand, therefore, erosion prone.

Comment: Quite a bit of change.

CTFN member: Witnessed a lot more west wind and greater ground saturation since 2007. When the dam went in, beaches disappeared, and now it's good to see beaches but it took years for the beaches to come back.

MM: Elders can provide very useful observations.

Q: Any consideration of Muskrat and fish populations? Some populations only breed at certain water levels.

MM: Travis Ritchie of YEC is a biologist and there are numerous biological reports on the YEC website. Travis Ritchie would likely be happy to answer your questions after this meeting.

Mike Miles reference: (page28 top diagram) Wind and wave heights need to be measured at representative sites to validate AECOM's wave height analyses.

It will be challenging to predict the incremental effect of raising and further prolonging high water levels in the late-summer and fall. An initial basis for making this assessment is to determine how the existing project has affected the location, rate and volume of bank erosion. This will require data on how the frequency and duration of water levels have changed on at least a monthly basis. Historical air photos, property surveys, ground photos, etc., should be used to establish the location and rate of shoreline retreat. The data can be used to help calibrate wave height and shoreline erosion models once reliable wind data is available.

Comment: The rock lined shoreline on my property was installed by the previous owner, but the 2007 flood increased the water level and we had to request more rocks. We were also informed that we needed to get a \$150.00 shoreline lease to install the rocks and we still get bills every year to pay for this even though it is YTG shoreline.

Comment: The rule on that just changed. You can get a 10 year lease and now there is no charge for the application.

Question: How much worse will it get if YEC hold the water even higher? Also, if YEC scrap this concept, what can be done about current erosion problem?

Mike Miles reference: Technology exists to stabilize short sections of beach (such as at Aishihik) but it's costly.

Q: Why wouldn't Yukon Energy cover that?

(Page 30 Diagram) Review Effectiveness of Employed Bank Stabilization Techniques:

Mike Mile reference: Gabions are wire baskets filled with rocks and can be used as an alternative to rip-rap as a means of stabilizing eroding banks.

(Page 30 bottom diagram) Soil Bio-engineering can expedite the establishment of vegetation and roots and is another possible method of stabilizing eroding sections of shoreline.

Comment: Our problem is that the water is too high in the fall and it drowns the willow shoots.

Comment: I have had some waterfront property for ~ 30 years. I have significant erosion problems now; even my survey pins are now impacted. My planned erosion control is for current levels and if water is raised and held to the new full supply level. I will have to redesign a whole new erosion control system and I would continue to live in a constant construction zone at risk.

MM: I understand your concern.

(Page 31 Diagram) It would be useful to run trials of bank stabilization techniques to determine the cost and effectiveness of techniques to stabilize eroding sections of shoreline. More specifically, the community and YEC needs to determine which techniques best suit particular locations and what is the estimated per meter cost for installation and maintenance? It is also necessary to determine what locations and distance requires mitigation. YEC has prepared a map showing the areas that they have identified as sensitive to high water impact. Is the map accurate, complete and are you located within these areas?

(P33 Top Diagram) Identify other impacts beyond anthropocentric/humans related to increased high water levels and shoreline instability.

Comment: One thing not discussed tonight is the collective property to which the dam has caused problems and further worsened by natural erosion. Roads have suffered like Reid Road at the end of California Beach. Emergency vehicles and school buses can no longer turn around as a result of the shoreline and embankment loss. What will it cost taxpayers to repair just this road? As well, beaver and swans are having their houses affected by erosion, just as we are and that's out fault.

Comment: The high banks on the West side of lake are sliding down and the commons ecology is being affected.

Comment: A huge sediment plume this year extended from the east Shore of Marsh Lake. The width of the plume extended from the east shoreline to just off army beach point and just off the island. The length of the plume was as far as the eye could see.

Comment: Lowering the water level by -10cm/4 inches through the proposed concept will cause lower ice and less open water in spring. Last year with a colder spring, 7 swans died that we know of.

YEC TR: That information and analysis has been completed.

Comment: Six Mile River is a Habitat Protection Area and it is slumping into the water, causing fears that there will be less area for swans to feed. Ecological effects of this project are ground water, swans and fisheries.

SLWLC: We have approached organizations and consultants who have agreed to answer these types of questions.

MM: The sediment studies I have reviewed have not specifically addressed salmon and wildlife-related impacts.

(Page 33 Bottom diagram) I would recommend that the costs to mitigate current loss and potential future loss due to shoreline erosion be determined as a basis for evaluating whether the proposed project is economically feasible.

(Page 34) Negotiate with YEC!

MM: People here have considerable influence, especially with the press.

Do you want to have the proposed concept?

Will acceptance provide a window of opportunity to address the existing erosion issues?

Do you require that current problem areas be stabilized?

CTFN member: 6 Mile River has valued shoreline, culturally significant sites, as well as other sites on the Southern Lakes System. How could those be mitigated and protected?

YEC TR: Work has been undertaken and is ongoing confidentially with CTFN and the archaeologists but if our proposal proceeds, YEC will definitely have to address these issues in more detail.

Comment: Before Army Beach was created by silt; it used to be called Mud Bay. The waterfront access road used to be located on the waterfront side of the cottages. Now it goes in front/North side of the original and newly built homes, as Army Beach Road. I have spent \$XXXX.00 to date on erosion protection for my property and feel I should be compensated by Yukon Energy due to the continued high water levels and continued damage.

DEB FULMER PRESENTATION: M'CLINTOCK BAY

On the Marny Ryder, Reba Miller properties including testimonials + bioengineering work done.

Marny Ryder has lived at South McClintock since 1952 and has completed a report based on records she and her husband kept as a result of rising property taxes and the loss of property through erosion. They have lost 65 ft. of shoreline property due to multiple reasons ~ higher glacier run-off, more boats, Lewes Dam, increased wave action. They are having trouble keeping up with repairs that seem beyond their control.

(Diagram) Ryder property at corner, various photos 1950s, 1960s show decreased property, loss of lower bank shown in 1978 photo. In 2008 the water level was not bad in terms of the current full supply level yet shoreline trees were flooding. The Fulmer property lost 2m/6.6 ft. in the 2007 flood.

At this location, four neighbours got together and performed a trial bio-engineering mitigation effort. At the proposed full supply level in 2009, part of the bio-engineering planting collapsed due to water height/waves. The project was unstable in 2009 but did work protecting the bank in 2012. This year, we did have higher water than 2012 and some further damage. Vegetation is establishing at bank bottom, despite having only 10-20% vegetation still alive. The top of the bank has been stable since 2007.

MM: Does the ice affect the vegetation?

Deb Fulmer (DF): No, the ice just stays on the bank and melts.

DF: (Diagram showing cribbing at bank base & vegetation) The Lois Craig property shows water rising above the ~1 meter high crib in 2013. The bank has further eroded and in-filled with sediment behind the crib. Reba Miller's house is physically threatened by critical and fast moving erosion of her shoreline. Reba has natural vegetation established.

YEC TR: Deb's mitigation is working and the 2012/2013 natural high-water level is 20cm higher than the proposed full supply level. This is not considering the duration of the high water as proposed in the YEC Concept through the fall and winter.

DF: It was one storm at high water that caused the damage.

YEC TR: Natural is 20.3cm/8in. higher than project full supply.

DF: Our bioengineering project is ongoing. We have hired students and put in a lot of hours on this mitigation work.

Q: Are you looking to the government to do something?

DF: We will approach YTG for funding for existing damage and we can also do that as a group in a formal partnership application or individually. As a group, we need to define what we want and present it. With strength and continuity in numbers, we may see some success much sooner.

YEC TR: YEC will come to an agreement shown 'significant' affects resulting from the Hydro Electric Reservoir.

YEC TR: The current proposed concept was proposed and later shelved in 2006. If it is shelved again, we remain at status quo.

DF: There is no spillway to the reservoir currently and no way to let the water down when we are at risk.

MM: Dave Polster and I have undertaken a demonstration soil bio-engineering project on the Klondike River. Dave advised a minimum diameter rule for willow cuttings of “bigger than circumference of thumb” and less than 1/3 of the cutting length should be above ground level. [However, given the annual variations in lake level this may not be practical.] Willows can only tolerate certain duration of flooding so this may be why many of your willows have died.

DF: We have 2m/6.6 ft. willow rods, 1m in substrate and 1m above substrate.

Comment: Groundwater a big issue for us on Old Constabulary.

CTFN member: Shore erosion, higher ice affects muskrats, when water sinks ice sinks and then you get 2 layers of ice which affects the muskrats’ ability to move/swim and breathe beneath the ice.

Q: How many properties were affected by the 2007 flood? Multiply times estimated \$50,000 per property equals \$5 million or more. A YEC Cost/Benefit analysis would presumably support a \$100 million dollar cost over 40 years whereas a new dam would be much costlier. When Aishihik dam went in, the whitefish/salmon were wiped out by the sediment and have not recovered. This wiped out a way of life in the Territory, yet YTG doesn’t have to pay for wildlife and lifestyle loss.

YEC Travis Ritchie: YEC studies have looked at values in all these areas, not just erosion.

Mitigation won’t just include erosion. YEC has a much broader approach to the Study Overview.

Q: We need to hear the YEC study results regarding fish and habitats. Once people’s issues have been addressed through a mitigation payout who will speak for the fish and habitat? I thought the decision not to raise the level of the Lewes Dam was already made by the Yukon Government. Yet people on the ground in the communities are saying NO.

YEC Travis Ritchie: A successful investment was made at the Aishihik Dam to bring back the whitefish.

BRUCE BEATON: GROUNDWATER PRESENTATION.

We moved to Old Constabulary in 2006. The previous owner filled in a swamp with hundreds of truckloads of gravel, built his home and on resale said no water had ever been in his sump. We just lost 2m/6.6 ft. of topsoil in the flood and the shore is already rocked. Our problem is groundwater.

We experienced a sump pump working for 3.5 months continuously through summer 2007 because if pump stopped, the basement would flood. After flooding, we went to YTG and said, “Old Constabulary properties were also impacted by ground water problems, along with Army Beach”. Four piezometers were placed in a micro well that measures ground water, year round. As the lake level rises so does groundwater and I have the records to prove this fact. Two years ago, we started to worry that the piezometers were not being monitored, so we noted water levels on 4 days in both 2012 and 13: Aug 15 and 31, Sept 15 and 30.

Q: In 2007 we had the sump pumping 24/7 all year. 2008, a low water year, we still experienced sump water. Do we now have higher groundwater?

Q: Will the proposed Full Licensed Supply level have an adverse effect on groundwater?

We had 656.53m groundwater height when the lake water level measures at 656.49m.

Q: Why is our groundwater now higher than Lake Level?

Q: Since the proposed Full License level is 656.53 matching our groundwater level, will my house be flooded due to groundwater higher due to super saturation?

YEC TR: Yukon Energy needs to understand where similar situations occur and consider all mitigating options.

Lloyd Atkinson/McClintock Contracting: I was there the day the previous owner of the Beaton's house poured the cement for that basement. It was dry even though it was high lake level water that autumn.

Q: How will YEC address impacted septic systems resulting from the Storage Project and resulting environmental pollution, as well as flooding? We need to as a community continue to gather all of the known impacts resulting from maintaining high water levels.

YEC TR: Monitoring needs to be part of the YEC Study Area Overview.

PERCEIVED RISKS

We have lost 65 ft of shoreline from high water, more boats, Lewes Dam and increased wave action.

Trees have died and fallen down; bank now goes straight down where there was an extended sloped beach previously.

There is lots of erosion, this kind of erosion does not occur at current high level but at the +30cm proposed level it would, so I am very concerned. Banks are medium coarse sand, therefore, erosion prone.

The water level and wind has increased at Tagish over the last 20 years.

There is a lot more west wind and greater ground saturation since 2007. When the dam went in, beaches disappeared, and now it's good to see beaches but it took years for the beaches to come back.

How much worse will it get if YEC hold the water even higher? Also, if YEC scrap this concept, what can be done about current erosion problem?

If water is raised and held to new full supply level, I will have to redesign a whole new erosion control system and I would continue to live in a constant construction zone at risk.

There was a huge sediment plume this year extending from the east Shore of Marsh Lake.

There is no spillway to the reservoir currently and no way to let the water down when we are at risk.

Groundwater is a big issue for us on Old Constabulary.

When Aishihik dam went in, the whitefish/salmon were wiped out by the sediment and have not recovered.

I thought the decision not to raise the level of the Lewes Dam was already made. People on the ground in the communities are saying NO.

We experienced a sump pump working for 3.5 months continuously through summer 2007 because if the pump stopped, the basement would flood. As the lake level rises, so does groundwater. Will the proposed Full Licensed Supply level have an adverse effect on groundwater? We had 656.53m groundwater height when the lake water level measures at 656.49m.

What about compensation for erosion protection to date? Where can we get funding and support for existing damage?

DATA GAPS

First Nations have resided in this area for centuries and some properties have been owned since the early 1900's. Elders and locals can provide very useful observations, photos, surveys and other information.

BASELINE DATA

We do not have baseline data which can be used to determine how the existing project affects natural water level elevations. This data is needed to evaluate the effects of the existing project and to determine the incremental or cumulative effect of the proposed increase in storage capacity.

The natural late-summer and fall water levels on Marsh Lake would be much lower and this would reduce the potential for shoreline erosion during this open water period.

The proposed full supply level has only been achieved 16 times in 49 years period of record (once every 3 years) and the proposed low supply level has only been reached 3 times. YEC needs to provide additional analyses to describe how the frequency and duration of proposed changes in lake elevation will be affected by the proposed project.

WILDLIFE AND HABITAT

What about muskrat and fish populations? Some populations only breed at certain water levels.

Identify other impacts beyond anthropocentric/humans related to increased high water levels and shoreline instability.

Beaver and swans are having their houses affected by erosion.

The high banks on the West side of the lake are sliding down and the commons ecology is being affected.

Lowering the water level by -10cm/4 inches through the proposed concept will cause lower ice and less open water in spring. Last year with a colder spring, 7 swans died that we know of.

Six Mile River is a habitat protection area and it is slumping into the water, causing fears that there will be less area for swans to feed.

Higher ice affects muskrats, when water sinks ice sinks and then you get 2 layers of ice which affects the muskrats' ability to move/swim and breathe beneath the ice.

What are the YEC study results regarding fish and habitats; who will speak for the fish and habitat?

WIND AND WAVE ACTION

There is conflicting scientific and anecdotal wave height results, i.e.: wave action models.

Analyses are based on predicted wind velocities for return periods of 2, 5 and 10 years, based on data from Whitehorse. The significant wave height calculations are the average of the largest 33% of the predicted waves and individual waves will significantly exceed this value. **The lack of local wind data is a significant concern, as is the limited number of representative cross sections.** Wind and wave heights need to be measured at representative sites to validate AECOM's wave height analyses.

Marsh Lake or Bennett Lake winds could be different from Whitehorse. It would be useful if local residents could install staff gauges (like a yard stick, but with large numbers) and measure water levels at different locations. Photographs, or ideally videos, could be taken to measure wave heights from wind and boat wakes.

Changes in lake level elevations as a result of prolonged wind (storm surge) are not considered in the models.

The analyses assume the wind is from the south and residents informed there are different winds today, i.e. we get wind from the west more often than in the past.

SEDIMENTATION

Sedimentation caused by increased erosion due to current reservoir lake level. How much of that extra erosion settles out into the reservoir that is Marsh Lake? Do we just already exacerbate the erosion by holding the water higher? How does this affect the efficiency of the turbines?

Additional analyses would be needed to determine how the increased late-summer and fall lake levels have and would affect sediment production.

Where does sediment go?

It is possible to date sediment deposits by looking at the annual layers in a collected core.

The sediment studies I have reviewed have not specifically addressed salmon and wildlife-related impacts.

BANK EROSION

It will be challenging to predict the incremental effect of raising and further prolonging high water levels in the late-summer and fall. An initial basis for making this assessment is to determine how the existing

project has affected the location, rate and volume of bank erosion. This will require data on how the frequency and duration of water levels have changed on at least a monthly basis. Historical air photos, property surveys, ground photos, etc., should be used to establish the location and rate of shoreline retreat. The data can be used to help calibrate wave height and shoreline erosion models once reliable wind data is available.

Army Beach was created by silt; it used to be called Mud Bay. The waterfront access road used to be located on the waterfront side of the cottages.

GROUND AND SURFACE WATER LEVELS

The water comes in earlier in spring now than it did 20 years ago.

Water level elevations chart at Army Beach shows only 1 elevation and thus one 1 behaviour whereas, we know the situation varies from location to location.

Groundwater levels since 2007. I live at the beach and it used to be dry in the springtime. Now in spring, the ground is so wet a loader would sink. I'll be sunk if the supply level rises and remains high longer.

Since 2007 my ground is super saturated. Water is not going back to the lake. It seems the water is higher than it's ever been.

It would be useful to measure lake and ground water levels with a recorder and determine how one affects the other.

Two years ago, we started to worry that the piezometers were not being monitored, so we noted water level on 4 days in both 2012/13: Aug 15 and 31, Sept 15 and 30.

In 2007 we had the sump pumping 24/7 all year. 2008, a low water year, we still experienced sump water. Do we now have higher groundwater?

Since the proposed Full License level is 656.53 matching our groundwater level, will my house be flooded due to groundwater higher due to super saturation?

How will YEC address impacted septic systems resulting from the Storage Project and resulting environmental pollution, as well as flooding? We need to as a community continue to gather all of the known impacts resulting from maintaining high water levels.

SAFETY

Roads have suffered like Reid Road at the end of California Beach. Emergency vehicles and school buses can no longer turn around as a result of the shoreline and embankment loss. What will it cost taxpayers to repair just this road?

MITIGATION

We needed to get a \$150.00 shoreline lease to install the rocks and we still get bills every year to pay for this even though it is YTG shoreline.

It would be useful to run trials of bank stabilization techniques to determine the cost and effectiveness of techniques to stabilize eroding sections of shoreline. More specifically, the community and YEC needs to determine which techniques best suit particular locations and what is the estimated per meter cost for installation and maintenance? It is also necessary to determine what locations and distance requires mitigation. YEC has prepared a map; is the map accurate?

What is the estimated cost and is there a mitigation plan?

The costs to mitigate current loss and potential future loss due to shoreline erosion will be determined as a basis for evaluating whether the proposed project is economically feasible.

How will culturally significant sites be mitigated and protected?

I have spent \$XXXX.00 to date on erosion protection for my property and feel I should be compensated by Yukon Energy due to the continued high water levels and continued damage.

Are you looking to the government to do something about existing effects?

Willows can only tolerate certain duration of flooding so this may be why many willows have died at North M'Clintock.

DR. GILLES WENDLING: GROUNDWATER, WATER SATURATION, SEPTIC FIELDS AND WELLS

There are two types of aquifer: bedrock, and sand or gravel. Both are based in the subsurface, where all the voids (in the bedrock or sand/gravel and till) are filled with water. Clay is not an aquifer because water doesn't move in it. In bedrock water moves fast, 100 m per day. Water moves much more slowly in a sand aquifer. Water through sand would take 3 months to travel across this room, while bedrock will do that distance in one day. Till is dense material so water will not move fast.

Water comes into an aquifer from 100,000s years of precipitation and with gravity, moves into the subsurface, fills the voids, and due to gravity will move from a higher to a lower elevation. Water is energy driven i.e. it flows from a high energy to a low energy location and is always moving in the subsurface. The water movement slants downward. See a river: most of the water to fill this river will come from an aquifer, so rivers are intimately connected to aquifers. One gets a general idea from a map where aquifers are, but to know for sure you have to drill down and put in pipes to test. To test is to let the water equilibrate in the pipe. That is, the water will come up the pipe and the level it comes to will give an idea of the pressure of the water in surrounding sand/ground around the pipe. Then one will put down another such pipe nearby, 500m or 1km away. The change in pressure and various other differences allows one to measure whether the sample is the same aquifer. Differential in pressure indicates the slope and direction of groundwater flow in the aquifer. These pieces of information are all needed in allowing the aquifer to be defined.

Then one looks at a regional map and does cross sections of these wells drilled, puts in information on these and they reveal the various aquifers. When one combines the information, one can assess where aquifers are and their extent and can estimate the presence of these aquifers. Then one can map valleys, rivers, subsurface layers that are deposited by rivers and oceans, some of which will be conductive and some of which will not be conductive. Recharge zones are areas where water infiltrates and replenishes aquifers, Discharge zones are where water daylights to rivers, streams etc. It can be quite complex to figure out pathways of water and where it comes from, where it goes. Some aquifers can be very long, hundreds to thousands of kilometers.

The water level in the pipe indicates pressure in the aquifer. Then it rains for a day and this addition of water will increase pressure in the aquifer so the water pressure in the well that one is monitoring, will rise. This is how aquifer responds to precipitation in 24 hours. Monitoring it over a year, one can see the fluctuation of pressure over time i.e. the course of the year, which is another crucial piece of information.

HYDRAULIC FORCES:

Slope of the water table or hydraulic gradient is how much energy is lost as the water flows down a gradient, and then there is friction as the water moves through the ground. Hydraulic force i.e. energy is lost when water moves through the subsurface due to friction as water hits obstacles, causing changes

in water pressure and the water to slow down. Thus one can get erosion creating a depression even in land, for example, where the water hits a big subsurface obstacle that it has to go around, such as a septic tank.

$F = i \times Y$ F =force, i = gradient, Y =gamma. This force can move particles and **cause erosion in the subsurface.**

SEPTIC FIELDS

- Require 1.5m of unsaturated soil on top of the field for aerobic bacteria break down contaminants. One wants one's septic field to be dry and well aerated.
- In the saturated zone there is less oxygen and (anaerobic) bacteria are not as active and less effective at breaking down contaminants.
- High water levels reduce the capacity of soil to reduce contaminants.
- Waste flows toward the zone of depression in wells. In sand this can take a long time, in bedrock quickly.
- Bacteria will be filtered by sand and silt, viruses will not because they are much smaller. Gravel and bedrock will not filter bacteria.
- Bacteria travel 10-20m in sand, viruses much further; up to 900m over 26 days. Saturated ground is anaerobic so will not break down viruses. So you want unsaturated soil that can break down viruses, to stop them from being able to flow through the space between your septic field and the next person's well, and you do not want to be on the receiving end of these.
- Pharmaceutical products do not break down and can harm the ecology and cause deformities in fish populations, e.g.: become 80% female 20% male.

REGION AND AREAS

This is a large watershed from Bennett to Marsh Lake. The affected lakes are Bennett, Tagish and Marsh. Atlin Lake is not affected. The water level peaks mid August. In 1984 to 2010 the lake reached the proposed level 10 times or once every three years.

ARMY BEACH - CROSS SECTION FROM BRIDGE DOWN TO RIVER, ACROSS AND DOWN TO THE ISLAND.

- 100m of sand and silt with no bedrock.
- Groundwater flows from M'Clintock to the island.
- The river is a very good indicator of where water table is. As lake and river level rise so does the groundwater table.
- Data from 2007 to 2014.
- At times groundwater level approximately 30cm below lake level which creates an inversion at high water levels in August to November.
- Both 2012 and 2013 were high water levels where groundwater flowed from the lake inland.
- High groundwater infiltration and extreme increases in water level in spring. Up to 17 cm is very extreme.
- Groundwater levels happen in subsurface measurement, therefore, are not affected by wind.

OLD CONSTABULARY – BRUCE AND JEAN`S

- 2 types of bedrock; greystone metabasite on east shore and shale, sandstone conglomerate on west shore.

- Bedrock at is at 27 meters in the well Note: bacteria and viruses move quickly in bedrock.
- Mountains on both sides of the lake are recharge zones,
- No inversion, water always flows toward lake.
- Groundwater is approximately ½ to over 2 meters higher than the lake level
- MP10-04 appears to be artesian.

TAGISH BRIDGE

- 89m of overburden; do not know where bedrock is.
- Big recharge zone here, assume groundwater flows toward the river.
- Flat water table with slow flow inversions in 2012 and 2013.
- Conifer trees are dead from high water levels.

CALIFORNIA BEACH

- There is not much data here only September 2010 to September 2011. It would be helpful to have more evidence from more piezometers installations.
- There is no inversion but the water table is flat indicating slow drainage.

CARCROSS

- Cross section through Carcross, shows the water table recharges on the ridge, then flows towards Carcross on this side and Tagish Lake on other side.
- There is 97 meters of sediment over bedrock in town.
- It is a flat water table with very little flow.
- In recent years, have had a rise already in the water level, so full supply level change is similar to natural and historical conditions.

COMMENTS

- We are holding Marsh Lake 7 feet higher to raise Tagish and Bennett by 6-8 inches. Because of this Marsh Lake gets damaged.
- YEC has never said they will compensate and pay to protect all these properties. This is a cost to everyone in this room so if you want 30 cm then compensate us.
- Travis: we will do that, we won't raise the water unless there is agreement.
- But you cannot fix everything.
- Travis: We are still exploring and we must have answers to everyone's satisfaction.
- Question and Comment: How much longer is this going to go on? We meet year after year every summer what will be impacts to properties?
- Travis: We will continue until we understand the impacts. Then we can answer; yes we can or no we can't to the regulators. We are not there yet.
- We put in a new septic system last year and the agencies told us we could not get a pump out system yet this is your recommendation. There are disconnects with agencies.
- In Carcross the regulations changed for 30 days for the RCMP to get septic but all others have pump out systems.
- Ground water travels faster in the type of sand we have around the lake.

We just have to say no, just say no. Clapping in agreement

QUESTIONS

CTFN member: I harvest moose. Last year I did not get a moose because there was no beach since the water was so high.

GW: That was natural, not due to the project.

Q: Is it just natural sedimentation or is there build up in the river?

GW: Yes, most of the sedimentation is just natural. Deeper level would be glacial deposit, from 5-10,000 years ago.

Tagish resident: this is the campground. Is that why all the trees are dying?

GW: Yes, a too high water table in that area.

CTFN member: I am curious about the effect of the dam? Previously that area was a natural flow, now the dam is slowing down water so all the sediment coming in from creeks is not getting past dam. With all this increased sedimentation lying on the lakebed, will lake level rise as we go into the future?

GW: This is not my area; yes the dam is an obstacle. This has been observed with other dams e.g. Assam dam. Pass that concern to another expert, ask YEC for an answer.

Comment: At the time of year when the lake freezes higher and ice expands, e.g. at Mayo Lake it breaks the vegetation, which makes the bank erosion worse after that. The biggest amount of damage to the environment is when the lake freezes when the water has not had a chance to drop. Key factor is not to have lake artificially higher from where it should be at time of year it freezes i.e. end October, otherwise when it freezes higher the ice will have bulldozer effect on vegetation

GW: Possible to get a map of what will be the area where this phenomena will happen e.g. 5% of lake area? Interesting question; you need to get information.

Q: I have been in this area for 50 years and I don't know why they think this will work. Has YEC established how much they will have to hold? They can't hold enough water just with the extra 30cm, always run out in Dec/Jan. They will have to supplement with diesel. So what are they gaining out of the 30cm?

YEC TR: I haven't spoken to you about project before though many here are familiar with the purpose. Holding the water higher forms a really small part of the bigger energy picture and we have to pick it up later in the winter with diesel. The purpose is to displace the diesel.

Comment: I said this to Mr. Morrison, but if you want to save that amount, you'll have to put forward money to cover damage to those properties at high levels.

YEC TR: We'll negate the impact.

Comment: Dave Morrison never admitted that they would pay the cost to protect all those properties.

YEC TR: Project would not proceed if we couldn't.

Comment: You always stood there and said you never ever realized the impact was that big. Somewhere you'll have to step up and say if you want the 30cm you'll have to protect the properties.

YEC TR: This is what we'll do. I'm telling you this right now.

Comment: We're flooding in Carcross.

YEC TR: But that wasn't related to the operation of our project.

Q: In theory you say you can fix everything but does it happen?

YEC TR: We want to make sure mitigation measures will work otherwise it's a guess. Need to answer to everyone's satisfaction before we proceed.

Q: But we have meetings winter and summer. How much longer is this going on for? Every summer it goes on. What happens to these properties?

YEC TR: Until we can say to the regulator we have looked at this. We haven't got there yet.

Q: I am sure my septic hasn't been legal for a while from looking at these graphs. What does Health Canada think?

YEC TR: Non-compliant septic systems are Health Canada's responsibility.

Q: But how will that work with the new levels?

YEC TR: If there was a change from compliance to non-compliance of a septic due to the project and once the company looks at all the properties that would have to be done too.

GW: You can put a pipe alongside your septic field and once a month dip your pipe and find level of water table

Q: Is 10-30m sand enough to flush the septic?

Lloyd Atkinson: If you've got enough distance 30m to flush your pipes.

GW: It's so much a function of the soil. The greater the distance the safer it is.

Comment: Greater communication needs to go on between the agencies allowing us to live out here. Gilles's first recommendation is to pump and haul but Environment Canada won't give us a license for that. Yet even with us as individuals trying to do the right thing, it seems it ends up that the agencies penalize the responsible residents.

Lloyd: Sand is your best perk rate.

GW: Addressing the situation now is the perfect time as the lake still has capacity; development to date of septic systems has not hurt the fish.

Comment: Atlin Lake campground is an issue.

YEC TR: Which is why we have dialogue to facilitate that process?

Comment: These are the headwaters of the Yukon River and we are talking septic systems. This is a bit small.

Comment: The answer is NO.

Comment: How many times do we have to say 'no'? The headwaters of Yukon River are important!

Comment: Instead of all this discussion that is going on (laughter).

Comment: YEC went around had a lot of meetings, YEC got their answer and then everyone resigned. Meetings started over with a new lot of people from YEC and we weren't there, as a lot of us were not available. I want to know, what happened with all those previous meetings. It's like the Quebec referendum.

Comment: Everyone says don't raise the water level yet it keeps going on. What Southern Lakes Water Level Committee (SLWLC) has suggested is that there are better ways to save or look at energy. Let's try demand side options. Don't keep pushing this thing here when people have said 'no'. Start saying let's work with you on how people can better use energy to make it better and sustainable. When do we say "enough is enough"? I know it is your job but when will you go back to YEC and say to stop.

Comment: Also the emotional cost to the people, the elders living out here by promoting this process over and over again. You should be ashamed of yourselves.

Q: Carcross has a garbage dump right at ground/water level, all buried. Also White Pass Yukon Railway there, got flooded out, creosote laced ties, lots of trouble. What does that do, also an open pit mine with the tailings pond right along the water level? Will that stuff leach in to the water?

GW: Very good question. Higher water table, higher groundwater table. It is not related to the control of the water but movement of water in the watersheds. Increase the capacity of exposing the water to toxic materials. It is a global statement. You need information/data from each potential source of contamination; e.g., landfills. Ask for network of monitoring wells to be installed and monitor the water on a scheduled basis.

Resident, Army Beach: A lady was taken right off her property due to flooding, not allowed to live there. You talk of mitigation but this is the best, most beautiful property in the entire Yukon.

YEC TR: There would be some things we would want to do to mitigate; also elements that are widespread; e.g., areas that would need mitigation for erosion and subsurface improvement.

Resident, Army Beach: Forget it. And what about people who are saying why does no one care? Families who have been here for 50 years!

YEC TR: Every summer water levels come up and they often come higher than the concepts new full supply level. This water rise is unregulated and is happening anyway. Our project will offer mitigation for that amount that is related to the 30cm, we are responsible for.

Comment: Actually we haven't heard your offer of mitigation.

YEC TR: I have been waiting for people to ask me for that information.

Q: What about the environment?

Comment: OK, then we need to know the potential for that.

YEC TR: OK, some people say no on principle, some people would like information before they say no.

Comment: You can't pay off the swans and the muskrat.

YEC TR: I know

PERCEIVED RISKS

PROPERTIES WITHIN 30M AND ON FLAT GROUND

Contamination from liquid waste. **Recommendations** are to haul, pump, composting toilets, raised septic beds, build the 1.5 meters of unsaturated soil, or mini treatment plants.

In recent years there has been a **high water level that captures and keeps this groundwater higher** on near shore low lands such as Old Constabulary. With capture in August and keeping water higher for a longer time, this would translate into the presence of a higher water table on near shore, low land properties. My recommendation is, be aware of that water. So people get this situation where ground is wet till October, so they cannot park a car where they used to during these months. My **recommendation** is awareness and adaptation: forget about building at that location. Adapt and build further inland so as not to deal with this challenge.

FROZEN GROUND

Near natural and historic conditions but with difference of longer higher level of water, which may result in potential expansion of that 20-30m of, ground that historically was unsaturated.

BANK EROSION

Due to higher water table, ground water will contribute to erosion. It will be similar to natural and historical conditions but with longer period of exposure. Take this into consideration plus with wind and higher water level, this may add to higher erosion.

WELLS AND WATER SUPPLY

Higher groundwater levels will have positive impact; due to raising the static level of well.

Potential contamination from nearby, saturated septic systems.

DATA GAPS

California Beach needs more groundwater data.

There is an overall need for more long term and historical ground water information.

Higher lake levels are climate change related and this is nature and not controllable.

Are current septic systems compliant?

SUMMARY

There was strong opposition to the project from the general public with many people saying no and the crowd clapping approval. There are unanswered questions and concerns that included: increased sedimentation cause by the dam increasing water levels into the future, vegetation being damaged from increased ice levels exposing sediment and increasing erosion, increased leaching from currently contaminated sites close to shoreline, stress and trauma to residents as a result of the proposal.

Yukon Energy Corporation explained they won't raise the water unless there is agreement. They are still exploring and must have answers to everyone's satisfaction. They will continue until they understand all the impacts. Some things may not be able to be mitigated. "Through this project our problems could be solved". Already water levels come up higher than they are proposing. They will mitigate for the project and current effects.

PUBLIC MEETING #5 – WILDLIFE/VEGETATION APRIL 24/14 CARCROSS

ROUND TABLE DISCUSSION - COMMENTS, QUESTIONS, PERCEIVED RISKS AND DATA GAPS

FISH & WETLANDS:

Q: How do **fish** move between and among the lakes?

Response (R): It is an enormous, interlocking complex system, including a complex political interplay between a project and the concept. We need to look at temperature and nutrient concentrations, and size of lake to estimate how many fish each lake can produce and how far they move. Fish feeding patterns need more research with evidence.

Q: If you raise the water don't you change the temperature?

Q: Does temperature change affect fish growth and impact the swans?

R: Yes, shallows are very valuable for fish, particularly for juveniles feeding, plus spring spawning species. Temperature and connectivity have an impact on accessibility, changes in vegetation, de-watering.

Pike live in the wetlands. Pike are all in the shallow waters in the wetland. When the Marsh Lake wetlands flood, that is where all the pike show up, you don't find them anywhere else. I am not an expert, but connected wetlands with appropriate vegetation are critical for pike spawning in spring. Their eggs need to stick in wetland vegetation to hatch, and then once the juvenile pike are hatched, they have to be in areas where they can feed on huge amounts of plankton and the tiny animals they find in the wetland. And even when they are feeding on fish in the shallower waters, they need to take advantage of being in waters with a lot of productivity so they can grow; they grow better where it is warmer water. Maintaining wetlands is critical. More wetlands study is required.

Q: What will the effects be on the **Swans**?

R: It is hard to say what kind of impact there will be on the Swans. In the fall you are sort of making a bad situation worse. Plants are doing most of their growing late May-August. I don't know what the effects will be when plants in the middle of winter will sit under an extra 30cm of water, the changes in freeze-up and if the ice is thicker and freezes later with the larger volume of water.

Q: Will these long term genetically inbred staging areas be affected?

Q: Are we limiting aquatic vegetation?

Q: What will the effect be on the wetlands?

YEC TR: We are still in the process of doing a lot of the assessment. There will be a slight shift of vegetation up slope.

Q: What will the effects be on the regional **habitat**?

R: Critical habitat for wildlife is 'open' water in spring. Connectivity could be affected. We know the concept water levels could go slightly lower in the spring. Some wetlands could be isolated at this time. Water elevations and flows in the Yukon River; WHEN these areas get wet again, is very important. Having water in those wetlands is really important. The Concept level of delay in spring seems to be really small, only 1-2 days. This information requires verification. This is really important for a whole lot of species, marine habitat for whitefish, grayling, suckers also invertebrates. These are not just important in themselves, they effect the whole food chain as lake trout and pike eat those species. So it is definitely something YTG is looking into.

FIRST NATION MEMBER

What Yukon Energy should do is go to each school and give money for each person who tries to conserve energy in their school without causing any harm. We should all start a "Use Less Energy" drive.

Spirit, we need to remember this land has spirit, the animals have spirit, I've got spirit and you've got spirit too. I know that because I was shown that.

Swans, we need to think about what we can do as stewards to ensure the swans can come back, because it is their home. We have no business trying to change that. That is the beaver's home, I have no right to change that and it's always for the same thing; money.

Impeding rivers: Fresh water fish rely on being able to move for their life history, their ability to feed in one place as juveniles then go somewhere else as adults and over the winter. Populations move for some very specific purpose. So if one changes fishes' ability to move, one changes their ability to carry out their life function. If you change where they go to reproduce, it affects that. If you change where they feed, it affects their condition, and they will not get so fat. Fish rely on their free passage through rivers. If that is impeded their life becomes more difficult. You could have impacts on their survival, and their reproduction and condition.

Creek and River mouths that drain into the lake system are critical in terms of productivity. These areas provide different mixing zones, different temperature regimes that can affect the invertebrate population. If you increase the water levels you then inundate the river mouths, you change the whole flow characteristics of the lower reaches of the streams. The invertebrate communities have already evolved into a certain structure based on those flow regimes, if you change that, you risk changing the whole population composition because you are going from a dynamic system to a less dynamic system in terms of water velocity. Work needs to be done on the creeks and river mouths.

Flow: Historic evidence: Aishihik Lake was impacted by major flow changes in the lake/river areas resulting in unforeseen consequences within small lake and pond systems between the two lakes that used to be quite productive. There were changes in flow conditions. There were also critical shoreline issues, where if you expose the discontinuous permafrost, you could set up some erosion concerns, situations that take a long time to stabilize including clay cut banks that would be more susceptible to

wave action. Flow changes, flow conditions, discontinuous permafrost and clay cut banks all need to be mapped and studied.

FLOW

Beaver, muskrat and otter depend on a natural flow. The Otter is rare to see now and depends on the natural flow.

Q: What are the resulting factors when natural flow is disrupted?

R: We have never really studied what happens to them with the different depth of water for prolonged periods of time. Dens are set up in a certain way in autumn. If the water is high and freezes differently, then when the ice drops, it will cause damage.

Q: What about **Large species (Moose, Caribou, Bear & fringe species)** we have not seen them a lot lately though in the past they were always there, feeding in the lakes.

Q: Have you studied the large species directly related to the aboriginal subsistence harvest? What are the effects of changing the depth of water through their journey?

If you change water flow and depth, it will change the **whole lake and river bottom system**, the certain areas that they depend on. A certain water flow needs to happen, keeps the silt moving off the pebbles and the bottom open. A change in the current flow throws that whole system off balance. Those are some of the important things that FN people tell us. We depend on these things. Yet since the dam was built, it has thrown the thing really out of balance.

CONSULTATION WITH IMPACTED FIRST NATIONS

Q: Why have YEC and these government people not come to talk to the First Nations?

Q: How can we help each other?

Comment: Our issues are common. Let us look at what we have in common and can do together. For some reason we are completely shut right out of the equation yet we are one of the biggest resource holders in these southern lakes. Let us look at the commonalities and look at the solutions not the problem.

Q: Does Yukon Energy have the right to negate my traditional lifestyle, to harvest and earn my living off the lake?

Q: Do I have any rights as an indigenous person who lives traditionally off the lake?

R-YTG: Certainly. Society, via developing these laws and these processes, through public processes with these boards and regulators, have said this process, these resource use-activities are acceptable, under licensing process.

Comment: Under the Land Claims Agreement, we provided the Yukon Government with the resource management component to ensure our subsistence rights, our aboriginal rights remain intact. If they

miss-manage these rights, so there is no salmon, no whitefish, no beaver, no herring, if the Yukon government wrecks the environment, at some point in time the First Nations will say that's not right.

Q: Who bears the cost of lifestyle?

Q: Who pays that mitigation?

Q: Who pays for the loss of the beavers and swans, of an aboriginal RIGHT?

Q: What is the cost of that?

Q: How can we do things differently?

Q: What is the effect if the swans habitat and food disappears?

Q: What is the effect if the ice freezes a foot higher?

Comment: We are hearing a lot of "I don't know". I hear a lot of "we think it will be OK within the range that we talked about here on this particular part", "but we don't know how it will impact this one".

If you take all the pieces, "we think it's OK", yet systems are systems, interactive; it is still about our relatives. So, if you impact the food that feeds the fish that feeds the swans that feed the people... These are the effect concerns. We've seen it before like the salmon, Seckleman, we lost the fish. There is a different way to do this and not impact the swans, the pike and justify the cost to all energy consumers.

YDC needs to widen their scope of criteria for Energy. Understanding is critical, the people, the habitat, the wildlife, the long term. Some effects have little impact but overall, the impact is unknown and feared.

The "I don't knows" scare me, stated by Gilles Wendling at the Groundwater meeting March 27, 2014 had a huge impact on the Southern Lakes Community. Mr. Wendling also said, "We should know, before we do things".

R: YEC makes no decisions, only references to the decision-makers for this concept. The YESAA process. Hopefully, we as Yukon Energy can put evidence there that can satisfy the majority of those interests. "I cannot tell you right now that we have satisfied all those interests".

Q: Who has the rights?

Q: What are their special interests?

YEC: There is a power benefit, with the water there that allows us to displace fossil fuels and save Yukon rate payers some money. That is the engineering and economic side, to reduce fossil fuel use and try to keep the rates affordable.

There is the other side, the impact of the project will be, saying that it is not going to be a significant issue, according to the criteria Yukon Energy is using or, it is going to be a significant negative impact.

YEC: These studies are telling us there are some things that can be addressed and we think these impacts can be dealt with. And then there are other things we still have to address, or that we can mitigate.

Q: Is the engineering and economics of the 'Yukon majority' versus impacted communities and habitats a fair base for decision making?

Comment: Alternatives are being left out of the equation; i.e. windmills, solar panels, conservation. Let's spend the same time on all potential alternatives before impacting anyone with a questionable concept.

Comment: We need the right people to answer the questions. We need to get critical answers. It is important to me to have our major waterways remain natural. We should still have salmon and an intact system.

R: YEC has done a lot of work on the erosion side of things. Mitigation and compensation is a huge unaddressed issue. We want the system to drop naturally and drain, as soon as possible. YEC wants to make sure everyone understands that it drops quickly.

Q: Does it drop quickly when it is being held?

Comment: Notice how often the statements; "we don't know what will happen, that is a 50/50 chance, not my specialty, etc are said. Industry would never proceed on that evidence with an economic decision.

R: As stated many times, "YEC would not pursue the project if there was a significant negative effect".

Q: Please define 'Significant negative effect'?

Q: Are we reducing the lifespan of our lake basin as a result of sediment build up in McClintock Bay, and the Lewes Marsh area as a result of the existing dam?

R: That is what happens with wetlands and estuaries. Sediment being deposited out of the McClintock River; therefore, there is less flow than there used to be, presumably due to backwater from the dam, so silt is accumulating. There is still a backwater effect with that dam even when all the gates are open.

Q: At what rate is sediment building and what mitigation options have been considered?

R: YEC states that Miles Canyon is a natural bottleneck. The dam has really no impact.

Q: Why don't you dam up Miles Canyon?

R: When you talk of Miles Canyon or the lake, it isn't any different to us. When we look at the dam being there for the past 60 years, we can learn a lot in terms of what has been the effect.

We can see that lake trout spawn every year, there are no missing egg classes, and we can see they spawned every year. So yes the population looks reasonably healthy from that perspective.

Climate Change: Our environment is changing. We have had high water levels in the last 5-6 years, more winter snow, warmer summers, and more precipitation, more glacial melt. I would predict that we will have high water levels for quite some time. That will affect a lot of things, summer erosion, water levels. I cannot predict the changes from that.

Comment: There are so many projects right now; this Marsh Lake Enhancement concept assessment, energy from Skagway to Carcross and Whitehorse, the LNG, etc.

Q: Can we see an energy development timeline?

Comment: I am not confident with the YESAB process. I have little faith.

Q: How much power is a transmission line going to generate?

Q: Couldn't we save ourselves a lot of money by holding on for the transmission line in 2 years?

Q: Why is there a project to raise the lake level and why are we not looking at alternatives first?

Comment: I went to Yukon Energy and said I just want lights for my house and my computer. The Yukon Energy said "we did some studies out at Tagish and Carcross, there just isn't any wind there" and I said, I live on Windy Arm", and as a result I did it on my own. Alternatives should be a goal for this community. Can we list local alternative options?

Why aren't we initiating wind and solar? There are other options that won't have the unanswered questions or the known impacts.

R: YEC would encourage you to look at our resource plan. We explore all options and put it into the Yukon context. Summarize YEC Options for clarity. Define Yukon Context.

Comment: Southern Lakes can be carbon neutral; communities could sell power to YEC. The communities have indicated that they want to go with these small renewable and conservation energy projects.

Comment: I am a member of the Yukon Fish & Wildlife Board, representing the board. We are concerned about the ramifications of this.

YEC MITIGATION MEETING – GROUNDWATER AND EROSION

MAY 29/14 MARSH LAKE

YEC REPS: DAVID MORRISON, FORMER CEO; TRAVIS RITCHIE, BIOLOGIST

NORTHWEST HYDRAULIC CONSULTANT: BARRY CHILLIBECK, ENVIRONMENTAL ENGINEER

YEC: Wildlife and Climate Mitigation are two other effect pathways and were not covered in this meeting.

YEC consultant: There has been some overview in the identification of erosion therefore it is not comprehensive in terms of the values, but a first step is looking at it. YEC is not clear regarding the use of word “Natural”: “We want to say, what is the right rate [of erosion]? It’s the natural rate. Yet since someone is living there and the lake shore erodes naturally, the natural rate of erosion is already an issue to them. There would be a natural rate of erosion anyway.

Groundwater Mitigation Options: Some properties will require additional/unique mitigation solutions.

Shoreline Erosion Mitigation Objective is to limit the amount of wave energy that gets onto foreshore and backshore, stabilize and protect the backshore, and promote the amount of riparian vegetation: incremental, adaptive management.

SHORELINE MITIGATION

- Very fine textured, glacially fluviated sediments and terraces along the lakeshore. Very difficult to stabilize, very fine-grained, gets mobilized at very low velocities, need very little wave strength to mobilize them. We also want to stabilize the toe of these bluffs as anything that comes down it gets mobilized along the foreshore.
- Suggested approach is mitigation designed by shoreline unit. Shoreline process is a geomorphological, physical process. Materials are naturally eroded, transported, deposited in the shoreline environment.
- Design our mitigation to both mitigate erosion, but also accommodate the natural processes which keep protective bars/shorelines units developing.
- Recommend Bioengineering Hybrid Beach: cost is hard to estimate but based on my experience labour and access to materials, it will be about \$500-\$1500/lineal meter based on lots of factors; i. e. difficulty of access. There are probably a couple thousand meters to protect all the properties that were identified in the report. It is not comprehensive to all the properties. **Note: Calculation of above is between 1 million and 3 million.**

“David Morrison: These options are just for the new Full Supply Level. We will not do anything unless we go ahead with the project. We know this will cost several million dollars but this project can stand a fair amount of work on all these beach fronts. It can handle these numbers.”

QUESTIONS AND COMMENTS

Is this mitigation for the dam that is already in, or for the new FSL proposal?

Residents are concerned about existing erosion from existing effects. What about those expressing historic damage?

We cannot deny there are effects from the existing structure. What can residents do about existing structures causing effects? Approach Yukon Government.

But you can't say this is a natural area; it's a reservoir. North McClintock residents are anxious to get some mitigation for existing effects. I feel residents are being presented with an ultimatum and it's not sitting well with me. These are excellent ideas and the residents do need some help with the existing problems.

No one thought of mitigation in 1920 or 1958 but we are seeing effects and now we know there should be mitigation for effects.

When we have these discussions all this stuff starts coming up. Moving ahead, when we start looking at the costs, we all go forward seeking what is right. Is there mitigation only where residents are?

What about First Nation and aboriginal rights and the wildlife impacts?

If there are aboriginal rights issues, beaver muskrats moose being impacted is part of the discussion. What is the cost of that on top of the per km cost of mitigation. Where is the cost benefit tipping point of the project?

Regarding existing effects, there are technical and geotechnical people in this room and if we just look at an aerial photo of the upper control structure, we can see that there is silting above it and a nice channel below. I believe since 1920, looked at from a fluvial point of view, if the river were not backed up by the Lewes Control Structure, we could see a nice channel on the river above it and that there is more erosion upstream with it.

It is Crown land being eroded now, not private property, but the erosion is going up to private and FN property.

PERCEIVED RISKS

30 years ago, you could have mitigated and people would have been happy, but nothing can be pushed through now. We all know it was not OK, what was done.

Now, trust is an issue. How much will power is there to help people at the level they need to be helped?

DATA GAPS

How will YTG support mitigation if the project goes through?

People will also say, rightly, that if none of the structures had ever been built, we would not have these problems now. YTG knowingly titled lots so surely YTG has a responsibility? Surely there is liability there that goes to the government? Ten years ago people purchased lots assuming it was safe to build. Ask YTG Planning Department for answers on 'Approvals Process' for Lands.

Tagish only leased originally. Then in 1972 you could apply to purchase, before that it was just lease. So evidently a decision was made then, not to use these lakes as a water resource. People are still around who remember camps where they went every summer, and then after this was in, the animals were dead and there is no more salmon.

The meeting on 24 April in Carcross encapsulated the core issues for many who live in the Carcross area and around the lake. And people talked about how the ecology is a part of their family.

Health costs, for elders going through stress. \$2m does not sound like a lot to me and surely there are other ways for it to be done. I am afraid that other ways will be proposed and you will go ahead anyway. What is the overall target that YEC wants to generate in 5, 10, 20 years. I want to help you move in a different direction. How do we put this on hold and yet solve the problem for you. You look at it and say, it still makes sense to pursue this. Are there other alternatives?

Now there is much more standing water that is not draining, in areas that used to be dry.

It is the issue of holding the water at the new height through to freeze-up, that is where the magnitude of the issues are and the low supply level .e.g. the impact on the swans.

We need baseline measurements of “erosion” and need to stop using word “natural” as Marsh Lake is a reservoir.

PUBLIC MEETING #6 – CLIMATE CHANGE

SEPT 18/14 MARSH LAKE

YUKON NORTHERN CLIMATE EXCHANGE

Guest speakers:

DR. BRONWYN BENKERT, RESEARCH PROJECT COORDINATOR

LACIA KINNEAR, NCE MANAGER

ALISON PERRIN, CC INFORMATION ANALYST

JOS SAMUEL, POSTDOCTORAL FELLOW HYDROLOGICAL & GLACIAL PROCESSES

JOHN STREICKER, SCIENTIFIC ADVISOR ON CLIMATE CHANGE

Northern Climate ExChange (NCE), studies of climate change in Yukon, research on impacts and adaptations, including risk and vulnerability assessments.

NCE GUIDING PRINCIPLES

1. That community participation in research and decision-making is essential to long-term resource, environmental and cultural sustainability in the North.
2. Strengthening links across northern Canada and among circumpolar nations through the exchange of knowledge and expertise.
3. Appropriate emphasis on the collection of local and scientific knowledge and expertise in order to reflect northern perspectives, priorities and needs.

Yukon government acknowledges Traditional Knowledge is critical.

SOUTHERN LAKES REGION

- Freshwater ecosystems: a warmer climate means increased productivity in lakes and rivers for warm water species of fish. Cold water species (salmon) will suffer.
- May cause deterioration to fish habitats through changes in water flow and water quality, may introduce new parasites.
- Landslides may increase sediment loads, melting ice can release organic material into streams, which reduces the oxygen supply for fish. Holding water higher will also increase these affects.
- 2007 flood was exacerbated by climate change and climate change is pushing us in a direction where more such events are likely to occur.

PRECIPITATION

- With changes in amount of ice cover in winter we are likely to see more erosion. Changes in sea ice and glaciers.
- These in turn cause increased erosion along shorelines, with increased wind affecting the wave action, and different snow and storms in the winter.
- Changes in precipitation mean change in water flows in rivers.
- Later freeze-up and earlier break-up on lakes and rivers.
- Hotter, drier conditions.

TEMPERATURE

- Changes in migratory bird patterns, with birds coming earlier and leaving later.
- Permafrost thaw causes major wash-outs on highways.
- From just north of Whitehorse to just south of the Llewellyn Glacier warming up 2 degrees in past 50 years.
- Yukon is more than twice the rate of warming, over the years 1960-2010, than there has been worldwide.
- We are currently warming at a rate of 4 degrees per 100 years and this (4 or maybe 5 degree change) is what melted the last ice age and that change took 10,000 years.
- Most of the warming in the Yukon and the North is happening in the winter, not summer.
- Trend: Warmth + Summer Rain + Big Winter Snowpack = Flood.
- Arctic Ocean is very close to us here, and will now be ice free for some months each year which will inevitably affect our weather will cause a lot of changes.

WIND

- Increase in wind speed of 15% over recent years

GLACIERS

- Coastal precipitation hits the mountains, it freezes into the glacier.
- The same snow would land, and it would just flow out the same year.
- If the glacier entirely melted we would have more variability in weather due to rain rather than pausing as glacial ice.
- The glacier is receding and the melt rate is accelerating.
- NCE anticipate the glacier will remain with 2-4 degrees of global warming (4-8 degrees of warming here) but that it will be smaller, higher and thinner.
- We will get roughly the same amount of water except we need to take into account the changes in precipitation due to the Arctic Ocean.
- 18% of water at the dam is from glacier melt, a third of water at the dam is from rain, almost half (around 47%) of water at dam is snow melt from the previous year.
- Snow is a much bigger contributor to the Yukon River than the glacier.
- If the melt comes through in the spring, it is not as bad as if it comes through in August which is a bottleneck month for flooding.

NET EFFECT OF CLIMATE CHANGE ON SOUTHERN LAKES

- Net effect of 2 degrees change and more to come.
- This will create more flow.
- 6% of glacial wastage (melting) could increase lake levels.
- There was a confluence of factors that led to flooding in August 2007 including a big snowpack and a massive rain event
- All three factors, glacier + snowpack + rain = variables. Wind + rain + temp also add variability.
- Expect more flooding, more frequent and more severe, "a 10 year storm will become a 7 year storm".
- Temperature matters; when it is warm at a particular time of year plus rain events will have a particular impact.
- Likelihood is that there will be more frequent floods and some of those floods will have more intensity on average than in the past.

- From May-Oct, precipitation is less than run-off. The area with glacier does produce more flow into Atlin Lake basin, than the area which is not glaciated.
- With an increase in temperature and precipitation over the next 50 years, are likely to have increased flow into Atlin Lake.
- The range of the remaining glacier will be 68-83% of the size it is now, or its loss of area will be 17% of what is there now.

COMMENTS

- Speed at which water levels come up really affects the fish. This spring for the first time in 17 years, on Marsh Lake, the water levels were rising and came up on shore before the ice melted.
- Resident Comment: I don't support the water level rise.
- There is nothing being done to reduce the increase in the water. This is what should be done.

QUESTIONS

Q: Who is responsible for mitigating climate change?

Q: How soon prior to an event can you anticipate flooding?

A: Previous winter snowpack.

Q: There will not be a water shortage?

JS: No.

Q: Can we divert some of the water and reduce the potential for flooding, e.g. spillways?

A: Would have to move it to a new watershed.

PERCEIVED RISKS

Perceived risks are all of above including the unknowns.

DATA GAPS

- There is poor quality of data in Yukon so we have to rely on statistical data.
- Variables and these unanswered questions, and for us to be able to make decisions where we feel that higher levels are a problem.
- Difference in elevation when you go to the Lewes Dam (the upper control structure) in the summer. Note: The elevation change was measured 3 times by locals and the elevation change at this structure was between 25 and 30 cm.
- If you removed the dam, Miles Canyon would still hold the water back. Note: Miles Canyon is two meters below the elevation at the outlet of Marsh Lake.
- NCE - We don't even ask about whether there are control structures. We just focus on whether the inflow is higher than the outflow as that is when the water level will start to go up. Atlin Lake always varies but there is no control structure on it.
- If you look at the lake shore and see where willows grow and where they stop, that is what has been our average high water mark. We are still investigating as the glaciers waste away, whether there is added water there.

- NCE: In this year maybe 6% of the water at the dam is glacial wastage from the glacier receding. How much does that add to lake levels? We're not sure, maybe 1cm, maybe several. It matters when it happens, i.e. typically during summer when the lake level is rising or later when the lake level is receding.
- The glacier is receding. We are trying to figure out how much that will raise the lake levels but it is probably less than 6".

DEBORAH FULMER PRESENTATION ON WHAT COMMUNITIES HAVE SAID TO DATE

HAROLD GATENSBY A FIRST NATION PERSPECTIVE

The point was made earlier that native people see things differently. Everything is connected. We are all 80% water the same water that is in the system is within each of us. Water is alive and is 4.5 billion years old. So we are in a way all 4.5 billion years old as that is the age of the water that is within us. Our interconnectedness includes the frogs and other species that are also 80% water.

The YEC shareholders are not considering all of life when they decide to come in with their profit orientation and shareholders to please, and not thinking of the rest of life that lives here. When the people work together they find a solutions that work, but this current situation scares me. There is a lifestyle that we live and it is in regulation with the lake and the environment. I don't want to see a corporation come in here without consideration for all the life that is lived here. Let's think a little more about this now. I know this lake well and a lot of people have spoken up to protect it.

What people call angels, we call our grandmother and grandfather spirit who have lived here a lot longer than we have. The lake has an angel in it, a grandmother spirit, the caretaker and keeper of the lake. We need to consider the holistic perspective and even if nothing else, postpone the decision. In the healthy native perspective, every drop of water has spirit, every mosquito. I am also concerned that the younger generations are not at this meeting tonight. They are the ones who will feel, as we have, the effects of the changes. I would like to hear their voice, where are they?

STEPHEN MOONEY – COLD CLIMATE INNOVATION, PRESENTATION ON ALTERNATE ENERGY

Stephen showed a Yukon Research Council video on research being conducted in the glaciers that feed the Southern Lakes watershed. He then went on to explain some of the alternative energy options that individuals and communities could consider these included:

1. **Waste to Energy:** It can be used to generate electricity or used for heating. At Marsh Lake dump, there is a lot of waste that could be used, plastics, and scrap lumber. All this could be turned into energy.
2. In Whitehorse there is a machine purchased 2 years ago, a Japanese machine able to burn/recycle **worthless #3-7 recycled plastic by returning it to diesel**. We do ship #3-7 to Vancouver but it's a waste of money, and uses diesel to ship it, and when it gets there we don't know what happens to it. We could use this machine in the Recycling Centre in Whitehorse, to convert these **zero value plastics to diesel**.
3. **Solar in the North:** We all know we have lots of sun in the summer and not a lot in the winter. But we could do more Solar here as there are advantages to Solar in the North: abundant

sunlight, increased efficiencies, atmospheric filtration, civil twilight. Yukon has equivalent latitudes and similar potential for kWh's generated in solar radiation, to Germany, where a lot of Solar goes on and which is a world leader in Solar. We could be doing more Solar here.

4. **Biomass CHP (Combined Heat and Power)** – we would have purchased this machine if we had not purchased the other one 2 years ago. It is a great machine, a great option. Biomass in Yukon is woodchips; alder which burns way hotter but also spruce, pine are great alternatives
5. **HTL Hydrothermal Liquefaction:** Waste Bio-mass/Sewage/Manure to Bio-oil
6. Another project with great income potential is **Cold Water Algae**, which has especially high levels of the antioxidant Astaxanthin (same thing that makes salmon red) and is thus worth big money; research ideas gratefully received.
7. **Hydrogen** – if we can use hydrogen in a cost effective way, it is a great potential alternative energy source; we need to split the water atom and then somehow store the hydrogen.

QUESTIONS

Note: During this discussion, CTFN Chief Danny Cresswell stated “no” in regard to this concept and CTFN had not been consulted.

Q: Are there any changes in projected needs for future electricity? Have projections been modified with the current ebb in mining?

YEC TR: Yes YEC have adjusted projections. In looking at concepts such as these we need to look at the pattern (expected increase) over 20 years and so even if there is a short term decline, we expect there will be overall growth.

Q: Is there anything different this year on the Lake? We have noticed the muskrats were struggling to put in their push-ups and now they aren't there.

YEC TR: Operation of the control structure begins August 15 or until water, which was at above FSL until early October, gets down to FSL, then it's regulated. Maybe the muskrats aren't visible now because this year they built under the ice.

Q: Why haven't intake pipes been built in the bottom of the dam to return water to Schwatka Lake to recycle it?

YEC TR: If pumped water back to Schwatka to re-run it through the dam it would not be feasible, as there is only 2 hours of storage in Schwatka. It is just a head pond. Hydro schemes do exist to pump water back but that is where there is a big storage lake such as Marsh Lake right above the dam

CTFN member: We will exercise our own rights to take care of the lake.

YEC TR: Government officials of the affected First Nation gave instruction that they were aware of the project.

CTFN member: I don't know who is speaking on our behalf, but this hasn't been surrendered.

CTFN member: I'm kind of confused. I've been here a few times. Don't you understand "No"? The whole meeting for the first hour was 'it doesn't work, this is not good'. Yet you're still going with the project. I don't understand, when is it going to stop? We don't want it. You're still going for this project. It's going to be a big corporation going ahead and we are going to be left out. That's what's going to happen. We don't want that to happen.

TR Well I can tell you first thing it's not a project. It's a study. We're studying a concept right now.

CTFN member: Well why don't you stop spending your money because we don't want it

TR We've heard from some people that is the case. We've also heard from other people that we need to do rigorous objective studies before you can convince me whether to support this project. So that's what we are undertaking to do.

CTFN Chief: I live in the CTFN. There's a thousand members and I haven't heard one of them say yes to any of this. I know we received some letters, sent in 2006, 2008. I can't see any good in this yet. Where is the spirit in this? You heard one of my Elders talk. He talks from a place that you can't see. You can't even feel it. But we live it. This is our water and our land. And I'd like to see this whole record of consultation that you talk about with our FN. I know they've met with the Land Use team. They told me this isn't consultation, this is just for information. So when you say it's a handful of people, I have a thousand people and I haven't heard one of them say anything good about this yet. There are a lot of questions and not a lot of answers. And we've seen a lot of alternatives. There's a lot of things that could be done and a lot of money being spent, on natural gas, you know, there's hydro, when we should be looking other places. You say it's only a handful of people in this area. But it's not a handful of people. I believe the majority of the permanent people who live here are behind what I'm saying. Just so you know, it's not a couple of people that are saying no.

Clapping

AH: We would never move forward without deep consultation with affected First Nations.

CTFN member: I'll have to find out who's speaking on behalf of our First Nation.

Q: What is the timeline for making decisions on this particular project?

AH: Hope within 2015 to make recommendation to our Board

Q: Will that be Water Board or YESAA?

TR: Project proposal goes to YESAA and then once through that would go to Water Board, to get permission to increase FSL and eventually to lower LSL.

CTFN Chief: What about "no" don't you understand?

Comment: I've read a lot of your applications to YESAA, Travis, and it's part of the application to present alternatives of which we have heard a lot today from Stephen Mooney, nb Solar for example is so

abundant in the spring when hydro is low. I hope there is a much more robust exploration of alternatives in any application made.

AH: Our regulator views projects through 1 lens, i.e. the economic lens. The appeal of this project is that it's cost effective so we cannot just drop it. We are not quite there yet in terms of it being viable to go with renewables, and we can mitigate.

Q: It is spongey already, the ground around my house, and that will get worse with the project.

TR: With concept mitigation you will see the shoreline hardened. Gilles Wendling said there would be similar and historic effects with the proposed project. This is an opportunity for you to address something you're already dealing with, i.e. rising water. There is potential for a win-win here. There is a long way to go, and steps still to be taken.

CONCLUSIONS AND RECOMMENDATIONS

Southern Lakes Community Members are obviously concerned about their life styles and their properties and they want the area and beaches to remain as they have in the past. But, it goes much deeper than that! They are concerned with the overall effects to all species and the ecosystem as a whole. To the First Nations this perspective runs even deeper into the roots of their ancestors. According to them, the waters are tens of millions of years old, and likewise so are they because they consume the water. They have experienced severe loss of treaty rights historically through the damming of this system and fear these rights could be further impacted if this concept moves ahead. These concerns have the potential to result in litigation from First Nations, communities, conservation groups and commercial users.

Local residents have resided in this area for many generations. They have observed and recorded information about the local environment for many years and have provided this information to the committee. They are concerned about variances in study results compared to their long term data, anecdotal evidence and experience.

The communities have said repeatedly over this past two year period they are not in support of this concept. The question; “Why are we not looking at alternatives?” has been asked many times.

PERCEIVED RISKS

There are many **Perceived Risks** as expressed at each of the public meetings. The following are perceived risks that were identified many times during the two year period.

- The effect on the ecosystem as a whole.
- The effect to swans, fish and other species.
- The effects of dewatering wetlands throughout the winter and species that rely on these areas.
- Changes to flows and critical habitat areas such as open water in spring, rivers, shallows, and creek inflows.
- Ice conditions and its effect on wildlife, ecosystems, safety, recreation and structures.
- Water levels, erosion and groundwater may create public safety issues by effecting infrastructure such as roads and structures. These may also negatively affect navigation, recreation and commercial use.
- There will be increased erosion, sedimentation, flooding, septic, and water well issues.
- There will be an increase in property loss due to erosion, groundwater saturation and other effects.
- The current situation and concept are adding stress to elders and other residents.
- Long term operational costs for mitigation systems?

DATA GAPS

There are some major **Data Gaps** that have been identified by Community Members and consultants. Some of these can be answered and perhaps addressed but some cannot. One of the largest data gaps is the lack of baseline information. Because the upper control structure was first constructed in the 1920's

there is little or no baseline data to determine what the natural system is. Baseline data is required to calculate the current effects and to estimate the additional effects such as predicted rates of erosion. Baseline data on contaminated sites is also required to determine the current and potential increase of contamination into the system. Community members feel there is not enough knowledge on how lowering the water level in spring will affect fish, vegetation, invertebrates, larvae, life cycles, wildlife and the ecosystem as a whole.

Other major data gaps include; effects to the ecosystem, climate change, lack of local wind data, current and predicted ground water effects, and the hydrological watershed system as a whole. Locals have commented on disconnect or disassociation between professional specializations and lack of integration of science with local and traditional knowledge. Community Members request a cost/benefit analysis that includes a mitigation plan of all species within the ecosystem. They are also lacking information on transboundary (B.C. and Alaska) consultation and mitigation.

RECOMMENDATIONS

Do not change the lake levels any more than they have already been altered. Listen to, hear and communicate to come to a collaborative decision on alternate sources of energy.

We will do great things together. “If you want to do it fast; do it alone; if you want to do it great do it together” (African Proverb).

APPENDIX A

TERMS OF REFERENCE - SOUTHERN LAKES WATER LEVEL COMMITTEE

CONTEXT

Yukon Energy Corporation's (YEC) proposed Southern Lakes Enhanced Storage Concept envisions raising the controlled maximum level (known as the Full Supply Level) by about 30 centimeters (12 inches) to approximately 656.534 meters above sea level and lowering the Low Supply Level by 10 centimeters (4 inches). Careful examination and clear understanding of the potential effects, their significance, and means of mitigating is necessary for the people of the Southern Lakes, Yukon Energy, and the general public, before a decision can be made by Yukon Energy on whether to proceed with the project. At this stage in the planning, more focused and intensive engagement between YEC and the community is necessary to ensure adequate understanding and consideration of community interests and concerns.

PURPOSE

Residents of the Southern Lakes are major stakeholders in the proposed Southern Lakes Winter Storage Enhancement Project therefore the purpose of the Southern Lakes Water Level Committee (SLWLC) is to engage and inform community members on the concept.

MANDATE OF THE SLWLC IS TO:

1. Form a Local Advisory Committee consisting of 2 members from each affected Community; Carcross, Tagish and Marsh Lake, plus two members from Carcross Tagish and two members from Kwanlin Dun First Nation communities.
2. Invite two members from the Southern Lakes Renewable Resource Council to attend committee meetings.
3. Act as a conduit between YEC and community members to insure information received from YEC is clearly understood and members concerns are expressed and addressed.
4. Not replace the current community consultation being provided by YEC and community members. Allow community members to remain in direct contact with YEC.
5. Review summarized environmental (including effects of climate change) and socio-economic study results provided by YEC. Comment on and return summarized study results to YEC prior to distribution to the communities. The objective of this study review is to comment on accuracy of results and provide a format community members will understand.
6. If community members can provide services to assist with the function of the SLWLC, ensure this will be taken into consideration by YEC.
7. Provide a platform that offers a voice from local residents on important decisions.

MEETINGS

1. The committee shall meet on a monthly basis, on the last Thursday of each month.

2. All SLWLC meetings shall be open to community members, though the SLWLC may designate a portion of their agenda for each meeting to focus discussion and completion of required Committee business as may be necessary.
3. The committee shall operate at arm's length of Yukon Energy. Yukon Energy shall have observer status at all scheduled SLWLC public meetings.
4. Five (5) members of the Committee will constitute a quorum for the purposes of any SLWLC decision-making at a scheduled meeting.
5. Where an action by the SLWLC, Yukon Energy, or another party is recommended, the specific action and the party deemed responsible for undertaking it shall be identified.
6. The minutes of Committee meetings shall be recorded in writing. They shall reflect the items discussed, decisions made, information offered by members/delegates, as well as identified recommendations and action items.
7. Within 10 days of Committee meetings, the secretary will distribute draft minutes of the meeting to Committee members and any delegates. Following that review and any revision, the minutes shall be provided to Yukon Energy and made available to any community member upon request or through openly accessible means, such as a website or email distribution.

ROLES & RESPONSIBILITIES OF SLWLC MEMBERS

1. Committee members are expected to have reviewed the proposed meeting agenda, past action items and status, and any written submissions prior to meetings to familiarize themselves with material and to facilitate engaged and meaningful discussion during meetings.
2. Active participation of Committee members in the meetings is essential for the fulfillment of the Committee's responsibilities.
3. If unable to attend a meeting, members should advise the chair/co-chair and endeavour to provide comments in advance to the chair/co-chair or via a delegate at the meeting.
4. Listen to concerns and suggestions made by all community members and ensure they are captured in the meeting minutes, as appropriate.
5. Obtain information if assigned to do so by the SLWLC, or requested by Yukon Energy through the SLWLC.
6. Provide concrete recommendations for consideration and action by the SLWLC and/or Yukon Energy.

ROLES & RESPONSIBILITIES OF YUKON ENERGY

Information shared by the SLWLC with Yukon Energy's project planning team will be fully and fairly considered in the development of any project proposal. The information provided by SLWLC will be included in any submissions to Yukon Energy's Senior Management and its Board of Directors, who will be involved in any future decision on whether to proceed with the project after the planning, assessment, and consultation has been completed.

Yukon Energy is responsible for:

1. Reviewing SLWLC meeting minutes and other written outputs from SLWLC activities.
2. Responding to SLWLC requests for information in an effective and timely manner.

3. Participating in SLWLC meetings and/or sponsored events, as may be requested by the SLWLC (e.g., making presentations, responding to questions).
4. Providing the SLWLC with appropriate resources to carry out its mandate, including:
 - a. A \$200 honorarium per meeting for each SLWLC member that attends scheduled monthly Committee meetings for up to ten committee members.
 - b. Up to \$2,000 per month for various Committee administration activities including: meeting preparation, communication materials development and coordination, communication with YEC and community members, record keeping and minute taking.
 - c. Up to \$1,500 per year for miscellaneous meeting items such as refreshments (e.g., coffee, tea, and snacks).
 - d. Up to \$900 per year for miscellaneous meeting materials and supplies.
 - e. Up to \$5,000 per year to operate and maintain the communications program developed by the SLWLC to engage and inform community members and Yukon Energy. Eligible expenses may include such items as website development and maintenance, printed information bulletins, email, phone, fax, printing, and photocopying expenses that cannot otherwise be provided by Yukon Energy at the request of the SLWLC. Efforts should be made to utilize existing community communications and information conduits.
 - f. Up to \$2,100 per year for venue rental \$175/venue.
 - g. Up to \$18,000 per year to secure the services of independent technical expertise to interpret and comment on project study information provided by Yukon Energy and provide a format community members will understand.
 - h. When specifically requested by the SLWLC in writing to Yukon Energy, other such funding deemed necessary for the effective and efficient execution of the functions of the SLWLC, and accepted for funding by Yukon Energy.
 - i. Note that on a quarterly or more frequent basis, the SLWLC must document and account for all expenses associated with the provision of the above resources and provide that accounting in writing to Yukon Energy to ensure subsequent advance of funds or direct payment of previous expenses.

APPENDIX B

SLWLC Q&A - AS OF 31 JANUARY 2015

FROM WEBSITE (WWW.SLWLC.ORG)

GROUND WATER AND TABLE WATER

1. Numerous comments about there having been no groundwater mapping done in the Yukon? How do we tackle that meaningfully? Eg. so as to avoid the potential scenario which is apparently happening at Mayo B (about which I know almost nothing) where the rise in water levels has had an unanticipated effect of washing out some person's property and he's not getting any sympathy from Yukon Energy.

➤ *Answer (from John Streicker - Environmental Consultant)*

Groundwater mapping is about water in the ground: levels and how it slowly flows. I am not sure about the relationships of this info re washing out of property. But if you want to get this info, probably the best person to talk to is Forest Pearson. He has done some of the groundwater work around the Southern Lakes. He was contracted by YEC, but I assure you he has a lot of integrity. If he has any info to pass across, I think you can trust it.

I am attaching a really simplified diagram to show how near a lake the groundwater table is usually a little above the lake water level. It depends on things like the material in the ground (e.g. clay, silt, sand...).

2. In particular, has anyone got any knowledge of what might happen to the already saturated ground around Marsh Lake, which has been unable to dry fully in some places, eg behind Army Beach residents' houses, since the 2007 flood, if the licensed full supply was raised by the 30cm YEC wants?

➤ *Answer (from John Streicker - Environmental Consultant)*

I think the general principle is that if the supply level is held higher, then this ground would remain more saturated (wetter for longer). It is a flood plain, and I think as Forest would explain the ground water table would be affected by the full supply increasing. Although, it is also a factor that the lake level would still drop low every year, and there would remain years that the lake floods more than the new proposed full supply level. In other words, residents already need to deal with these challenges, and the new full supply level would add to the challenges.

3. A scientist at Northern Climate ExChange, when I spoke to her about water tables, gave me a few suggestions about how to get people to measure their own. But when I suggested this to the committee, they said people are floating away so they don't need to measure the water as it's in their basements. However someone suggested finding out, eg via Lloyd Atkinson, who has a septic installation company, whose house has a sump pump, who has flooding in their basement, whose septic is floating away. Or whose house has had their shore-line erode so much that the house itself is buckling with the shifting and saturation of the ground.

➤ *Answer (from John Streicker - Environmental Consultant)*

Lloyd is very knowledgeable about the ground around Army Beach and South McClintock

4. What is the current Water Table within the Army Beach, South M'Clintock area at risk to Fall & Winter High Water? Without natural fall and winter drainage, how is the land able to drain?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

With higher fall and winter water levels the groundwater and water table level will likewise be higher.

5. Why is there higher groundwater since flood of 2007? Eg resident at Tagish said, "I live at beach and it used to be dry in springtime whereas now in spring, ground is so wet a loader would sink. I'll be sunk if raise water level the proposed 30cm."
 - *Answer (from Ric Janowicz - Yukon Government Hydrologist)*
 With increasing annual precipitation and increased glacier melt there is a documented trend of higher peak water levels. Groundwater and water table levels adjacent the lake system are likewise increasing in response to the higher water levels.
6. Resident: We moved to Old Constabulary in 2006. Previous owner filled in swamp that was property with hundreds of truckloads of gravel and said no water had ever been in the sump. We just lost 2m topsoil in flood as shore already rocked. Our problem was groundwater. Sump worked for 3.5 months continuously through summer 2007 because if sump stopped, the basement would flood. After flood, went to YTG and said Old Constabulary properties were also impacted by ground water problems, along with Army Beach. Four piezometers were put in, a micro well that measures ground water year round, 2 computer recorded and 2 measured personally. As lake level rises, so does ground water : have records to prove this. Two years ago, started to worry piezometers not being monitored, so noted water on 4 days in both 2012/13: Aug 15 and 31, Sept 15 and 30. In 2007 had sump all year; in 2008, although low water year, still sump water, so wonder if have new higher groundwater level. And wonder if new higher Full Licensed Supply level will have bad effect on ground- water. Notice that have 656.53m groundwater height even though lake water level is 656.49m. Why is it higher? And since new Full License level happens to be 656.53m too, will my house be flooded due to groundwater being somewhat higher due to super saturation?
 - *Answer (from Ric Janowicz - Yukon Government Hydrologist)*
 With increased water levels the groundwater and water table level adjacent the lake will likewise be higher. The water table elevation slopes upward moving away from the lake. Higher groundwater and water table elevations will impact low lying infrastructure such as septic systems and structures.
7. Why has the groundwater risen and our property become totally saturated to the point of sinking, since the flood of 2007?
 - *Answer (from Ric Janowicz - Yukon Government Hydrologist)*
 Peak water levels have been increasing in the last several decades due to greater amounts of precipitation and increased glacier and high elevation snowmelt.
8. Why is our groundwater higher than ever experienced in the past and will saturation only continue with an increase in water level?
 - *Answer (from Ric Janowicz - Yukon Government Hydrologist)*
 Peak water levels have been increasing in the last several decades due to greater amounts of precipitation and increased glacier and high elevation snowmelt.

ENERGY CONSERVATION MEASURES

9. Is some work being done on the hospital building to reduce their footprint? I found this interesting Environment Canada initiative that Ontario hospitals are signing on to <http://www.ec.gc.ca/ecoaction/default.asp?lang=En&n=F4BE13C2-1>. Meanwhile, I couldn't locate anything in my research online that indicates that our hospital or the government is trying anything like this. Could you let me know who I might approach on this?
 - *Answer (from John Streicker - Environmental Consultant)*
 YEC DSM group say that by sectors all of health care is 4 to 5% of electricity. So likely the hospital is around half of that. And the DSM group does consider the hospital but it may not be named as such. For example, they have a big DSM program on Commercial / Institutional lighting. The hospital uses a lot of light so this program is good for them.

EROSION

10. When do the shores of north end Marsh Lake and Lewes River drain? If not in the fall and winter. If there is no significant drainage period, is the community, habitat and Eco system are we satisfied with the outcomes?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

Marsh Lake water levels generally peak in August or September and recede slowly after that time with groundwater and water table levels following. As mentioned with higher fall and winter water levels, the groundwater and water table level will likewise be higher impacting shoreline habitat and low lying infrastructure such as septic system.

11. Problem of sedimentation from this increased erosion due to reservoir lake level: how much of that extra erosion then settles out into the reservoir that is Marsh Lake? Do we just already exacerbate the erosion by holding the water higher? Before the dam we had "Marsh Lake Flats", totally different presentation. Sedimentation now presenting totally different for turning turbines. Changes whole perspective of countryside adjacent to water, eg had similar experience when living by Cowichan River. The last 50 years of sedimentation are now creating a big problem that wasn't there before. There is a drastic difference on the bank of the Yukon River, plus Army Beach, so where did that sediment go?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

Increased water level variability will result in increased shoreline erosion and sedimentation. Increased sedimentation is also increasing with greater runoff amounts from tributary streams as a result of increasing precipitation. Some sediment is transported through the lake system during the summer when Marsh Lake is largely uncontrolled; however, significant amounts are naturally settled out by the lake resulting in increase in lake bed elevation.

12. Can you comment on changes to Army Beach since dam was built? Nb One resident said: before Army Beach was created by silt, it used to be Mud Bay. Road used to go across front, now it goes at back of houses.

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

The Marsh Lake control structure may be resulting in increased sediment deposition. Even during the summer period when all control gates are open, the sill of the structure restricts some downstream sediment transport.

13. How does YEC predict the extent of the erosion damage caused by holding water higher throughout the system and the cost to mitigate all those affected?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

YEC has carried out shoreline erosion studies throughout much of the Southern Lakes to document existing erosion rates and will use this information to predict future rates. At this time I am unaware of how mitigative costs will be determined.

14. How fast and by how much is the water capacity of the basin being reduced through sedimentation load?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

Sedimentation definitely has an effect on channel and lake bottom deposition. The rate is currently unknown but existing and proposed work by YEC should provide estimates of the rate.

15. Can we afford to exacerbate the erosion and subsequent sedimentation by holding the water higher?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

According to YEC there are significant financial benefits in power generation costs and they will be willing to provide compensation.

16. Can YEC account for the substantial changes 'mud bay to eroded sand beach' at Army Beach since dam was built?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

I'm not able to answer this question. Perhaps their studies will provide some insight.

Answer: (from John Streicker, Environmental Consultant): Refer this back to YEC or to a geofluvialologist.

Jan 2015: SGT: I forwarded this question to Travis for reply and await his response. Unfortunately there is no time to go back to Mike Miles at this point for further comment. However this question was raised at the Erosion meeting led by Mike Miles and he didn't answer it then, making just general and consistent comments about the fine, erosion-prone silt in this area so of course the shoreline is shifting over time with the rising and falling and changes that ought to be measured, due to the existing control structure.

LAKE LEVELS AND DRAINAGE

17. If the natural water level used to be exceeded 10% of the time, and is currently exceeded eg 60% of the time with the current supply level, how can we tell the effect of it being eg exceeded 80% of the time with the new supply level?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

I'm unsure about the percentages; however, shoreline erosion will increase with greater water level variability.

➤ *. Answer (from Mike Miles within Erosion meeting minutes)*

We can do a comparison, with a Water Duration plot (diagrams in ppt). Nb the proposal is a concept under study in cooperation with the community, ie there is no project yet.)

18. When and for how long do the currently saturated lands have to drain at the North end of Marsh Lake and the Lewes River? At what point does YEC drop the levels and allow sufficient drainage?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

YEC must keep the control structure gates open from May 15 to September 15 or as long as the lake level remains above the full supply level of 656.234 m. The system usually peaks in August or September and drops slowly after that time.

19. What would the natural October lake level average be if unmanaged by YEC compared to an estimated natural unregulated October level?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

The control structure was reconstructed in 1969. Prior to that time the October mean water level (based on five years of record only) was 2.341 m. After that time the October mean water level is 2.788 m.

20. What is the potential for increased hydrological and ecological damage with an increased 30cm fall rise in levels, plus a decreased 10cm spring drop in water levels? And what is effected?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

The planned changes would increase flow variability which would accelerate shoreline erosion and potentially impact riparian habitat.

21. If the natural water level has been exceeded 10% of the time over the past and is exceeded 60% of the time currently, what will the damage be if water levels rise even further?

22. What is the result of rising water levels and sedimentations loads on the upstream and downstream of our water system to both hydrological and ecological receptors?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

Increasing water levels will likewise increase water level variability which will accelerate shoreline erosion, and have potential habitat and infrastructure impacts.

Comparison should be made with a Water Duration plot (diagram shown within the power point presentation). This is recommended as a community project.

CHANGES TO ENVIRONMENT

23. What will the changes in the water temperatures be as a result of increasing the volume within the Lake system? How will the temperature changes effect the hydrological and ecological system?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

Lakes turn over from top to bottom prior to freeze-up. Freeze-up will likely be delayed slightly as a result of increased water levels.

24. As related to our Southern Lakes, see this info about changes in wave height and action on the Beaufort Sea. What changes in wave action and height are likely to happen to the Southern Lakes, with Climate change factored in to the proposed increase in Full Supply Level?

US Office of Naval Research report

Waves rearing as high as the second-floor windows of a building have been detected in the Beaufort Sea for the first time.

Arctic waves are normally kept in check by sea ice, which has traditionally covered large areas of the Arctic Ocean even in the summer. But warmer temperatures as a result of climate change are melting away more and more of that ice.

A wave gauge deployed in the Beaufort Sea in the western Arctic in 2012 has already measured some of the consequences, recording wave heights of almost five metres during a September storm.

"That's a lot bigger than anything previously recorded up there," wrote University of Washington researcher Jim Thomson in a blog post about the results.

"Of course, the ice had melted back a lot farther than anything previously recorded too."

In a new study released this week in the journal *Geophysical Research Letters*, Thomson and his colleague Erick Rogers at the Naval Research Lab at Stennis Space Centre in Mississippi officially reported the data collected by the wave gauge between mid-August and October 2012.

They also calculated the relationship between the available distance of open water and the size of the waves that could potentially form. As the open water between ice-covered areas increases, the wind gets more opportunity to build up waves. That means the potential size and power of the waves increase dramatically.

Those waves, in turn, may gain enough power to smash away more sea ice, generating a "feedback mechanism which drives the Arctic system toward an ice-free summer," they wrote in their paper.

In his blog post on the website of the American Geophysical Union, Thomson added, "Bigger, more powerful waves could also accelerate erosion of the Arctic Ocean coasts, which are already breaking down rapidly from the effects of climate change and melting of permafrost."

Thomson is currently out on the Beaufort Sea deploying more sensors to track how wave heights are influenced by the ice, open water and weather conditions.

The research was funded by the U.S. Office of Naval Research.

➤ *Answer: (John Streicker, Environmental Consultant):*

With wave height, there is a big difference between oceans and lakes. On oceans there is more fetch, ie the wind acts over long distances and sets up huge waves. Wave height depends on 1) length of the lake 2) amount of ice cover. John is currently doing work on a project on the Beaufort Sea and available distance of open water and size of waves. Beaufort Sea used to be frozen all the time and now will be thawed for some of the year ie including possible open water in the winter. Marsh Lake/Southern Lakes is currently always seasonally frozen (winter) then thawed (summer). There might be times in the future in the winter, when get "melt out" so yes would have waves if that were to happen. But today's wave size will be roughly the same as future wave size, though maybe a bit bigger, because the fetch is limited due to the size of the lake. As well, water levels are lower in the winter. The ice comes down as the lake levels fall and the ice becomes beached. This will also affect the impact of waves on the shoreline.

25. Methane and radon above background levels is another variable related to temperature and confined spaces. What effect will an increase in these gases have on the environment and weather patterns of the Southern Lakes and how will the proposed increase in the Full Supply Level interact with this?

➤ *Answer: John Streicker, Environmental Consultant):*

1) Radon: never heard of this as a greenhouse gas. 2) Methane yes this is a greenhouse gas in the atmosphere. Does not feel this area is a confined space. Re: holding Marsh Lake water higher: remember this is connected to a project that will produce hydro in contrast to using fossil fuels so must measure and offset any methane produced against emissions of fossil fuels not used. If flood a big area, methane will be produced as the flooded forest or surface vegetation of the lands beneath the water rot. In this case however, 1' or 30cm will hit some willows but John does not anticipate much Methane production.

Need to look at net Fossil Fuel production ie if lake produces more hydro there will be less Fossil Fuel used, so the net side effects are low from this environmental perspective.

EFFECTS ON PROPERTY VALUES

26. This question of Climate warming and water rising and the vicious cycle of the melting of both sea ice and permafrost and the warming atmosphere with CO2 being absorbed more into the oceans - we should bring this to people's attention. Our Southern Lakes won't be much to value if we have Bids for oil wells down the lakes nor more and more erosion caused by higher water and stronger winds.

➤ *Answer (John Streicker, Environmental Consultant):*

If look at this question as "Would it be better to raise the lake by 1' and avoid diesel generators or NOT raise the lake and use more Fossil Fuels", then in fact one needs to consider that LNG is likely to cause more climate change than diesel and also did you know that diesel is also produced using fracking processes. Both LNG and diesel are worse than hydro.

OK the locals do not want this project to go ahead of the water level being held higher by 30cm. But as John tries to watch for renewable energy solutions, he has to think about how we will meet demand for 1) transportation and 2) heating and if hydro is off the table, that is a big one not available. Yes he understands the preference for microhydro but raising the lake by just 1' actually IS small hydro. No solution has a zero footprint so have to assess which is better/best. John believes Marsh Lake and southern lakes WILL get more flooding with climate change so if did go ahead with this project then people would get mitigation for problems they will have due to climate change. John doesn't feel FN will lose much land if water rises. And when try to put forward argument that if the control structure wasn't there, then the current problems of erosion etc wouldn't exist – John points out that maybe would still get flooding without the dam being there due to ice jam (nb that was original reason dam was put in). Certainly if there was no dam we would get big erosion issues in Riverdale and Marwell and there would be massive outcry if that were to happen. However John understands the project is unlikely to proceed if there is no social license.

Feels at this stage the best bet is a wind/hydro mix. We have 2 storage reservoirs ie Aishihik and Mayo B, (though not Schwatka). John says that Electro Thermal Storage (ETS) will not solve our needs problem as on this grid there is no surplus of energy.

POWER GENERATION

27. Have the Turbines and power infrastructure been re-engineered to accept the changed load to the power system?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

As far as I know there have been no changes to the power generating units but additional winter water supply will offset the use of diesel generators at a significant cost saving.

28. Having heard that the project might supply 5 ggw hours (or less) to a maximum of 8 ggw hours, how do we find out how much energy will be supplied by this project?

➤ *Answer (from Ric Janowicz - Yukon Government Hydrologist)*

It is a simple process of calculating the additional water volume and converting it to turbine generating capacity.

29. What percentage of the overall power generation in Yukon (hydro and fossil fuels) will the Southern Lakes Enhancement Concept add to the grid?

➤ *Answer (from Travis Ritchie, Biologist, Yukon Energy Corporation):*

The short answer is about 2% at current loads, but the key benefit of the concept is not its contribution to the overall energy profile, but rather the time at which the power comes, i.e., winter. Energy timing is a huge factor here. With the additional water that would be available with the licence change renewable energy can be made to displace the 7 gigawatt hours that would otherwise have to be met with diesel or natural gas. So it represents more value than just its annual energy equivalent or the millions of dollars of avoided costs to rate payers. The other important factor to consider is that it would provide this benefit every winter into the future, displacing tens of millions litres of fossil fuel and the associated GHG emissions. So from a life-cycle perspective that 2% really adds up over time to more than just gigawatt hours of electricity.

APPENDIX C

1996 AMENDMENT OF WATER LICENSE FOR EARLY CLOSURE OF GATES

YUKON TERRITORY WATER BOARD AMENDMENT OF LICENCE

LICENSEE: YUKON ENERGY CORPORATION

LICENCE NUMBER: Y2L7-0242

AMENDMENT NUMBER: 1 (ONE)

Application Number: HY96-002

Pursuant to the Yukon Waters Act, Water Use Licence Y2L7-0242 is hereby amended as follows:

Part B Sections 4 d) and e) are hereby added:

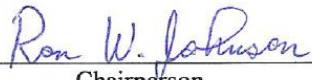
- d) Notwithstanding the requirements of Part B Section 4 a) and b), the Licensee may close the gates, during the summer of 1996, in accordance with the following schedule of conditions:
- i) If, on the effective date of this amendment, providing that the effective date is no later than July 21, 1996, the elevation of Marsh Lake is less than 654.82 metres, then gates may be closed in order to increase inflows into Marsh Lake. If the elevation equals or exceeds 654.82 metres, then all gates must remain open.
 - ii) If, July 21, 1996, the elevation of Marsh Lake is less than 655.15 metres, then gates may be closed in order to increase inflows into Marsh Lake. If the elevation equals or exceeds 655.15 metres, then all gates must remain open.
 - iii) If, on August 16, 1996, the elevation of Marsh Lake is less than 655.65 metres, then gates may be closed in order to increase inflows into Marsh Lake. If the elevation equals or exceeds 655.65 metres, then all gates must remain open.
- e) The Licensee shall visually monitor the behavior of adult chinook salmon at the Lewes River Dam for a period commencing two days after the first salmon ascend through the Whitehorse Rapids Fishway and ending on September 10, 1996, or four days after the last salmon ascends the fishway, whichever comes first. The Licensee shall submit a daily report on this monitoring to the Board, by hand or by facsimile at (403) 668 3628.

Dated this 12 day of
July, 1996



Witness

YUKON TERRITORY WATER BOARD

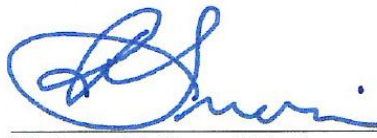


Chairperson

Dated this 6th day of

August, 1996


Witness



Minister of Indian and Northern
Affairs Canada

EXISTING WATER LICENSE #HY99-010 – 1996 AMENDMENT ADDED IN CLAUSE 21B

Terms and Conditions of Water Use Licence HY99-010

Page 6 of 7

PART B - OPERATING CONDITIONS

18. A minimum instantaneous flow of 85 m³/s shall be maintained in the channels downstream of the Lewes Dam and of the Whitehorse Rapids Powerhouse.
19. The water surface elevation on Schwatka Lake shall be maintained between a minimum of 652.272 m and a maximum of 653.339 m as measured from Geodetic Survey of Canada benchmark 86G114A.
20. The mean daily water surface elevation on Marsh Lake shall be maintained between a controlled minimum of 653.796 m and a controlled maximum of 656.234 m as measured from Water Survey of Canada gauge 9AB004.
21. With respect to the Lewes Dam, the Licensee shall comply with the following:
 - a) Except as permitted by sub-clause b) of this licence, or as required for repairs and maintenance, all gates shall remain open from May 15 to August 15 of each year.
 - b) The following exceptions shall be permitted to the requirements of sub-clause a) of this licence:
 - i) If, on July 7 of any year, the water surface elevation of Marsh Lake is less than 654.82 metres, then up to twenty gates may be closed and at least ten gates must remain open. If the water surface elevation equals or exceeds 654.82 metres, then all gates must remain open.
 - ii) If, on July 21 of any year, the water surface elevation of Marsh Lake is less than 655.15 metres, then up to twenty gates may be closed and at least ten gates must remain open. If the water surface elevation equals or exceeds 655.15 metres, then all gates must remain open.
 - iii) If, on August 10 of any year, the water surface elevation of Marsh Lake is less than 655.65 metres, then up to twenty gates may be closed and at least ten gates must remain open. If the water surface elevation equals or exceeds 655.65 metres, then all gates must remain open.
22. The Licensee shall maintain existing fish passage facilities at the Whitehorse Rapids and Lewes Dams and shall ensure that the fish passage facilities are open and functioning from April 1 to November 15 of each year.
23. Existing boat passage facilities at the Lewes Dam shall be maintained by the Licensee.
24. Annually, the Licensee shall carry out a dam safety monitoring inspection of all water management structures associated with the Whitehorse Rapids and Lewes Dams. The inspection shall be carried out by a qualified professional engineer licenced to practice in the Yukon, and shall follow the recommendations contained in the most current edition of the *Canadian Dam Safety Guidelines*.

APPENDIX D

2006 PROPOSAL DROPPED DUE TO RESISTANCE

YUKON ENERGY DROPS MARSH LAKE PLAN

Yukon Energy has dropped its proposal for additional water storage on the Marsh Lake system because of steadfast resistance, says the corporation's president.

BY [WHITEHORSE STAR](#) ON NOVEMBER 10, 2006 AT 5:00 PM

Yukon Energy has dropped its proposal for additional water storage on the Marsh Lake system because of steadfast resistance, says the corporation's president. David Morrison said this morning the decision was made in light of concerns raised during public meetings held this summer in Tagish, Marsh Lake and Carcross. The announcement comes as Yukon Energy prepares to go next week before the Yukon Utilities Board with its 20-year resource plan. The additional short-term storage in late summer was one of four principal initiatives identified in the plan. Yukon Energy, said Morrison, initially viewed the possibility for the Marsh Lake proposal as a relatively inexpensive option to generate a small amount of additional energy for the Whitehorse-Aishihik-Faro grid. Morrison said the public concern with the proposal was significant. It was apparent there would be no acceptance, no matter what Yukon Energy said or did, he said. 'It was a very clear message.' He said the Crown corporation realized it didn't have a relatively straightforward and inexpensive means of generating an additional 1.6 megawatts. Rather, it was apparent that forcing the issue would have resulted in a costly and lengthy regulatory review that simply wasn't worth the amount of additional hydro power, Morrison explained this morning. Yukon Energy was proposing to have in place by next August a new water licence that would have allowed it to increase the upper limit in its Marsh Lake storage by 30 centimetres between Aug. 15 and the end of September, in no-flood years. There are times of the year, Yukon Energy had pointed out, when the water level naturally reaches or exceeds the new limit that was proposed. Area residents, however, expressed grave concern that higher water levels would increase problems that already exist with erosion, and demanded to know what Yukon Energy was proposing to do about it. The three principal proposals that will go before the utilities board beginning Tuesday at the Gold Rush Inn are:- The construction of a grid extension from Carmacks to Stewart Crossing. While Yukon Energy originally estimated the cost at \$30.2 million, updated information submitted the board yesterday indicated a new forecast of somewhere between \$30.2 million and \$40.6 million, given the impact of the increasing labour shortages in western Canada. The first segment of the line from Carmacks to Pelly Crossing was originally pegged at \$17.2 million, and is now estimated at \$17.2 million to \$23.1 million. Construction costs are expected to be shared between ratepayers and the new Minto mine under development by Sherwood Copper Corp., and possibly another mine currently going through the regulatory process. Morrison has said Yukon Energy would like to begin building the extension next year, with the Pelly to Stewart segment to follow immediately afterwards. The corporation views the grid extension as an opportunity to sell surplus hydro power and generate additional revenue. - Yukon Energy is also

proposing to spend \$7 million to install a third turbine at the Aishihik dam sometime between 2009 and 2012.- It is also proposing to spend \$6.4 million to refurbish three diesel generators at the Whitehorse dam. Morrison said the cost of the next week's hearing will be somewhere between \$500,000 and \$1 million, but likely closer to a million. Yukon Energy is viewing the hearings as the only regulatory review required to proceed with its plans as it has received no other instructions from the utilities board or the Yukon government. Premier Dennis Fentie, however, insists that before any of the three proposals proceed, cabinet will exercise its authority to ensure each proposal will be subject to individual, project specific hearings by the board. Yukon Electrical Company Ltd., which distributes in the neighbourhood of 90 per cent of electricity generated by Yukon Energy, will not be participating in next week's hearing. The Alberta-owned utility informed the utilities board it would not be participating in the hearings as it would be a waste of time and money, as the government has indicated there will be a second set of project-specific hearings. Morrison said this morning the utilities board must deliver its response to these hearings no later than Jan. 15. The Yukon Utilities Board will ultimately decide what portion of the cost for the hearings can be passed on to consumers through the rate base.

APPENDIX E

SOUTHERN LAKES PUBLIC INPUT RESULTS

SLWLC contracted with Market North Promotion Systems to develop a website for the committee to post information. One of the tools of the website was an online poll. This poll was open to anyone to complete through October 2014. During that time, the Committee also conducted door-to-door meetings with residents and asked those residents the same questions. In January, those interviews were entered into the website tool.

The data produced includes all completed polls, and also separates them into the open poll vs. the door-to-door meetings. Therefore, the results presented in the data tables reflect neither a random nor a representative sample process. This is not a survey of Marsh Lake residents. It is merely a report on public input received.

Total Input	Survey Type	
Non random sample	Opened to anyone	Southern Lakes Residents only
91 100%	22 100%	69 100%

1. Which of the following have you recently attended:

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	90 100%	22 100%	68 100%
	Both a Kitchen Table discussion and a Public Meeting	19 21%	3 14% **	16 24%
	Just a Kitchen Table discussion	7 8%	2 9% **	5 7%
	Just a Public Meeting	28 31%	5 23% **	23 34%
	Neither	36 40%	12 55% **	24 35%

2. How aware of the Yukon Energy's, Southern Lakes Enhancement Concept do you think you are?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	90 100%	22 100%	68 100%
	Not at all aware	2 2%	1 5% **	1 1%
	Not very	9 10%	2 9% **	7 10%
	Somewhat	37 41%	10 45% **	27 40%
	Very	29 32%	4 18% **	25 37%
	Extremely	13 14%	5 23% **	8 12%

3. What is your general understanding of the plan Yukon Energy currently has for water levels in the Southern Lakes?

Understanding Of Plan Text
Yukon Energy wants to keep more water in the Southern Lakes in the winter to use it to generate electricity when it's needed.
Hold the reservoir 30cm above the current YEC license level fall through spring and allowing the water to drop lower in the spring. Thus greater capacity to the hydro power to the grid.
FSL to be increased by 30 cm resulting in the water levels in the Southern Lakes, excluding Atlin Lake, being held at a higher level over a much longer time in the Fall. Drawdown to be 10 cm lower
Hold water higher than their current license in the Fall through to Spring.
They plan to raise water levels in the fall and lower them in the spring. But the raising will still mean higher water levels in the spring than is now the case.
Maintaining higher water levels throughout the winter
The gates at the Lewes control structure will be closed slightly earlier in the year in order to hold back additional water in the Southern Lakes.
The plan appears to be to hold back more water in the lakes, thereby raising the water levels for most of the year.
Raise water levels and increase soil erosion and damage to property owners' land so that they can, at no cost to themselves, increase power generation and profits.
That any purposeful rise in lake water level will put my property back into the lake.

Understanding Of Plan Text
hold fall water levels 0.3m higher than currently
To raise the water so more electricity can be made without diesel use. When raising the water will it cover the area that birds feed when they are moving north or south, so there would be no food?
Higher levels in fall lower in spring
YE would like to raise the maximum allowable water level in the summer and hold the water longer in the fall.
Raise level of the lakes in the Fall so the extra water can be used in the winter, to make up for the low amount of water normally entering the lake (from streams, snow melt, etc.)
Raise water levels to increase power savings
raise water levels, keep water levels high into the Fall
They want to hold water level in the system to generate 6mw electricity.
YEC will keep water levels in the Southern Lakes higher than previous FSL to ensure more power is available in winter.
extremely aware
Hold in fall with a licensed height increase.
Hold water high and let flooding continue
Very good
Yes
yes
good
moderate to below moderate
I have heard from neighbours YEC will raise level regardless of how it affects residents. They are saying they are going to mitigate but we don't know to what extent, how long it will take or how much damage there will be. Will levels be raised before mitigation or after? As for studies in question 4 below, I feel there is no hurry and inadequate studies have been done.
Raise & Lower levels to extended & earlier times of year
YEC wants to hold the water higher in Fall & let it drop lower in Spring
Wanted to Flood it one time (Frobisher Plan) Hold water high in Fall & lower in Spring.
Hold back existing water
Raise water level
Plan to store more water and raise levels
We're aware that Y. Energy wants to raise lake levels.
Not up to date.
Increase them for more hydrogenation.
To raise the water level despite opposition from residents.
I understand they intend to hold more water in the lake in the fall.
Raise water level 1/3 metre & hold until Late Fall.
Late Summer, Close Lewes Dam to hold back water for use during winter months.
Raise 30cm, hold high through freeze up then drain during winter for hydro use. In spring may drain down up to 10cm lower than current level
YEC is proposing to raise the controlled maximum level by 30cm and to lower supply level by 10cm In my opinion less invasive renewable sources of energy should be used.
informed
30cm rise in water held till late winter

Understanding Of Plan Text
maintain usable levels
Raise lake level
They plan to raise the lake to higher levels in the fall and draw down to lower levels as required over the winter.
raise level to create more power
Raise level 1'
Hold water longer and have better control of it.
Very good understanding as I was used as consultant for YEC
Raise the lake about 1ft
Good
Full concept per YEC
Retaining water 1 foot higher through freeze up.
Raise full supply 1.0' from existing water license.
Big damage!!! Very costly!! Piss me off!! They cannot have more water level!! No Way!!
30cm is nothing compared to 2007 height. Feels ice will float on the water.
Raise the lake to create more power
Propose to hold levels 1' higher
Hold it longer for control
Maintain higher water in the southern lakes in order to save water for hydroelectric generation downstream at Whitehorse
holding back the water levels
To raise the levels a little bit
increase storage and draw down by raising water levels over summer -- Fall by 30cm & drawing down over winter -- Spring an add'l 10cm below existing license
apply for new water license to increase FSL by 30cm and decrease LSL by 10cm
Change water license to hold 30cm higher in FALL and lower 10cm in Spring

4. Do you feel that the issue has been:

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	80 100%	21 100%	59 100%
	Studied enough – time for decisions	26 32%	4 19% **	22 37%
	Some more studies are needed – but quickly	28 35%	8 38% **	20 34%
	Much more study is needed	26 32%	9 43% **	17 29%

5. Do you feel that consultation with the community has been:

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
Base		87 100%	20 100%	67 100%
	Completed – time to move on	33 38%	6 30% **	27 40%
	Still in progress, needs more time, but not much	25 29%	6 30% **	19 28%
	Much more consultation is needed	29 33%	8 40% **	21 31%

6. One of the options proposed by Yukon Energy is to “hold the water high” in Marsh Lake. Rate you strongly oppose or support this option:

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
Base		90 100%	22 100%	68 100%
	I strongly oppose it	46 51%	8 36% **	38 56%
	I somewhat oppose it	21 23%	4 18% **	17 25%
	Neither support or oppose	5 6%	3 14% **	2 3%
	I somewhat support it	13 14%	4 18% **	9 13%
	I strongly support it	5 6%	3 14% **	2 3%

One of the options proposed by Yukon Energy is to “hold the water high” in Marsh Lake. Rate you strongly oppose or support this option:

I strongly oppose it→ What are your concerns?

Reason Strongly Oppose
Risk to the intact comprehensive eco system, wetlands
Flooding & erosion in fall when winds are greatest.
It is not natural. Many species have adapted to, and rely on natural hydrologic regimes.
It also raises the water in Tagish Lake
My property floods already at the current allowable height
My house is on the shore of Marsh Lake. The lake is high enough and there are years when it is much too high.
Concern regarding shoreline erosion
Current ground water level already threatens my home.
Increased rate of erosion
Damage to shoreline thru erosion, and to nearby dwellings
soil saturation, property loss, our cabin may fall down or the foundations may continue to move as has been the case every time water levels have been high. Ground water precludes our reasonable access to the beach.
Prevailing winds in N. M'Clintock shores have already caused extensive erosion and cost long term residents a considerable amount of money and labour in efforts to preserve their property.
Communities are at risk
return of 2007
get off the pot, find alternatives, go elsewhere
Concerns are mitigation and year round lifestyle (boating and ice conditions), swans and whitefish.
Erosion of waterfront properties in the whole water system. Marsh Lake, Tagish Carcross
Erosion, not only that but washing away the bank and trees, destroy docks, (already washed away trees and soil)
A lot more study is needed.
We don't need higher water here.
It will raise water levels in Southern Lakes to unsafe levels.
Erosion of property, lake becomes shallower.
Too risky as too many unpredictable weather events will happen now as governments refuse to deal with negative effects of burning fossil fuels.
Erosion & Wildlife concerns.
YEC is being old school and refused to face need to change how it sources energy though I also recognize regulations need to be changed for YEC to change
only raise if sure it won't affect habitat of wildlife and not sure this has been adequately assessed
My concerns centre around the erosion caused by the combination of higher water & wind & the effect this would have on aquatic life, wildlife, wetlands and ecosystems in general.
not good
flooding destroying animal habitat
Mitigation and life style
net gain not worth the risk
Shut the door and forget about it

Reason Strongly Oppose
Risk and damage
Sacred headwaters that should not be touched.
Damage land, erosion, fish habitat, damage property waterfront, costly, septic, Ducks geese are losing their eggs nests, confuse where to build nest. fur habitat, less fish/minnows.
Climate change in general. Water regimes and wind regimes may be more unpredictable in the future and I see increased erosion as a huge concern. While I first felt that raised water levels would be a good source of green energy, now I feel that efforts would be better spent on other smaller sites
flooding of critical habitat areas, exposure of critical habitats
Unknown changes to lake ecosystem – extensive damage caused by attempts to mitigate. – effects on marine life unknown. – too great a risk to “experiment”-experts not sure. – damage caused by high water ice.- Wind and high water in fall will cause increase in erosion even if mitigated. –Will ongoing mitigation be a YEC responsibility. YEC not concerned about lake effects in BC (Taku Arm etc)
Huge ecosystem, destruction of shoreline, spawning areas, river mouths, plant growth – under water – feeds Swans and provides for other creatures (beavers, muskrats etc.) Loss of land, shoreline due to erosion, pollution in Bennett from White Pass rail bed, creosote etc. Starvation of Swans in Tagish River in Spring

One of the options proposed by Yukon Energy is to “hold the water high” in Marsh Lake. Rate you strongly oppose or support this option:

I somewhat oppose it → What are your concerns?

Reason Somewhat Oppose
Firstly, the statement above should refer to Marsh, Tagish, Nares and Bennett Lakes. My main concern is the fact that this concept will increase the erosion of the bank in front of my property
because I have seen the damage done on Lake Bennett with higher levels
More shoreline is lost with every high wind storm we have, raising levels will only increase this loss of shoreline.
erosion
property damage, environmental concerns
flooding & erosion
erosion of my bank and land saturation
Property Damage
flooding for residents
Access to my property could be affected. Environmental impact.
don't believe they can control or properly mitigate
if they can prove they can control it
Erosion
concerns include ecosystem

One of the options proposed by Yukon Energy is to “hold the water high” in Marsh Lake. Rate you strongly oppose or support this option:

Neither support or oppose→ What are your concerns?

Reason Neither Support Oppose
Depends on results of data re: support or oppose
Don't know what the higher levels will do to birds and fish.
Unknown Concerns
Too many unknowns yet. doesn't affect me much

One of the options proposed by Yukon Energy is to “hold the water high” in Marsh Lake. Rate you strongly oppose or support this option:

I somewhat support it. Why do you support it?

Reason Somewhat Support
the water level is below the current high water levels
Better than Ing
It's required
Depending on the height of water.
I really like electricity
reasonable usage
We do need more power subject to proper mitigate it
We need power
Believe natural erosion is going to increase so this would be a way to mitigate it. Without adequate mitigation I would not support it.
Subject to appropriate mitigation.

One of the options proposed by Yukon Energy is to “hold the water high” in Marsh Lake. Rate you strongly oppose or support this option:

I strongly support it. Why do you support it?

Reason Strongly Support
The elevation that water is 'held' is lower than the actual ordinary high water mark.
the option is to support fracking and oil and gas dev. in the territory
Low impact way to generate lots of clean energy - responsible thing to do.
Prefers electricity from water than from fossil fuels. Why don't they update technology eg better turbines.

7. Please check each of the following areas where you are concerned, due to changing water levels.

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
Base		87 100%	21 100%	66 100%
Erosion		68 78%	14 67% **	54 82%
Groundwater		63 72%	11 52% **	52 79%
Septic		59 68%	10 48% **	49 74%
Hydrology		58 67%	9 43% **	49 74%
Wildlife		53 61%	11 52% **	42 64%
Wetlands		48 55%	13 62% **	35 53%
Aquatic		42 48%	7 33% **	35 53%
IceConditions		39 45%	7 33% **	32 48%
Mitigation		34 39%	4 19% **	30 45%
ClimateChange		30 34%	5 24% **	25 38%
Lifestyle		31 36%	2 10% **	29 44%
TraditionalUse		31 36%	3 14% **	28 42%
PublicUse		28 32%	2 10% **	26 39%
CommercialUse		15 17%	- **	15 23%
NONE		5 6%	3 14% **	2 3%

8. Do you have any other areas of concern?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	85 100%	20 100%	65 100%
	Yes	42 49%	7 35% **	35 54%
	No	43 51%	13 65% **	30 46%

Do you have any other areas of concern?

☐ Yes - Explain _____

Any Other Areas Concern Text
Sedimentary load at the Lewes control structure and swamping due to reduced reservoir capacity.
A change in the regulated levels will an alternative "natural boundary" in cases where property is bounded by the lake OHWM. This is significant for the settlement lands, and will impact some private properties along Army Beach.
Travel conditions on the Tagish River
Yukon Power wants to cause damage to one area solely for their own financial gain
ongoing development of residences on what are technically sandbars and flood zones but have high dollar values
Roadways surrounding my property are too high, they trap spring melt onto my property.
Use of large rocks (riprap) and other methods to control erosion causes as much damage to the shoreline as erosion does
Freeze up condition and permafrost
Property values
Our cost \$8000 so far, what's next with more erosion?
Property Values
Groundwater locked behind property creating swamp in spring
Lost faith in YEC - using energy solution based approach only.
How many license change increases have been approved? What was the license level in 1956
structural damage to my residence
Litigation from First Nations and Conservation Groups. Post experience shows there are always problems.
Animals will move or die, otters, muskrats
Drinking Wells, Water Wells
Railway grade on Lake Bennett
Around Carcross
What happens when we have heavy wet summers again?
Hydro companies need to demand reduction of usage rather than mindless continued expansion.
Damage to Property & Compensation
Will the higher water affect the swan feeding during fall / spring migration

Any Other Areas Concern Text
I think we need to look at the bigger picture and realize that entire ecosystems will suffer from these proposed changes.
fish
water
continued development on flood plain areas
Are you listening to the people living out here?
What will happen if high water levels occur naturally/affect
Concern for waterfowl and how changing water levels could affect them.
Cultural
Mitigation and we need to study specific property by property mitigation.
HIGH RISK water (dirty, pollution, less clean)
Trucks and fossil fuel use
private property
A general concern that the potential risk greatly outweighs the benefits
There is a lack of information as to how this project fits in with Yukon Energy medium - long term plan. For example YE states this will save \$\$ by offsetting diesel. But we also heard the same in spades with respect to LNG , This SPIN is not appreciated
Lack of baseline data
Need conservation programs for power. Need YTG & YE to work together to reduce demand for power. Conserve and not always demand more & more. This is one of the largest intact fresh watersheds left in North America. Do not destroy further with damage.

9. Which of the following do you feel might be put at risk if the water level is higher?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	89 100%	22 100%	67 100%
	The trees/plants in/near the lake	70 79%	15 68% **	55 82%
	The fish/wildlife in/near the lake	63 71%	12 55% **	51 76%
	My personal property	48 54%	10 45% **	38 57%
	My neighbours property	56 63%	8 36% **	48 72%
	My neighbours safety	24 27%	1 5% **	23 34%
	My personal safety	17 19%	2 9% **	15 22%
	None of these	11 12%	6 27% **	5 7%

10. Are there any other risks you perceive?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	79 100%	18 100%	61 100%
	Yes	37 47%	6 33% **	31 51%
	No	42 53%	12 67% **	30 49%

Are there any other risks you perceive?

Yes - Explain

Any Other Risks Text
Integrity of an intact eco system
the water table may change impacting some septic systems
increased sedimentation, bridges, culverts, infrastruaction, uncertainties, streams, water quality
recreational use of the beaches will be affected
increased risk of flooding
That those properties that were permitted to build on flood/high water zones will be after public money to rebuild and upgrade.
Probably more risks than I care to think about
property
unintended consequences, divisiveness within community, YTG & YEC roles, property owners left out to dry after further negative effects, lack of leadership, communication and the uncertainty
Property, trees, wetlands behind dying
see above
Our neighbour fell through a crack in the ice caused when levels dropped
Highways impacted by ground water. Losing aboriginal and current heritage sites.
more mosquitoes with we areas, flooding
Not for me but for friends who have bad flooding. Costs more each month to get septic pumped out. A lot of garbage will go in the river. Backflow of river water.
Flooding
White Pass Rail Line washes out again.
One cannot mitigate for unknown conditions that are starting to negatively affect our planet elsewhere & soon very likely that we may experience.
degradation of riparian habitat; swans and feeding habitat
large ecosystems are at risk

Any Other Risks Text
road closure
Existing structures/culverts /bridges
west wind
Continued erosion at extreme would affect my house.
I gather food so it all depends on what I can eat.
Existing structures, buildings and culverts.
High Risk water, - pollution, dirty, less clean
Make sure look after spawning areas for fish eg Brook Trout Sanctuary; Manitoba/Quebec experience with huge dams is important as comparison eg lead levels etc in fish
Deteriorating relationship between YG and First Nations
while I didn't mention personal safety above, I suppose that ice levels dropping could affect
Changes in water levels may not just be limited to Marsh, Tagish, Bennett --there could be changes in other water bodies sharing same aquifer. Storm surges will make high water situations more perilous.
Not enough known about effects, long term effects on aquatic life, wetlands, not worth the risk. No long term baseline data, no good monitoring system. Too late once everything is destroyed or killed off.

11. Can you please explain specifically the risks you perceive?

(IF ANY RISKS ARE CHECKED). Can you please explain specifically the risks you perceive?

Perceive Risk Text
Water level changes could affect erosion of lands that people now own and are valuable property. The Southern Lakes have been a managed water system for decades.
Flood caused erosion, swamping, shoreline vegetation, nesting and breeding grounds, melting permafrost, highway culvert realignment, spawning creeks and tributary damage, increased methane and carbon dioxide emissions, plus the ever increasing knowledge of additional ripple effect damage.
wildlife habitat damage, water quality, erosion, sedimentation build up, flooding wetlands
Other than effects on current shore/wetland use by veg, fish & wildlife, a major concern is ground water level changes
Higher water levels affects the beach front and trails along the beaches.
Already stated.
There are no risks to perceive, the proposed water levels are LOWER than the ordinary high water mark (and seasonally high water levels).
My front yard is very susceptible to erosion, even in regular water level years. I don't want to lose my property, and I don't see any gov. efforts to prevent continuous erosion in my area. Everything that has been done has been done at my expense.
Presently the current groundwater level is already within 15-20 inches of my house and garage foundations. I'd would show this to anyone who would care to see.
no, because I don't know what can happen.
Everything you do to mitigate/manage effects something else
The sand shoreline is very sensitive to high water. In the short term damage to shoreline and homes. In long term major loss of the entire beach area.
Lost property & vegetation; risk of damage to structures if not abated.
Property and wetlands damage
see above
Risks and values are much greater than benefits of concept proposed
Flooding, erosion, lifestyle
Risks as noted
see above
Public Safety Risk
same as above
Question Below "Not at all" NO WHO ARE THEY TRYING TO KID?
Erosion, Flooding
Depending on the Water Level
Roads eroding
High Water Level
High water causes erosion which cannot be controlled.
The higher water will freeze in November for the whole winter. We may be vulnerable if we have extremely high

Perceive Risk Text
water levels combined with freak storms from the North.
Bad for wildlife. Please leave things as they are.
Road is close to the lake
Safety in winter due to overflow and draw down
Property loss happening now!! They have to prove mitigation will work. What happens if it doesn't
We gone over it may times and said NO!! We have water pooling in our yard when it rains now. Army Beach was at least twice as big 50 yrs ago.
Don't have any personally. I am far enough back
The main control structure may need some work
Habitat damage caused by flooding and erosion
Cannot evaluate project without evaluating mitigation. Want to see the range of mitigation measures. Feel owners should have input into design.
Things should stay as they are and we need to determine alternate ways (energy).
Mitigation being handled properly with full concerns of property owners.
fish habitat, fur habitat, land damage property damage, water damage, septic damage....Duck geese are losing their eggs, nest, confused where to build nest.
YEC has to prove with certain
Relations to First Nations (ie. CTFN) who has not been adequately consulted on this proposal
Effects on groundwater levels & how this will affect water bodies (ponds, lakes, streams) in close proximity to the impounded areas.
Not enough known about effects, long term effects on aquatic life, wetlands, not worth the risk. No long term baseline data, no good monitoring system. Too late once everything is destroyed or killed off.

12. Do you think the risks can be mitigated/reduced/managed:

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	89 100%	20 100%	69 100%
	Not at all	15 17%	5 25% **	10 14%
	A few of them	32 36%	7 35% **	25 36%
	Some of them	19 21%	2 10% **	17 25%
	Most of them	15 17%	3 15% **	12 17%
	All of them	8 9%	3 15% **	5 7%

13. Have you or anyone you know been personally impacted by changes - when the upper control structure was first built in early 1900's?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	85 100%	20 100%	65 100%
	Yes	23 27%	4 20% **	19 29%
	No	62 73%	16 80% **	46 71%

Have you or anyone you know been personally impacted by changes:

a. when the upper control structure was first built in early 1900's? Yes Explain

Built1900ImpactText
I have heard about changes that this made to the lakes particularly around Carcross
Disappearance of wildlife critical to culture and sustainability.
traditional territory and cultural and heritage sites
Muskrat trappers

Built1900ImpactText
Flooding
My husband built our cabin 1955. Since then we have lost over 100 ft. of shoreline
loss of aboriginal rights, impact on hunting and trapping.
Oil, Stuff from White Pass went in the river & killed fish, destroyed drinking water.
Flooding in the past
High water coming in some of the houses in Carcross
I live along Nares River in Carcross and dealt with the flood of 2007
first nations locally
first nations
Look at Army Beach now! Half as big
my ancestors
1/2 of what was Army Beach is gone from early 50's
Impacts have not been summarized enough to really know.
Known FN elders have described the loss of salmon and all muskrats on lake system. Loss of "Gathering Places"
Elders have described loss of muskrats, land flooded, First Nations affected.

14. Have you or anyone you know been personally impacted by changes -when the dam was build in 1958?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	81 100%	20 100%	61 100%
	Yes	34 42%	5 25% **	29 48%
	No	47 58%	15 75% **	32 52%

b. When the dam was build in 1958? Yes - Explain

Changes 1958 Text
I think it created Schwatka.
Ctfn kdfn
wildlife depletion and habitat damage
First Nations have spoken of the impact.
Salmon fishermen.
Flooding
Flooding and erosion of near shore area.
As above, we are the longest residents of N. M'Clintock except for Johnnie Joe

Changes 1958 Text
Neighbours have lived here since 1955.
Family Clans First Nations and Early Pioneers, loss of salmon & traditional areas.
land eroded, animals die off (drown, freeze)
Fish, Salmon areas destroyed.
Flood 2007
Again Carcross People Removed
I can remember 3 floods at the north end of Marsh Lake since 1958. People should not build on flood plains.
wildlife species such as salmon and otter adversely affected/ thus also first nations locally
first nations
Wiped out the spawning salmon in M'clintock river
Remember Army Beach with road out front and trees on south side
NO salmon in M'Clintock
Hunting and fishing
I have heard stories from long time residents.
my ancestors
army beach
Those that used fish camps @ mouth of McClintock River.
increase in levels of erosion on lake shore
Salmon smoking camps at mouth of McClintock River destroyed. Wetlands Destroyed

15. Have you or anyone you know been personally impacted by changes - in recent years due to high water or wind events?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	91 100%	22 100%	69 100%
	Yes	81 89%	17 77% **	64 93%
	No	10 11%	5 23% **	5 7%

c. In recent years due to high water or wind events? Yes - ☐ Explain

Changes Water Wind Text
The summer flood of 2007 impacted properties around Marsh Lake
Our shoreline willow berm almost eliminated, shoreline now ever greater losses, mature spruce have died and fallen or stand black from flooding.
high water during wind events significantly increase the erosion long the silty banks on Tagish Lake, including areas in front of private land.
shoreline vegetation dead, erosion
Flooding at marsh lake a few times. Flooding near Tagish.
Flooding of property on Marsh Lake.
Lose of property and flooding
We lost a house to the 2007 flood. Having rebuilt with a huge new mortgage, we do not wish to lose anger one.
2007 flood
house flooded in 2008
being allowed to build on flood zones and sand bars
The flood that occurred peaked right at my property level, killed half of my trees.
Summer flooding and wind erosion - in summer time natural flooding - not fall time.
Flooding of property, septic, loss of docks etc
property damage at Marsh Lake
As Above
Damage to shoreline and homes. At Marsh Lake, septic system flooding and contamination.
erosion, lost vegetation
High water saturates the soil on our property at Tagish causing the Foundations of our cabin to move.
high water flooding low areas and property
We have raised our sauna, move it back, deck required constant change and have been raised 5-6 ft
Tagish & Carcross flood
Yes, dam has created problems, causing ice problems
flooding since 2007

Changes Water Wind Text
Built moat 2007, sandbags, pumping 24/7, garage flooded
historic tree stumps are huge indication no flooding, now shoreline trees are dying
all my neighbours have completed some mitigation for risk reduction
bank erosion, more damage due to land saturation
Flood in 2007 and wind damage annually.
Erosion of traditional territory changes in ice patterns and loss of salmon and traditional gathering areas.
Neighbour flooded out completely, our house had to be lifted, gravity pad put down.
Friends flooded, Bank erodes
Flooding, Erosion
Flooding
Flooding
Tree blown over in my front yard
Road access was limited
House in Carcross Flooded
On the river side
High water in 2007 prevented residents from using one of the best beaches in Yukon
Yukon Energy Redoing the Road Grade last year along Nares River?
Erosion (Shore)
Damage to shoreline on California Beach
Flood of 2007 but I believe the flood was not caused by man made changes. Shoreline erosion has occurred.
shoreline property owners
army beach & old constabulary residents
Eroded shoreline resulting from high water and high winds.
lot holders who built on flood areas
washouts, road, basements
Extensively in 2007 flood
2007 flood dilemma
Erosion/property loss/ septic problems
2007 flood
Lost cabin completely. Had to rebuild on stilts
Lots of trees dying due to high water levels still after flood
Shoreline vegetation including trees
Erosion on mine and 4 neighbouring properties.
Lost cabin in 2007 flood.
Property damage, erosion, less and less minnows, change of landscape and swamp and piss me off more than before.
When property flooded various years
flooding
1/2 dozen all around
2007
Folks at S. McIntock and Army Beach effected by flooding
I think both 1900s and 1958 structures have resulted in increased erosion over the years, impacting numerous

Changes Water Wind Text
residents that I know
Flooding
flooding at Judas Creek & Army Beach residential properties
loss of property, loss of beach sand, loss of boats
Lots of property damaged – many, many, areas around lakes and rivers. Swans starve to death when water raised and freezes higher

16. How would you say those changes have affected the Southern Lakes area?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	88 100%	19 100%	69 100%
	Very Negative impacts	37 42%	5 26% **	32 46%
	Somewhat Negative	35 40%	8 42% **	27 39%
	Neither Negative or Positive	15 17%	5 26% **	10 14%
	Somewhat Positive	- -	- - **	- -
	Very Positive impacts	1 1%	1 5% **	- -

17. Have you personally invested to protect your property, others property, habitats or the environment?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	89 100%	22 100%	67 100%
	I have spent a great deal of money	20 22%	3 14% **	17 25%
	I have spent some money	15 17%	3 14% **	12 18%
	I have spent time	30 34%	5 23% **	25 37%
	None of these	24 27%	11 50% **	13 19%

(IF any) Did this include work on your own property?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	91 100%	22 100%	69 100%
	Yes	49 54%	8 36% **	41 59%
	No	42 46%	14 64% **	28 41%

(IF any) Did this include work on your own property? Yes - Explain

Work On Own Property Text
Construction of rock berm
I constructed an erosion control structure along the bank in front of my property - took several years of manual work and some money
development of a rock barrier
New house. Rock on shoreline at personal expense.
put some rocks on my shore line

Work On Own Property Text
Install pump system to empty basement sump, repair foundation, replace destroyed electronics
I annually pump groundwater melt off into 45 gallon drums and haul away.
Sand Bagging
Above question - I checked both 'I have spent money and I have spent time' it won't register two clicks. Work includes cleanup work & some efforts to reduce erosion. - Significantly more work / investment required.
Leveling the foundations of our cabin several times in response to high water levels, clearing trees that have fallen due to high water levels. Cleaning extensive debris from beach at Tagish during high water levels
retaining the bank from erosion
Dock repair, filling shoreline with rock, raising and relocating sauna.
YES
No choice
Mitigation to get water under control to this point.
yes
Bio stabilization staking willows protection against further erosion from high water, winds and waves.
Great deal of money and time on a bioengineering project.
I have spent a great deal of time and money. Had to lift house, pump property, Had to move to a trailer for a few months.
Sand Bagged top of walk near river
Rip Rap
Protected the bank with major rocks/boulders
Clean up of branches etc.
Sand Bagging
Others
Most of the Neighbors along Nares River and lake. Build Dikes around several homes.
MY PUMPHOUSE FLOODED AND I HAD TO MOVE THE PUMP
protective log wall
Rip Rap
Major bank reclamation project
Backfill
shore line rebuilding
Rebuild dwelling
Rock break wall
I have hand placed rip rap and protected trees from beavers.
I have spent some money and time.
Lots of sandbags, rock, try to save land and erosion, not time for fun, fishing, -- always working!! Always checking water level, worry there're less minnow (small fish) now than before. More trees falling off.
filled and humped sandbags
I have spent time: Filling sandbags; not own property
n high water years we have had to clear debris & shovel back ridges
sandbagging to protect lake frontage
Sand bagged and helped neighbour fill bags, replaced docks and water lines. Helped a lady find a new house when hers was destroyed by flood. Support neighbours, Seniors, stressed by thoughts of YE raising water every year.

Please explain what you have done to protect your property, others property, habitats or the environment.

What Done To Protect Property Text
Sand bagged, built rock berm
Explained above building an erosion control structure. One concern is that my neighbours are doing nothing which will eventually impact the bank in front of my property
rock barrier to uprush
Helped sandbagging.
AS stated previously
As Stated.
Fire smart paid personally, erosion prevention work, as approved by environment (rock on shoreline and around dock)
bioengineering project on 4 properties for property, habitats, and the environment.
Pumps, sandbag, loads of earth, lifted house, had to have cement floor put down. Have no septic system now. Pay for pump out frequently -- expensive.
Redid the dock, made it higher 11 years ago. Quite a few docks washed down the river.
Rip Rap Erosion Protection
Sand Bagging
Sand Bagged, Pumped
Built breakwater to reduce erosion of banks.
Live staking and gabien baskets
Backfill
Increased height of berm
Shoreline rock barrier
Want mitigation
I have spent a great deal of money and time, worry, problem sleep from WORRY!
More help with flood response

18. Do you foresee or plan on any costs in the future that you will do to protect your property, others property, habitats or the environment?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	81 100%	19 100%	62 100%
	Yes	45 56%	9 47% **	36 58%
	No	36 44%	10 53% **	26 42%

Do you foresee or plan on any costs in the future that you will do to protect your property, others property, habitats or the environment? Yes -☑ Explain

Explain Costs In Future Text
Blast rock support to shoreline erosion
Further erosion control work
additional shoreline protection
Sandbags for my cabin property. Provide box habitat for birds to breed.
change in climate and ground water flows and perm frost melting affecting non water front structures as well
SELL!!! To Yukon Energy if they go ahead and raise the water level.
Erosion control works
If higher water levels are allowed in the Fall, then armouring of ALL of Tagish Beach will be required, particularly near the 'point' at the start of the river.r.
Depending on soil saturation, our cabin's foundations may fail, the beach may become submerged. We could lose the beach entirely.
High water may cause flooding in the future and the need to control it
Our property has been sole owned for 60 years. I want my children and their children to continue enjoying their heritage.
Overdue
major changes are required to protect shorelines
Can't wait for YEC & YTG. Contracting work to be done.
more bank reclamation
raise by backfill foundation
It will affect us if YEC raises the water. The cement pad has cracks now. Can't have a garden, too wet.
Protect bank, grew trees down by water
more rock, large
Don't know
Yes, if you raise it, it will Flood!
Additional work will be needed to reduce erosion.
Shoreline berm but all adjacent properties need to do the same.
More live staking and gabions
Backfill
septic
want mitigation to cover it
If it get higher than 1ft then I will have a problem
Shoreline
Planning significant rip rap protection.
Backfill
shore erosion protection
Septic system if we have more high water. Ground saturates much quicker, water always accumulating
Likely at a minimum filling more sandbags, possibly helping neighbours fortify their lakeshore properties
continue same but with greater frequency

Explain Costs In Future Text
Depends if this concept becomes reality.
If needed. Should fight against Y.E. doing this every year

19. Do you think that alternate energy options are needed to either supplement or change the planned concept?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	78 100%	19 100%	59 100%
	Nothing is needed	7 9%	5 26% **	2 3%
	Minor changes are needed	19 24%	2 11% **	17 29%
	Major changes are needed	52 67%	12 63% **	40 68%

Do you think that alternate energy options are needed to either supplement or change the planned concept?

Minor changes are needed ☐ Explain

Minor Changes Needed Text
More re-newables would be great.
Minor use of Fossil fuels; Wind and Solar
offer incentives re: alternate energy options
We need a plan from YEC
effective dialogue
look at option, reduce community anxiety
explore all options
Try wind and solar
keep water level the same
Need no longer there as mining and litigation have stopped need for more power
Not sure what to do
Demand is no longer great as mining has been low so don't need any immediate need once LNG plant is completed. Should supplement with alternates.

Do you think that alternate energy options are needed to either supplement or change the planned concept?

Major changes are needed ☑ Explain

Major Changes Needed Text
Research adaptable best available energy options to rural small population communities
Alternative energy sources will always be needed to supplement the planned concept
small populations need leading edge technology in energy alternatives within rural communities
Since groundwater impacts cannot be mitigated, find other power production option
we need to explore wind and other alternatives
Wind turbines.
alternate energy, solar, wind, etc.
Yukon Energy knows what the other options are better I. My favorite would be to hook into BC grid.
Efficiencies in existing infrastructure.
not sure
Individuals putting wind, solar on own properties not relying on big utilities to do large projects. Micro-hydro
Dam systems (such as the Whrse. Dam) are VERY problematic particularly near developed areas. Should consider alternate sources such as wind, geo-thermal, solar, in-channel generators, etc.
Territory is out of power, viable options must be explored
micro hydro
wind, solar
would have to be major to change the plan
reduce use supplement b u grid
Rather than mess around with the water level use other energy options
Program to reduce consumption. Use wind, solar.
Alternate ways to produce power must be brought in. Reduce waste of power.
go to green power : water / wind / solar
Public education to lower demand on electrical use.
Solar and wind power have not been fully explored.
Wind Solar small hydro NOT MORE FOSSIL FUEL ENERGY GENERATION
Change in attitude re wind, solar generating other hydro projects.
More hydro development.
see question 6: regulations governing YEC need to be changed so it can be managed in ways that reflect the need to prioritize renewable energy and reducing environmental footprint
I actually think that Yukon Energy should conduct a major campaign to promote conservation to help reduce the need for hydro energy.
alternate sources to generator use
Would have to be major to change plan
Have to get FN on board
bigger Hydro no enough power here
Ask experts
Wind, mini hydro, solar and other alternate options to take us off the grid and reduce power outages. We need

Major Changes Needed Text
community programs to do this.
Need to start having more option eg bulbs.
Have to set First Nations on board
We've known for years that Mt Sumanik would make a great place for a wind farm, possibly also Ferry Hill. Let's start with Sumanik
this project has the potential to negatively impact a huge area due to size of the water basin
a whole shift away from this concept to other renewable energy
Small scale, green energy, micro-systems. Conservation, Education, Reward Program.

20. Do you think there is anything the residents need or should do to support alternate energy options?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	74 100%	17 100%	57 100%
	Yes	59 80%	12 71% **	47 82%
	No	15 20%	5 29% **	10 18%

Do you think there is anything the residents need or should do to support alternate energy options?

Yes - Explain

Explain Residents Alt Energy Text
Support in selecting viable alternative energy options for small demand communities.
WE need to support any energy project that is sustainable and has an environmental impact that can be tolerated. WE need to accept the fact that nothing is perfect so something has to give.
education, funding
Support groups calling for energy production options
public education about alternatives; public protests
invest in solar panels or photo-vonatics, and water turbines for rivers, streams, or small wind turbines.
Support clean HYDRO projects.
With financial support we could try solar and wind options.
move away from the low water areas
See previous comment. Press the government to put in incentives and look for alternatives. Put in their own when they can.
Add'l research needed to make these sources more viable, such as electrical storage.
Interested user groups need to be funded to explore all options
Help in preventing erosion, environmentally suitable rock is very expensive.

Explain Residents Alt Energy Text
Overdue
Dialogue with affected parties
energy reduction, micro hydro dams, 2-mile river Atlin & Tagish
education and research
reduce use & consumption, more efficient use of power
Use sustainable methods such as wind and solar
Should try to get a government that will shift to sustainable, green, power
Rebates
Vote responsibly for Greener Energy. Personally reduce power use.
Financial incentives for seniors to switch to solar / wind power. Meetings about viable options.
Cut back on power use & perhaps personally invest in other power sources.
Fight Yukon Energy About This!
Full -- expert driven support for WIND, SOLAR & small hydro generation.
reduce demand
Find out realistic way to get YEC to change its culture
Become better educated in options
Lobby our government to promote research & development into less invasive renewable energy & lobby our government to promote conservation of energy.
don't build on water's edge
education
advocate for development
failure of hydro availability
Education and research
Become less reliant on the grid
Let MLA know
Not sure what though
Reduce energy needs or supplement
Residents should explore wind to power community and sell power back to the grid.
Community campus, funding, education, curriculum and programs.
Let MLA know.
Wind, build new Hydro dam, throw out the L.N.G., use diesel generator for back up.
Reduce cost of power as much as possible.
reduce reliance on it
Do it
If there is some kind of alternate energy options, these options should be very cleared laid out to all residents of the southern lakes, and should proceed only with a consensus from the majority
Geo-Thermo
Make their voices heard in surveys like this
energy conservation, variable rates/day, solar, wind, -- need some visible community demonstration projects where entire communities are on green energy (no fossil fuel)
elect a new government
VOTE FOR A PARTY WHO WILL SUPPORT REDUCTION, CONSERVATION, AND GREEN ENERGY. Protest against uncontrolled use and development of endless, cheap, power

21. Looking ahead, how would you most like to see the Yukon's energy needs being met?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	86 100%	21 100%	65 100%
	Wind	59 69%	16 76% **	43 66%
	Hydro	57 66%	14 67% **	43 66%
	Solar	55 64%	12 57% **	43 66%
	Other	28 33%	4 19% **	24 37%
	Natural Gas (LP)	19 22%	6 29% **	13 20%
	Diesel	7 8%	2 10% **	5 8%

22. Is there anything you would like to see planned now that would help in the future?

		Total Input	Survey Type	
		Non random sample	Opened to anyone	Southern Lakes Residents only
		A	B	C
	Base	77 100%	19 100%	58 100%
	Yes	59 77%	15 79% **	44 76%
	No	18 23%	4 21% **	14 24%

Is there anything you would like to see planned now that would help in the future? Yes

Explain Future Help Text
Immediate planning for alternate energy options
Need to look at run of river hydro projects and possibly partnering with First Nations
micro hydro local generation throughout Yukon
Smart grid with home heat storage and timed electricity use.

Explain Future Help Text
The government investing in all sorts of renewable energy such as geo-thermal, solar and wind energy.
Keep water levels low
Enhanced storage in Marsh Lake and the Southern Lakes.
Integration with BC. If Washington state can do it, we can do it.
dams
Stop the LNG conversion and subsequent fracking development that is driving the changes in energy production.
Ration power consumption to curtail the excessive life-styles of urbanites infesting the river valleys
Again, increase the efficiency of existing infrastructure.
More hydro dams
Atlin storage
Reducing our requirements for energy by retrofitting buildings
new hydro development and more investment in wind power
Expansion of high efficiency generators, solar and wind options.
Again, additional research into some of the above sources. If only 10% of the investment currently placed into research on sucking out the last remnants of oil in the ground, we'd have these problems solved.
Discussions with government on options to protect property & vegetation without infringing on current legislative requirement / limitations.
Power purchase from Skagway
STOP changing water levels, clean up consultation process, start being honest from the get go.
Consult with J.P. Pinard
Need a viable plan for future success
Alternatives
Mitigation with 'best practices' discussion, YTG experts working directly with residents NOW on effective
OPTIONS
Long term stability of system and energy
Alternatives, build on every solution suitable to rural needs and local resources.
forgivable loans, grants
More research and development on alternate energy because this is a band aid fix in a highly populated area.
all options including small nuclear plants, run of river & micro hydro
Skagway - Buy power for us in the winter; sell it to them in the summer. Work out an agreement.
Program to reduce power consumption initiated.
Thermal Energy, Conservation, wind, other forms of power
More presentations on a homeowner's do-it-yourself installation of solar/wind/water options.
micro dams
Wind Turbine in Southern Lakes
Get rid of LNG, do run of river, and other alternative sources of energy
carefully administered studies that are fully reported, comprehensive; change to incentives for YEC and other potential energy producers that may come on board in the future
We need to envision a fossil free energy world & thus investment & research needs to be done to come up with new renewable sources of energy of the least invasive.
barricade around low lying properties
get rid of Pasloski and Yukon Party; facilitate commonsense resource and power development
underground wires

Explain Future Help Text
explore nuclear concepts
Nuclear research
Satisfy the demand as cost effectively as possible
Big Hydro as long term option.
Coordinated effort to get communities on board
Utilize small hydrokinetic units. Long term macrohydro and other options for short term.
Education and we need to make the rubber hit the ground.
Long term hydro is the best option. Thermal storage is another option.
Some road in Whitehorse, like Hamilton street, HWY, 2 mile Hill, should cut down lights to 50% during late night to save more energy use.
Small to medium hydro projects that have less effect on watersheds.
Update the energy plan & give the real goods on economics -- need to revisit the big picture again since we don't know now how this project fits with other initiatives such as LNG, the next major hydro plant, renewable plans for wind etc.
A shift away from the use of fossil fuels to reduce effects on climate change
Education, Rewards instituted NOW!! (Yesterday!)

23. Do you have any additional comments to add?

Do you have any additional comments to add?

Any Comments To Add
We have to say no to any alterations to our Southern Lakes eco system and watershed. NO. The community has no confidence in YEC from recent energy planning failures technically and fiscally. The southern lakes has far too great an impact on the Yukon to overlook any potential risks or damage caused by short term needs for power. NO. To best guesses and incomplete studies. Leave the system to Mother Nature..Come hell or high water.
Although I would not like to see the concept go ahead, I think we need to sacrifice some things in order to provide energy sources to support our way of life. IF YEC provided adequate erosion control mitigation and other mitigation measures where needed (e.g. septic systems, compensation for lost land), I would reluctantly support the project. I think the First Nations will be the big players in saying whether this project will proceed or not; have not heard much from their governments.
No to changes the storage level, YES to reducing high storage levels in the Fall with new innovative drainage options to alleviate flooding & erosion.
Thank you for doing this work. It is vital.
Yes. -- To the question "Do you think the risks can be mitigated/reduced/managed?" I answer "A few of them BUT would be VERY difficult and expensive."
The risks to us and our property are significantly concerning. These risks greatly outweigh the stated benefits of the plan. We may lose our property and the ability to enjoy our property for a minimal rise in power generation - why are the views of those who will be impacted by the plan not being properly considered by our Government? What reparations will be offered regarding the damage that will be caused to our property, and who will decide this?
We want the consultative process to be honest and believable. Personal safety - erosion undercuts the banks

Any Comments To Add
and walking anywhere near the lake is hazardous (M'Clintock) is precipitous. There is a win, maybe we can control the water to some extent. I do not understand the current draft where 'lakeside residential' is suggested in the land use plan.
Talk to JP Pinard
Problems are well known by YUB and YEC, Water Board next, very undecided, too many unknowns, need all options detailed and studied before proceeding
More consultation with our local residents, the property behind us is impacted, filled land, everything is dead, swamp. Major changes are required to protect shorelines and already impacted areas. We need something other than this concept.
We contacted Harvey Brooks, EMR with land holder problems in support of our neighbours initially with suggestions and were told it's the land owner's problem.
Our experience with YTG engineering: Mitigation Test Ditch pumping 24/7, no prior consideration to elevations in and outflow. This has been the best solution to date. Failed. We are not confident in YEC mitigation and we haven't received or seen any viable or acceptable options presented.
We need an independent study on all potential risks and damage resulting from the Concept. YEC control needs to be studied and all impacts associated with holding water higher and lower in spring. We need an assessment of resources available from within each community. Design energy system to meet the needs.
We will eventually have to have an efficient hydro project in Yukon to support future generations.
Do Not Do This
Move to use more wind, solar, green energy. Don't raise the water in the Southern Lakes.
Been here for over 40 years, seen a lot. Don't want this project to go ahead. Let's not spoil our last great environment -- our rivers and lakes, our grandchildren's future.
Incentives to Conserve. Any Alternative to Non Renewable energy.
Since I have lived in my lakefront property (1980) I have witnessed 20 - 35feet of shore erosion. Raising the level of the lake will only cause more erosion which must affect the depth of the lake as it fills up with shore erosion.
I don't understand why Yukon Energy did not access our energy needs years ago and meet the demand with another hydro project.
Same comment of needing to change old style centralized profit-maximizing corporate organization of YEC to being about lowering emissions, and making changes to reduce consumption , store energy, use technologies like ETS that require storage of capacity i.e. so how do we change our grid to store as this needs
When using hydro have existing developments only and possibly new micro-projects.
if it ain't broke, don't fix it
Another source of energy for Yukon future energy needs: Small newtech nuke power plant
Make sure YEC does due diligence and that affected property owners are compensated
Current erosion is a big concern because you cannot reverse the consequences.
By hydro I mean mini hydro projects not macro.
Make sure YEC does their due diligence and that affected property owners get their fair say.
Deb re-entered this survey because there were no comments on it.
Yes, I'm sorry to say but the best thing is to build a new Hydro Dam. I know during construction will damage more and less but after is done, everything will come green in many years, more people will get the job permanent in long run make sure you build a new dam. Far away from any town, do not sell any pieces of land to people where the dam and surrounding water level, trapper can use it to build cabin only to living trapline. No outfitter cause they build for money!! Unless they build only wall tent. The Hydro Dam is very better than the fucking L.N.G.! We don't need L.N.G.!! You need a meeting about build new Hydro Dam to explain us and our suggestions, idea to you guys!! I have some good ideas!! The native people have some good idea too!! The way

Any Comments To Add
they built the Hydro dam in Whitehorse is a really bad place, bad design, unsafe, too much damage, water, land, fish etc. etc.... VERY OLD Turbine!! Hard to shut down long term to fix up, upgrade, etc.....like I said, You need meeting about new Hydro dam!!! Thanks! Thanks! Machiso! Merci!, Gracias!
YEC wants to make \$ and sell power. Don't truck it in. YEC should mitigate; thinks they will try to raise it again in future as per Quebec- should do it once only. Why do they (YEC) only study things they want and skip what they don't. Fish species and their survival/safety need to be studied. Every time raise water say will do study and maybe don't, i.e. try to get away from chores that don't want to do. Talked to YEC one time and thinks it is bad to truck in fuel from outside, feels trucks are very big risk.
A sane policy on powering mines and other major industrial consumers. This policy should not compel the public to provide power, should encourage industrial consumers to invest in renewables for their operations (which could be then absorbed by the public) and to have a demand side management plan in place. There should be demand side management programs for residential and other commercial users too
Allow individual and/or group energy production efforts (solar/wind) to be tied to the grid so t hat excess production can be used territory-wide or at least on a local level. Provide incentives for individuals or groups to construct power projects! Grants and/or interest-free loans
How good is the ecological baseline so that if this project proceeds impacts can be monitored -- where are the critical habitats for fish and wildlife and have they been inventoried? - What risks do flooded areas pose - exposed permafrost areas, flooded forests, exposed cut banks, etc.? Wind / storms will exacerbate these. --what impacts will there be on access into streams for spring spawners such as grayling? Potential siltation in Fall (high water) -- impact fall spawners eg. lake trout. -- the dynamic range in water levels will have negative effects on shore - dwelling wildlife - nesting, over wintering habitat (eg. beaver, muskrat) critical staging / feeding areas (eg. swans) -- what is the impact monitoring plan??
This concept should NOT be implemented.
DO NOT MOVE AHEAD WITH THIS PLAN. Reduce, Conserve, Reward, Micro-hydro, -- Skagway Connection

APPENDIX F

LETTERS RECEIVED



WHITE PASS & YUKON ROUTE
THE SCENIC
RAILWAY OF THE WORLD

P.O. Box 435
Skagway, Alaska 99840
Phone: (907) 983-9800
Fax: (907) 983-2017
wpyr.com

September 18, 2014

Sent via e-mail only

TO: Southern Lakes Water Level Committee

Ed Lishman jelishman@gmail.com

Dorothy Gibbon digibbon@northwestel.net

Deborah Fulmer deborah.fulmer@gmail.com

Jean Kapala jkapala@northwestel.net

Paul Prevost paul_prevost@hotmail.com

Gerry Peters rustic@northwestel.net

Rob and Mary Ann Lewis ramal64@gmail.com

Mark Wedge mwwedge@yahoo.ca

RE: WP&YR Opposition of Raising Water Levels in Southern Lakes

Dear Southern Lakes Water Level Committee,

White Pass & Yukon Route adamantly opposes the concept of raising the water levels in the Southern Lakes by any measure and during any time of year. The WP&YR right-of-way is built along the shore of Lake Bennett. Any rise in the water level would compromise the rail bed and prevent White Pass from transporting passenger trains to and from Carcross, Yukon.

Sincerely,

John Finlayson
President



Cc: Mark Taylor, WP&YR Superintendent of Rail Operations

Pacific & Arctic Railway and Navigation Co. • British Columbia Yukon Railway Co. • British Yukon Railway Co.

To All,

I'm a property owner at Army Beach. I don't want a increase of water by 30cm in the fall or a decrease of 10cm in the spring. Enough damage has been done to southern lakes, thanks to a dam that was built in the late 50s. Miles canyon is a prime example. A Bootle neck occurs in the canyon and wont discharge water fast enough when we have high water in the summer. Why are you wanting to make this problem more of a hazard. Remember the flood a few short years ago, I have photos at the Yukon River Bridge Dam showing water a couple inches below the gates. Ready to spill over. With the little bit of money that Yukon energy is going to pocket. We need more than science. This venture has to be stopped.

I prospect and cant believe the hydro potential I'm coming across on class 4 creeks where the main grid is close by. Why doesn't these high paid people with week-ends off. Get there boots on the ground and find alternatives. Put people to work. Its OUT THERE.

Diamond Tips Exploration Corp

Bear Aware "Danger Never Sleeps"

Charlie Brown

I became angry and sad at the same time

Tuesday, Oct. 28, 2014 made history for Yukon and Carcross because a huge, white tank crossed the Nantasee Heen River at Carcross, Yukon, the headwaters of the Yukon River (Shaw nalth hini, water that comes from the mountains is the translation).

I am sure this tank is for the new liquefied natural gas (LNG) generators in Whitehorse!

If so, then I would have liked to have stood at the bridge, drum in hand, and maybe stopped them a couple minutes, maybe said a prayer, had a moment of silence, too, reflecting on the significant change this leads us

to. Engineers, ATCO Electric, Northwestel, highway safety officials ... everyone was there when I drove over Tuesday morning to see the tank crossing the bridge at Carcross.

I became angry and sad at the same time, and rushed to get pictures.

The risks and benefits are these, in my view. I risk being the fool for ever speaking against oil and gas as the way for us to go.

I believe in alternative ways to create energy. I will risk it, although the decision is made

before we get to the public consultation part.

The benefits are to the big companies and corporations which trudge on as if the bumble bees have no right to clean living too.

Governments blaze the trail for them by stripping legislation, undermining First Nations people and ignoring the public.

There is pressure for more power, so fast, the raising of the Southern Lakes concept, a line from Skagway, LNG generators (which means that much more stuff coming through our community), a resort, new lakefront

lots, etc.; there is no plan.

Tutshi Lake (Black/Charcoal Lake translated) is along the South Klondike Highway.

We have many concerns in our area, water being foremost.

Water is *alive*. It has memory, it's the most mysterious liquid/substance, it is sacred, if you will, and we all need it to live. I love water!

We lost a lot when the dam went in at Lewes/Marsh, salmon being the big one, muskrats too. Imagine the change at that time!

Colleen James
Carcross

APPENDIX G

COMMITTEE AUTHORIZATION

Marsh Lake Members

Deb Fulmer Chair Sign: _____ Date: _____

Jean Kapala Co-Chair/Treas Sign: _____ Date: _____

Tagish Lake Members:

Rob & Mary-Ann Lewis Sign: _____ Date: _____

Tagish Lake and CTFN Member:

Mark Wedge Sign: _____ Date: _____

Carcross Members

Dorothy Gibbon Sign: _____ Date: _____

Ed Lishman Sign: _____ Date: _____

Committee Support

Sue Greetham Sign: _____ Date: _____

Susan Gwynne-Timothy Sign: _____ Date: _____