



**Table. Lizard Creek --Existing Wetlands and impacts post-construction-above R-1 (Upper Lizard Lake and Lillie Lake)**

Wetland #	Existing area (ha)	Wetland type	impact	mitigation
ULIZ-01	0.0.976	MAS 3-10 Forb organic shallow marsh  3:1 slope	Water level to remain at 233.1-233.6 masl (metres above sea level) range, which is within typical range of Upper Lizard and Lillie Lake currently based on data logger info. Operation of the hydro plant and turbines will be designed to match incoming flows to the upper lakes mimicking natural fluctuations seasonally and after rainfall events. Summer growing season will see hydro operation only running when rainfall inflow to the upper lakes allows the plant to run. Otherwise natural conditions will see the level drop in periods of drought year or fluctuate when thunderstorms or major rainfall events in the watershed occur. Daily fluctuations when plant is running full out will be 25-50 mm with the lake levels allowed to rebound. As such no impacts on this wetland is predicted as there will be no change in the magnitude, duration or frequency in the water levels. The wetland is a backbay with lilies, sweet gale, royal fern and pickerelweed that is currently subjected to a range of water from 233.1 to 234.3 over the year. Recent beaver activity at R-1 has seen lake levels stabilize and maintained at a higher level (approx. 30 cm) in the summer than normal. No impact on this wetland has been observed as a result. NEA surveys were conducted when the upper lakes were at 233.4 masl in June 2012. This and other	-none -monitoring of wetlands will be conducted by establishing quadrats in specific areas and comparing to post-construction period -if necessary and if any impacts are identified to the vegetation, species or wetland type, the water levels can be altered by creating a summer drawdown or varying the pond elevation seasonally.

			<p>wetlands were typical northern marshes and swamps. The dryness of the summer was evident but otherwise the wetlands were lush and diverse. The wetland is on a slope with the existing spring flood line delineating the upper edge. The royal fern appeared normal despite being well above the water line over the summer, implying the organic soil holds moisture from rainfall or there is some seepage in this area.</p> <p>Lower Lizard Lake and its wetlands below R-1 will be inundated with 1.5-1.8 metres of water and the wetlands will be flooded out. This is not the case above R-1 where no change in the duration, frequency or magnitude will occur and inflow of runoff from the watershed will match plant operations, mimicking natural conditions.</p> <p>Impact level: negligible.</p>	
ULIZ-02	0.1121	MAS 3-10 Forb organic shallow marsh SWM on outer edge	<p>Impact level: negligible</p> <p>Same kind of wetland and impacts as above</p>	
ULIZ-03	0.0843	MAS 3-10 Forb organic shallow marsh	<p>Impact level: negligible</p> <p>Same kind of wetland and impacts as above</p>	
ULIZ-04	1.768 ha	SWT 2-6 sweet gale organic thicket swamp	<p>Impact level: negligible</p> <p>Wetland is at lake level between islands. A thick floating mat of mosses with cranberry groundcover, succession to sweet gale and a ponded area. Wetland is subjected to variable</p>	<p>-none</p> <p>-monitoring of wetlands will be conducted by establishing quadrats in specific areas and comparing to post-construction period</p> <p>-if necessary and if any impacts are</p>

			<p>water levels including spring flooding currently. No impact on the plant species, health, successional communities or wetland type will occur from the inclusion as part of the ZOI. Water levels post-construction will be in the same range as current conditions (233.1-233.6) and mimic existing inflows. Wetland has been observed during site visits on April 11 2012 and June 9, 2012 at 233.28 masl and 233.4 masl, respectively with no discernible difference in the vegetation. The moss banks and outer edge showed some erosion on June 9<sup>th</sup> from wave action indicating the lake levels may be higher in a typical summer season. As a floating swamp the wetland does have a high water table and water retention capabilities. A range up to 233.6 in the lake level would not impact the plant species and given the species present would be beneficial. That level may be a more normal elevation for this lake in the summer and fall.</p>	<p>identified to the vegetation, species or wetland type based on the monitoring program, the water levels can be altered by creating a summer drawdown or varying the pond elevation seasonally</p>
ULIZ-05	1.87 ha	MAS 3-10 Forb organic shallow marsh	<p>Impact level: negligible</p> <p>Same kind of wetland and impacts as ULIZ01 and 03 above.</p>	none
ULIZ-06	0.348 ha	MAS 3-10 Forb organic shallow marsh	<p>Impact level: negligible</p> <p>Same kind of wetland and impacts as ULIZ01 and 03 above.</p>	none
<b>TOTAL</b>	<b>4.28</b>			
LILK-01	0.119	MAS 3-10 Forb organic shallow marsh	<p>Impact level: negligible</p> <p>Same kind of wetland and impacts as ULIZ01 and 03 above.</p>	-none
LILK-02	0.732	SAM 1-1 (pickerel	Impact level: negligible	-none

		weed mixed shallow aquatic type) to a MAS 3-10 (Forb organic shallow marsh type)	Same kind of wetland and impacts as ULIZ01 and 03 above. Open water aquatic marsh adapted to variable water levels over season. No change in vegetation type or frequency of high and low water levels expected. Beaver dam establishes limit of lake level influence as dam is over 1.3 m high, old and stable.	
LILK-03	0.274	SWT 3 (Organic thicket swamp Ecosite)	Impact level: negligible  Same kind of wetland and impacts as ULIZ01 and 03 above. Series of three beaver dams creating a tier of wetland pockets. Lower two dams in various states of disrepair but upper dam location of main beaver pond and dead cedar swamp. Beaver dam establishes limit of lake level influence as upper dam is over 2.5 m above lake level, high, old and stable.	
LILK-04	11.955	SAM 1-1 (pickerel weed mixed shallow aquatic type) to a SWT 3-6 (Sweet gale organic thicket swamp) With a BOT 1 (treed bog ecosite) in background.	Impact level: negligible  Wetland extends to the south and east downstream of the beaver dam. This area includes large areas of sweet gale in the western portion, connected to the lake and a tamarack bog at the far east end. The effect on lake levels in Lillie Lake would be minor at the end of this old bay that has succeeded into a sphagnum bog. No impact on the plant species, health, successional communities or wetland type will occur from the inclusion as part of the ZOI. Water levels post-construction will be in the same range as current conditions (233.1-233.6) and mimic existing inflows. Wetland has been observed during site visits on April 11 2012 and June 9, 2012 at 233.28	-none -monitoring of wetlands will be conducted by establishing quadrats in specific areas and comparing to post-construction period -if necessary and if any impacts are identified to the vegetation, species or wetland type, the water levels can be altered by creating a summer drawdown or varying the pond elevation seasonally.

			<p>masl and 233.4 masl, respectively with no discernible difference in the vegetation. The moss banks and outer edge showed some erosion on June 9th from wave action indicating the lake levels may be higher in a typical summer season. As a floating bog the wetland does have a high water table, possible groundwater influence, beaver activity from evidence of low ridges and ponded areas.</p>	
LILK-05	11.401	<p>Marsh Open water Low shrub thicket</p> <p>ELC code:  SAM 1-1 (pickerel weed mixed shallow aquatic type) to a SWT 3-6 Sweet gale organic thicket swamp BOT 1-1 (Black spruce treed bog type) in background.</p>	<p>Impact level: negligible</p> <p>Wetland extends to the west from the lake. This area includes large areas of sweet gale swamp in the eastern portion, close to the lake and a bog at the far west end. The effect on lake levels in Lillie Lake would be minor at the end of this old bay that has succeeded into a sphagnum bog. No impact on the plant species, health, successional communities or wetland type will occur from the inclusion as part of the ZOI. Water levels post-construction will be in the same range as current conditions (233.1-233.6) and mimic existing inflows. The moss banks and outer edge showed some erosion on June 9th from wave action indicating the lake levels may be higher in a typical summer season. As a floating bog the wetland does have a high water table, possible groundwater influence, beaver activity from evidence of low ridges and ponded areas. These large wetlands would attenuate spring flows and retain water in the moss layers providing moisture in the driest summer periods. As such they are very resilient to water levels except if drained .</p>	-none

LILK-06	2.902	SAM 1-1 (pickerel weed mixed shallow aquatic type) to a SWT 3-6 Sweet gale organic thicket swamp	Impact level: negligible  Wetland at mouth of creek and wetland in mid watershed below waterfall/rapids. No change in water levels in this waterbody and wetlands. Flow from river and lake effect is limited as boat access was possible for several hundred metres upstream with no riffles or beaver dams. No impact on wetlands will occur post-construction. Pickerelweed marsh at mouth subjected to variable water levels.	-none
LILK-07	0.77	SAF 1-1 (Water lily – bullhead lily floating-leaved shallow aquatic type) leading to a SWT 3-6 Sweet gale organic thicket swamp	Impact level: negligible  West end of Lillie lake defined by series of long beaver dams across the mouth of a river. Wetland below first dam extends out into lake as a floating leaved shallow aquatic marsh. No impacts on this community post-construction as lake levels will be within normal range.	-none
TOTAL	28.171 ha			
<b>Overall loss</b>	<b>0.0 ha</b>			<b>-no change in existing wetlands or new wetland area created post-construction</b>