

Department of the Interior Canada

WATER POWER BRANCH

REPORT

ON THE

STORAGE POSSIBILITIES

OF BEAR LAKE

AND

POWER POSSIBILITIES

OF BEAR CREEK

BY C.H. ATTWOOD,

A.M. CAN. SOC. C.E.

OTTAWA, MARCH 22, 1916

DEPARTMENT OF  
THE INTERIOR

CANADA

*Dominion Water Power Branch*

REPORT

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MMS.

Ottawa, March 22<sup>nd</sup>, 1916

Sir,

Herewith is a report upon the results of my investigations into the advisability and possibility of building a dam at the outlet of Bear Creek, in the Grande Prairie district in township 72, range 7, west of the sixth meridian and the power possibilities of Bear creek near the village of Grande Prairie.

Your obedient servant,

C.H. Attwood (signed)

Chief Engineer,

Alberta and Saskatchewan  
Power and Storage Investigations.

J.B. Challies, Esq., C.E.,  
Superintendent,  
Dominion Water Power Branch  
Department of the Interior,  
Ottawa.

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Plan – showing drainage area.

Photographs.

Ottawa, March 22<sup>nd</sup>, 1916.

Bear Lake.

Grande Prairie, Alberta.

I. Sources of Data.

An application was received by this Branch on April 27<sup>th</sup>, 1915 from Mr. W.A. Rae of Grande Prairie, on behalf of the farmers residing on the banks of Bear Creek and the residents of the village of Grande Prairie, to have a dam placed at the outlet of Bear lake to raise the level of the lake and regulate the discharge of Bear creek for water supply and power purposes. A second request to have a dam placed at the outlet of Bear lake was received by this Branch on November 29<sup>th</sup>, 1915 from the secretary-treasurer of the village of Grande Prairie. This later request states that the village of Grande Prairie is dependent for its water supply on Bear creek, which has very little if any water flowing in it during the winter, and asks that a dam be placed at the outlet of the lake to control and regulate the discharge of Bear creek.

On June 24<sup>th</sup> last the undersigned received instructions at Ottawa to make a reconnaissance investigation of conditions at Bear lake and to report on the possibility and advisability of placing a dam at the outlet of Bear lake and to ascertain the power possibilities of Bear creek in the vicinity of the village of Grande Prairie.

To make the investigation I left Edmonton on September 17<sup>th</sup> last, travelling by way of Peace River Crossing, which was reached the following afternoon. On September 21<sup>st</sup> I hired a team at the Crossing and

drove to Grande Prairie, via Dunvegan and Spirit river, a distance of approximately 170 miles, reaching there on the afternoon of September 24<sup>th</sup>. I called on Mr. W.A. Rae the same evening, when he informed me that the district fair was being held at Lake Saskatoon on the following day and that, if I attended the fair, I would meet most of the farmers residing along the shores of Bear lake. Acting upon Mr. Rae's suggestion I accompanied him to the Lake Saskatoon fair and met many of the people interested in the raising of the water level of Bear lake. From this source and also from interviews with the people residing in the village of Grande Prairie it was learned that the object of having a dam built at the outlet of Bear lake was chiefly for the purpose of water supply for both the farms and the village and that water-power development was only a secondary consideration.

From September 26<sup>th</sup> to 29<sup>th</sup> I inspected the shore line of Bear lake and Bear creek for about three-quarters of a mile down from the lake and also inspected the reaches of the creek below the village of Grande Prairie for possible power sites.

There are no run-off records available for the Grande Prairie district. As yet there are no railroads traversing this part of the country though the grade of the Grande Prairie branch of the Edmonton, Dunvegan and British Columbia railway was being pushed to completion; the steel being promised early in 1916. The district has been surveyed and subdivided and district maps are available showing the location of the lake, creek and village of Grande Prairie.

## II. Summary.

During the investigation of Bear lake it was ascertained that the development of water-power

on Bear creek was a secondary consideration. The people living in the village of Grande Prairie depend on Bear creek, which drains Bear lake, for their water supply. These people claim that during the winter months there is very little water flowing in the creek and it is to regulate the discharge of the creek during this season, with the hope of securing a better water supply both in quantity and quality, that they are interested in raising the lake. The farmers living along the south shore of the lake want to have the lake level raised about 3 feet and maintained at the original highwater mark so that the flats in front of their farms will be submerged. The farmers living at either end of the lake object to the water being raised as it would submerge their hay lands and cause a condition similar to that now existing along the south shore. Those living along the north shore are not affected but are in favour of raising the lake.

Bear lake is the largest lake in Grande Prairie District. However, since it is very shallow, and is the breeding and feeding place for thousands of wild geese and ducks, the water is absolutely unfit for domestic use. Owing to the number of barn-yards and watering places along Bear creek, between the lake and the village, the quality of the water is not improved when it reaches the village. Raising the lake level three feet would not improve the quality of the water supply to any great extent and would only change the existing conditions on the lake from the south side to the ends.

An examination was made of Bear creek, near the village of Grande Prairie, to ascertain the possibilities of developing power at or near the village, but no site, offering any particular advantages, was

noticed. At almost any place along the creek a head of ten feet could be developed but the discharge of the creek, particularly during the winter months, is so small that power development for municipal lighting is absolutely out of the question and the development of power on this creek cannot be recommended.

### III. General Introductory.

Bear lake is situated in townships 72 and

73, range 7, west of the sixth meridian.

The lake is about five and a half miles long and two miles wide, covering an area 7832 acres more or less, and lies in a northwesterly direction, the outlet of the lake being at the southeasterly end in section 24, township 72, range 7, west of the sixth meridian.

The lake is very shallow, the average depth at normal water being about five feet. At each end of the lake the shore is very low and flat, rising only from three to five feet above water level in a distance varying from 1500 feet to 2000 feet back from the water's edge.

Upon these flats, which are very extensive, large quantities of marsh grass grow each year. This grass is cut and stacked by the settlers and fed as hay to the cattle and other live stock during the winter. Along the southerly side of the lake the shore is higher and steeper, and on an average, rises to a height of ten feet in a distance of from ten to fifty feet from the highwater mark. Between the highwater mark and the water's edge are sand and mud flats varying from 100 feet to 500 feet in width and approximately 4 miles in length. These flats are covered with water during the high water period but for the remainder of the year they are wet and soggy, preventing the horses and cattle getting to the water's edge for water. Around the upper end of the lake, the northwest end, is another large area of marsh lands from

which large quantities of marsh grass is cut each year. The northerly shore line is steep and varies from ten feet to twenty feet in height above lake level. The settlers living on the south side of the lake have requested that a dam be built at the outlet so that these flats will always be submerged, the lake deepened, and better water obtained. The farmers living at the ends of the lake object to the lake being raised as their hay lands would be destroyed.

#### IV. Investigation.

From September 26<sup>th</sup> to 29<sup>th</sup> an examination

was made of the entire shore line of Bear lake with particular attention being given to the southeast end at the outlet of the lake. Here a short traverse was run from the mouth of Bear creek down to the highway bridge on the road allowance along the east boundary of the township. An examination of the creek was also made for several miles below the village of Grande Prairie, in township 71, range 6, west of the sixth meridian, in search of a power site. No site offering any particular advantage for power development was observed.

As aforementioned a traverse was run from the lake for a short distance down the creek in hopes of finding a suitable dam site. Between the lake and the highway bridge, a distance along the creek of approximately 4000 feet, the fall in the creek was found to be 0.3 feet, the water level at the lake being given an assumed datum of 100.00, and the water level at the bridge being 99.70. In this distance the banks vary in height from elevation 100.0 to elevation 109.0, rising three feet above water level in the first 1500 feet from the lake and six feet in a distance of 2000 feet from the lake. Below the highway bridge the banks get higher and steeper and are composed of clay loam.

The investigation revealed the fact that while it was possible to build a dam at the outlet of Bear lake, yet to do so would flood large areas of hay lands and would not improve local conditions on the lake.

V. Water Supply.

No rainfall or run-off records are avail-

able in the Grande Prairie district and so little is known of the local conditions that no attempt is now being made to compute the amount of water available for storage on Bear lake. The drainage area of the lake is approximately 350 square miles but with the exception of the creek flowing into the lake at the northwest and it is quite evident that only a small portion of the run-off from this drainage area reaches the lake. There are numerous small sloughs in the drainage area which collect the rainfall from whence it slowly percolates through to ground water or is lost by evaporation.

It was also noticed that on Grande Prairie the lack of water was one of the great drawbacks and obstacles with which the settlers had to contend. Wells are very scarce as yet on the prairie owing to the lack of well drilling machinery. At one well in the village of Grande Prairie it was found necessary to drill to a depth of 300 feet to get a good supply of water. Upon enquiry, the settlers were of the opinion that it would be necessary to drill to a depth of at least 200 feet to get a good well.

Two discharge measurements were obtained on Bear creek, one at the outlet of the lake on September 27<sup>th</sup>, 1915 when the discharge recorded was 15 c.f.s., and the other on September 28<sup>th</sup>, 1915, at the village of Grande Prairie, when the discharge recorded was 20 c.f.s. The difference in the discharge at the two points being

7.

supplied by Spruce creek which joins Bear creek a short distance from the outlet of the lake.

Conclusion.

As there are no water powers on Bear creek worthy of development without creating storage on Bear lake and whereas it is not advisable to build a dam at the outlet of Bear lake for this purpose, I would suggest that Mr. Rae be notified accordingly.

The lake cannot be recommended as a source of water supply even though the lake were deepened but as this side of the case does not come under the jurisdiction of this Branch, I would advise that the matter be turned over to the proper authorities to be finally dealt with.

Chas. H. Attwood (signed)

Please address your reply to  
subject in

The Superintendent  
reply

Dominion Water Power Branch EAM.  
Ottawa, Canada

DEPARTMENT OF

THE INTERIOR

CANADA

Please refer to one

a letter and in your

Quote File No. 6081-W.

Dominion Water Power Branch

Ottawa, December 14, 1916.

Sir,-

In further connection with your correspondence with this Department relative to the placing of a dam at the foot of Bear lake to regulate the outflow therefrom, I would say that a report on the whole situation had been made by Mr. C.H. Attwood, engineer in charge of the power and storage investigations carried on by the Dominion Water Power Branch in Alberta and Saskatchewan.

This report goes very fully into the general situation in the vicinity of Bear lake and the possibilities of manipulating the outflow. Mr. Attwood concludes as a result of his study that there are no water powers on Bear creek worthy of development without creating storage on Bear lake and it is not advisable to build a dam at the outlet of the lake owing to flooding troubles which would result on the lake borders. A copy of Mr. Attwood's report is being forwarded to you under separate cover for your information.

As this ~~Department~~ Branch is only interested in the question of water power development, the information compiled is being made available to the Irrigation Branch.

Your obedient servant,  
DOMINION WATER POWER BRANCH,

W.A. Rae, Esq. , B.A.,

~~Ene.~~

Notary Public,  
Grande Prairie,  
Alberta.

J.B. Challies,  
Superintendent.  
Per.- J.T. Johnston (signed)

# Department of the Interior

## IRRIGATION BRANCH

REFER TO FILE

PLEASE ADDRESS YOUR REPLY TO  
THE COMMISSIONER OF IRRIGATION  
DEPARTMENT OF THE INTERIOR  
CALGARY, ALTA.

CALGARY, ALTA.

December 27, 1916.

B/P.

Sir,-

In reference to correspondence which you have addressed to our Mr. W.H. Storey, concerning Bear lake, I now find that the other engineer who accompanied Mr. Attwood of the Water Powers Branch on his inspection, was a Mr. Wilson who is employed by the Department of Public Works, Edmonton office.

I trust that this information will make it clear that this Branch has not had anything to do with your application. I understand from Mr. Attwood that he is sending you a copy of his report on Bear lake.

Your obedient servant,  
(signature illegible)  
Commissioner of Irrigation

Mr. W.A. Rae, B.A.,  
Barrister, etc.,  
Grande Prairie, Alberta.

MINISTER OF LANDS

PROVINCE OF  
BRITISH COLUMBIA

VICTORIA  
February 21, 1918.

W.A. Rae, Esq., M.P.P.,  
Earls court, Georgia Street  
Vancouver, B.C.

Dear Mr. Rae,-

I have your letter of the 17<sup>th</sup> of February and enclosed herewith is the map you ask for, also copy of the "Coal and Petroleum Act."

With regard to Mr. W.J. Hinchliff's application to purchase land in the vicinity of Red Willow River, on taking this matter up with the Department they inform me that Mr. Hinchliff made application to purchase 640 acres in 1911.

This land is still unsurveyed and now abrogated and cancelled under Section 4, of the "Soldiers' Homestead Act," and the deposit of \$320.00 is forfeit. No application for allotment or to pay up in full was made by Mr. Hinchliff.

I enclose copy of the Act, from which you will see that it is impossible to consider Mr. Hinchliff's former application. There is nothing, however, to prevent him, if he desires this land, from making a new application. The only stipulation which we make in new purchases is that there must be a certain amount of development carried on.

With kind regards, I am,

Faithfully yours,

(illegible signature)

Encls.