An open document to the

Ministry of Health.
Ministry of Environment
Department of Fisheries and Oceans

October 1st 2017

Englishman River Water Supply Accountability

The Englishman River Water Service (ERWS) is in the process of building a new surface water intake, water treatment plant and supporting infrastructure. The new system will supply the growing populations in the City of Parksville and areas of Nanoose on the Central East Coast of Vancouver Island.

Since the project was announced there have been many inconsistencies and irregularities in the planning and pre-development phase. Unconfirmed reports suggest that this phase has already cost more than $10,000,000 million dollars. Many residents and citizens have expressed concerns about the project, particularly the decisions that were made without, or with limited public awareness.

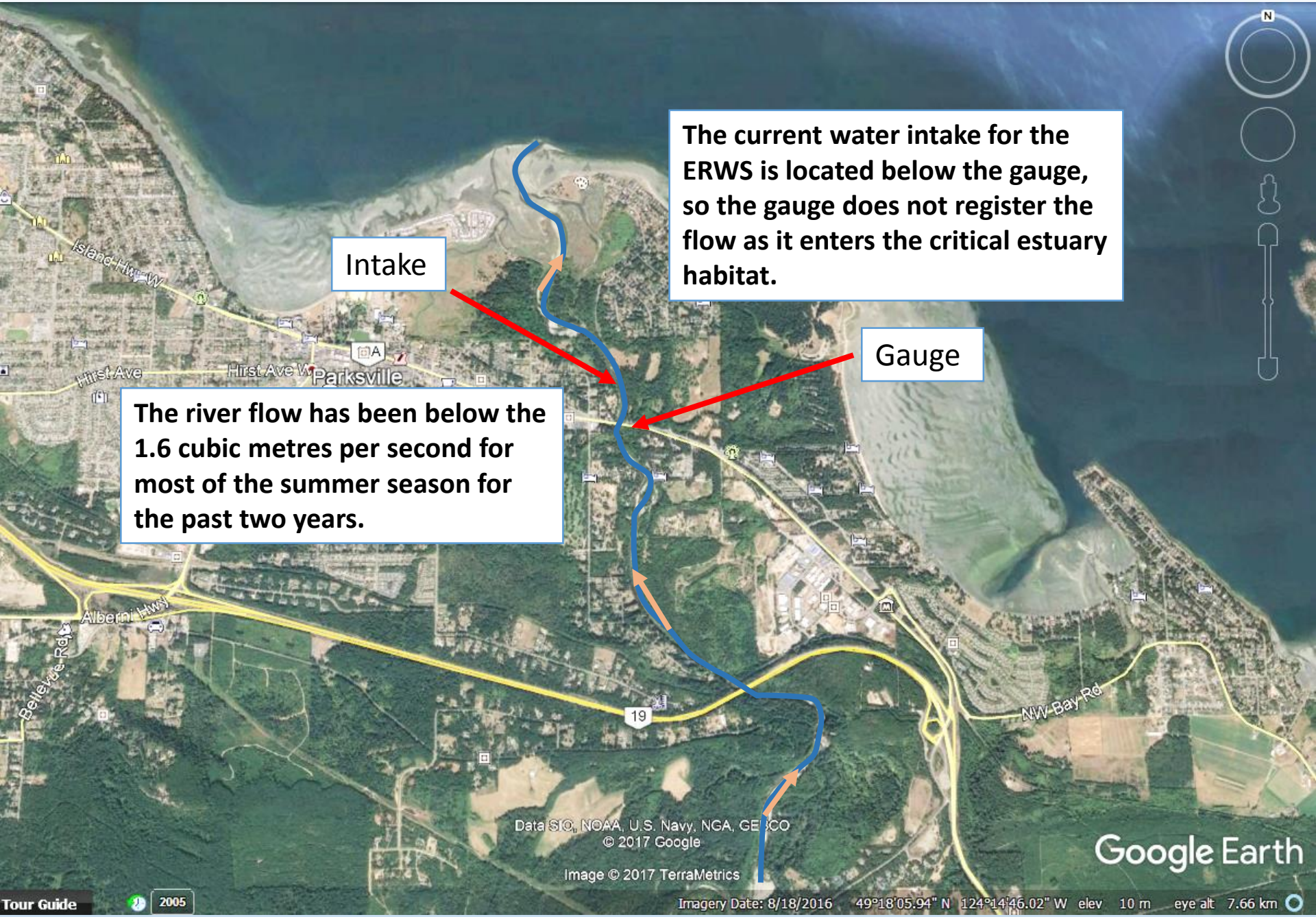
An independent overview is required to determine the logic and accountably of this project.
The following 16 pages, ask some questions in graphic form.
The questions in red are only a portion of the list of items that should have been clarified before the project proceeded too far.

The Arrowsmith Lake Dam is located about 20 kilometers upstream from Parksville on the Englishman River. The Arrowsmith Dam reservoir fills up each spring until it naturally overflows the dam to the Englishman River. The Provisional Operation Rule applies until the new intake is in operation.

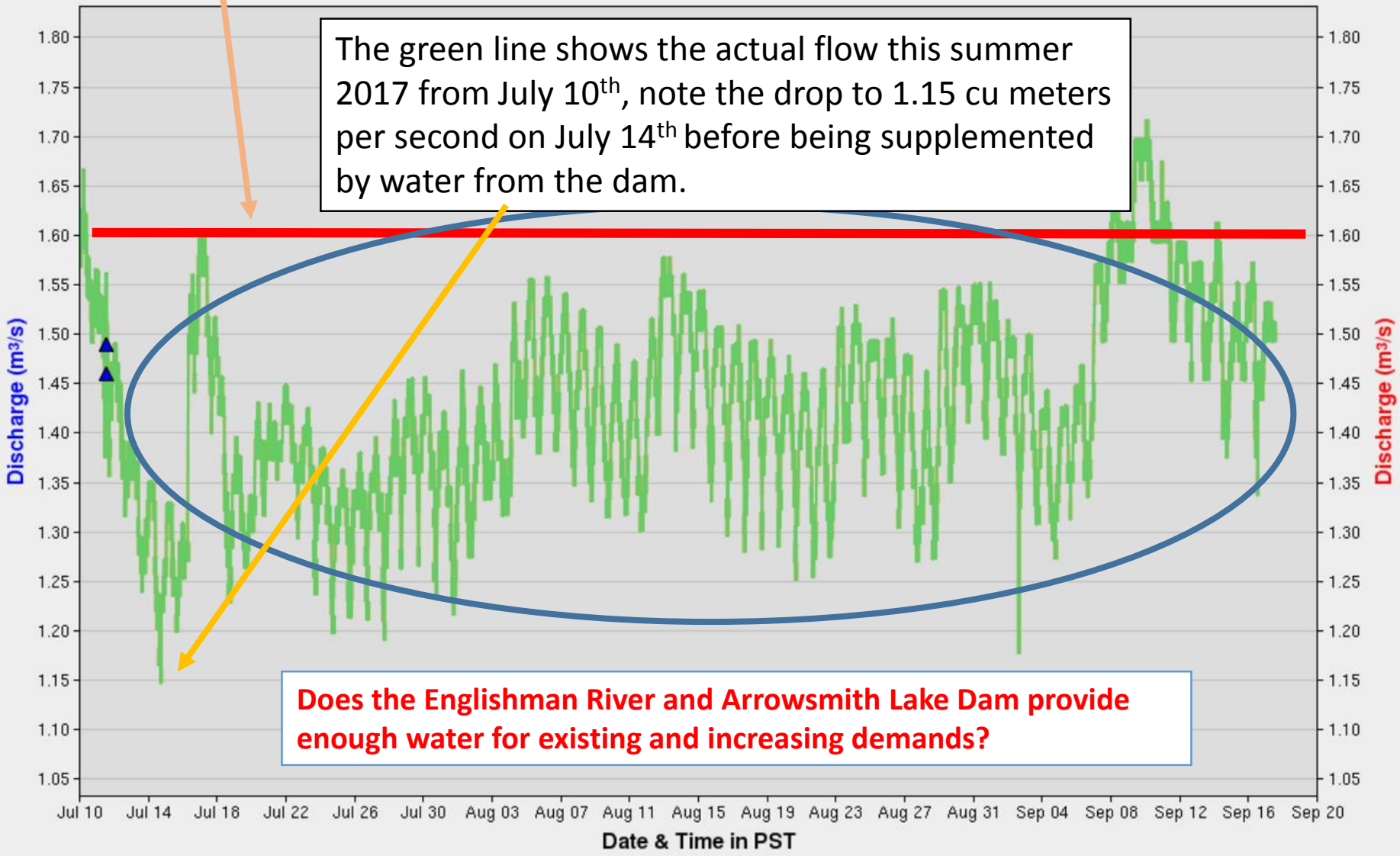
The permit states when the flow in the river drops below 1.6 cubic metres per second, as measured at the Englishman River hydrometric gauge in Parksville, the AWS releases water to maintain the flow at 1.6 cubic metres per second.

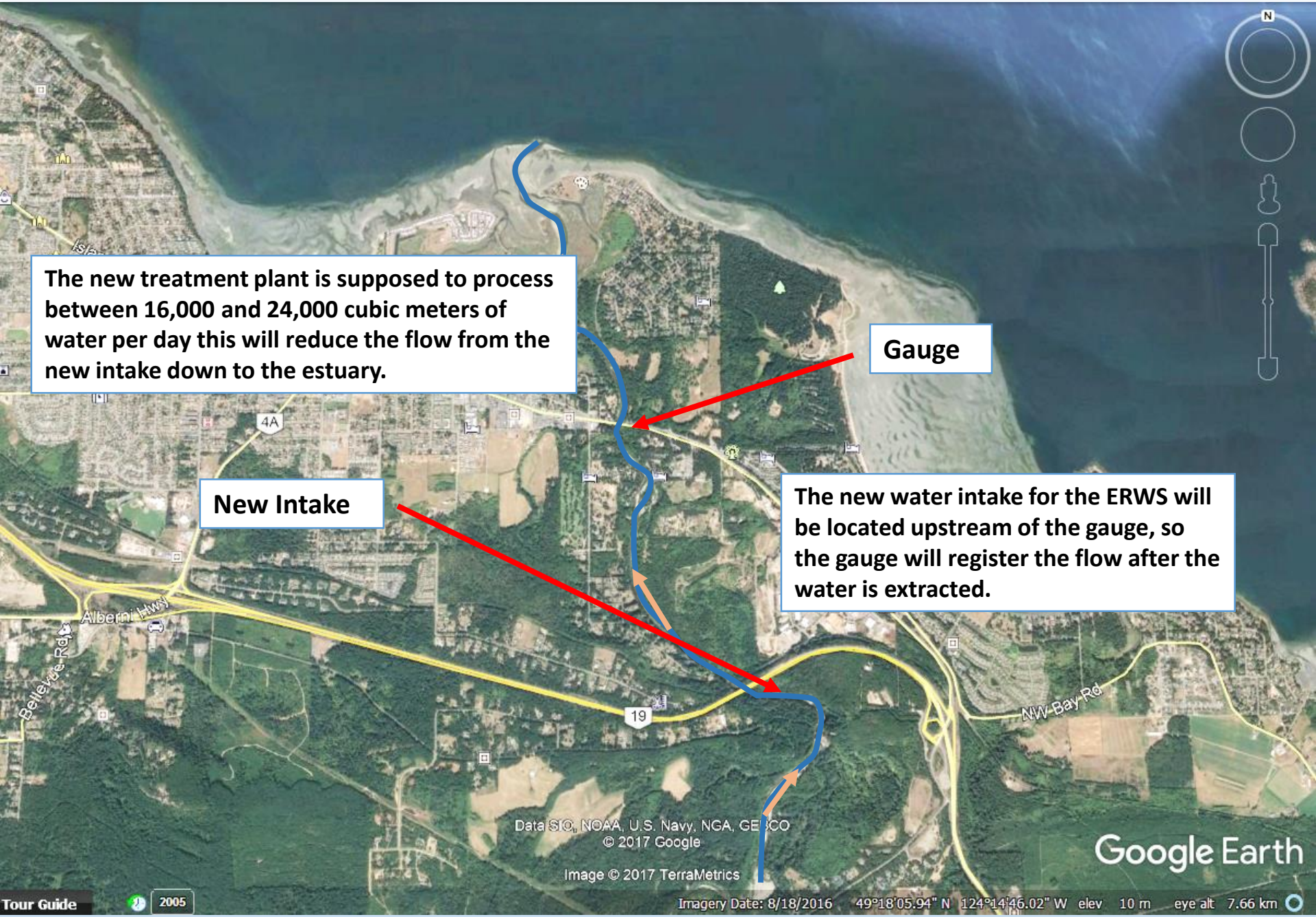
Concerns include:

- **Insufficient raw and processed water storage**
- **Very low river flows in summer**
- **River temperatures unsuitable for fish and drinking water**
- **High risk of water contamination from algae toxins**
- **Heavy winter sediment loads**
- **No contingency for emergencies**


The current water intake for the ERWS is located below the gauge, so the gauge does not register the flow as it enters the critical estuary habitat.
Intake
Gauge
The river flow has been below the 1.6 cubic metres per second for most of the summer season for the past two years.
Island Hwy W
First Ave
First Ave W
Parksville
Alberni Hwy
Bellevue Rd
19
NW Bay Rd
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2017 Google
Image © 2017 TerraMetrics
Google Earth
Tour Guide
2005
Imagery Date: 8/18/2016 49°18'05.94" N 124°14'46.02" W elev 10 m eye alt 7.66 km

The red line represents the flow requirement in the Englishman River of 1.6 cubic meters per second




The new treatment plant is supposed to process between 16,000 and 24,000 cubic meters of water per day this will reduce the flow from the new intake down to the estuary.
Gauge
New Intake
The new water intake for the ERWS will be located upstream of the gauge, so the gauge will register the flow after the water is extracted.
4A
Alberni Hwy
Bellevue Rd
19
NW Bay Rd
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2017 Google
Image © 2017 TerraMetrics
Google Earth
Tour Guide
2005
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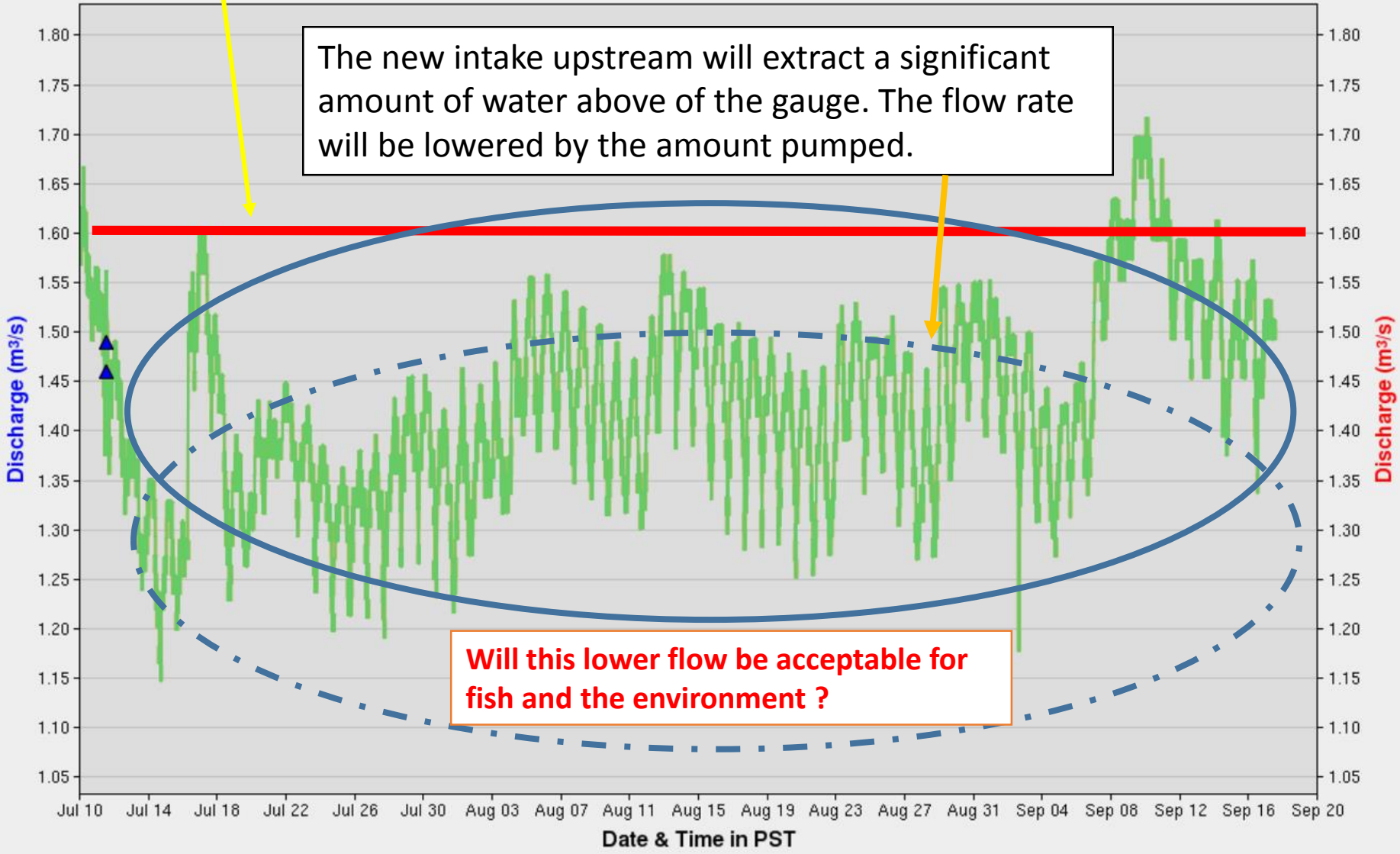
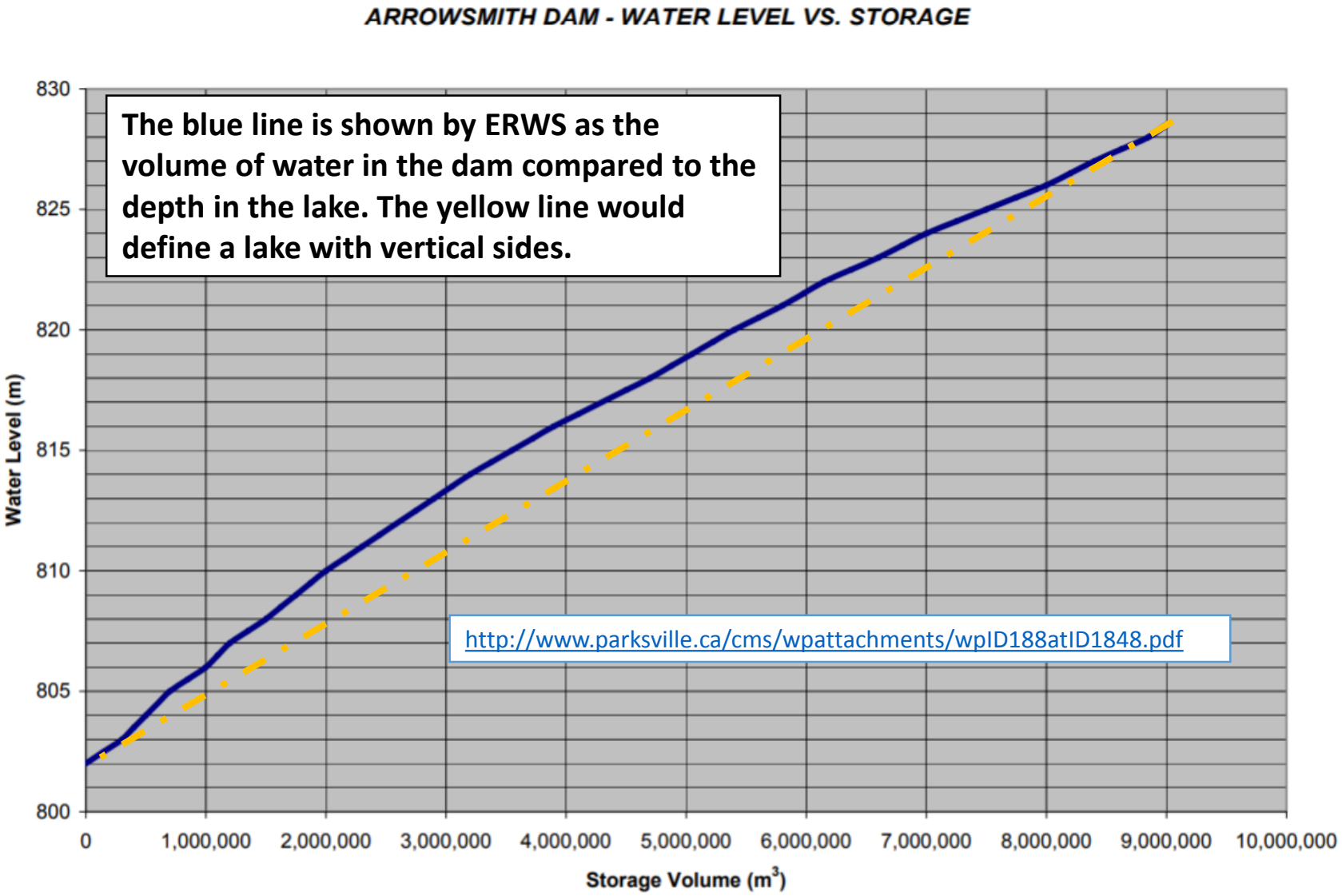
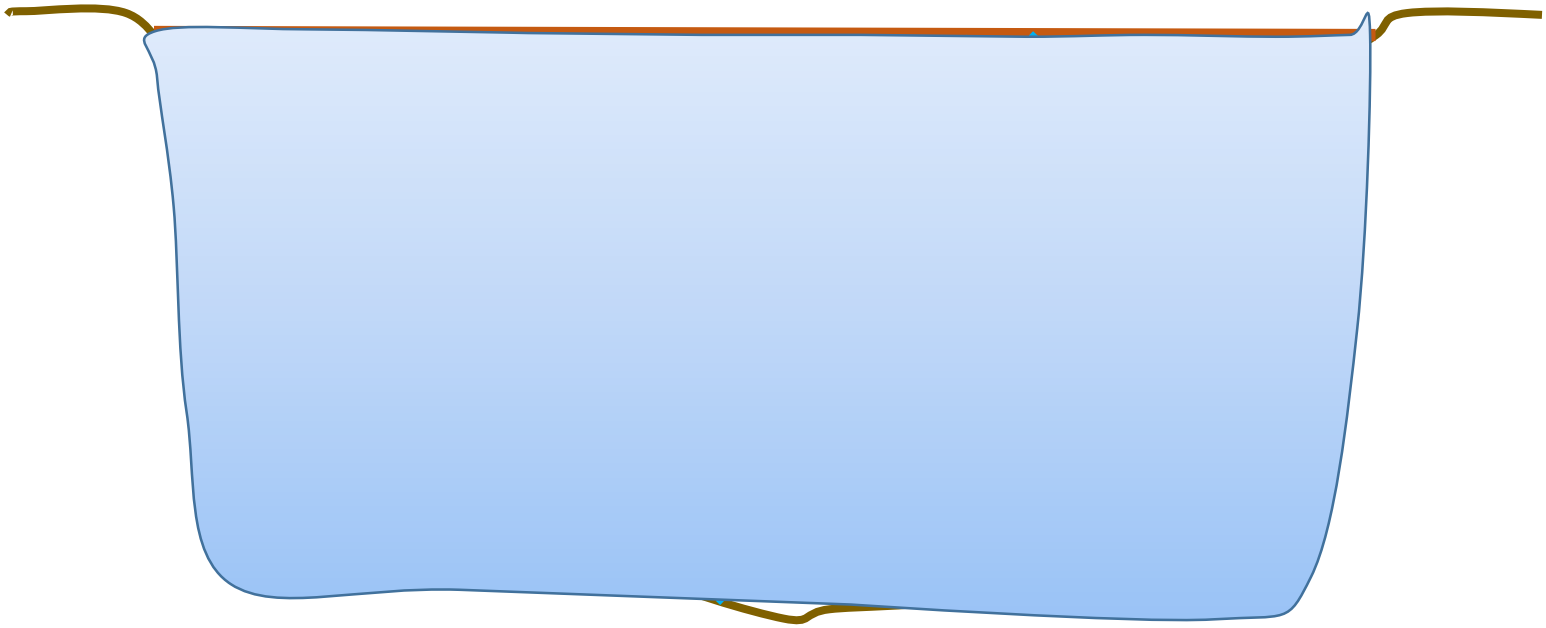



The Arrowsmith Lake watershed is very small, the lake may not fill during a low precipitation winter.
Should ERWS have a contingency plan, if/when the Englishman River is at a low flow state, and they cannot pump water from the river?


ARROWSMITH DAM - WATER LEVEL VS. STORAGE
The blue line is shown by ERWS as the volume of water in the dam compared to the depth in the lake. The yellow line would define a lake with vertical sides.
http://www.parksville.ca/cms/wpattachments/wpID188atID1848.pdf
Water Level (m)
830
825
820
815
810
805
800
0
1,000,000
2,000,000
3,000,000
4,000,000
5,000,000
6,000,000
7,000,000
8,000,000
9,000,000
10,000,000
Storage Volume (m3)

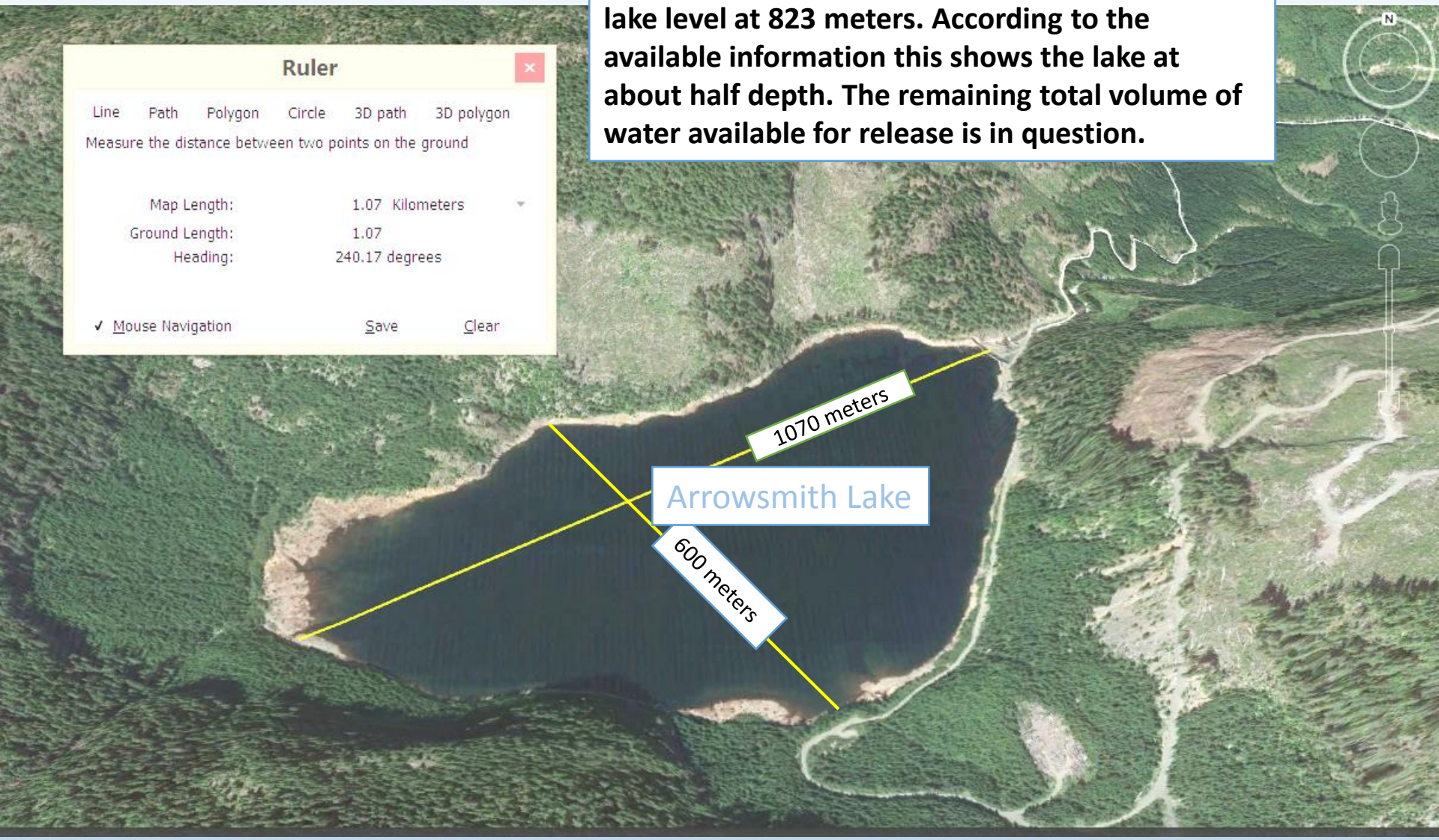
If the blue line on the preceeding graph was a straight line, the lake would have vertical sides below the water line



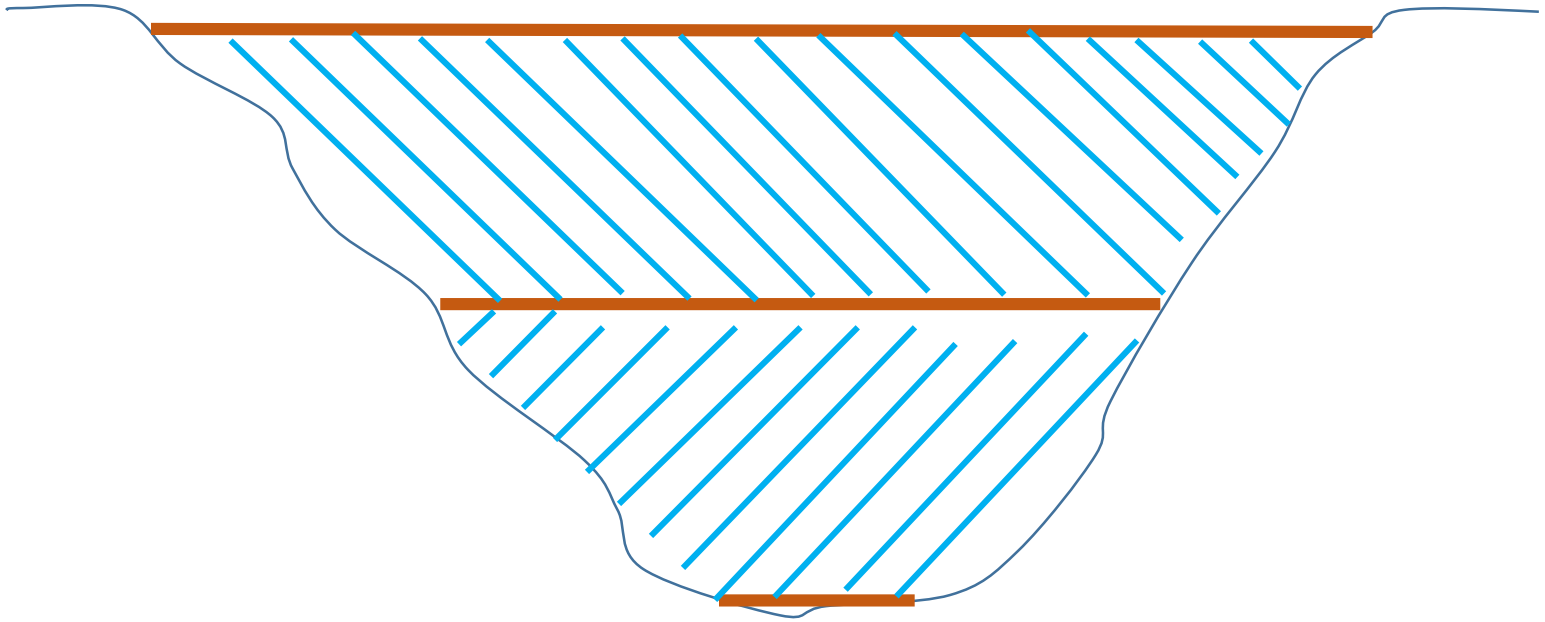
These pictures show that the Arrowsmith Lake is tapered toward the center

The amount of taper and the total depth of water at the center of the lake will determine the volume, not necessarily the amount available for release.

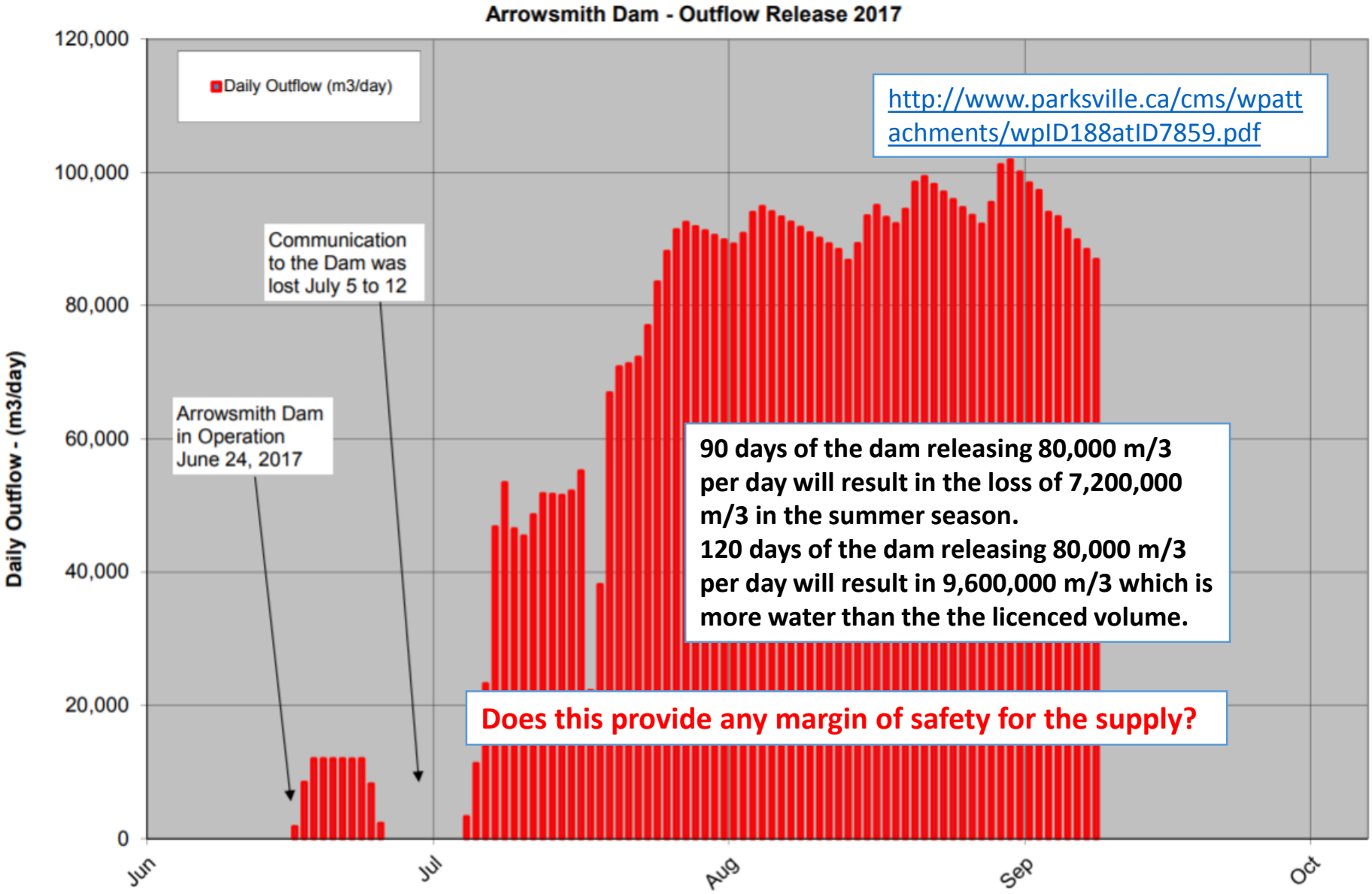
This image is dated August 18th 2016 with the lake level at 823 meters. According to the available information this shows the lake at about half depth. The remaining total volume of water available for release is in question.

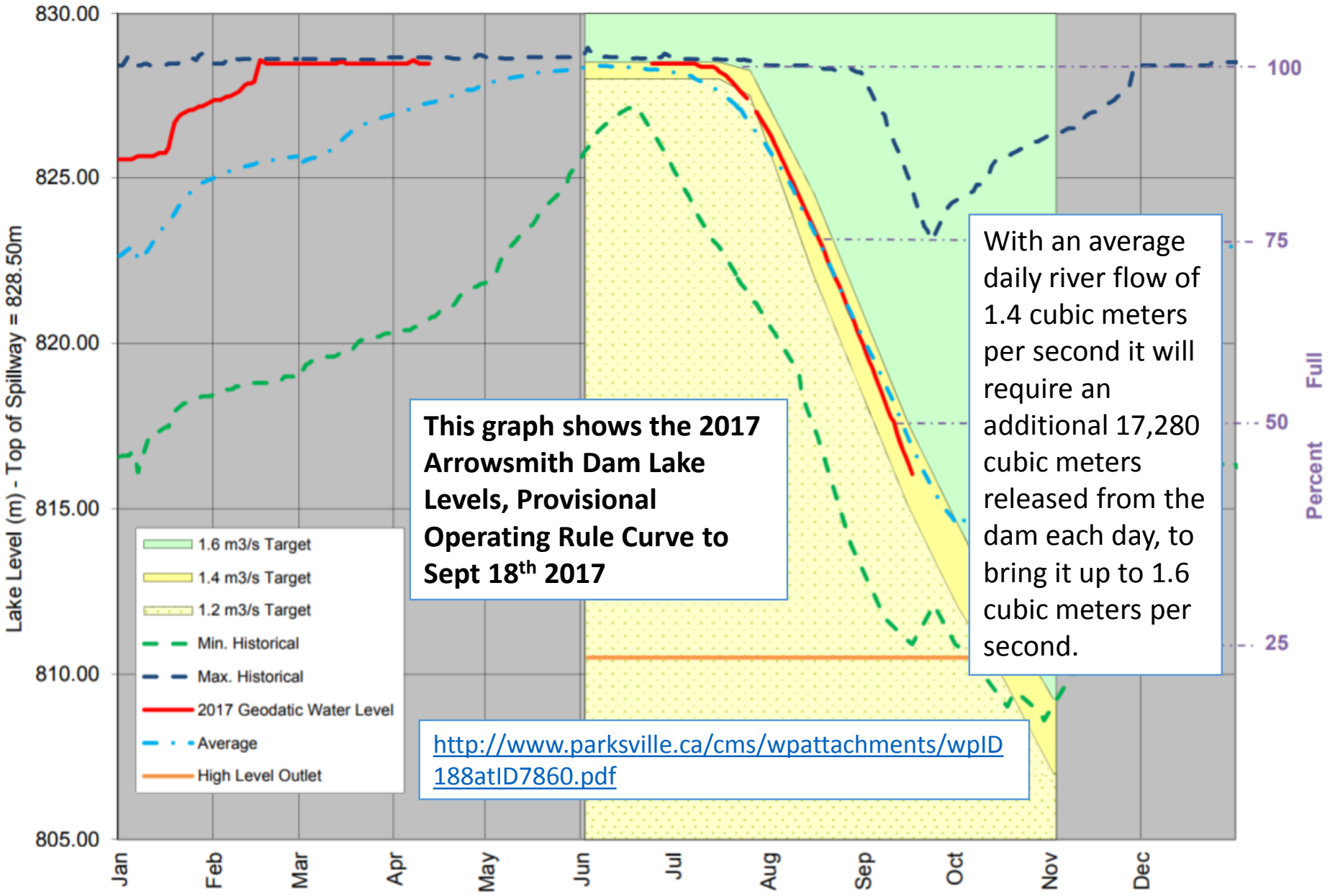


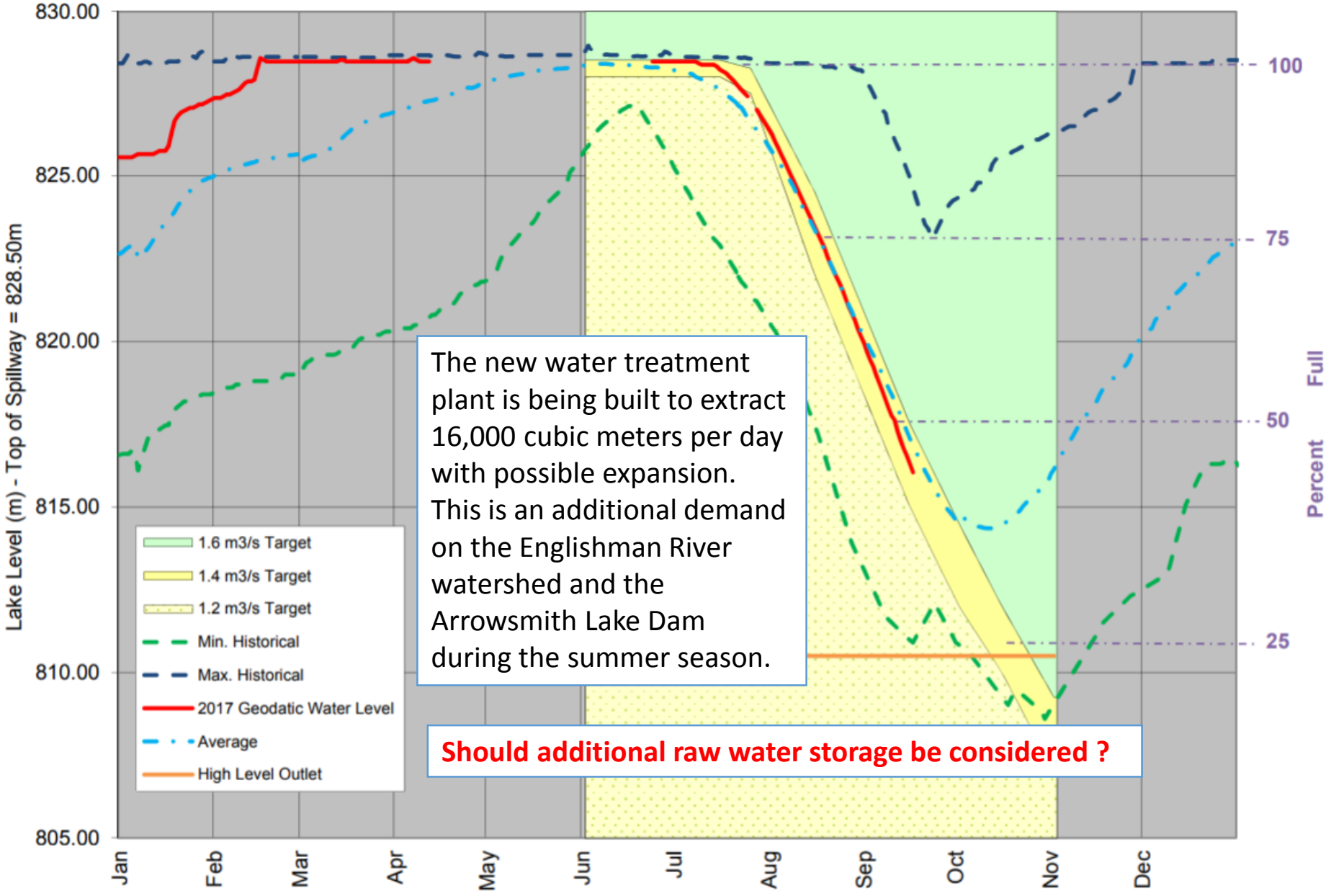
A lake with tapered sides has a much larger volume of water in the top half, than the bottom half.



How does the ERWS calculate the water level vs storage ratio?


Arrowsmith Dam - Outflow Release 2017
Daily Outflow (m3/day)
Daily Outflow - (m3/day)
120,000
100,000
80,000
60,000
40,000
20,000
0
Jun
Jul
Aug
Sep
Oct
http://www.parksville.ca/cms/wpattachments/wpID188atID7859.pdf
Communication to the Dam was lost July 5 to 12
Arrowsmith Dam in Operation June 24, 2017
90 days of the dam releasing 80,000 m/3 per day will result in the loss of 7,200,000 m/3 in the summer season.
120 days of the dam releasing 80,000 m/3 per day will result in 9,600,000 m/3 which is more water than the the licenced volume.
Does this provide any margin of safety for the supply?


830.00
825.00
820.00
815.00
810.00
805.00
Lake Level (m) - Top of Spillway = 828.50m
100
75
50
25
Full
Percent
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
1.6 m3/s Target
1.4 m3/s Target
1.2 m3/s Target
Min. Historical
Max. Historical
2017 Geodatic Water Level
Average
High Level Outlet
This graph shows the 2017 Arrowsmith Dam Lake Levels, Provisional Operating Rule Curve to Sept 18th 2017
With an average daily river flow of 1.4 cubic meters per second it will require an additional 17,280 cubic meters released from the dam each day, to bring it up to 1.6 cubic meters per second.
http://www.parksville.ca/cms/wpattachments/wpID188atID7860.pdf


Lake Level (m) - Top of Spillway = 828.50m
830.00
825.00
820.00
815.00
810.00
805.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
100
75
50
25
Full
Percent
1.6 m3/s Target
1.4 m3/s Target
1.2 m3/s Target
Min. Historical
Max. Historical
2017 Geodatic Water Level
Average
High Level Outlet
The new water treatment plant is being built to extract 16,000 cubic meters per day with possible expansion. This is an additional demand on the Englishman River watershed and the Arrowsmith Lake Dam during the summer season.
Should additional raw water storage be considered ?

Logical solution

There is a solution to this situation, upland storage of surplus winter water for use during the dry summer months.

Click links below for more information:

http://www.ouroceansidewater.com/upland-storage-a-better-option.html

http://www.ouroceansidewater.com/uploads/1/8/8/5/18858082/high_level_water_for_march_24th_2015.pdf

... Trevor Wicks ...

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