Water Boundaries for Treaty 3 Flooded Lands

(Rainy Lake)

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Introduction

Canada desired to open up the west, requiring a major transportation route through the lands now occupied by the Saulteaux. Treaty discussions ensued in 1870, but no treaty was forthcoming. The Dominion then negotiated with First Nations located west of the Saulteaux. These negotiations were successful and resulted in what came to be recognized as "Treaty 1" and "Treaty 2".

In 1873, the Dominion of Canada once again sat down with the Saulteaux at the North-West Angle of Lake of the Woods. "Treaty 3" between the Dominion of Canada and the Saulteaux tribe of Ojibways was concluded and signed on October 3, 1873[1].

Provisions of "Treaty 3"

Within the treaty, the Saulteaux offered to "hereby cede, release, surrender, and yield up to the Government of the Dominion of Canada, for her Majesty the Queen and her successors forever, all their rights, titles and privileges whatsoever to the lands"[2]. In return, the First Nations were offered certain presents, monies and lands:

> "And her Majesty the Queen hereby agrees and undertakes to lay aside reserves for farming lands, due respect being had to lands at present cultivated by the said Indians, and also to lay aside and reserve for the benefit of the said Indians, to be administered and dealt with for them by Her Majesty's Government of the Dominion of Canada, in such a manner as shall seem best, other reserves of land in the said territory hereby ceded, which said reserves shall be selected and set aside where it shall be deemed most convenient and advantageous for each band or bands of Indians, by the officers of the said Government appointed for that purpose, and such selection shall be so made after conference with the Indians: Provided, however, that such reserve whether for farming or other purposes shall in nowise exceed in all one square mile for each family of five, or in that proportion for larger or smaller families, and such selection shall be made if possible during the course of next summer or as soon thereafter as may be found practicable, it being understood, however, that if at the time of any such selection of any reserves as aforesaid, there are any settlers within the bounds of the lands reserved by any band, Her Majesty reserves the right to deal with such settlers as she shall deem just, so as not to diminish the extent of land allotted to Indians; and provided also that the aforesaid reserves of lands or any interest or right therein or

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[1] *The Treaties of Canada with The Indians of Manitoba and the North-West Territories including The Negotiations on which they were based* by The Hon. Alexander Morris, P.C. 1880

[2] Ibid pg. 322

appurtenant thereto, may be sold, leased or otherwise disposed of by the said Government for the use and benefit of the said Indians, with the consent of the Indians entitled thereto first had and obtained."[3]

Creation of the Reserves

Other than the reserves having a defined area not to exceed one square mile for every family of five, no other provisions could be found within the treaty dealing with the extent and potential boundary limits of any reserve to be created.

In July 1874, S.J. Dawson and R. Pither were appointed by Order-in-Council to sit with the Saulteaux bands to select reserves as required under Treaty 3[4]. By October, the selection process was complete and the following year, John Stoughton Dennis, Surveyor General met with the Chiefs in Council to iron out an Agreement regarding the surveying of the reserves. This Agreement was finalized on October 5, 1875.

Boundaries - Background

Nature of Boundaries

Boundaries are created by the owners of land, their intentions of location conveyed to surveyors who then proceed to lay out and monument those boundaries on the ground. Rectilinear or straight-line boundaries are marked by survey monuments placed at sufficient intervals and bends so that an observer can, with relative ease, find and locate the boundaries of a parcel of land. Other physical markings such as lines cut through a bush or the blazing of trees also help in giving a physical representation of the location of a boundary. Natural boundaries are treated very differently.

A natural boundary has the distinction of having a very visible presence on the ground, easily discernable by the naked eye. In the case of a property fronting on a navigable inland water body in Ontario, case law states if a property is meant to be riparian[5], that is, the owners of the upland parcel have direct access to the water, then the water's edge is the boundary[6].

The nature of a water boundary is such that it can move over time. The rise and fall of water levels due to natural causes such as seasonal events (snow and ice runoff), precipitation levels and long term climatic changes will cause the water's edge to retreat or encroach upon the upland parcel. Movement of the water's edge, when slow and

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[3] Ibid pg. 322-323

[4] *Treaty Research Report Treaty Three (1873)* by Wayne E. Daugherty, Treaties and Historical Research Centre, Self-Government, Indian and Northern Affairs Canada, 1986

[5] A riparian owner is one whose land runs to water and is bounded by it. *Cockburn v. Eager* (1876), 24 Gr. 409 (Ont. H.C.). Canadian Encyclopedic Digest, Waters and Watercourses (Ontario).

[6] *Walker v. Ontario (Attorney General)* (1970), 14 D.L.R. (3d) 643 (Ont. H.C.); affirmed (1972), 26 D.L.R. (3d) 162 (Ont. C.A.); affirmed (1974), 42 D.L.R. (3d) 629 (S.C.C.).

imperceptible, can cause the location of the boundary to move[7]. So long as the movement is slow, imperceptible and gradual, the boundary shifts. In the event of a sudden occurrence, such as a river breaking its bank and suddenly changing course, or a man-made structure affecting the water levels of a water body, the boundary is considered "fixed" in place at the instant before the occurrence occurred[8].

Although this concept of fixing a boundary in place is relatively simple, the practicality of determining the position of this fixed boundary is not easily accomplished. In the case of a natural event such as a river breaking its bank and finding a new course or channel for the water to follow, the water level would probably have been higher than normal in order for this event to have taken place. To place the fixed boundary at the above-normal level at that instant in time when the break occurs may not be the most practicable solution. Likewise, when a dam is built, construction happens over a period of time and the water levels may be altered slowly and imperceptibly during the phase of construction or even months after construction. Surveyors provide expert opinions on the location of these natural boundaries including submerged boundaries.

Low Water Level vs. High Water Level

Throughout the four seasons, lake and river levels tend to ebb and decline due to snow and ice melt, seasonal rain patterns, storm and wind surge and other natural events. Generally, in the Treaty 3 catchment area, the water level of lakes is at its lowest during the spring month of April and at its highest in the month of July. The difference between high and low levels can be quite significant, both before flooding and after damming.

The following values are taken from the historical charts available at the Lake of the Woods Control Board website and are typical of the last few years, well after regulation due to damming:

Lake	Approx. difference bet. avg. High and Low water levels within one calendar year (in metres)
Lac La Croix	1.0
Rainy Lake	1.0
Lake St. Joseph	0.8
Lac Seul	1.6
Lake of the Woods	0.6

[7] *Clarke v. Edmonton (City)*, [1930] S.C.R. 137 (S.C.C.).

[8] *Port Franks Properties Ltd. v. R.*(1979), 99 D.L.R. (3d) 28 (Fed. T.D.) (sudden change in course of body of water caused by storm, flood or human interference not being accretion, and not altering boundary lines).

Although the above values show significant seasonal fluctuations between normal high and low water levels today, seasonal fluctuations in water levels were typically greater before the construction of dams.

Question – Where do we fix the boundary prior to water levels being regulated?

Some of the proposed solutions:

1) Fixing the Boundary at the *instant* construction starts or is finished on a dam.

Not a very practicable solution as the exact dam construction date may be difficult to establish. Also, chances are the water levels were, in fact, not actually affected at the initial phase of construction, but may have been altered at a later date[9]. Perhaps one or more coffer dams were built prior to the building of the actual dam or powerhouse. As an example, a section of the entire St. Lawrence River was held back and diverted during the construction of the large power generating station at Cornwall, leaving the bed of the river completely dry in some areas. This solution is thus less than ideal.

2) Using an average of water levels over a period of years prior to dam construction.

This solution may be good mathematically, but from a historical land use perspective, may not seem fair. If, say, a dam was constructed at an elevation such that water levels were kept to an established minimum, and that the yearly fluctuation of 4 feet was reduced to a fluctuation of only 2 feet, and where the average yearly high water level was not affected, there may be lands lost due to flooding.

As an analogy, the Nile River in Egypt would historically flood its banks every year, causing the landowners to wait for the Nile to recede before planting their crops. In this case, the high water level would be earlier in the season and then the low water level would be later allowing the farmers to make use of the lands located within the range of the low and high levels, thus creating value in those lands located therein. By building a dam that still allowed the river to reach its "ordinary" high-water level, but not recede to its "ordinary" low-water level, then some lands previously farmed would now conceivably be covered by water year round.

3) Use a normal or average of High Water level pre-construction.

As noted above, by fixing a boundary that is higher than the range between low and high water may not adequately address the actual permanent loss of use of land due to flooding. To use the Nile analogy above, if a dam was constructed that permanently held

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[9] For example, dam construction at Ear Falls on Lac Seul was started in the summer of 1928 and completed in the spring of 1929, but the full flooding of the lake did not occur until 1934 (from Ontario Power Generation, http://www.opg.com/pdf/ear75.pdf and Lake of the Woods Control Board historical graphs http://www.lwcb.ca/historicalgraphs.html), likewise, the Norman Dam on the Winnipeg River constructed in 1893-95 did not go into operation until 1898 (*Final Report of the International Joint Commission on the Lake of the Woods Reference,* 1917).

the Nile at its greatest average annual flooded level this would cause great distress to the farmers along the Nile as they would forever be deprived of the use of the land where they formerly sowed crops.

4) Use a contour limit derived from a reliable source (such as a plan) before flooding.

Although the source may be identified as reliable and accurate, it only represents a snapshot in time. This snapshot ignores seasonal water level fluctuations. The observations could well have been made in a very wet or very dry year or during a spring freshet. That water level as shown on the source may not be truly indicative of the "normal" water level before flooding.

Further, for a variety of reasons, surveyors in Ontario have located on the ground and delineated on their plans either the water's edge or the "high water mark". "High water mark" appears on many plans and has been interpreted differently by various surveyors over the years. Although the courts have consistently *not* used the term when dealing with water boundaries on inland lakes and rivers in Ontario, surveyors have erroneously accepted the tidal high water mark principle when doing surveys in Ontario in the past. Some have defined it as "the line of vegetation" or even "where trees and bushes begin to grow". So when dealing with an older plan on a pre-flooded lake, one must be careful to determine what feature the surveyor located – was it the water's edge or some other "high water mark" feature?

5) Use a normal or average Low Water level pre-construction.

Using an average of previous years' low water levels to fix the natural boundary as it would have potentially existed before any artificial flooding eliminates some potential problems. By using an average, *extreme* low levels due to drought are avoided; also *extreme* wet years where the low water level may be much higher than usual are also taken into account. This is the solution that we support with the caveat that this solution can only be used where water level values exist, or can be determined, before dam construction.

Water Boundaries – The Law

So far, this report has only discussed terms such as high and low water *levels*. This terminology has only been used as a practical exercise in helping to define the physical limit between the upland riparian parcel and the bed of the lake (typically owned by the provincial Crown). The Canadian Encyclopedic Digest (CED) – Boundaries and Surveys supplies a legal definition of the limit between these two parcels:

> §37 In the case of the inland waters of Ontario, a grant having a boundary on a river or lake whose bed has not been granted by the Crown extends to the water; the law of foreshore as it is applied in the common law of England with respect to tidal waters is not applicable; insofar as boundaries are concerned, the distinction between high- and

> low-water marks does not hold, as the waters are not tidal.[10] The "shore" of a navigable inland lake means the edge of the water at its lowest mark, and a grant to the lakeshore carries to the edge of the water in its natural condition at the low-water mark.[11]

So we see that if a parcel of land is considered riparian, that is, bounded on one or more sides by an inland lake or river, then the boundary of that parcel extends to the low water mark in its natural condition. This water boundary limit was affirmed by Justice Stark in *Walker v. Ontario (Attorney General)* which was later affirmed by the Supreme Court of Canada. There was, however, no locatable physical definition given for "low water mark" by the justices in the above-mentioned cases. This begs the questions – what is the "low water mark in its natural condition"[12] and what is "the water in its natural condition"?

Looking again at the CED – Boundaries and Surveys, we find the following definition:

> §41 The "low-water mark" of tidal waters, when used as a boundary in a grant, is prima facie to be taken as meaning the *ordinary or medium low water determined by the mean line* of the low spring and the low neap tides[13] (Italics – author).

This definition, however, only applies to tidal waters. To find a definition for "low-water mark" for inland waters, we must refer to the CED – Waters and Watercourses:

> The "low-water mark" is the space through which the river flows ordinarily at its lowest flow.[14]

This definition defines "mark" as a "space". Looking to the wording within the case itself we find Justice Burton's remark:

> … in the words of the Digest, that is considered to be banks which contain the river when *fullest.* The commentary of Grotius on this passage is: "This signifies that that space next to the bank which is sometimes not occupied by the river when reduced by heat in the summer season is not a part of the bank, but of the bed. It is the space between the banks occupied by the river at its *fullest* flow." This defines high water-

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[10] *Parker v. Elliott* (1852), 1 U.C.C.P. 470 (U.C. C.A.); *Walker v. Ontario (Attorney General)* (1970), 14 D.L.R. (3d) 643 (Ont. H.C.); affirmed (1972), 26 D.L.R. (3d) 162 (Ont. C.A.); affirmed (1974), 42 D.L.R. (3d) 629 (S.C.C.).

[11] *Stover v. Lavoia* (1906), 8 O.W.R. 398 (Ont. H.C.); corrected (1906), [O.W.N. 128] (Ont. H.C.); affirmed (1907), 9 O.W.R. 117 (Ont. C.A.); *Attersley v. Blakely*, [1970] 3 O.R. 303 (Ont. Co. Ct.); affirmed [1970] 3 O.R. 303 at 313 (Ont. C.A.) (description in deed establishing boundary at low water mark).

[12] Justice Boyd's actual comment is: "I have no doubt that the boundary to the lake shore means and carries to the edge of the water in its natural condition at low-water mark." *Stover v. Lavoia.* Para. 1.

[13] *Delap v. Hayden* (1924), 57 N.S.R. 346 (N.S. C.A.).

[14] *New Hamburg (Village) v. Waterloo (County)* (1892), 20 O.A.R. 1 (Ont. C.A.) reversed on other grounds (1893), 22 S.C.R. 296 (S.C.C.).

> mark, while the space through which the river flows at its ordinary lowest flow defines the low water-mark, the space between those marks being shore.[15]

Burton, J.A. has defined the low water mark as the *lower* limit at which a river flows in its ordinary state. This definition, however, applies to a river and not a lake. To resolve this, we take the general principles from all the definitions above and apply them to an inland lake.

The term "low water mark" is a term that has historically been applied to tidal waters and has been well defined. This terminology has been taken and attempted to be used in inland waters where tides have no effect on water levels. Note though that inland waters are subject to highs and lows due to spring melt and runoff and late season dry periods.

We must now look at what is considered "ordinary" as commented above in the phrases "ordinary or mean line of the low spring and the low neap tides" and "ordinary lowest flow". The definition of "ordinary" according to various dictionaries comes up with words and phrases such as "of no exceptional ability, degree or quality; the expected or commonplace condition, situation or status; average; usual or normal." In case law, we find "ordinary or mean" and "ordinary or usual and customary". We can assume that "ordinary" means something usual or occuring on a regular basis over a period of time, whether from a statistical or observational sense. Looking at historical water level charts and graphs, one can quickly see that there is no usual or common elevation that water levels remain at during an annual cycle. Instead, the plotted levels versus time on a graph takes on a sine wave characteristic with the levels going up and down every year, the only dissimilarities being the degree of difference from low to high water levels in each year.

United States case law on "Low Water Mark"

In those states that have used low water mark as the extent of riparian ownership, the courts are divided on how to define the physical location of that mark.

Only two states have held that the low-water mark is the lowest or most extreme elevation that the waters had receded to at any time; twenty-one other states have defined the mark to be the lowest elevation that the water usually reaches during a season not affected by droughts or floods.[16]

In *Stover v. Jack* (Pa. 1869) 60 Pa. 330, 343, the judge remarked: "…to bound title by a mark which is set by an extraordinary flood, or extreme drought, would do injustice and contravene the common understanding of the people"[17]. Some courts recognized an

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[15] *New Hamburg (Village) v. Waterloo (County)* (1892), 20 O.A.R. 1 (Ont. C.A.).

[16] *River & Lake Boundaries: Surveying Water Boundaries – A Manual* by James S. Simpson, 1994, page 305-309

[17] *Water Boundaries: Demystifying Land Boundaries Adjacent to Tidal or Navigable Waters* by Bruce S. Flushman, 2002. page 277.

averaging of the daily lows during the low-water season as being the "fairest and most reasonable" determination of the low water mark.

Summation:

As we wish to determine the physical location of the edge of the water in its natural condition at the low-water mark before flooding, we need to use the best available evidence. Applying the legal principles of low water mark to inland waters, it is my opinion that the calculated average low water level is the best representative for low water mark under natural conditions and of the pre-flood boundary of Rainy Lake. Since we wish to come up with a mean or average of low water levels, it is best to use as large a sample as possible of water level data, preferably pre-flooding, to calculate an average of the lowest water levels over those years.

Datums for Rainy Lake

All water level values must refer to a reference datum and should provide the source of the data. Level datums are, by definition, points, line or surfaces to which elevations, heights or depths on a map or chart are referenced. There are three level or horizontal datums that someone may come across while doing research or surveying within the Rainy Lake area. The following is a brief synopsis of each datum, their origin and the mathematical relationship between the three.

Department of Public Works Canada Datum (DPW1909)

This datum is a local datum established by the Department of Public Works, Canada. The benchmark for this datum is fixed at 500 feet and described as follows:

> "Department of Public Works, Canada, B. M. Top of iron bolt set vertically in solid rock, 4 feet from edge of north side of canal, directly beneath the Canadian end of the Minnesota and Ontario Power Company's bridge: Elevation, Public Works, Canada, Datum = 500.00"[18]

Note that all the *Tables* and *Plates* in the Engineer's IJC Reports are referred to this Datum.

United States Coast and Geodetic Survey Datum (USCGSD)

This datum (adjusted 1912) is the one used in the IJC Engineer's *Textual* Reports for the Lake of the Woods and Rainy Lake area and is the one in current use today to reference water levels on Rainy Lake.

All references to elevations in this Report are referred to this datum.

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[18] Report to International Joint Commission Relating to Official Reference Re Lake of the Woods Levels, Text, Arthur V. White and Adolph F. Meyer Consulting Engineers, 1917, pg 91.

Elevations referred to DPW1909 datum can be converted to USCGSD by adding 611.61 feet.[19]

Canadian Geodetic Vertical Datum 1928 (CGVD28)

This Datum (adopted in 1935) is the current datum in use in the Rainy Lake area with respect to benchmarks established by Natural Resources Canada Geodetic Survey Division. *Any survey work carried out will be referred to this Datum.*

To convert from USCGSD to CGVD28, subtract 0.83 feet; from DPW1909 to CGVD28, add 610.78 feet.

Flooding of Rainy Lake

The dam located on Rainy River at the outlet from Rainy Lake commenced control of water flow from the Lake on March 10, 1909[20]. Coffer dams had been built starting in 1905, but their effect on water levels was not noted by the engineers in their report to the International Joint Commission (IJC).

Continuous recorded water level information began in August of 1911. Level information previous to that date is sporadic at best. There are no accurate continuous recorded water levels for Rainy Lake previous to the construction of the dam at Fort Francis / International Falls.

It is difficult to determine just how much the water level rose due to the presence of the dam, but a letter written in September of 1909 makes mention of the effect of rising lake levels on the shores of Couchiching Reserve[21]. Indeed, it appears that lake levels rose significantly enough that Ontario & Minnesota Power Company had to draw down a large amount of water in December of that year[22].

There is evidence that the lake did, on occasion, flood under natural conditions pre-dam construction as related in correspondence. Indian Agent, Pither, wrote in 1885: "Owing to the high stage of water last autumn most of the hay was lost…"[23] and again in 1888, Pither notes that due to a late season and heavy rains "The water in the lake and river is

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[19] Ibid, pg 91

[20] *Report to International Joint Commission relating to Official Reference re Lake of the Woods,* Text, Arthur V. White and Adolph F. Meyer, Consulting Engineers, 1916, pg. 190. Also, see Tables, Plate 77, pg. 266

[21] Letter from Chief Joseph Yourdain and Councillor Pierre Yourdain to Frank Oliver, Superintendent General of Indian Affairs dated 29/9/09– LAC, RG 10, vol. 4021, file 282,759, pt. 1, reel C-10,203

[22] Letter from Blake Lash Anglin & Cassels (Barristers) to Secretary, Department of Indian Affairs dated December 16, 1909 – LAC, RG 10, Vol. 4021, file 282,759, pt. 1, reel C-10,203

[23] Annual Report by Pither. Canada, Sessional Papers, Vol. 19, No. 4, Sessional Paper No. 4 (1886)

rising and has already flooded some of the gardens and the hay marshes in the lake."[24]. In 1889, Indian Agent, McCracken writes of the local First Nation bands and their reserves:

> "the prolonged rainy weather of last season destroyed most of their crops. The water in the Rainy River and Lake being unusually high many of their fields and gardens were completely submerged. The wild rice, too, an important item of food supply, was a total failure from the same cause…"[25]

These flooding events did not; however, appear to contribute to any erosion of the shoreline as evidenced by the lack of any mention to this effect.

There is no information on how much water levels rose subsequent to 1909. The agreement entered into between the Province of Ontario and Edward Wellington Backus stated, among other things:

> "…a grant of fee… for the purpose of developing the water power to the full capacity of the stream from side to side *at high water mark*..." and "the waters of the Rainy Lake shall not at any time be raised to a higher level than may be authorized by the Government"[26]

No mention was found in the agreement stating what the elevation the high water mark was. Later correspondence from Samuel Bray, Chief Surveyor to the Deputy Minister states that if the water is allowed to rise three feet higher than the 497 benchmark, then a large tract of land will become a marsh[27]. Note that 497 equates to 1108.61 feet USCGSD.

There is much correspondence speaking to flooding and, more notably, erosion subsequent to the dam going into operation. Indeed, the Ontario & Minnesota Power Co. was later successfully sued for damages due to flooding[28].

The problem is to determine how much flooding has occurred and where the boundary is between the Reserves (upland parcels) and bed of the lake[29]. To determine this boundary, we need to find a value for the normal or ordinary lowest yearly low water mark.

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[24] Annual Report by Pither. Canada, Sessional Papers, Vol. 22, No. 13, Sessional Paper No. 16 (1889)

[25] Annual Report by McCracken. Canada, Sessional Papers, Vol. 23, No. 10, Sessional Paper No. 12 (1890)

[26] Agreement between His Majesty and Edward Wellington Backus. LAC RG 10, vol. 3091, file 282,759, reel C-11323

[27] Memorandum from Samuel Bray to Deputy Minister, LAC, RG 10, vol. 4021, file 282,759, pt. 1, reel C-10,203

[28] See, for example, Smith v. Ontario & Minnesota Power Co. (1918), 44 O.L.R. 43. and Ontario & Minnesota Power Co. v. The King (1925), 2 D.L.R. 37

[29] Although the current boundary is where the water's edge would have been previous to the Reserves begin artifically flooded, the "headlands" issue, when resolved, may have an affect on the Reserve's final boundaries.

Water Levels before Dam Construction

No accurate, consistent water elevations were observed on the lake until August 20, 1911 when the water gauge at Ranier, Minnesota came into use.

Report	Table	Years covered	Comments
1916	31	1911-1914	Gauge at Ranier. Accurate levels of lake proper.
1916	32	1913-1914	Gauge at Kettle Falls. The readings differ slightly from those at Ranier
1916	33	1911-1914	Gauge at Power House on river. These readings can be up to 1 foot lower than those at Ranier.
1916	36	1907-1914	Gauge at International Falls measuring Head and Tail waters. The Head readings from 1911 onward are in the range of 0.5 to 1 foot lower than those at Ranier.
1916	38	1905-1906	Gauge on Power Company's Cofferdam above Falls.
1929	131	1911-1927	Gauge at Ranier. Accurate levels of lake proper.
1929	179	1911-1927	Gauge at Power House on river.
1929	188	1916-1927	Gauge at U.S. Pulp Mill on river. Similar readings to the Power House gauge, but not the same.

The best source for determining pre-dam water levels come from the computed natural levels as calculated by the engineers and presented in their 1931 Report to the International Joint Commission[30]. There were also values calculated for the 1916 IJC Report (Table 77)[31] and the engineers Preliminary Report of 1929[32], but the engineer's values in their 1931 report is to supersede the two previous reports[33]. The calculations made for the 1916 Report were based on estimates and computations and are not considered reliable.

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[30] "Report to International Joint Commission Relating to Official Reference Re Levels of Rainy Lake and Other Upper Waters – Tables" by Major P.C. Bullard, Corps of Enginners and S.S. Scovil, Consulting Engineer, 1931, Table 132: Computed Natural Levels of Rainy Lake.

[31] Report to International Joint Commission Relating to Official Reference re Lake of the Woods Levels Tables, by White and Meyer (1916) pg 264-267

[32] "Preliminary Report to International Joint Commission Relating to Official Reference Re Levels of Rainy Lake and Other Upper Waters – Tables" by Scovil, Crawford and Bullard, 1929.

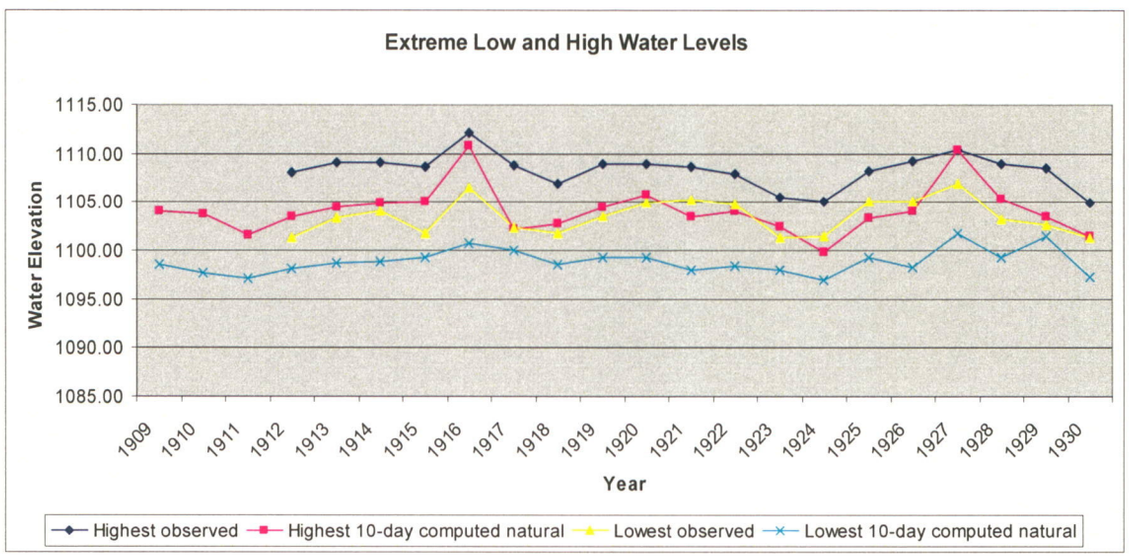
[33] 1931 Report, page 5.

The explanation surrounding the computations for the computed natural levels are given on pages 196 to 205 of the 1931 Report. The following two observations are noted:

- Although accurate and continuous water elevations were observed starting in August of 1911, computations for the years 1909 to 1914 were made from Table 76 of the Report of the Consulting Engineers on the Lake of the Woods Reference.
- For the years 1915 to 1930, computations were made using actual gauge readings that had been corrected for wind effects and occasional errors in readings.

Lowest 10-Day Mean (Computed Natural Levels):

The engineer's 1931 Report to the IJC provides 10-day period computed natural levels for the 10th, 20th and 30th or 31st of each month for the years 1909 to 1930.



Note:

a) Actual water levels previous to August 20, 1911 are estimated and therefore, any computed natural levels are not as accurate as those calculated after this date.

b) Values for observed extreme highs and lows from 1912 to 1930 are daily,

c) Extreme highs usually occur around the month of July,

d) Extreme lows usually occur around the end of March or beginning of April,

e) Dam constructed in 1909.

f) Calculated average low water for years 1909 to 1930 is 1098.84 feet,

g) Calculated average low water for years 1912 to 1930 is 1099.00 feet,

h) Calculated average low water for years 1915 to 1930 is 1099.09 feet.

Conclusion:

For the purposes of using a contour elevation that best fits the original legal boundary of any reserve that fronts onto Rainy Lake *and in the absence of other evidence*, I would suggest using **1099.00 feet USCGSD (334.98 m) being 1098.17 feet CGVD28 (334.72 m).** This would be the value obtained using an average of the lowest 10-day mean of computed natural levels from the years 1912 to 1930.

Reasoning:

In the absence of actual observations, the computed natural water levels as calculated and presented in the engineer's Final IJC report of 1931 for Rainy Lake represents the best evidence of water levels pre-dam construction.

As daily water levels were not computed and hence, the lowest water level for any given year is unknown, using the lowest 10-day period is the next best value.

Taking an average of the lowest 10-day periods from the greatest amount of available data (1912 to 1930) eliminates extreme drought and wet years and reduces the risk inherent in calculated and non-observed values. As the values used to compute natural water levels previous to 1912 are based on estimates and not observations, they have not been used.

Taking an *average* of the lowest yearly10-day periods best approximates the *ordinary* low water level and, by extension, the ordinary or normal low water mark as defined in case law with respect to natural boundaries in Ontario.

This report presumes that the natural boundary of the Reserves abutting Rainy Lake is based on the initial surveys and does not consider the headlands[34] issue as it is an unresolved legal matter, not a survey matter, at this point in time. Should the headlands issue be resolved, then the limits of the reserves may need to be adjusted.

Other Statistical Observations:

1) Based on the computed lowest and highest 10-day periods yearly from 1912 to 1930, water levels would have fluctuated 5.3 feet, on average, previous to the dam being constructed.

2) Based on observed water levels from 1912 to 2009, the lake fluctuated 3.7 feet, on average, post-dam construction.

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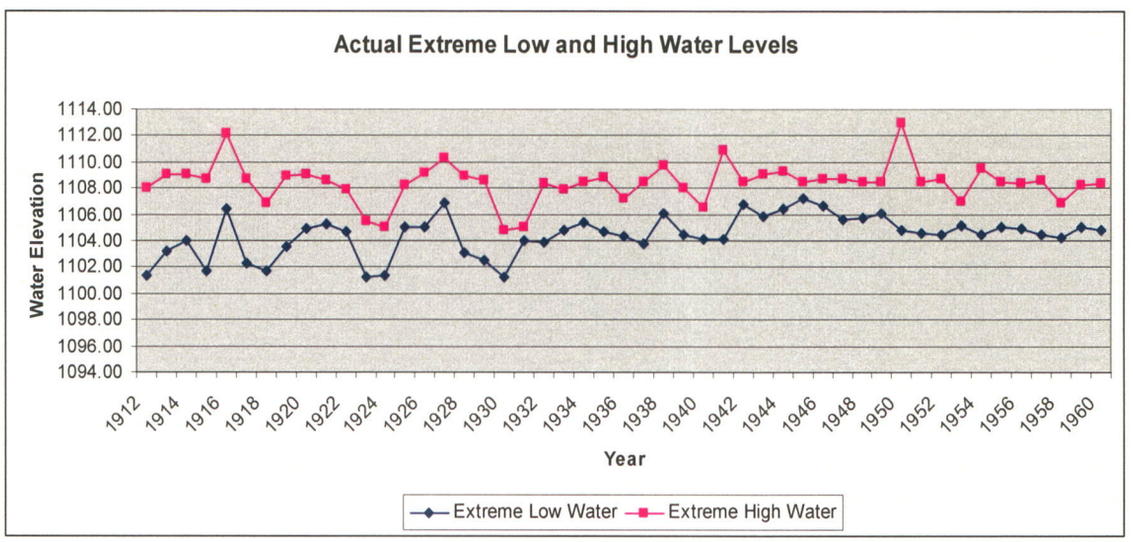
[34] In 1891, Canada and Ontario passed reciprocal and substantially identical legislation entitled "*An Act for the settlement of certain questions between the Governments of Canada and Ontario respecting Indian lands, 54-55 Victoria, c.5*" (Canada) and "*An Act for the settlement of questions between the Governments of Canada and Ontario respecting Indian lands, 54 Victoria, c.3*" (Ontario) respectively. In 1894, an agreement was attached as a schedule to the 1891 legislation that stated: "…land covered with water lying between the projecting headlands of any lake or sheets of water, not wholly surrounded by an Indian Reserve or Reserves, shall be deemed to form part of such Reserve including islands wholly within such headlands…" In 1915, Ontario enacted legislation to revoke any of these lands contained between headlands as being part of a Reserve.

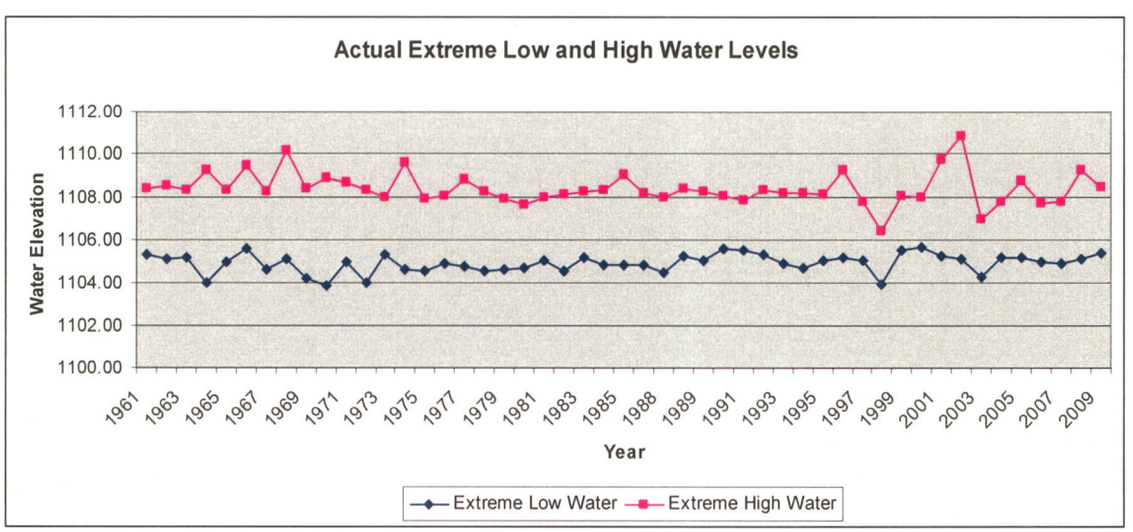
3) Based on the computed values from 1912 to 1930 and the observed values from 1912 to 2009, the average low water level has risen about 5.7 feet since construction of the dam in 1909.

4) Based on the computed values from 1912 to 1930 and the observed values from 1912 to 2009, the average high water level has risen about 4.1 feet since construction of the dam in 1909.

5) The average lowest water level from 1912 to 2009 is 1104.68 USCGSD.

6) The average highest water level from 1912 to 2009 is 1108.41 USCGSD.





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