Muriel Lake Basin Management Society

Annual General Meeting

July 15, 2018

Agenda

- Call to Order
- Introductions
- Minutes of 2017 AGM
- Financial Statement
- Status of the lake
- Review of MLBMS projects and activities
- Election of Directors for 2018/19
- Comments and Questions from the floor
- Adjourn
- Guest Speaker: Mr. Ray Makowecki

Introductions

- Distinguished Guests
- Directors
 - Lyall Kortzman, Jeff Hlewka, Richard Bourgeois, Peter Crown, Jan Ramful, Peter Cordingley, Don Midgely, Cheramie Barbazuk, Kevin Roth

Introductions – the facility

- Washrooms
- Fire exits
- Fund raising
 - Print Raffle
 - Donations (tax deductible)
- Coffee & snacks
- Handouts & Displays
 - Financial Statement & Volunteer signup
 - Membership list check your email address
 - Beaver River Watershed Alliance posters

Minutes of 2017 Annual General Meeting _{Cue minutes}

Motion to accept minutes of July 7, 2017 AGM

2017 Financial Statement

- Formal copy of statement available as handout
- Opening Bank Balance \$7582.50

• Income	2016	2017
Donations	\$1,740.00	\$1 <i>,</i> 405.00
Bottle Returns	\$2 <i>,</i> 073.65	\$1 <i>,</i> 838.95
Raffle	\$ 175.00	\$ 200.00
Grant	\$3 <i>,</i> 822.77	\$7 <i>,</i> 775.22
Fund Raisers	<u>\$1,512.90</u>	<u>\$1,720.00</u>
Total Income	\$9 <i>,</i> 324.32	\$13,251.17

2017 Financial Statement (continued)

Disbursements		2016	2017
Administration		\$ 57.00	0.00
Bank Fees		\$ 111.02	\$ 208.19
BBQ		\$ 309.49	\$ 312.00
Meeting Expenses	S	\$ 0.00	\$ 100.00
Projects & Profess	sional F	ees <u>\$ 5,147.61</u>	<u>\$8,434.70</u>
Total		\$ 5,625.12	\$9,054.89
Net Gain (Loss)	\$	\$3,699.20	\$4196.28
Closing Balance		\$7,582.50	\$11,778.78

→ 6.8% of 2017 spending on administrative, fundraising etc., >93% on direct project expenses → Responsible spending
Call for MOTION TO APPROVE

2018 Budget

Opening Balance	\$11	,778.78			
Income		Disbursement	S		
Bottles	\$ 2,000	Admin	\$	50	
Grant	\$ 6,000	BBQ	\$	0	
Donations	\$ 1,500	Meetings	\$	100	
Raffle	\$ 200	Bank Fees	\$	125	
Fund raising	\$ 1,500	Web site	\$	150	
		Projects: Beavers, digital elevation stu			study,
		water diversion <u>\$ 16,000</u>			
Total	\$ 11,200		\$ 3	16,425	
Net Gain (loss)	\$ (5,225)			
Closing Balance	\$ 6	,553.78 (projected	d)		

Status of Muriel Lake

- Lake level now about 555.85 masl
 - Available online at <u>wateroffice.ec.gc.ca</u>, station number 06AC007
 - down from 560.3 MASL in 1974



40 Year Trend of Declining Water Level



Lake Level





Why the lake level dropped

- Numerous studies over the year conclude major reason is
 - Changing climate has reduced water available to the lake
- With some additional contribution by
 - Natural and land use changes that have interrupted the flow of water to the lake
- Possible change in groundwater contribution
 - AEP winter lake level study (2010) shows Muriel lake continues to gain water from groundwater aquifers
 - It is unknown if groundwater flow lower than historical

Climate Change – Pengrowth report (2012)

- The Millenium-NHC study commissioned by Pengrowth Energy Corp. in 2012 compiled weather data, stream flow data, a water balance and groundwater data
- Our climate has changed:

	Avg. Annual Precipitation	Avg. Annual Evaporation	Avg. Annual Evapotranspiration
	mm	mm	mm
То 1950	362		
1940's	378		
1970's	490		
1951-1980	459	606	350
1981 -2010	422	635	362

Evaporation Exceeds Precipitation

• AESRD letter to MLBMS (February 19, 2015):

Annual precipitation	421 mm
Annual evaporation from lake	647 mm
Area of lake	68 km ²
Land Drainage Area	276 km ²
Regional average runoff yield	22 mm/y (5.2% of precipitation)
	6,100 dam ³

Annual Deficit (Precipitation-Evaporation+Runoff) 9,300 dam³

• Runoff yield required to balance

15,400 dam³ => 55.6 mm => 13.2% of precipitation

Expected Water Yield



Summary

- Climate Change (lower precipitation, increased temperature, increased evaporation) is the major cause of loss of lake level
- Studies suggest other factors may have also contributed
 - Disruptions to drainage network less precipitation is making its way to the lake
 - Groundwater contribution reduced?
- Opportunity to mitigate effect of climate change by addressing these anthropogenic and natural causes
 - Anthropogenic
 - Industrial and public development
 - Natural
 - Beaver dams

Water Quality: Lakewatch Results

- Lakewatch is a volunteer-based community water testing program which collects scientific data on the health of Alberta lakes
- 2015 results for Muriel Lake show our lake is in poor health:
 - Microcystin (blue-green algae): highest of all lakes sampled
 - Chlorophyll –a (indirect measure of algal biomass or productivity): 6th highest
 - Total phosphorus: 4th highest, large increase over historical
 - Secchi depth (water clarity): 2nd lowest
- Additional testing in 2017 after rise in water level
 - Funded by BRWA

Water Quality: 2017 Results

Good news

- Microcystin: down from 16 (2015) to < 1 ug/l(2017)
- Chlorophyll –a: down from 40 (205) to 20.9 ug/l
- Total phosphorus: down from 100 (2015) to 48 ug/l
- Secchi depth (water clarity): up from 0.75 to 1.03 m
- Bad news metals over CCME guidelines for Aquatic Life
 - Arsenic: up to 54.8 ug/l from 10.7 (2015)
 - Selenium: up to 12.8 ug/l from 0.055 (2015)
 - Boron: up to 1.76 mg/l from 0.44 (2015)
- 2018 AEP to conduct additional testing

Review of MLBMS Projects & Activities

- Groundwater Monitoring
- Surface Disturbances and Culverts
- Projects
 - Beaver Deceiver
 - Digital Elevation Model
 - 2015 Special Resolution- add water to the lake
- Communication
 - Web site, Facebook and Twitter

Groundwater Monitoring

- In 2014 MLBMS installed monitoring equipment (donated by Baytex) in two existing but no longer used wells in the Muriel Lake area:
 - the Labrie well on the north point of the lake and completed into deeper portion of Ethel Lake or Bonnyville Sand aquifer
 - The Brosseau well east side of lake and completed into Ethel Lake aquifer
- In 2016 the Brosseau well monitor was relocated to the north side (Harlton)
- In 2017 the monitor was removed from the Harlton site
 - Currently seeking new home for it know of any abandoned wells?
- Two existing Alberta Government wells of interest
 - The Muriel Lake GOWN well located west of the lake, Ethel Lake Aquifer
 - The WWE GOWN well Muriel Lake aquifer
 - Not located close enough to the lake for conclusive data

Groundwater Elevations in Monitoring Wells around Muriel Lake (2008 to present)



Groundwater Monitoring

- 2016 observations:
 - Water levels in all aquifers are greater then the lake level, so it is likely the lake is still receiving support from the Ethel Lake aquifer
 - Data is giving us further evidence that the lake and aquifer are well connected
 - Long term trend of decline in Ethel Lake Aquifer on west side of the lake shows similar decline as lake level; possibly the same cause
- 2017/18 observations
 - In progress
- Long term benefit
 - To track the water level in the aquifer vs. the lake and relative trends
 - To provide data for future modelling studies

Surface Disturbances and Culverts

- Matrix study (2015-16) identified potential surface disturbances that may have contributed to the lake's decline
 - By comparing historical aerial photographs and satellite imagery
 - Further work required to evaluate if any of the changes are significant
- Improper culvert identified Culvert on Township Road 593A (Muriel Lake Drive) near 2nd Street is situated at too high an elevation and improperly sloped
 - Restricts drainage from approximately 2 quarter section area
 - Should yield around 7,000 m³/y additional runoff to the lake
- M.D. personnel have inspected and informed MLBMS the culvert will be repositioned in 2018

1950 – before roads



1991

March 2016





Spring 2017







Beaver Deceiver Project

- Increasing beaver activity may be decreasing the flow of fresh water into the lake. Beaver dams store and slowly release runoff. A portion of this stored water is lost by evapo-transpiration (evaporation, use by plants, seepage into the ground).
- Beavers are "stakeholders" in the environmental management of the region. Eliminating beaver population is not a desirable option.
- This project involves installation of beaver dam level control devices to maintain a constant water level in the pond. Any new precipitation flows through the beaver dam directly to the lake. The beaver and associated ecosystem are not harmed.

Beaver Dam Level Control Device

- Simple device with no moving parts. Specialized design to deceive the beaver mask the noise and velocity of flowing water
- Elevated inlet maintains existing pond, safe environment for the beaver



Grant for Beaver Project

- In April 2016 MLBMS obtained a grant for \$39,235 over 3 years to install devices in 10 beaver dams from the Environmental Damages Fund (Environment Canada)
 - "This project was undertaken with the financial support of the Government of Canada. Ce projet a été réalisé avec l'appui financier du government du Canada"
- MLBMS has contracted beaver expertise from technical consultant
 - Dr. Dee Patriquin of Solstice Canada
 - PhD in Biology, P. Biol., R.P. Biol., beaver project experience with Dr. Glynnis Hood of UofA
 - Alberta experience Beaver County, Blackfoot/Cooking Lake

Beaver Dams on Creek from Garnier Lake to Muriel Lake (2016)



South East Muriel Lake

- High spring runoff washed out the dams at the selected sites
 - 2016

2017





Creek is clear – no beaver dams



Beaumieux North

- Multiple beaver dams on this creek between Hwy 657 and the lake
- Two deceivers installed in August 2017
 - Both these dams, plus a third dam, failed during spring 2018 runoff
 - Both deceivers are intact and will work when beavers rebuild
- Two additional deceivers installed in July 2018
- This creek now clear from Highway 657 to the lake
 - May need one more deceiver if beavers rebuild last dam

Beaumieux North



Installation at Beaumieux North - 2017



Deceiver downstream Discharge



Dam washed out April 2017



Installation at Beaumieux North - 2018



Beaumieux South – Lemieux Drive

• Culvert and screen box dammed by beavers





Beaumieux South

1972:



2011:



Installation at Beaumieux South June 2018



Next steps

- Waiting for beavers to rebuild
- Looking for additional dams
- Grant money must be spent by March 31, 2019
 - Applying for one year extension

Digital Elevation Model – Drainage & Runoff

- Develop a runoff model of the basin
 - digital elevation model using airborne light detection and ranging ("lidar") data
 - model surface water flow
- Detailed understanding of runoff and drainage in the basin
 - model surface water flow "as-is" terrain and with anthropogenic barriers (eg. roads) removed. Locations of concern, such as roadside ditches and low lying, water bogged areas would be plotted.
 - assess the locations and impact of disruptions to surface water flow
- Identify opportunities to increase surface water flow.
- Currently two environmental/engineering consulting companies are reviewing the proposal and will provide us with a cost estimate
 - Expect we will need to apply for a grant to cover the substantial cost \$xxx,000

2015 AGM Resolution to Add Water to Muriel Lake

- Special resolution passed at 2015 AGM proposed refreshing Muriel lake by pumping water from elsewhere
- MLBMS continues to develop a project proposal
 - Considering multiple sources: North Saskatchewan River, local water bodies, groundwater
 - Alberta Legislature would have to approve inter-watershed transfer
- Linking this initiative to fish stock restoration
- March 2018 oxygen levels tested by AEP
 - Very low oxygen levels at 3-4 meters depth: 0.2-0.3 mg/L

Stream Monitoring

- LICA/BRWA X-Stream Science program
 - Water quality and stream flow measurement
- MLBMS tried out in 2017
 - Measured stream flow 0.4 m³/sec
 - Identified benthic macro-invertibrates
 - Black fly larva, Midge larva, Scud
 - Damselfly nymph, Blood midge larva
- 2018 tba
 - Hope to add chemical analysis
 - Nitrates, phosphates



Communications

• Website

www.savemuriellake.com

- Lost contact with builder of new website
- Lost administrator rights and passwords
- Attempting to acquire via website provider, or start over
- Facebook
 - Follow us on Facebook!
 - Passed 600 Like milestone!
- Twitter
- Email
 - Update your email address

@muriellake

@savemuriellake

Election of Directors for 2017/18

- Existing Directors (two year term thru 2018)
 - Peter Cordingley
 - Richard Bourgeois
 - Jan Ramful
 - Don Midgley
 - Kevin Roth
- New directors
 - Call for volunteers from the floor

Lyall Kortzman

Peter Crown

Jeff Hlewka

Cheramie Barbazuk

2017 Budget

• Income

Bottles	\$ 2000
Grant	\$6 <i>,</i> 000
Donations	\$ 1500
Raffle	\$ 200
Fund raising	\$ 1500
Total	\$11,200

Disbursements

Admin	\$	50	
Meetings	\$	100	
Bank Fees	\$	125	
Web site	\$	150	
Projects: Beavers, digital elevation			
study, water diversion	<u>\$1</u>	6,000	
Total	\$1	6,425	

• Motion to approve 2017 budget

Comments and Questions

• From the floor

Closing

- Final comments
- Call for volunteers for committees
- 2019 AGM July 2019, date to be set by Directors
 - In the meantime: web site, Facebook, Twitter, email
- Raffle draw
- Motion to adjourn meeting
- Introduce special Guest Speaker