

"DIVIDING THE WATERS": A PRELIMINARY
OVERVIEW OF WATER MANAGEMENT ON THE RIDEAU,
1832-1972

by Brian S. Osborne, Donald Swainson
assisted by Susan Code

1985

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Brian S. Osborne
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April, 1985
A.D. Revill Associates

Frontespiece

...The writer considers it his duty respectfully to offer the remark that it would be a wise policy for the government at once to establish the principle that the waters of the Rideau Navigation can in no way be diverted to its injury to benefit any other interest...and that the water communication itself must be distinctly held to take precedence over everything so ever which may come into opposition with it. (1)

The mechanical duty of locking a boat is easily learned..., but this is by far the least portion of a lockmaster's duties. The regulation of the water is the principal thing he has to attend to.... also the control of water to prevent damage during freshets in the spring requires good judgement and foresight.... (2)

Lockmasters will take every precaution to keep up the water in the Canal at their several stations and save all water possible having due regard to the safety of the works. The report of any waste water through carelessness or inattention will be at once investigated and reported to the department....Weekly water reports to be punctually sent to the Head Office. (3)

Oh yes, always had to send in a report of the bywash every month...Well, you have to raise logs and let your water run through. Because the water was rising and they'd be probably calling for water at Chaffey's or Jones Falls and you'd get orders and you'd have to run water. But you always got your orders from the Department before you run the water...If I saw the water rising, if it was water rising above what it was supposed to keep, I'd raise a log and let some run through...Then when it come back down to its level, I'd drop the log back down again. (4)

Acknowledgements

This report is an outgrowth of a larger and more comprehensive study of the Rideau: Brian S. Osborne and Donald Swainson, The Rideau Navigation, 1832-1972: Its Operation, Maintenance, and Management, Parks Canada Manuscript, Cornwall, 1985. To the authors, the control, regulation, and allocation of the waters available within the Rideau catchment area was a crucial aspect of the operation, maintenance, and management of the Rideau Navigation. Accordingly, these matters were addressed in the report. Sufficient materials came to hand during the research, however, that a supplementary document was possible and was worked into the form of the present report. Ideally, the two reports should be considered to be complementary to one another although each has been produced as a self standing document.

Acknowledgement is given here to Susan Code, Harry Holman, John Kowalski, and Susan Warren for their assistance in archival and field research. The maps were drawn by Ross Hough and photographic reproductions produced by George Innes. Susan Code deserves special mention for her contribution of preliminary drafts of sections of the text at an early stage in the project.

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Chapter One: The Original Concept

Writing in 1834, Edward John Barker, the editor of the Kingston British Whig, commented that

The Rideau Canal is not a canal so called, but rather a succession of raised waters by means of dams, with natural lakes interspersed. One end of it empties into the Ottawa, half a mile above the falls of the Rideau, intersecting the upper and lower villages of Bytown; and the other end terminates at Kingston Mills, six miles above the town of Kingston. (1)

The phrases, "...a succession of raised waters by means of dams, with natural lakes interspersed" accurately depict the essential character of the Rideau waterway system.

The completed system comprised three components which had been integrated by the substantial engineering works: the Rideau River section, draining from the Rideau Lakes to the Ottawa; the interior lake section of Sand, Opinicon, Indian, Clear, and Mud (Newboro) lakes which originally drained south to the St. Lawrence via the Gananoque River; and the Catarqui river section with its limited watershed in the Cranberry and Loughborough lakes area. Through these distinctive drainage regions, a route was selected to minimize construction problems and ensure the military security of the waterway. But once integrated into one system, certain characteristics of this artificially produced hydrological unit required attention for navigation to proceed and be maintained. The topography was such that there were major falls or rapids at several points along the route and these had to be flooded out or bypassed by means of

locks. Annually, seasonal temperature and precipitation regimens combined to produce spring "freshets" which threatened to overcome the works and summer "droughts" which lowered water levels and interrupted navigation.

With construction completed, attention was directed to ensuring the maintenance of the works. Given the circumstances identified above, effective water management was a crucial prerequisite for the continued operation of the Rideau Navigation system.

i. Colonel By's System

These various circumstances had been accommodated by Colonel By's project, although they were to continue to tax the Rideau establishment over the ensuing generations of the operation of the system. Basically, By's solution rested upon the erection of a system of dams and embankments which served several purposes.

In some instances, they enhanced the navigation potential by increasing the overall draught and flooding out rapids upstream from the dam. This innovative method was known as the "slackwater system".(2) Used by others to effect, the extent to which it was adopted by Colonel By was unprecedented and, given the particular problems posed by the Rideau route, particularly appropriate as it eliminated the need for much excavation work. This was the case with combined dam and embankment at Kingston Mills which provided an overall increase in draught of of 20 feet and flooded out

two rapids which originally impeded navigation between Kingston Mills and Lower Brewer's Mills. An even more spectacular project was the 62 feet high and 440 feet long stone arch dam at Jones' Falls, "the most stupendous and perfect of its kind in the world", (3) which overcame the problem there of a one and a half mile long set of rapids falling some 60 feet. Less dramatic, but equally essential construction was necessary at several other sites such as that at Upper Brewer's. This backed up the waters to the foot of the Jones' Falls locks, increased the draught by some eight feet, and extended the source areas into Dog, Loughborough, and Cranberry lakes. Lesser dams were completed at Chaffey's, the Narrows, First Rapids, Smith's Falls, and other sites along the Rideau River section. A particularly crucial and contentious dam was put in place at White Fish Falls. It maintained the level of water in the adjacent Whitefish and Cranberry lakes by diverting waters which originally flowed from Lake Opinicon and Sand Lake into the Gananoque system. Maintaining, and even improving, the control works at the White Fish Dam site was to be essential for the ensuring adequate water supplies throughout the Cataraqui section of the Rideau system. Several such improvements were to be mooted in subsequent years and were the cause of much rancour and debate.

Finally, other dams were designed not only to increase the draught but also to regulate the potentially destructive spring freshets that flushed through the system. Thus, at Long Island, three waste weirs and a stone dam were required

"to meet any extraordinary quantities of water, which by freshets or other causes, may descend the river and impede the navigation. (4) Similar water control works were required at Black Rapids to "resist the freshets in Spring and Fall", the severity of which moved Barker to wax poetic:

The great body of the waters is caused by this dam to fall down two artificial cataracts, on the eastern bank of the river with prodigious force and noise; and the whole scene, if viewed at a time when the Rideau is at all swollen, is one capable of inspiring the highest gratification. (5)

Dams such as these, therefore, were crucial to maintaining the boundaries of the system's watershed, providing a suitable depth for navigation, and regulating the seasonal flows. Not only did they comprise the most innovative and impressive feats of engineering on the system but their maintenance was essential for the continued integrity of the navigational system.

With the dams and an associated system of weirs and locks in place, Colonel By then developed a water control method appropriate to the hydrological regimen of the Rideau system. Weirs were opened in the fall to let the waters run through the system and closed each spring as soon as possible after the passing of the spring freshets through the basins. With these waters held back, the water levels throughout the river and lake sections were raised ready for navigation and, with judicious use of the waters for lockages, could be maintained for the balance of the navigation season.

Effective in its simplicity, it was recognized early

that such operations necessitated much vigilance. An order from the Office of Ordnance in May, 1833 urged the Rideau Establishment to protect their works and "the artificial means by which it [water] is raised...for the partial giving way of a single Dam might interrupt the Canal Communication for a whole season." (6) The Master General urged that Colonel By be called upon to suggest precautionary measures to "prevent accidents" and to ensure "the command of the Water." (7) Later that year, By's recommendations were noted, including the reservation of lands to 40 feet above high water mark along the route of the canal, and the reservation of the right to dam all lakes tributary to the Rideau system. (8) By had constantly emphasized the need to take control of all of these waters but it was decided that no action should be taken until "the adjoining country is minutely examined by competent Officers of the Department." (9) That the sensitivity of the subject was recognized is evidenced by the added injunction that "the subject is to be kept as secret as possible in the meantime." (10) Following the presentation of the report in April, 1834, Byham reported to the Inspector General of Fortifications that there was no need to obtain "a more efficient control over the waters running into the Canal than now employed." (11) This decision was to have repercussions in future years when the need for a more comprehensive control and regulation of the various drainage basins became apparent.

ii. The System in Operation

The operation of the water control system as conceived of by Colonel By was coordinated by headquarters at Ottawa. But the maintenance of a sufficient draught of water for navigation, the regulating of flows to other users such as mills, and the protection of the works and the surrounding countryside from flooding were all very much part of the responsibilities of the lockmasters. For these objectives to be attained, they had to work as coordinated elements of an integrated system, a system which extended beyond the banks of the canal alone and incorporated the whole extent of the several watersheds draining into the Rideau. Ideally, with careful operation of the locks, sluices, and weirs, water levels could be maintained throughout the navigation season. It required close cooperation between the lockmasters at each station, the operation of each being carefully syncopated in time and space.

The annual cycle commenced with the closing of each navigation season, at which time all lock gates would be opened in sequence and the works drained, lockmasters being instructed to "run off" the water as fast as possible without "damaging the works." (12) Apart from the security of the "works", another concern was the effect upon the milling enterprises which were also dependent upon a continued flow of water. Accordingly, lockmasters were reminded of this dimension, if with considerable qualification:

As much fear is entertained by many individuals on the Rideau Canal that a

Scarcity of water during the winter will prevail and that their Mills will suffer if the water be lowered suddenly & rapidly at all stations. Lockmasters generally will bear this in mind and be guided accordingly taking care however that in so doing the works of the Canal and interests of the Department do not suffer. (13)

Long before the first signs of spring, stations along the line were ordered to make preparations for the perennial freshets that challenged the works:

The probabilities are that a freshet more or less will occur during the early part of next month. Lockmasters will on the first signs of a freshet be prepared to open the waste weirs and pass it down as gradually as possible. If any damage is likely to occur notice must be sent to this office with the least possible delay. (14)

The force of the spring freshet had to be channelled around, directed through, and endured by the works and the order came down the line that

As there are indications of a thaw you must without hesitation take out the logs Should there be any appearance of the water rising As it would be impossible to take them out under high water Under any circumstances keep the water below Navigation Level Untill [sic] Next Monday when they Must all be taken out. (15)

At some station, "passing the waters" simply meant the opening of the waste weirs by lifting the stop logs, being sure to replace them as soon as possible after the first rush in order to reserve the waters for later use. But at other stations, final repairs had first to be made before the onset of the floods. At this time of the year, this could be arduous. The laconic entries in the Lock Journals belie the

rigour of the work. At Black Rapids, the week of March 9-14, saw one labourer employed for two days at "cutting stop Logs out of the Ice preparatory to getting them out to stop back the water in order to fix the flange of Sluice." (16) With such preparations completed, the stations had next to withstand the freshets and, during this period, the work could be even more demanding, the Lockmaster at Black Rapids listing the names of his labourers who had "worked from 12 to 13 hours each day at hard Labour...Securing and protecting the works During high water." (17)

Following the passage of the freshet through the works, lock gates and sluices would be closed, stop logs placed in the weirs, and water levels would be raised throughout the entire system and flood the works preparatory to navigation. Lockmasters were advised of their duties by Canal Order requiring them to "raise the water" at their stations and put the stop logs in place on their weirs to "retain a good supply for the coming season". (18) Again, however, the interests of the local country had to be taken into account and lockmasters were admonished to "be careful not to let the water raise at their respective stations beyond what is actually required for the Navigation" so that as little as possible flooding of neighbouring lands would occur. (19) Increasingly, however, such were the various demands upon the system that the main problem was maintaining a sufficiency of water for navigation during the summer months. Frequently, Lock Journals record orders received from Headquarters warning them of this problem: "The Season hitherto proving an

unusually dry one, a scarcity of water may be apprehended, to Guard against which as much as possible the several lockmasters are to take immediate steps to retain all the water they can." (20)

During the course of the navigation season, therefore, the requirement that lockmasters "...retain all the water they can" sorely taxed the abilities of the lock staff and the patience of the administration. All along the line of navigation, stations cooperated in maintaining levels by passing as little water as possible from the summit reservoirs. The synchronization of the actions of some 26 individual actors, the lockmasters at their stations, was coordinated by Canal Orders. Water moved from the summit via Newboro, Chaffey's, and Davis' to the Cataraqui section via Jones' Falls, a typical order requesting that

Lockmaster Simmons will run down three inches of water to Davis'. The Lockmaster at Davis' will pass it on to Jones' Falls, from thence it will go to Cranberry Level. Advise me what effects the last rains had on the levels. (21)

Or again, a general exhortation encouraging vigilance and efficiency:

Lockmasters will take every precaution to keep up the water in the Canal at their several stations and save all water possible having due regard to the safety of the works.

The report of any waste water through carelessness or inattention will be at once investigated and reported to the department....Weekly water reports to be punctually sent to the Head Office. (22)

And even then, despite such supervisory diligence, the

system did not work. Thus, the lockmaster at Long Island who let the water through "in a rush" without notice to the stations below was castigated, the incident being regarded as "the act of a man who does not know what he is doing and shows the grossest incapacity." (23) Superintendent Wise also had occasion to crack his whip at the Kingston end of the system. In November, 1872, the water level at the Davis' station was 1 foot 2 inches above navigational levels, resulting in the predictable squib from Wise:

This rise is in the face of orders you received from Mr. Abbott to let it down and keep it below navigable water in order that the repairs to be made this year would be facilitated. Lock masters must understand that they must promptly follow all orders given by the officers of the Canal and not take upon themselves to allow water to accumulate when orders to the contrary have been given them. (24)

The following fall, lockmaster Foster was exercising his initiative and independence of action in Wise's system yet again and, much to the disapproval of the latter, was holding back water "when it is needed below":

Mr Abbott wrote and verbally instructed you in this very point but in face of all this you are letting your end get up.

If you have not already done so take out some of your logs & notify Jones Falls you are running down to supply Cranberry.

A little more judgement on the part of Lockmasters is to be expected in these matters and if that is wanting more competent men must be put in charge of stations. (25)

In 1885 Wise had a problem with Lockmaster Read at Hogs Back as, on two occasions, his inattention to the levels had caused

the flooding of the road at Hartwell's. Further, these mal-controlled levels came close to making a break in the embankment south-west of the waste weir: "The practice of letting your sluices run all night without watching your level must be stopped, as you will be held responsible for any damage that may occur from the raising too high." (26)

Clearly, despite the essential logic of By's system and the diligence of the supervisory staff, ensuring lockmasters' cooperation in the task of water level regulation was a chronic problem. But other actors in the system were even less under the control of the Rideau administration. Increasingly, the waters were also used for hydraulic power by various enterprises. Theoretically, canal management operated on the assumption that it could exercise full control over mills powered by the system's water, a control that was specified in the original leases and the general Canal regulations:

All Owners of Mills, or those in charge of them, shall stop or shut down their Gates when directed by the Superintendent, or person in charge of that part of the Canal on which they are situated, and not at any time to draw down the Level below high-water mark.... (27)

While this gave the canal management substantial legal authority to regulate these other users, in practice, policing mills and other industries came to be one of the main problems faced by those charged with the responsibility of water control throughout the Rideau.

iii. An Emerging Problem

As the century progressed, therefore, administrators and lockmasters alike were sorely taxed to regulate the water at their stations in order to maintain navigation in such a way that that the rights of others would not be interrupted. Given the natural hydrological regimens, and given the increasingly diversified other uses, this was to prove to be an impossible task from the outset. As the nineteenth century unfolded and this trend continued to develop, the impossible became even more difficult.

Chapter Two: Old Challenges, New Pressures

The arrangements made for the preservation of the water for navigation exert their influence to the benefit of every water power user in the least degree connected with the main route. (1)

This extract from William Kingsford's report to C.E. Slater, the Superintendent of the Rideau Canal, was a comment on the extensive demands to which the limited supply of water was subjected, a comment that was as optimistic as it was unrepresentative of the prevailing opinions of many. Indeed, the report was penned at the very height of the political and commercial turmoil resulting from the decision to further develop the hydraulic resources of the Rideau by the granting of additional water power privileges along the Rideau and Cataraqui rivers. And at a time when the system was already demonstrating that it was unable to meet existing demands being placed upon it. But with the transfer of the responsibility for administering the system from the British Department of Ordnance to the Provincial Department of Public Works, the mandate of the new administration was broadened from "protecting the navigation" to encompass the wider responsibility of serving the "public good".

i. Floods and Droughts

Certainly, steps had been taken to ensure the mechanical efficiency and structural security of the navigational works, but there still remained the problem of

the proper regulation of the water supply. A problem from the first years of operation, effective regulation of the water levels was being rendered even more difficult by the progress of the clearing of the forests and the increase in settlement. Each of these developments tended to exacerbate the hydrological extremes. With the forests being pushed back by lumbering and agriculture, the spring run-off was increased and the protection of the works continued to be vital:

[The Rideau] is a system of navigation which deals directly with every flood of the country through which it passes, and in order that it may be placed in safety beyond the reach of these disturbing causes, its mechanical structures and appliances for regulating the water should be constructed on the most approved principles, and the superintendence should be in every way efficient. (2)

The extent to which the works could be threatened was demonstrated by the spring freshet of 1862. In that year, a flood "the like of it is not remembered" damaged or destroyed the bridges at Ottawa, made a 150 feet wide break in the waste weir at Hog's Back, flooded and weakened the works at both Black Rapids and Long Island, washed out all the mill dams and bridges on the tributaries, and left the communities of Perth, Richmond and Kemptville "suffering". (3) Extraordinarily high levels were experienced again the following spring although no damage was done to the works. Superintendent Slater reported that "If water was the only thing to contend with it could be easily managed, but every spring immense quantities of drift wood come down the River,

which choke the sluices." (4) Ice was a problem too. Slater reported that the works at Hog's Back were threatened by a mass so large that it took 30 men to move only a portion of it. (5) In 1870, the lakes were reported as being higher than ever before, and this after all the water that the canal could hold having been passed down. Timber, stone, and sod had been added to the canal embankments so that even though the floods were "more formidable" than those of the year previous, the canal was better prepared for them. Even so, Slater recommended damming the lakes at the headwaters of the tributaries and "some trustworthy local should be placed in charge" as they were so remote and difficult to get to and the "floods seem to be getting more troublesome every year." (6) During the spring floods, these were the ironic trade-offs: letting off water through the system to protect the works but attempting to retain as much as possible for future use; holding back water to protect the works downstream but by so doing raising lake levels and flooding adjoining lands.

The late summer months posed a different challenge, however. Throughout the 1860's, the operation of the Rideau was plagued by low water levels. Superintendent Slater was optimistic in the high summer of 1863, reporting that, "The Navigation has been Maintained during this Season. In consequence of the improved state of the Dams, there is an abundant supply of water, there being fully 2 feet to spare in the Rideau Lake." (7) A year later, however, he had to

report that water was getting low below Rideau Lake and he ordered his lockmasters to keep the reach below them up to navigable levels. (8) 1865 was a particularly bad year with the severe floods of that spring being followed by a virtual drought from May on. Navigation was interrupted, mills were forced to operate on a part-time basis, cattle were driven miles to find water. Not surprisingly, with the navigation interrupted, local business interests complained of the unprecedented break down and recommended corrective measures. M.K. Dickenson complained to the Commissioner of Public Works:

I regret that I have to represent that from the want of a proper supply of water on the Rideau, the obstructions on this route have finally culminated in the total suspension of navigation (for all practical purposes) between Ottawa and Kingston.

Much as my business has suffered heretofore such an event to the the same extent has not occurred during my whole experience on the route now twenty five years.

I do earnestly beg that some immediate steps be taken to increase the supply of water as at present the business of my line of boats on this route is destroyed. (9)

A similar complaint was directed to the Commissioner by J.M. Currier, who had been elected Tory M.P. for Ottawa in 1863:

I regret to say that on my arrival home [Ottawa] I find the water so low in the Rideau River and Canal that steamboats and barges are stopped from running (for all practical purposes) and that the mill[sic] are in the same conditions. The present is to request that you will at once order a report as to where and how the \$1500 which was appropriated for the improvement of this river shall be laid out to best

advantage.

If this money be not expended this fall of course no benefit can be derived from it next year, as the object is to retain the water back next spring keeping it in reserve against low water in summer which can be easily accomplished. I beg you to order someone to examine & report at once. (10)

The citizens of Kingston also complained of the interruption of the water communication between their city and Ottawa because of low water, arguing forcefully

that something be done as soon as possible in order that at the opening of navigation or soon afterwards there shall be a plentiful supply of water, that navigation be not impeded and that if necessary at any time to use the Rideau as a military line of communication it may not be comparatively useless as it now undoubtedly is for a great part of the summer season. (11)

Low water levels prevailed throughout the entire decade of the 1870's and each September saw the discontinuance of steamer traffic along the Summit and Rideau river sections of the waterway, together with other inconveniences. Thus, lockages of rafts of lumber had to be staggered to ensure a sufficient draught of water for this heavy demand, and one lockmaster faced a back-up of some 150 lock fills of lumber as he waited on the p[ro]vision of more water. (12) The impact of such interruptions can be judged by a communication from lockmaster McCann at Jones' Falls to the station above him:

You will oblige me very much if you give all the water You can spare today and Tomorrow, as I am passing 49 lockages of cedar. And now up to 10:30 am the water has fallen 4 inches on my upper sill. I commenced running at 6 am so you can judge how much I want. I

have passed up to 11 am 10 lockages. (13)

Other activities were interfered with to such an extent that in 1871 the forwarders, millowners, and manufacturers from the Kingston to Chaffey's Mills section of the waterway petitioned for relief. Their main recommendation was a new system of dams at the headwaters of the Cataragui but they too questioned the efficiency of the "superintendence":

That in a work of this kind embracing such a diversity of interests... necessitating the proper maintenance of Locks and Dams... can be looked for only in an active, energetic and efficient Superintendent, one possessed of more than ordinary capacity and decision to character, with considerable administrative ability. And that your memorialists regret to state that judging from the wide spread and reiterated complaints... a thorough change in the management [is] imperatively necessary. (14)

Apart from the limits being placed upon navigation and industrial development along the Rideau by the questionable reliability of the water supply, other promising developments were also being prevented. Recognizing that "water lot owners live in a constant dread lest the supply of water on which their whole operations depend and on the strength of which capital has been expended will be exhausted in the early months of Autumn," two petitioners, Lewis and Currier, identified a new opportunity being lost because of the parlous state of the navigation:

...if it were possible to pass from Kingston to Ottawa in ten or twelve hours... during the months of July, August, September and part of October, thousands of American travellers would make the trip, considerably adding to

the revenue of the Navigation Tolls, and leading to the expenditure of large sums of money at Ottawa, Kingston and the intermediate points. The extraordinary statistics of pleasure travel is suggestive of the extent such a movement would take in this direction...more especially as the Rideau Navigation lies in the main route to Montreal, and would certainly be followed by those tourists who had passed through the Thousand Islands and who have descended the Rapids. (15)

Others had shared the "wondrous beauty" of the Rideau with the petitioners, but they must have been among the first to explicitly predict future tourist developments.

It was obvious to all, administrators, users, entrepreneurs, and the local populace at large, that an improved system of reservoirs was needed. With this system in place, spring freshets could be constrained and summer droughts minimized. But before these problems could be addressed, the new administration was contemplating the addition of a new set of hydraulic users. Rather than Kingsford's sanguine assessment, conflicts over the protection of a sufficiency of water for navigation, the proposed expansion of hydraulic privileges, and the local populace's fears of insufficient volumes for milling, industrial, and urban needs, was to become a paramount issue of concern during the years that the Rideau system was administered by the Department of Public Works.

ii. Developing Hydraulic Power

Colonel By had originally recommended the leasing of the water privileges along the canal, arguing that their

development would improve the security of the canal works. It was not until 1845 that the Ordnance surveyed the hydraulic potential of each of the lock stations, and established the elementary ground rules for leasing which assured that Ordnance controlled the regulation of the waters, rights to re-occupy the lands, and was protected from any claims for compensation because of damages done by floods. (16) Even though the Ordnance recognized the financial returns to be gained from such initiatives, it was not until the transfer of authority to the Province that the potential for commercial development was realized.

The intentions of the new administration with regard to hydraulic rights were clear from the outset. The request for a lease of the surplus water at Long Island was very favourably received by the Superintendent of the Ottawa Works:

I am of opinion that all the water powers on the line of the Canal, so far as they do not interfere with the navigation, should be leased, as nothing tends more to improve a country by ways of increasing the population and introducing capital, than manufacturing establishments in full operation, to say nothing of the business that would, in this case be created for the Canal. (17)

If these were the ends, proper development required a survey of the water power resources. Accordingly, a preliminary inventory was taken in 1859 of the surplus water that had already been developed, that was suitable for development, and that should not be allowed to be developed. (18) Another

report in April, 1860 was more comprehensive and had been initiated by the Commissioner of Public Works "with a view of ascertaining where Water Power would be available and could be leased for Manufacturing purposes." (19)

This report prepared by J.D. Slater and H. Morrill recognized that "at certain Stations on the Canal, the waste water might be used for propelling Machinery," but then proceeded to list several qualifications: no leases should be allowed where "the Water might be drawn below Navigable height"; where leases were granted they should specify that there were to be "no claims for damages or compensation when the Water is let off"; where "hydraulic lots" were to be allowed, "Manufacturing establishments should be erected on the Bank of the River opposit [sic] to the Locks so that the Navigation not be impeded"; and attention was drawn to "the danger of Saw Mills filling the canal and River with saw Dust, Slabs, & other refuse which should be strictly prohibited." (20) With these caveats, the report inventoried the commercial prospects for the government's property: four hydraulic lots at Hog's Back with water power sufficient for driving four runs of stones or "any description of machinery"; one mill site each was assigned to Black Rapids, Clowes, Edmond's, Chaffey's Mills, Davis' Mills, and Brewer's Lower Mills, with a rent of \$16 per annum per run of stones and \$64 per annum for water rent; a "superior" site was identified at Jones' Falls but, because of its isolation, no developments should take place until roads and bridges were provided; mills were also favoured at the waste weirs of

Chaffey's, Davis', and Lower Brewer's, the latter being so isolated from other milling facilities that "it ought to be stipulated that a Grist Mill only should be erected at this place." (21)

Later that year, none other than Samuel Keefer considered the question of the possible use of the "remaining Surplus Water Power" and, having toured the line of the canal with Slater in attendance and the Slater and Morrill report in hand, was able to advise J. Rose, Commissioner of Public Works:

I had thus an opportunity of seeing on the ground how they proposed to carry out these Plans. I have the satisfaction of reporting that they appear to be judicious & that they meet with my entire approval. (22)

Keefer went on to report that, following meetings with Mr. Coffin who was in charge of Ordnance lands, that

it appears to me the time has arrived when for public convenience as well as for making the most of the Government property, some of these Water Powers with the Land necessary for there [sic] operation might be advantageously leased. Due notice being given in Canadian and some of the United States newspapers, these leases might be disposed of at Auction, and the remainder sold...as they come in demand. (23)

Keefer's recommendations were acted on expeditiously. In 1861, the Commissioner of Public Works reported that the Merrill and Slater report had been received, examined, and adopted by the Department and that, in accordance with this plan,

...Leases of the water privileges at Hogsback, Edmond's, Chaffey's, and Lower Brewer's have been advertised for sale, by public auction, to be held at Ottawa on the 15th April, next. Leases for the remaining privileges at Black's Rapids, Clowes', Davis's, Smith's Falls, and Jones' Falls, will likewise, be offered for sale, so soon as there may appear to be a reasonable demand for them. (24)

His attendant comment that "in the course of a few years, this work may be made self sustaining" was not unassociated with this new policy initiative. (25) Accordingly, Superintendent Slater was ordered to prepare for a public auction of leases of water power by circulating printed notices

setting forth the advantages that belong to the Water Power at Hogsback and which you can circulate as you may think proper, without however publishing them in Newspapers although they might furnish matter for Editorial writing on the subject if necessary. (26)

Water power lots were also auctioned off for Edmond's, Chaffey's, and Lower Brewer's, the sales being finalized on May 15, 1861. (27) The conditions of sale which accompanied the transaction included the requirement that "free roads" would be required, that the site at Lower Brewer's could only be developed for a grist mill, and that

It is distinctly to be understood that should any saw dust, slabs, edgings or any other refuse or rubbish be allowed to be thrown into the River or Canal from either Edmonds, Chaffeys or Brewers Lower Mills, it shall be the power of the Government to cancel the lease and stop the mill in addition to the fines proscribed by the rules and regulations for the management of the Provincial Canals. (28)

Later that year, pressure was exerted to develop the site at Kingston Mills, it being argued that "the people in the Neighbourhood are very anxious to have a grist Mill erected as there are none near there." (29) The site was transferred from Ordnance to Crown Lands on May 5, 1862 and offered for sale on March 7, 1863, with the condition that "The Water Power proposed to be let consists of the surplus water at this station, not required for the use of the Canal, this is variable but there is generally sufficient to drive six run of stone but the Government will not enter into obligations to supply any stipulated quantity." (30) That local entrepreneurs were not anxious to avail themselves of all of these speculative opportunities is clear from a survey of the milling enterprises in place by the end of 1863:

MILLS								
STATION	GRIST		SAW		SHINGLE		WOOLEN	
	No.	Stones	No.	Saws	No.	Saws	No.	
Hogsback			No Improvements					
Long Island	1	4	1	1	1	1	1	
Burritt's Rapids	1	3	1	3	1	2	1	
Nicholson's	-	-	3	37	1	2	-	
Merrickville	2	7	1	4	-	-	2	
Edmond's			No Improvements					
Old Sly's	1	4	-	-	-	-	1	
Smith's Falls	2	5	2	4	1	1	1	
Whitefish	1	3	1	55	-	-	-	
Brewer's Upper	-	-	1	51	-	-	-	
Brewer's Lower	1	3	-	-	-	-	-	
Kingston Mills			To let				(31)	

Clearly, Public Works had moved quickly and far along the road away from the Ordnance position of reserving the facilities at the stations for navigation and defence.

Henceforth, the management of the establishment would have to contend with demands motivated by concerns other than navigation, some of which had interests diametrically opposed to those of navigation.

iii. Opposition to Hydraulic Developments

Not all were in favour of this rush to develop the hitherto unexploited opportunities for Rideau water power. Superintendent Slater was nothing but consistent in his warnings about the danger of excessive use by mills in general and the special menace to navigation posed by lumber mills in particular. Thus, at a time when all the water privileges, at most of the stations were on the block he went on record as being opposed to the application to develop the water power at Newboro. His reasons were quite clear:

the waters of the Canal at Newboro are at the summit level, and that no more water is allowed to pass towards Kingston than is sufficient for Lockage, the surplus water of the Upper Rideau Lake, when there is any, falls into the Lower Rideau Lake at the Narrows.... It is necessary to economise this summit water strictly, or the navigation cannot be maintained thro' the season, and it would be highly improper on any account, or on any conditions to grant any Mill privilege in connection with this level. (32)

With water levels falling in Rideau Lake in 1864, Slater complained that under normal circumstances, there was a sufficiency of water stored for navigation, but not for milling too, especially as they were unregulated.

Accordingly, he recommended that

the Government should be particularly cautious hereafter about granting water power on the Canal, when once privileges are granted, no matter how small, there are constant applications for extension of them backed by political influence, and much trouble and expense is created thereby. (33)

On being requested to provide information about further power Slater reported that there was "no amount of any importance" left to be leased, added the opinion that the "late Ordnance wisely came to the determination to lease no more water power", and, finally, provided the gratuitous explanation for his views that mill owners were constantly expanding their machinery and were difficult to restrain from using the water so "abundantly" that it was to the detriment of navigation. (34) He had plenty of proof to support his case. Thus, at Smith's Falls, "the Lock Master has found that he could not fill the Basin, and has found this slide open and feeding the water to the Mills, instead of filling the Basin." (35) Later that same year, forwarders complained that the mills were running "day and night" at a time when navigation was marginal and Slater responded by directing the lockmaster at Long Island that "we cannot run water enough down from the Lake to supply the Mills and waste, you will therefore have to stop the Mills unless the Water is absolutely required below your Station." (36) For Slater, therefore, the principal cause of low water, and frequent interruption to navigation was caused by the Mills, which were being continually enlarged, and appropriating water

which could not be spared.

In particular, the primacy of navigation was to the fore in his focussed position to lumber mills as, despite canal regulations and conditions of leasing, "the Navigation of the Canal is being nearly destroyed by refuse from saw mills." (37) His comments on a specific proposal to establish a mill at Chaffey's Lock reveals his general concern:

I should not recommend that any saw mill, or other establishment for manufacturing timber, be allowed at this place, on account of the refuse being allowed to fall into the Canal, which under any circumstances, can scarcely[sic] be prohibited, but would encourage Grist Mills, or other factory which would give employment to the people, and benefit the country, without injuring the navigation. (145)

Some of Slater's other reasons were more sensitive than pragmatic. Having recognized the "picturesque" and "pleasantly situated" attractions of the Hog's Back station, he had the prescience to recommend that it be reserved as it could be "laid out into park sites when the population of Ottawa begins to increase." (39) Jones' Falls elicited a similar reaction and, despite the "superior Water Power at this place", he argued that "the grounds and scenery are very beautiful, and are much admired, it would therefore be a pity to destroy these, without some corresponding advantage." (40)

The government announcement that expanded hydraulic privileges were to be offered was met with considerable opposition from other quarters also. Noting the newspaper advertisements of the Government's intention to lease

additional water rights along the Cataraque section, Gananoque mill owners petitioned Commissioner Rose that the water diversion effected by the Whitefish Dam had been "originally authorized and can only legally be applied for canal purposes" and that he prevent "any further appropriation of water power for milling purposes." (41) Clearly, the manufacturers of Gananoque led by the Gananoque Water Power Company feared that the new developments would further diminish the water supply to the Gananoque river via Whitefish Creek, a supply which had already been restricted to only that water considered to be surplus to the navigation needs of the Rideau.

The historical precedents for the claims presented by the millers of the Gananoque were well documented. Prior to the War of 1812, two Gananoque millers, Lemuel and John Haskins, erected a dam at Whitefish Creek. Their objective was to interrupt the flow to the Gananoque river in order to increase the head of water in the lakes behind for milling purposes. Later, Lemuel Haskins had constructed a second dam at a narrow section of the drainage which came to be known as the Round Tail; this dam directed the drainage of the Dog and Cranberry lake systems to the Gananoque at the Whitefish dam. Following the collapse of the original dam at Whitefish, John Brewer, the proprietor of a mill at Brewer's Mills, had joined with the Haskins brothers in replacing and improving the dam there, so producing a more extensive reservoir system in the Dog, Cranberry, and Whitefish lakes

to supply their respective milling interests along the Cataraqui and the Gananoque rivers.(42) The original delineation of the natural drainage system and its local use was well recognized locally. One settler of long standing, Isa Haskins, noted "the natural outlet of the Lakes above Jones' Falls was originally thro' Whitefish Creek and the natural outlet of the lakes below Jones Falls was by the Cataraqui."(43) For another, Charles Chrysler, "John Chrysler[sic] had a contract for masts, spars and oak with the Imperial Government and brought the timber from Rideau Lake by the Whitefish to Gananoque in preference to the Cataraqui route - this was a short time before the canal commenced say about 1822 to 1827."(44) But, however well documented the claims for a formerly more extensive Gananoque drainage system, in 1827, John Haskins and John Brewer had sold their milling privileges to the Ordnance to make way for the Rideau canal. A large dam was constructed at Morton, drowning out the one at Round Tail, diverting all the waters down the Cataraqui, and leaving only a modest overflow to the Gananoque system.(45)

The case for the Gananoque Water Power Company rested on the assertion that the Whitefish Dam diverted the natural flow of water, to the detriment of the Gananoque, for the express purpose of providing sufficient levels for navigation. The new proposal to direct some of the diverted waters to new milling activities along the Cataraqui section of the Rideau system contravened, it was claimed, the original agreement. Further, the increased demand for water

would eliminate any surplus water at Whitefish and, therefore, diminish flows along the Gananoque. The Gananoque mill owners' petition to the Commissioner of Public Works insisted that an investigation be mounted by a competent engineer to "prevent any further appropriation of water power for milling purposes below the level of the said Whitefish Dam." (46) That geography alone did not determine opinions on this matter is demonstrated by the support afforded the Gananoque position by Benjamin Tett. He communicated to Commissioner Rose that "when the Canal was first constructed the water was diverted from the Gananoque River by the erection of the Whitefish Dam for Canal purposes but not to increase the quantity of Water for Mill puposes as at present advertised to the great injury of the Mills on the Gananoque Rivers", adding that he supported the Gananoque millers so "that the rights of property in private persons may not be interfered with." (47) Whatever the merit of the historical evidence, Superintendent Slater was persuaded by more pressing contemporary arguments: water had to be passed down to Kingston Mills because of the loss due to the leak there, because of the considerable loss due to evaporation along the Drowned Lands, and because of sanitary considerations. He closed his case with the telling argument, "If the Government has not the legal right to despose [sic] of the surplus Waters, in that case it would not be advisable to grant any Milling privileges at Lower Brewer's", others in existence being dealt with later. (48) A similar practical observation

was advanced by the veteran of the Rideau, Thomas Burrowes, the former Overseer and Clerk of Works, who was well acquainted with the Rideau from the early days of construction: "there is as much leakage (that cannot be controlled) thro' the dam at Kingston Mills as will drive a mill, this has to be supplied thro' Brewers and this power might just as well be employed for the benefit of the country as to be allowed to be wasted." (49)

With the Cataraque leases assigned, the dispute continued into the crisis decade of the 1870's, the question of the allocation of water to milling interests adding to the pressure to find some solution to the problem of falling navigation levels. The Gananoque Water Power Company had again pressed its claim for its share of the Rideau waters via the Whitefish Dam, this time advancing the reasonable request that the waters above Jones' Falls be allowed to flow into the Gananoque at the close of navigation. The Department thought this to be "just and reasonable and should be the policy in the distribution of surplus water after the close of navigation as between the interests of Gananoque and those in the direction of Kingston Mills", provided a sufficient flow was protected for the three government leased mills below Whitefish Dam. (50)

Initially, the concept had been to develop the waters surplus to the needs of navigation as supplementary revenue for the Government operation of the system. As predicted by Superintendent Slater, however, such were the demands of the millers, and such was their political influence, that they

would become an influential pressure block affecting the policy for the development of the Rideau. Nowhere was this more clear than with the dispute over the division of waters between the milling interests of the Gananoque and Cataraqui systems. While the three mills between Jones' Falls and Kingston (Upper Brewer's, Lower Brewer's, Kingston Mills) employed only 20 persons, they were Government mills and paid annual rentals for their water privileges. (51) On the other side of the Whitefish Dam, however, there were 21 private mills, employing some 594 hands in the water powered production of shovels, springs and axles, hinges and nails, agricultural implements, harness and snaths, sashes and doors, woolens, rivets, hubs and spokes, iron products, as well as a tannery and grist and saw mills. (52) An equally diversified hydraulically powered industrial economy could be found along the Rideau below Smith's Falls and its water needs, together with the demands for navigation purposes, added to the pressure for improving the water supply for the system. Dividing and allocating the waters between the interests of commerce, milling, and industry was a new responsibility for the policy makers and managers.

iv. Planning for Expansion

Major fluctuations in water levels and increased conflict over use of that water which was available clearly argued for a reappraisal of the hydrological resources upon which the Rideau system depended. Accordingly, in March,

1865, a report was presented by the Select Committee appointed by the Government of the Province of Canada

to enquire into the feasibility of regulating the supply of water in the Rideau Canal, and to the mills thereon, by means of retaining-dams on sundry lakes, being the head-waters of the Rideau River, and also of considering the practicability of, and the advantages that would arise from, the opening up of the navigation between these lakes and the Rideau Canal. (53)

With the benefit of advice from Thomas Keefer, the Committee arrived at a determination of the cause of, and the solution to the problem posed by the "severe freshets in spring and very low water in summer" attributing them to

the clearing up of the country, which causes the ice and snow in the interior to melt earlier than was formerly the case, and also to the better drainage of the country, allowing a more rapid discharge of surface water than previously took place.

To remedy these evils the Committee are persuaded that all that is necessary is, in the words of one of the witnesses, "by artificial means to do what the swamps and woods effected before they were cleared up; that is, to collect and hold back the surplus of the flood-waters, and feed them out as required." The way to accomplish this desirable object would...be by the erection of a few retaining-dams and waste-gates upon the Lakes on both sides of the canal, which could be effected at a small cost. (54)

While a recommendation was made regarding the extension of navigation via Otty, Long and Adam's lakes to within two miles of Perth, the committee considered the "maintenance of a sufficient supply of water" to be the larger subject, affecting "the Province at large, as well as the section of

country through which the canal passes":

The canal is indispensable to the towns and villages, and the large commercial and milling establishments created by it, and is also of the greatest value to Ottawa and Kingston, its termini. It is, besides, of the utmost importance that the Province should be in possession of an internal route of navigation, lying away from the frontier, and consequently less exposed, and that the route should be in such a state of efficiency as to be serviceable in the event of interruption of the St. Lawrence Canals, from any cause. (55)

To this end, the Department of Public Works was charged with the responsibility of a thorough examination of the tributary lakes to determine the most "efficient and yet economical" improvements. Three distinct drainage basins were specified:

1. The Wolfe Lake system draining into the Rideau at Westport.
2. The Bob's Lake, Myer's Lake system feeding the Tay River and linked to the Rideau via the Tay Canal.
3. The Devil Lake system feeding into the Rideau at Bedford Mills by Massassagua Creek.

The Committee's report was underscored by the occurrence of an "unusual drouth" in late 1865 and although the canal remained open for "small steamers and sailing vessels", mill operations were interrupted and "large passenger steamers were laid up about a month." (56) For Slater, as with the Committee, the solution was obvious: "There is an abundance of water every year for both these purposes [navigation and milling], if only it could be retained and economized"; the principal reservoir was Rideau Lake and steps should be taken

to "supplement this reserve". (57)

As early as 1864, James H. Rowan had been dispatched by the Department to produce a preliminary examination of the extensive Devil Lake drainage basin. While existing maps were quite unreliable, he estimated that there were some 25 to 30 lakes, ranging in size from 30 to 3,000 acres, and draining at least 87 square miles in the townships of Loughborough, Storrington, Bedford, and South Crosby. Not only were these lakes large but they were possessed of high and bold rocky shores and narrow outlets which facilitated dam construction. (58) Dams had already been erected along Massassagua Creek by the local entrepreneurs, Benjamin Tett and George Chaffey. The dam at Buttermilk Falls had been maintained there in its present form for over 25 years and served to raise Devil Lake by 3 feet; another dam at the western end of Devil Lake raised Mud Lake 7 feet and Knowlton Lake 2 to 3 feet. (59) Apart from originally facilitating the Tett and Chaffey lumber operations by allowing them to float their timber to the mills at the foot of Devil Lake and the junction with the Rideau canal, these men pointed out to the Commissioner that their dam had also served as "a much needed reservoir for the Rideau Canal." (60) John Chaffey went on to offer his services in the construction and maintenance of dams if the Department would assume them as public works, and also exempt him from any claims for flood damage. (61) It was well recognized that the "Chaffey's Dam", as it was locally known, was an important and integral part of the Rideau water regulation system. By 1871, however, with the

dam in a serious state of disrepair and Chaffey discontinuing his operations there, the old "Chaffey's Dam" was replaced by the "Dominion Reserve Dam", a 4 feet wide sluice, 50 feet long at the crest, and 12 feet high. (62)

Elsewhere dams were established throughout the headwaters of the Tay system, Slater reporting that "if the water of these Lakes is reserved it will flow into a series of Lakes, the head waters of the Rideau, and into the Upper Rideau Lake which is our summit level, and could be sent either way (viz) towards Kingston and Ottawa." (63) The first dam was constructed at the outlet of Eagle Lake in 1865, the expenditure of \$830 raising the water level some 10 feet and, in the same year, the burnt dam at Crow Lake was repaired, so increasing the lake level some 20 feet there also. (64) Repairs to the dam at Poonamalie and deepening of the channel there also served to increase the capacity of the crucial Rideau Lake reservoir. (65) Slater considered the best prospect to be a dam at Bob's Lake and, accordingly, a dam was constructed there in 1871, with another at Mud Lake. Not only did the new works increase the storage capacity of these units and allow for the better regulation of the waters for the benefit of the Rideau navigation but they also did much to improve the security of water supply for the 20 millers along the Tay between Bob's Lake and Port Elmsley. (66)

With this formal extension of the Rideau sphere of influence, other interests asserted themselves and, despite the promised advantages, the new dams did not meet with

universal approval. Indeed, water control practices and engineering works directed at improving the system had long had to contend with local opposition. Thus, the first section of the system where "water fails" each year was at Kilmarnock station and, in an attempt at alleviating this problem, dams had been established there to prevent water escaping into lowlying lands called the "Break Ground",

...but the inhabitants of the neighbourhood open the channel again as often as it is closed, to drain the lands, as they are valuable as meadows or pasture lands. No one can be got who will give information of the offenders. (67)

Or again, ever since the original construction of the dam at Bedford Mills in 1832, fluctuating water levels had occasioned damage claims against the Chaffeys and, even though many of these were advanced by settlers who had taken up land long after the construction of the dam, they were paid to avoid unnecessary trouble. This was obviously a potential problem for the Department and in order to minimize future claims, the Department of Crown Lands was requested to add the proviso to all land patents in the townships of Loughborough, Portland, and Bedford that

it shall be lawful for the Proprietors of Mills and for the Department of Public Works to maintain the waters of the Lakes and Streams adjacent to or upon the said lands hereby granted, at the highest level attained at any time previous to the date hereof without liability for Damages to the said grantee his heirs or assigns.

Reserving also the right to the Crown to overflow the whole or any part of the land hereby granted without liability for damages to the said grantee his heirs, successors or assigns. (68)

Not content with this, Public Works requested even more of Crown Lands, urging that as improvements were being made in the vicinity of several lakes throughout the townships of Hinchinbrooke and Bedford, "with a view to increasing the supply of water in the Rideau Canal and that these improvements will flood adjacent lands", that no further land grants be made until the works were completed.(69) Those already settled throughout the area concerned had to be dealt with, however. Farmers complained that their "valuable" lands were being drowned or rendered unserviceable by waters backed up for repairs such as those at Poonamalie or by the annual flood control operations. These could be considerable and some were thought to be patenting land in vulnerable areas simply for the annual damages that could be claimed. Others were more concerned with the destruction of their property and the interruption of their activities. Their pressures must have had some affect as by November, 1875, Prime Minister Alexander Mackenzie, who also served as Minister of Public Works, had been persuaded that the government dams on the Devil's Lake system should be abandoned and that no more damage claims entertained.(70) Hearing of this report, the local M.P. and a remarkably venal Liberal, S. Shibley, wrote to Mackenzie expressing his full approval of the proposed action:

Upon enquiry at your department a few days ago I was pleased to learn that the Government had decided to abandon the Dominion or Government Dam between what is known as Mud Lake and Devil Lake in the riding of Addington.

Thereby giving the people an opportunity[sic] of reclaiming their lands in stead of getting [compensation] for [damages] which will please them much better. (71)

However, the Department never had the opportunity to officially implement its new policy. The decision was made for it. On July 26, 1876, Chaffey's Dam was "entirely torn up and floated away by a gang of evil disposed persons" disguised with blackened faces. (72) Well organized opposition was also met with in the Tay region. The first estimate of damages for the lands drowned by the raised levels of Bob's Lake amounting to over \$11,000 although they were later "evaporated" to less than \$3,000. (73) The threat of their "valuable" lands and "hard earned roads" being drowned prompted petitions signed by some 115 farmers and inhabitants. (74) Not satisfied with their treatment, local people vented their spleen on the offending dams and, after two unsuccessful attempts at blowing it up, the dam at Eagle Lake was eventually burned in 1875. (75)

Despite this opposition, these developments in the headwaters to the west of the Rideau did afford some relief to the water users in that section of the country. They did little, however, to alleviate the concerns of the interests to the south and east, and, in particular, the Gananoque interests continued to press their case. Thus, in 1872, the "Mill Owners, Merchants, and Agriculturalists, residing along the valley of the Gananoque River" petitioned Sir Francis Hincks, Minister of Finance, for redress of past grievances and improvements of their water resources. (76) The petition

system were originally to be Cranberry Lake, the outflow which furnished "numerous Mill : the route, and large motive which was occupied and appl many industrial pursuits."

2. That because of water shortages on Rideau, "a portion of this overflow turned back - at first perhaps a quarter, then half of the stream until within the last ten or fifteen years, the supply on the Rideau become so short, that during two or three months in the year, the whole stream has been withheld, greatly to the damage and inconvenience of you memorialists."
3. That the Gananoque drainage basin could be rendered "navigable for boats of light draught at a comparatively slight expense, and furnishing thereby a coast line of over one hundred miles."
4. That approval had been granted in 1837, but no action had been taken.
5. That while other sections of the Rideau country had been favoured with government projects, South Leeds had been neglected, the surplus water provided by the project "in some measure compensate for the appropriation of waters to the use of the Rideau Canal, and open up a section of country now cut off from direct communication with markets - and add greatly to the population of this section, with corresponding increase in the various industries."
6. That given the 1837 precedent, past damages suffered, and the potential benefits of the works, "the whole subject will receive that attention which its importance demands." (77)

In an attempt at a rational clarification the claim of the contending interests and a possible technical solution

the problem, in 1872 William Kingsford, C.E., had been commissioned to investigate the potential for improving the water supply in the Cataraqui-Gananoque headwater region. His report addressed this question and also the possibility of integrating a navigable route along the Gananoque river with the Rideau system. (78)

Kingsford's survey determined that the headwaters of the Cranberry Lake system which originally drained at Whitefish were very indeterminate, had been much altered by the Rideau works, and was, therefore, artificially connected with its present feeders. Prior to these alterations, the original Cranberry Marsh headwaters appeared not to have been very extensive. Kingsford argued that rather, there had been several lakes which had been formed in "isolated geological pockets at different levels, many with the slightest water thread of connection, and generally speaking maintained by the spring freshets." (79) His conclusion, therefore, was that the real headwaters for the Gananoque were to be found not in the Cranberry Lake area but in the Beverly and Charleston lakes. With this determined, the implications for the question of the Rideau water supply were quite clear:

That formerly when the water in the dry season was at a low level, little or no water flowed from the Northern Lakes, and that accordingly when in parallel circumstances the Morton By Wash is closed no waters are diverted from the natural course to supply the Rideau Canal. (80)

As for improving the water supply for the Rideau, "very little increase can be made in any way to the Supply beyond

carefully guarding the dams against leakage, and that nothing further can be advantageously done to obtain further storage of water, that all artificial aid is now exhausted." (81) Nor could he envisage any projects for the diversion of some of the Rideau waters for the use of Gananoque interests:

No Engineer writing with any sense of responsibility can countenance such a hope for a moment. The Rideau Navigation will exact all the water it can ever command. Its importance is paramount to every other consideration. ...The writer considers it his duty respectfully to offer the remark that it would be a wise policy for the government at once to establish the principle that the waters of the Rideau Navigation can in no way be diverted to its injury to benefit any other interest...and that the water communication itself must be distinctly held to take precedence over everything so ever which may come into opposition with it. (82)

Kingsford was more positive about the possibility of opening the Gananoque river for navigation, a task that could be accomplished at the "moderate expence" of \$109,205, claims for damages excluded. (83) An improved "Gananoque Navigation" would be of benefit to the area, extending "facilities to a district which now languishes from a tedious land carriage over indifferent roads." (84) He did recognize, however, that "an increased supply of water at Gananoque is held of higher account than the development of the navigation of the River", and pointed out that the improvements required for navigation would also serve as storage facilities for the spring freshets along the Gananoque system. (85)

Needless to say, the Gananoque interests were not

entirely satisfied with this report. The promise of improvements along a system extending from Gananoque to headwaters in the Beverly and Charleston lakes was not sufficient. The Gananoque Water and Power Company returned to its basic premise that the Cranberry system and the lakes above Jones' Falls were properly part of the Gananoque watershed, the natural outlet for these waters being at Whitefish. Using Ordnance documentation from the original construction period, they argued that

it is shewn that all the Lakes to the North were connected with streams and flowed into Cranberry Lake, and also that a large marsh called Cranberry Marsh existed between the waters running from the north and those running from the chain of lakes to the west which supply the Cataraquei. (86)

With Kingsford's failure to identify any definite "dividing ridge" or watershed, the Gananoque Power Company considered that the question could only be resolved by natural "outlets", the final resolution of the issue being clear to them:

up to a certain level the Whitefish was the outlet for any water that came from the chain of Lakes to the north during low water and similarly the Roundtail the outlet for the chain of lakes to the west - Cranberry marsh at that period dividing the waters to a certain extent - When the water high it covered the marsh and both waters became one and had the two outlets in common. At the very lowest stage of the waters very little, if any water passed over the outcrop of the Rocks at Mortons or the Roundtail. (87)

Despite the severity of the water shortages, therefore,

little was actually done to effect major improvements. However, certain advances could be marked up. First, it was now clear that the originally defined Rideau system did not hold sufficient water for its needs. Secondly, even though abortive in this period, future years were to see the attention being focussed again upon further development of the hydrological resources of the Wolfe Lake, Devil Lake, Tay, and Gananoque systems. Thirdly, if no major construction projects were initiated, the water supply crises had underscored the importance of efficient water management practices. Finally, it was also becoming clear that managing the Rideau Navigation required that attention be paid to other interests such as industry, agriculture, and the general public.

v. New Pressures

While the improved and diversified commercial development of the Rideau system increased revenues and helped stimulate the economic and social development of the region it served, it also imposed new pressures on the integrity of the system. Increasingly, pollution in several forms came to be a concern for the management of the canal challenging not only the navigation but other interests as well.

The first concern, however, was with an unfortunate by-product of the policy of developing the hydraulic privileges of the Rideau for milling purposes. All along the line of the canal, but especially at Smith's Falls and

Ottawa, refuse from the mills threatened physically to impede navigation. Such was the refuse from the saw mills at Smith's Falls that at the close of navigation lockmaster Buck had to employ his labourers at clearing away up to four feet of bark, edgings, slabs, and sawdust which had sunk against the upper gates. He also reported that there was also an embankment of refuse in the channel, 165 yards long and extending from shore to shore, leaving only a three feet clearance for navigation. His was a futile battle as there were no controls, the "saw mills work constantly", and the deposits of refuse were "still increasing". (88) By 1868, the problem had become so severe along the section of the canal from the Combined Lock at Smith's Falls to Sly's station that it was almost unfit for navigation:

the water has to be kept a foot above stated navigable level, and the vessels have to go very slowly. The sawdust and other refuse is disturbed by the boats passing which makes the water quite thick. (89)

This report went on to identify the seriousness of the problem at the locks at Ottawa, as was reported in 1868:

The lower lock is filled in the chamber about two feet with the refuse, and it takes six men from one to three hours to clean the recess after every Boat passing that touches the deposit, and Barges are much impeded by the floating stuff. The men have sometimes to put out lines one hundred feet and have to warp into the lock. The trouble at this station is yearly increasing and will shortly cause considerable expenditures to maintain navigation. Much trouble has been caused along the line of Canal...some parties have been brought before Magistrates, and the nuisance

is now much abated. (90)

At the Upper Brewer's station, however, an extensive mill business did not pose a problem as all sawdust and other refuse was disposed of by the "inexpensive and simple" expedient of carting it away and burning it.

Regulations were in place to prevent such obvious obstructions to the navigation but were difficult to enforce. Lockmaster Buck had pressed the local offenders to no avail, the local mill owners being "powerful and no one in this place [Smith's Falls] likes to incur their hostility." (91) Given the severity of the abuse, the Department did attempt to limit it by refusing to grant additional privileges. Thus, in 1867, an application by a Mr. Forster to erect a saw mill some 30 feet from the canal at Lower Brewer's was denied because the Department feared it would be unable to enforce the prohibition of the dumping of bark, edgings, and saw dust. (92) Elsewhere, enforcing the canal regulations and provisions of the hydraulic leases were futile. By 1869, Superintendent Slater urged that action be taken against mill owners, arguing that the shingle mills were the worst offenders, and complaining that "they have been threatened, and have promised fairly, but they now sit us at open defiance." (93) Local magistrates were willing to enforce the penalties but were unsure how to proceed and Slater requested authority to take legal action.

While the Department of Public Works was struggling with the best means of asserting its authority, another interested party, the Fisheries Branch of the Department of

Marine and Fisheries, directed its attention to the problem. A circular to all lockmasters advised them that as mill owners along the canal had not ceased throwing refuse into the river, the Minister had ordered that legal actions be commenced. Further, since it was desirable that lockmasters and labourers give testimony, an inducement was offered that those giving information would receive a portion of the fines!(94) On the same day, another circular from the Ministry of Marine and Fisheries was directed to the offending mill owners at Merrickville, Nicholson's, Burritts, Smith's Falls, and Manotick, complaining of the dumping of refuse, to the "continued injury of the fisheries and navigation" and requesting that they provide statements before proceedings were commenced.(95)

The practise could not be abated immediately, however, and two years later Superintendent Slater was still complaining of the threat to navigation at the Ottawa locks. With a sawdust deposit of 3 feet 4 inches in the lower lock chamber reducing the draught there to just over three feet, he reported the extraordinary efforts required to keep the lock operational: "I have employed two additional men at this Lock, every vessel that passes down drags some of the rubbish into the recess and it has to be raked and scraped out before the gates can be worked."(96) Others were concerned too that the general commerce of the country was being interfered with by the steady deterioration of the facilities at the Ottawa terminus of the canal and the Ottawa Board of Trade,

the City of Ottawa, and a group of Ottawa forwarders, all petitioned the Governor General. The Board of Trade's petition was typical of these several appeals:

The Memorial of the Ottawa Board of Trade Respectfully Sheweth
That the approach to the entrance of the lower lock of the Rideau Canal, from the Ottawa River and the Chamber of the aforesaid lock is obstructed by Saw dust, slabs and other substances to the great detriment of the traffic.
That the basin above the works is encumbered with wrecks and needs dredging and that its shore requires to be converted into wharves for the accommodation of trade.
Your Memorialists respectfully request that your Excellency by and with the advice of your Council will cause such measures to be taken as may afford the traffic of the Canal the necessary relief in these particulars. (97)

The situation was no better upstream, and the lockmaster at Merrickville appealed to Inspector Caldwell of the Department of Marine and Fisheries:

Dear Sir,
I beg to call Your attention to the great Quantity of saw dust allowed to go into the River & Rideau Canal above my station. Please come up and have a stop put to it. As in a very short time it will interfere with the navigation And the destruction of the fish. (98)

Apart from the effect on navigation, therefore, the industrial use of the Rideau waters was attracting attention because of its ecological impact. And it was not only the millers that were to blame. At Ottawa, the proximity of an expanding urban area to the waterway posed a problem of even greater proportions. The most pressing problem was the Bywash carrying off surplus water from the waste weir in the

vicinity of St. Paul, Rideau, and George Streets. A petition from the residents and endorsed by Mayor Dickenson complained that it was "a receptacle of filth", a "grievous eyesore", and recommended that it should be replaced by a sewer as in its present condition it was "endangering the health of the Citizens." (99) Similar petitions were submitted over the next few years, culminating in a report prepared by a committee appointed by members of the local "Medical profession". (100) Their report was a comprehensive one, concerning itself with various measures to "prevent the spread of cholera and other diseases": the clearing of deposits of filth and the disinfecting of water closets by April 15; the removal of night soil with the "greatest care" so as not to interfere with the water supply; the monitoring of such noxious enterprises as tanneries, breweries, soap factories, stables, slaughter houses, and piggeries; the chimney heights of industries were regulated to prevent "foul air"; the appointment of a Medical Officer, the provision of hospital accommodation, and the enforcing of vaccination. (101) Attention was also directed to the waterways administered by the Department of Public Works: the Bywash was to be deepened to prevent seepage into neighbouring cellars; as soon as possible it was to be covered to "arrest the spread of disease". Prior to the report, Superintendent Slater had advised his superiors that the current practise was to cleanse the Bywash by flushing it about two or three times a week during the summer months, although it was so surrounded by buildings that it resulted

in much flooding of basements.(102) On receipt of this report, Superintendent Slater reported that the Bywash extended some 4,844 feet from the Canal Basin to the Rideau River and that it could be deepened, culverted, and covered at a cost of \$3.00 per lineal foot.(103) The Department was left in no doubt that the Bywash was "a receptacle for every description of filth such as cannot fail to pollute the atmosphere...especially during the summer months."(104)

Ironically, the Minister of Public Works was petitioned in 1868 to allow the construction of a public "swimming and plunging bath" in a section of the Bywash, the water being supplied by the canal waste waters.(105) Not surprisingly, Slater advised his superiors against the proposal:

I should not consider this a proper place to erect a Bath, the water in the first place is dirty and stagnant, and it would be placed along side of a very extensive Tannery, the odors from which are not particularly nice in hot weather, tho' there are no very serious objections to granting the privilege.(106)

As ever, he was more concerned with protecting the navigation than the public and the clinching argument was that "the patrons would get in the lockmen's way."(107) Despite this more generous view, the infamous Bywash continued to be a "source of continual danger to the health of the inhabitants of the City of Ottawa" due to the accumulation of filth there. This communication from the Corporation of the City of Ottawa to the Governor General noted that the Bywash was owned and controlled by the Dominion and repeated the recommendations of earlier years:

That in order to obviate the danger to the Public health from the present noxious condition of said Bywash...should this City unfortunately be visited by Cholera or other serious epidemic, it will become a matter of necessity that the same should be cleaned out at Stated Periods during the summer months, or otherwise covered in, so that it may not any longer continue a public nuisance. (108)

Slater favoured the covering of the Bywash, although he did point out that prior to the provision of waterworks it had been an important source of water for fire control. (109) By the spring of 1875, however, the Bywash was being replaced by a sewer along its length, thus eliminating a major health hazard for the populace and a management problem for the Department of Public Works. (110)

Chapter Three: The Canal Commission and the Rideau

The question of the sufficiency of water supply along the line of the Rideau Navigation bulked large in the attention directed by a major inquiry into the condition of Canada's canal system. In November, 1870, a Royal Commission was appointed to investigate the state of Canada's canals. The cabinet assumed

that the improvements required for the development of the trade of the Great West, and the affording such means of access to the sea-board as will attract a large and yearly increasing share of that trade through Canadian waters, as well as a thorough and comprehensive improvement of the Canal System of the Dominion on such a character as to afford ample facilities for the expansion and due development of its growing trade and commerce, are objects of the highest importance to Canada....(1)

The Canal Commission was charged with a series of specific tasks, including a study of "The Rideau Canal and its improvement, and the development of trade through the same."(2) The commissioners constituted a blue-ribbon group of Tory businessmen: C. S. Gzowski, a prominent Toronto engineer and contractor; George Laidlaw, an important Toronto businessman; Sir Hugh Allan, the operator of the Montreal-based Allan line, a key trans-Atlantic shipping enterprise and the man who in 1872-73 was chiefly responsible for the Pacific Scandal which wrecked John A. Macdonald's first post-confederation government; and, Pierre Garneau, William J. Stairs and Alexander Jardine, business leaders from Quebec

City, Halifax and St. John respectively. The final member of the Commission was Dileno Dexter Calvin of Garden Island, near Kingston. Calvin was an important lumber baron who made extensive use of the Rideau system. (3)

The work of the Canal Commission took place in 1871, eight years before the Rideau Canal was placed under the jurisdiction of the new Department of Railways and Canals. However, both the Canal Commission and the creation of the new department were products of Macdonald's Tory policies and were closely related to the economic concerns and policies of Canadian conservatism. The Conservatives, of course, were out of power, 1873-78, and the grand economic policies of Sir John A. lay in abeyance during those five years. It is appropriate to look at the Canal Commission, however briefly, within the context of the Conservative regime that resumed power in 1878 and used some of the Commission's recommendations to formulate late nineteenth century transportation policy. At the same time, it must be understood that the Rideau system did not loom large as a part of the post-confederation Canadian transportation system.

The Canal Commission solicited views from a wide variety of sectors of business and public opinion. The Royal Commission's evidence so produced provides insights into contemporary views of the Canal and its utility. One of the questions posed by the commissioners was: "Is it your opinion that the business of this Canal is of sufficient importance to warrant any outlay for improvement?" (4) The various

answers given reflect the diversity of regional and entrepreneurial interests of the users of the Rideau. B. Tett, M.L.A. (Ontario) was of the opinion

...that the business would warrant an outlay for improvements. The Canal passes through an old and well settled country, and supplies the cheapest mode of transport for merchandize to and from Kemptville, Merrickville, Smith's Falls, Perth, Newboro, and other places of business. It should also be remembered...that the Rideau Canal was given over to the Canadian Government upon the understanding that the Canal should be kept open, and in proper repair. (5)

Hiram Easton, of Merrickville, commented:

Thinks Canal pays, inasmuch as it supplies manufacturing facilities to villages along its route; should happen that the Canal were closed, a large number of enterprizes [sic] would be ruined, and a large amount of wealth unavailable. (6)

Naturally, J.D. Slater, in his capacity as a Superintending Engineer, took the opportunity to press his case for the importance of navigation, arguing the case for further expenditures by demonstrating particular economic consequences:

...that the present trade is chiefly local. For instance, Ottawa and Kingston consumes [sic] in round numbers, 100,000 cords of wood annually, and of this quantity about a 1/3 is procured from the Rideau Canal; and were it not for this supply, the consumer would have to pay at least one dollar more per cord. (7)

Slater found that the principal tolls [werel] collected on Salt, Wheat, Coal, Firewood, Floats, Traverses, Railroad

ties, Shingles, Sawed Lumber, Saw-logs [and] Pork...." (8)

John Chaffey, from Newboro, opined:

This Canal is no doubt indispensable to the country through which it runs. A Cleveland Company have made a contract for carrying through it 20,000 tons of Iron from Hull to Kingston, during 1871, and the tolls on that quantity will amount to \$4,000. The trade of the Crosby Iron mines is increasing, and must increase to an unlimited extent. (9)

For John Marion of Perth there was no question whatever about the wisdom of improving the Canal:

Judging from the development of the country, north of the Rideau, the trade must increase very largely within the next few years; a most serious loss to this part of Canada must follow, if the Canal should be allowed to go out of repair. (10)

The Perth Town Council

Recommended considerable outlay for improvement as the Canal is indispensable to the prosperity of that part of the country through which it passes, and that the present traffic might be greatly increased by opening up the water communication between Perth and the Rideau. Lumber, Ore and Merchandize would then find their way by the Canal, instead of by the present route. (11)

W.K. Dickinson of Manotick agreed that improvements would stimulate Canal traffic. He also pointed out that much manufacturing enterprise was located on the Canal and enumerated such enterprises, not including "numerous other mills situated at short distances, on either side of the route...." (12):

Flour Mills	17	
Carding and Fulling Mills	4	
Saw Mills	12	
Oatmeal Mills	2	
Shingle Mills	5	
Foundries and Machine Shops	3	
Stave Factories	2	
Cloth Factories	3	
Sash and Door Factories	2	
Match Factories	1	
Malleable Iron Works	1	
Tannery	1	
Total	53	(13)

Dickinson pointed out that these establishments, together with those not enumerated in his report, were

wholly dependent upon a regular and sufficient water supply to the various mill privileges, for which the Government have undergranted [sic] leases, and receive an annual rental. Under these circumstances many persons have made heavy investments in good faith. It is, therefore, obviously unjust on the part of the Government to allow this route to become unreliable, as indeed has been the case for some time past.

He was was also concerned about the possibilities of mineral production:

The mineral productions immediately bordering on the Canal, especially on the Western shore, between Oliver's Ferry on the Rideau Lake and the City of Kingston, are varied and important, yeilding iron, copper, lead and phosphate of lime. (15)

Another of the commissioners' questions was: "Is the Canal sufficient for the trade passing through it?" (16) Affirmative answers were received from businessman in Smith's Falls, Merrickville, Newboro, Perth, Ottawa and Manotick. The Ottawa and Kingston's Boards of Trade agreed, as did

Superintendent Slater. There were a couple of minor reservations. B. Tett, M.L.A. (Ontario) believed "that had the Canal been kept up in the same state of efficiency as was the case when it left the hands of the Ordnance Department, it would have been sufficient for present trade"(17) and W.H. Fredenburgh of Westport suggested that the "Canal would be sufficient for present trade, if the water could be kept up to navigation height."(18)

Considerable response was elicited by the commissioners' third question: "Are there any obstructions to the navigation of the Canal that can be easily removed?"(19) The always concerned B. Tett had a fairly well thought-out view:

The greatest obstruction is at the Isthmus which passes through a Canal cut between the Upper Rideau and Mud Lakes - a distance of about 3/4 of a mile in length. For some years past the dam at the Narrows lock has been leaky, as well as the upper sill of the Isthmus. On this account the water at the short cut at the Isthmus during dry summers has lowered to nearly 1/2 of its first or usual depth. Consequently, boats have been able to pass only half laden....(20)

Tett proposed that this problem be solved by "making the dam at the Narrows tight, the upper sill of the Isthmus lock secure from leakage, and by digging away and blasting this short piece of Canal eighteen inches or two feet - about two-thirds being rock and one-third clay."(21) Hiram Easton from Merrickville wanted several specific improvements undertaken. He wanted "dredging" of the Canal from "Kingston Mills to Kingston - (6 miles), and buoys or signal posts where the channel is very narrow." (22) Further, Easton recommended:

"Two piers at entrance, of Newboro' Cut, from Little Rideau Lake, should be repaired; Cut should be either lowered or lakes dammed for reservoirs to supply water during dry season. Cuts at Killmarnock, Merrickville, Burritt's Rapids, require cleaning out." (23) Mr. Easton also wanted damming "of some of lakes at head of River Tay.... Big Rideau Lake depends chiefly upon this river for water. " (24) Like Tett, Easton had some safety concerns: "Signal boat is necessary at head of Land Island, below Bickett's Bridge, as it is dangerous on dark nights." (25) W.K. Dickinson of Manotic wanted some relatively minor improvements: "For instance, the accumulation of sunken logs, loose stones and other debris in the cuts forming approaches to many of the locks; rocky Shoals on the route give a good deal of trouble, and should be removed by blasting or an increased supply of water." (26)

The "supply of water" was considered by several expert witnesses to be a subject that related closely to "obstructions to the navigation of the Canal...." (27) J. Chaffey (Newboro') noted: "The reservation of water to supply Canal is very much neglected, but it would not take much money to remedy the difficulty - what is chiefly required is the attention of some one of practical experience." (28) The Kingston Board of Trade concurred, "There are several places where the water has been found too shallow - these should be deepened." (29) And, A.J. Russell of Ottawa was concerned about water levels:

No doubt much could be done to increase the depth of water at dry seasons, when vessels are obstructed now and then, by damming the lakes at its sources, so as the reserve part of the surplus waters of spring. If that be not done, the draft of boats built for the Canal should be diminished, a necessity it is desirable to avoid, as gun boats might have to pass over it and the Ottawa in the event of war. (30)

Superintendent Slater shared these concerns:

The most serious obstructions have been the lowness of the water in the latter part of the season, and the floods in the spring. To remedy this, dams are being built at the outlet of lakes, the head waters of tributaries of the Rideau, to retain spring floods until the season of low water. (31)

In a larger sense, the water supply was of substantial interest to the Royal Commission. Its final question was: "Is the supply of water from the summit sufficient for the present requirements of Navigation on the Canal? If not, what means can be adopted to increase it? (32) This problem was not the same as that related to water levels, although it is obvious that the two issues could overlap. Water levels related to navigation in the sense that boats needed certain depths of water to navigate. Deficiencies in water level could be caused by obstructions on the bottom, insufficiently high banks, inadequate locks or, of course, a shortage of water. The "supply of water", while it could have a bearing on water depth, and hence navigational options, was, in essence, a problem related to water management. The various watersheds that made up the Rideau system produced a finite supply of water. The supply varied from year to year,

depending upon precipitation, but it was rare that there was sufficient water to run satisfactorily all the mills (and later hydro stations) on the route and maintain an efficient system of locking boats. Further, to store water, it was necessary to dam certain lakes. This increased water levels along these lake shores, which became an issue of substantial importance in certain areas. The "supply of water" issue was important, and it is not surprising that firm views were expressed on this issue.

It was generally agreed that the water supply was not sufficient. The ever-concerned B. Tett expressed, as usual, fixed and firm views:

The supply is insufficient. A reservoir of water above the summit level, may easily be made for the Kingston end, by constructing dams at the outlets of Mud Lake and Canoe Lake...and at the outlets of Loughboro' and Long Lakes.... In this way three or four feet of water may be saved to be let down, when required in the dry season from Devil, Mud, Birch, Desert, Canoe, Otter, Knowlton and Great Mud Lakes, embracing altogether an area of about 40 miles by 30; dams in an inefficient state exist in all the places mentioned.... (33)

H. Kernahan wanted to increase the water supply by "damming the lakes on the upper part of the river Tay which falls into the Rideau below Port Elmsly. Then there would be nothing wanted but to get an increase of water for the lock at the Narrows and the locks at Newboro', and this could be done by draining the West Rideau Lake and one or two other small lakes." (34) W. H. Frederburgh of Westport noted that "the supply of water at summit level is insufficient...." (35) He

wanted improvements in the locks at Newboro and the rapids, and raising the dam at outlet of West Rideau one foot higher." (36) Fredenburgh would then bring water into West Rideau from Bob's Lake. "Then the surplus water can be held in the West Rideau till midsummer, and let into the summit. This would supply the summit the remainder of the season." (37) For. J. Chaffey of Newboro, the "greatest difficulty occurs in the autumn at the Newboro' Cut, on the summit level...." (38) Chaffey argued that much water here is "wasted each way...." (39) This waste could be avoided with improved and strengthened locks, "together with holding all the freshet in the spring that the works will admit of...." (40) Chaffey was not in favour of running water from Bob's Lake to the Upper Rideau, because it would harm a number of mill owners. However, he pointed out that a dam "ought to be built on Long Lake, for it would reserve a large quantity of water to fall into Bob's Lake and further the interest of that locality as well as benefit the Canal." (41) Chaffey was so committed to this course of action that he made a remarkable proposal to the Royal Commission: "he will propose to the Government to build this dam free of expense. No person would sustain damage thereby." (42)

John Manion, Perth, wanted a whole string of new dams:

the supply for the coming season will be very much increased by the erection of the dams at the foot of Bob's Lake and Crow Lake.... Bob's Lake will give a surface of about 22 square miles of an average depth of eight feet summer level; Crow Lake about three square miles and an average depth of 18 feet. Two other dams would largely increase

the supply of water - one at the foot of Long Lake...the other at Elbow Lake. A large addition to the supply west of Newboro' could be obtained by erecting a new dam at Buttermilk Falls, at the foot of Devil Lake, and another dam at the foot of Mud Lake on the same stream; and further by renewing the dam at foot of Canoe Lake. (43)

J. M. Cromwell, a surveyor from Perth was concerned about a shortage of water in the region running from Poonamalie to Ottawa. He wanted Poonamalie dam "maintained to a sufficient height, and then all the difficulty as to water supply would end.... It will, however, perhaps yet be necessary to dam the outlet of Long Lake, which will give perfect control of all the waters of the Tay, and probably fully supply that part of the Canal throughout whole summer and autumn." (44) In order "to receive full benefit from these dams...", Cromwell proposed the purchase from John Hony of "the entire control of Bob's Lake, which is now his reservoir for his mills." (45) Cromwell was of the view that "control of the lake" could be purchased for \$3,000. (46)

Superintendent Slater saw a problem, but a minor one, and one that could easily be controlled:

The most serious obstructions have been the lowness of the water in the latter part of the season, and the floods in the spring. To remedy this, dams are being built at the outlet of lakes, the headwaters of tributaries of the Rideau, to retain spring floods until the season of low water. The past season, however, has been peculiar, and may not occur again for a long time. (47)

The Canal Commission was concerned with some very large questions, like the adequacy of the Welland Canal and the

various arguments in favour of major canal construction at Sault Ste. Marie. The Rideau was a very small cog in the national system. Nonetheless, the commissioners recognized it as part of the national system, and wanted it maintained as a fully functioning transportation unit:

it is an important work, which ought to be maintained as one of the public works of Canada. That as constructed it is quite sufficient for the wants of the trade, provided it is kept in good working order, and the summit level maintained at its original height. That it requires no extension or enlargement.... To insure a constant supply of water, at all seasons, for the several reaches of the Canal, but more especially at the summit, it is necessary that dams and regulating sluices should be constructed at the outlets of the larger lakes which empty into the Canal in order to retain the flood-waters, and let them off as required during the season of navigation. Four such dams appear necessary.... An appropriation of \$12,000 was made last year for this purpose, and two of these dams are now in course of construction. (48)

Clearly, the local opinion was that the Rideau system of navigation played an important role in the local economy, a role that was being severely limited by deficiencies in water supply, and inefficiencies in water management. To this end, it was essential that such matters be addressed when the administration of the canal was transferred from the Department of Public Works to the Department of Railways and Canals. The report of the Canal Commission makes clear the extent to which water supply was inextricably intertwined with all aspects of canal management.

Chapter Four: Plans for Improvement and Expansion

During the late nineteenth century, increasing demands were made of the Rideau system. Superintending Engineer, A.T. Phillips (1894-1934), continued to maintain that the position of his predecessors that his primary responsibility was to ensure uninterrupted navigation between Ottawa and Kingston. Nonetheless, growing communities, increasingly sophisticated industrial technology, and an ever more demanding set of urban requirements expected to meet their water needs by drawing huge quantities out of the Rideau system. The Department of Railways and Canals endeavoured to meet these many and varied requirements, a task often fraught with dispute. (1) Disputes notwithstanding, the late nineteenth and early twentieth century saw substantial progress in the system's ability to manage its water.

i. Regulating the Rideau River Basin: Poonamalie Dam

Spring freshets and summer droughts continued as major problems for the management of the Rideau waters. But solutions were not to be found without cost, effort, and considerable rancour. This may be clearly demonstrated by the developments at Poonamalie. The dam at this location made Poonamalie an extremely important water control station on the Canal: from Poonamalie water levels could be influenced as far up as Portland and all the way down to Ottawa. The dam controlled the largest, and until 1870 the only, water

reservoir for the Rideau River-Rideau Lake sub-system.

In 1866, the dam was improved at a modest cost of \$350: two foot flashboards were added allowing better regulation of water through the Bywash and permitting the maintenance of high water levels in Rideau Lake for a greater portion of the season. The flashboards permitted greater control should any serious trouble or damage occur at this point on the Canal.(2) These improvements at Poonamalie by no means satisfied many of those influenced by water levels in that area. The improvements raised the Rideau River-Rideau Lake levels; spring freshet waters were retained and this, of course, helped to maintain reasonable water levels during the navigation season. Unfortunately, the farmers and industrialists along the Tay and the Rideau were not satisfied. The farmers wanted less flooding and the industrialists wanted a thoroughly reliable source of water for their mills all year round.

In 1872, one Cromwell, a land surveyor from Perth, was hired by the Departemnt to rule on all damage claims made against the new Poonamalie Dam. Awards were made to those whose property had been destroyed or otherwise made useless due to prolonged high water. In spite of these awards, complaints continued against the annual flooding above the Poonamalie Dam, as did complaints from persons who alleged that their problems had not been attended to.

Some late claims were justified and honoured. John Polk, John Lyons and Thomas McDonald, all of Portland, filed for compensation in 1883-84, claiming that their cases had been

overlooked by Cromwell in 1872. A subsequent investigation conducted in 1877, they affirmed, was made at the wrong time of year when the water was too low. Nearly twenty years after the events, John Polk was awarded \$150 for damage to six acres in Bastard Township, John Lyons obtained \$160 for damage to four acres in the same township, and, Thomas McDonald received \$70 because of damage to two acres, also in Bastard. (3)

Other individuals were equally persistent, if less successful. J.H. Beveridge of Port Elmsley was one such person. In June 1900, he wrote to John Haggart, Tory M.P. for South Lanark, seeking action on a petition submitted the previous year regarding the "raising of the Poonamalie Dam." (4) A year later he demanded that the dam be reduced to its pre-1866 height:

...do they think the land around the Rideau is sinking and the lake itself keeping its original height?... Are the farmers of Elmsley fools? They surely know the dam has been raised when they see their best land destroyed by water in the dryest part of the summer which used to be dry in the spring. (5)

Phillips insisted that the water levels had been the same at Poonamalie since 1865 regardless of modifications in the interim. In August 1901 Phillips, accompanied by Mr. Carroll, Foreman of Works, Lockmaster Pearson (both were thirty year plus men), Beveridge and his brother, visited the site to prove once and for all that the levels had not been modified. Despite water level records based on careful

measurements, the Beveridge brothers remained unconvinced and threatened a suit against the Department. Beveridge was a tough old man who resolutely opposed any dam at Poonamalie. Upon investigation it was discovered that the owners of the lands in question had received compensation for damages in 1873 and 1876 and had signed releases relinquishing any future claims. A substantially embarrassed Beveridge had signed one of the releases.(6)

Other claimants had more palpable evidence of the effects of flood damage. On April 11, 1904, after thirty-six hours of rain, seventy-five feet of the 200 foot dam at Poonamalie was carried away by twenty-four inch thick pieces of ice that had begun breaking away from the lake shore two days earlier. During the following seventy-two hours, all but fifty feet of the six foot high dam was destroyed, and this was despite the fact that there was a protective bank of stone and gravel in front of the flat timber structure. Lockmaster Pearson reported that ice had never before come down in such quantities and that this was the first time that ice had caused any serious damage at Poonamalie Station. The situation was under control by April 18. A temporary dam was quickly built in the interests of continuing navigation.

The ruined dam was considered to have been in excellent condition, and had needed no repairs since November 1899 and under normal circumstances, was not expected to require repairs of substance until 1906 or 1907. Ironically, the bulkhead was scheduled for earlier renewal in 1905 but it survived unscathed.(7) These facts notwithstanding, a number

of municipal officials and merchants in Smith's Falls and Merrickville held the government fully responsible for the Poonamalie dam disaster:

[The Government] knew or ought to have known that the accumulation and storage of such a large quantity of water was a source of danger and menace to the property of your Petitioners.... [S]aid Dam... would require to be constructed of great strength and to be maintained in an efficient state of repair.... [The Dam] has been carelessly increased... in an improper, unskillful and inefficient manner. (8)

The Poonamalie Dam disaster damaged nineteen individuals, businesses and institutions to a total cost of \$18,491.80: (58)

	Damages in Dollars
John R. Curry, General Store	3,100
John McEwan, Lot 13, Water Street, Merrickville	1,275
Robinson & Son, Saw, Flour & Grist Mill	800
Johnson & McGregor, Stove & Castings	400
Fred A. Crute, Flour & Grist Mill	600
A. Foster, Forwarder, Dealer - Hard and Soft Coal	820
A. Wood (estate)	2,310
Gould Manufacturing Company Foundry	260
Citizens Electric Company	75
James H. Gould, damage to buildings	150

Smiths Falls Electric Company	1,000
M. Ryan, Lumber Yard, Wharf, Buildings	350
John J. Smith, Mill (woolen), Dye Works	1,126.80
Steel & Co., Lumber, Lath, Shingles	75
A.W. Bell, Two storey Brick Building, Two Shops, Storehouse, Dwellings, Wharf	4,500
E. Kennedy, Wholesale Liquor Dealer	300
A. Chester & Co., Harness Maker	325
Village of Merrickville, Roadway	500
G.B. McGee, Private Property on Mill Island	600
 Total	 18,491.80 (10)

Superintendent Phillips was much concerned by a failure as serious as that at Poonamalie and the various charges that had been made. In June, 1904 he travelled up the Rideau to Oliver's Ferry on the Shanley, conferring with lockmasters concerning damages sustained between Andrewsville and Poonamalie. He was anxious to confirm that no damage had been occasioned in April because of negligence on the part of federal employees. (11) Phillips arrived at Poonamalie and observed that the gap in the dam had been filled with cribs of timber and stone. The dam's original cribs had not been damaged; they saved the portion of the dam that emerged unscathed from the disaster. Phillips determined that the dam's timber was sound due to the quantity of stone piled against the dam on the downstream side. Henry Macleod, an engineer, noted: "The dam having withstood for so many years, was certainly strong enough for all ordinary seasons." (12)

According to figures supplied by the Department of Marine and Fisheries, the winter of 1903-04 was unusually cold. November was five degrees (fahrenheit) colder, December fourteen degrees, January seventeen degrees, February sixteen degrees and March four degrees colder than the average for the previous 62 years. On January 5, 1904 the temperature fell to thirty below (fahrenheit) with the average being twenty below during the day. (13) These bitterly cold temperatures caused ice as thick as four feet to form on the low lakes. The sudden thaw in April combined with heavy rains detached much ice and the ice was discharged into rapidly rising waters. The result was the Poonamalie disaster. "I am of the opinion," noted McLeod, that the break in the dam was caused by the lowness of the water in the Rideau Lake, by the very severe winter, and by the sudden rise in waters, accompanied...with high wind." (14) It was also assumed that the damages in Smith's Falls were exacerbated by Wood's Mill. Because of this mill, all surplus water coming through the town had to pass through two large stone arches on Beckwith Street, each with a fifty foot span. The most southerly of the spans was almost entirely covered by the mill allowing only a small portion of waste water to pass through. (15)

The damage done to the industrial centre of Jasen Island in Smith's Falls was extensive. Several businesses were shut down for as long as a month while equipment was replaced, buildings repaired, debris (ruined grain, smashed timbers and lumber, shingles, stone and sand) cleared away, and wharves

re-erected. The cleaning up process was slow and was hampered by disputes over responsibility. The government stood aside from the work because it disclaimed responsibility for the break in the dam. Tempers became somewhat frayed. For example, J. H. Gould's woolen mill was under water for three months while the argument over responsibility raged. (16) Indeed, it took three years before the issue was settled. During the interim period, the injured parties filed petitions and suits against the government citing the latter's negligence and seeking remuneration. Finally, in June 1907, the government settled at the cost of \$12,132, which was paid to claimants upon submission of deeds and verified damage reports. (17)

Immediate repairs, costing \$2500, were made to the dam to ensure navigation for the 1904 season. During the summer the dam was totally rebuilt to its original height. However, this was not evident to neighbouring landowners, who feared that the dam would be higher and that as a result their lands would be flooded each spring. Some of these farmers assumed that it was the official policy of the Department of Railways and Canals to flood their properties. The indomitable J. H. Beveridge continued his agitation against the Department until at least 1912. Other lamenters included the Township of North Elmsley, the Bolten Brothers - sawmillers in Portland, and the Postmaster on the Perth-Smith's Falls Road.

Like many townships bordering the Rideau, North Elmsley had a low population, limited resources to exploit and could

derive very little tax revenue from its small tax base. In typical Canadian fashion, the municipal leaders in North Elmsley were anxious to pry as much money out of Ottawa as possible. Any excuse would serve. Much of North Elmsley adjacent to the Rideau is low and swampy. Drainage is very poor. Twelve inch flashboards had been installed at the Poonamalie Dam since 1866. Their use after the subsiding of the spring freshets was designed to maintain a larger reservoir behind Poonamalie. The assumption that the dam as rebuilt in 1904 would be higher than hitherto caused an immediate spread of rumours that the already enlarged reservoir created by the flashboards would be substantially larger and of longer duration. Extensive flooding was feared by the citizens of North Elmsley. Their dark views of the Department of Railways and Canals became even darker. In 1911, the Department proposed to maintain the reservoir behind Poonamalie for a full six weeks longer than was natural. The Department's argument was that it needed the extra water for navigation. It assumed that it would be cheaper to pay \$10,000 to \$15,000 for land damage resulting from the extension of the reservoir's season than pursue the alternative solution of deepening the channel at Poonamalie. (18) The people of North Elmsley felt that they had a grievance and that the federal government should pay. The result was a series of prolonged and often unjustified damage claims against the government.

One such claim was pressed by James Garvin, who owned a farm in North Elmsley. His farms spanned Concessions V and

VI, and the only access to his farm was the road allowance that separated the two concessions. James Garvin was the only user of this road. Garvin's road crossed an inlet of Rideau Lake. It was originally built in 1876 by filling in the inlet's soft muck with rough field stone to one foot above the level of the lake. The field stone was then covered with small stone and gravel. Garvin's road was just wide enough to take one wagon. No repairs were made to this road, which was technically a township responsibility. By World War I it had settled, and portions of it were very close to or at lake level. Of course, lake levels fluctuated, so, on occasion, portions of Mr. Garvin's road were submerged. Garvin complained to Phillips. His argument was that the water problem, and it was becoming serious as parts of the road were submerged for as long as two months, had been serious ever since Poonamalie dam had been "raised" in 1904.

This issue dragged on for years: Garvin was still seeking compensation as late as 1928. People like Garvin could not be convinced that the dam had not been raised in 1904. The annual procedure used at Poonamalie seems reasonably straightforward: during the freshet, all stoplogs were removed from the dam to facilitate the runoff. Once the freshet had subsided to one foot above the crest of the dam, the flashboards were installed to save water. The result was the persistent belief that Poonamalie Dam was "raised" in 1904. (19)

Mr. Garvin's misunderstanding notwithstanding, the problem of poor roads and misunderstood water levels was very real. Montague Township submitted a petition to T.A. Thompson, Conservative M.P. for Lanark, regarding the "deplorable condition" of the road between Elmsley and Montague. The township sought assistance for repairs from the Department of Railways and Canals, arguing that this portion of the road leading to Perth was "almost unfit for public travel owing to the waters of the Rideau Canal having at times overflowed a portion of the road." (20)

The section of the road in question ran for about 4000 feet through drowned land formed during the original construction of the dam at Detached. The road was built and initially maintained jointly by North Elmsley and Montague. It was only a ten foot wide mud road running at two feet above navigation level when water was kept at the standard depth of 7 feet 3 inches on the upper sill at Detached. During freshets the water rose two feet above this level and the two small culverts available were quite choked with debris. In 1931 the townships requested \$9,000 in assistance to raise the road three feet. The Department felt that \$1,000 was sufficient, but did not make that contribution until 1934. (21)

Routine water management operations, let alone extraordinary events such as floods and equipment failure, generated much friction between the occupants of riverine properties and those charged with administering the Rideau. The charges that the Rideau authorities were constantly

tinkering with water levels and the slow and complicated departmental procedures for processing claims for land damage produced an atmosphere of acrimony and confrontation. This was to prove to be a continuing problem.

ii. Developing the Cataract Basin

The... improvements [to the system at Devil Lake] will open up a way for Barges to the head of Knowlton Lake giving the traffic of eighty-six miles of coast to the Rideau Canal, a largely increased water supply, both to the Canal and the Gananoque River, and, also make the Land-owners to cultivate their meadowlands and to work their mines besides enabling a large quantity of firewood now locked up to come to Kingston and thereby reducing the price of that commodity in the City. (22)

While Poonamalie and the Tay River were the major areas of focus for the northern end of the canal, it was the Gananoque River and Devil Lake systems that attracted attention in the southern end. Water management and water control was as contentious an issue in the south as in the north and, accordingly, two proposals were mooted which were thought would be of benefit to the Rideau and the region in general.

a. The Gananoque River Proposal

When the Rideau Canal was constructed, several river systems were examined throughout the Rideau Corridor and a combination of economics and geography competed with numerous private interests to determine the best route. Consequently,

some waterways that had been little influenced by human intervention were altered in their course or reduced in their flow to serve the best interests of the Rideau Canal. The Gananoque River was one such example and, as has been discussed above, proved to be a contentious issue in ensuing years.

A variety of proposals designed to make the Gananoque navigable from Morton to the St. Lawrence had been considered in the past but no concrete steps towards the realization of this end were taken before the 1880s. In 1883, a group from the region applied to make the St. Lawrence to Morton section of the Gananoque navigable along with a branch to Charleston Lake. This proposal was similar to that contained in a petition of 1872 represented by Leed's Tory M.P., David Ford Jones. That petition in turn led to the exhaustive report made by W. Kingsford, C.E., in September 1872. Kingsford estimated that the cost of a five foot deep navigation channel from Gananoque to above the second fall at Lyndhurst - a total of 22 3/4 miles - would cost \$109,205. That sum included the branch to Charleston Lake but excluded land damage costs. Because of a large bay at Lyndhurst, a 140 rod tramway could be installed connecting the waterway with the upper portion of Beverly Lake. The four locks required (two at Whitefish and two at Lyndhurst) would cost \$175,000. A survey was also needed: it would cost \$3,000. The total estimate for the proposed project came to the relatively large sum of \$285,000. (23) By February 1884, Wise was acknowledging the very real possibility of there being

steamboat navigation linking the Rideau with the Gananoque. Wise prepared an extensive outline, complete with costs, of what was needed to make the proposal a reality:

RIDEAU-LYNDHURST (ten miles): here "a remarkable gorge with high perpendicular rocks on either side is encountered." (24) A good dam and sluice at Morton was needed to compensate for the gorge and fall of ten feet to the mill pond level, which feeds the saw and grist mills located about 1,200 feet below the dam. At the mills there is another fall of ten feet to Morton Creek. Wise noted that the mills did not generally work during the summer for want of water. Morton Creek winds through low, flat country until Beverly Lake. At the junction of Upper Beverly Lake and Beverly Lake is the village of Delta. Lyndhurst Creek flows out of Beverly Lake. To make this section navigable, two locks each with a ten foot lift combined with a waste weir were needed at Morton. It would also be necessary to dredge mill refuse for 600 feet below the mills and build two swing bridges over public roads. The requested water was to come from the Rideau.

LYNDHURST WORKS: There were two falls at Lyndhurst totalling 23 feet. The first drop of seventeen feet falls from a dam across the creek to a mill pond to provide power for two saw mills and two grist mills. At the second and lower fall of six feet was a carding mill. It would be necessary to buy these mills or find surplus water for their power needs. As it was, an 1,800 foot cut was needed across a neck of land plus a set of combined locks at the lower outlet of Mill Pond Lake (making a waste weir in the present channel). This was to be the most expensive section as it also needed a dam at the head of the mills and a swing bridge, but Wise was willing to compromise on a tramway to connect the two levels.

LYNDHURST-MARBLE ROCK DAM (19 miles): The reach that followed the Gananoque River through Singleton and Gananoque Lake to Marble Rock was a "remarkably fine sheet of water with ample depth." (25) However, there were five obstructions caused by rock ledges and gravel croppings across the channel. These were located at Latimer's Rapids, Jim Day's Rapids, Black Rapids, Beaver Rock and the narrows near Marble Rock. 3,500 yards of rock would have to be removed and one swing bridge constructed.

JUNCTION OF CHARLESTON AND GANANOQUE RIVER (two miles north of Marble Rock): The navigation followed Wiltsie Creek for three miles through the "drowned lands" which

were actually a treeless marsh. The creek was about 200 feet wide with a "good depth of water"(26) and soft weed covered bottom: "Tugs plying on it would soon clear a good channel."(27) It would then be another four miles through cleared and level country to the outlet of Charleston Lake. At the lake's mouth was a natural dam - a ridge of rock across the stream. There had been a dam on this site which had raised the waters five to six feet to supply Webster's Mill, which ceased to function after a devastating fire. This dam site was close to the Gananoque Water Power Company, and the firm was considering the re-construction of the dam to provide a storage reservoir. Here it was proposed to construct a dam, a lock with a four foot lift and a waste weir. all of this would allow navigation to the head of the lake, a distance of seven and a half miles. Three swing bridges were also needed as well as the removal of a small obstruction at the Little "S".

MARBLE ROCK WORKS: A dam with a ten foot fall existed at Marble Rock. It powered a sawmill on one side and a grist mill on the other. This property, including the dam belonged to the Gananoque Water Power Company. One lock, on the sawmill site was needed along with the excavation of loose rock and gravel and a swing bridge. Already in existence at this site was a portage between the two levels for the transportation of cordwood.

MARBLE ROCK-GANANOQUE (7 miles): There was ample water in the Gananoque River. The only obstruction was a 500 yard rock ledge cropping into the channel at Schapp's. As the Grand Trunk Railway crossed the river about four miles below the line and a branch line at two miles, swing bridges were needed. A public road also crossed the river near the G.T.R.

In theory, Superintendent Wise supported the Gananoque project. The Gananoque river drained an area of 300 square miles in the townships of South Crosby, Bastard, Leeds, Lansdowne, Yonge, and Kitley, most being well settled with good farming country. The nearest railways were the Grand Trunk to the south and the Brockville and Ottawa to the east. Both lines were fourteen miles from the centre of the Gananoque River's watershed. Because of the area's geography, Wise doubted that a railway would ever run through its centre and that improving the navigation was the area's

best possibility for development. Wise's proposal would cost an estimated \$250,000 or \$5,000 per mile. (28)

While the proposal received initial government approval, Wise was well aware of the possibility of a clash of interests between manufacturing and navigation. Wise had worked on the Rideau long enough to have learned this lesson well. The Gananoque Water and Power Company controlled the surplus water from Charleston Lake and the dam at Marble Rock: thus, the Gananoque project could not proceed until the Department and the Gananoque Water and Power Company came to terms. Wise suggested that a limit be placed on the amount of water available to the Company and that it be required to keep its dam in good repair. "If they do this," he noted, "I see no reason why the work should not be a success and a benefit to the whole of that country." (29) The Gananoque Water and Power Company was supportive of the scheme, although it maintained consistently that it had the right to an adequate supply of water because the natural water flow before the construction of the Canal was via the Gananoque and its headwaters of Whitefish Creek. The Company and mill owners along the Gananoque River were increasingly irritated by the reduction of water supply caused by Canal improvements that diverted water. This problem was made more pressing by the government's practice of continuing to grant mill leases along the river. The Gananoque Water and Power Company believed that making the Gananoque navigable would produce a better flow of water and would therefore "remedy to great

extent the evils which now form a just subject of complaint." (30)

In 1885, after decades of discussion and lobbying, success seemed to be at hand. \$20,000 was voted by Parliament to improve the waters of the Rideau Canal and supply water to the Gananoque Water and Power Company. (31) The issue of sufficient water supply was central to the Gananoque improvement scheme. In his 1872 report, Kingsford had declared that the Rideau needed all available reservoirs and that none could be spared for the Gananoque. In 1877, the dam at Devil Lake had been taken down amid great controversy, thereby reducing storage capacity in the headwaters. But at the same time, the Whitefish Dam had been repaired and thus preventing more water from escaping down its natural route. In consequence, lobbying had been directed from several corners to have the Devil Lake system improved to provide access to the many mines and timber stands under exploitation and to procure more water for the Cataraqui and Gananoque Rivers. While this was going on, the Gananoque Water and Power Company went ahead with its own development plans, confident that the government would soon follow. An article in the Gananoque Journal outlined the efforts the Company had gone to in order to improve the guaranteed water supply for the village. (32)

Long before it approached the government, the Gananoque Water and Power Company applied to the courts for permission to raise the waters in Charleston Lake. The firm assumed responsibility for all damage to land. After the completion

of surveys and appraisals, the company discovered that the project was bigger than they could handle. Nonetheless, they elected to proceed because the work was essential if the factories in Gananoque were to have sufficient power. Following a petition to Leeds M.P., George Taylor, the government ordered Wise to make a survey. The result was a cost estimate of \$247,000, an estimate which did not include compensation for land damages or the purchase of waylieves. Wise also recommended raising Charleston Lake to allow an eight foot head and the damming of several lakes north and west of Morton to provide additional reservoirs.

Of the \$20,000 voted by Parliament in 1885, \$8,000 was given to the Gananoque Water and Power Company to pay for expenses already incurred. In return, the government was given title to all damaged lands (for which the company had paid \$20,000) and right of way through the Company's dams at Marble Rock and Charleston Lake. The Gananoque Water and Power Company was also to be responsible for the deepening of the channel, the removal of the Little S and the construction of a dam at that site. The remaining \$12,000 was to be spent in Frontenac and Addington to reconstruct the destroyed dams in order to produce more water for the Rideau. All available excess water was to be released at Morton in order to maintain navigation from Morton to Long Point. According to Gananoque's newspaper, Leeds M.P. George Taylor was seeking funds to remove obstructions from Lyndhurst to Marble Rock. He also wanted funding for one lock at the

Outlet, one at Marble Rock (making navigation complete from Gananoque to Charleston Lake), one at Lyndhurst plus a guarantee of a full power supply to Gananoque manufactureres for the entire season. (33)

Details are sketchy about events in this arena during the subsequent few years. However, we do know that what might have been called the Gananoque Canal was never completed. That did not mean that no work progressed. For example, by 1887 the dam at Charleston Lake was near completion at a cost of \$906.87. (34) The work at the Little S obstruction was near completion in 1887 but it was estimated that about \$1,000 worth of labour was still needed there. The sums spent on the Gananoque at this time are as follows:

Obtaining a court order to raise waters, survey work, land evaluations and arbitration of damages	\$4,935
To landowners for damages	\$14,160
Excavation, erection of dam at Charleston Lake	\$907
Total	\$20,002

The major obstacle to the creation of the Gananoque Canal was the problem of a guaranteed supply of water that would assure seasonal navigation on both the Rideau and the Gananoque. There was in many quarters a profound suspicion that there was simply not enough water.

The Devil Lake Proposal

Kingsford had argued in his 1872 report that all

available reservoirs were being utilized to their utmost. Not all were convinced and eyes were continually being cast north to the vast series lakes of which the Devil Lake system was the centre. In the 1870s a dam had been built at the mouth of Devil Lake in an attempt at capturing more water for the ever thirsty Rideau system. The dam was subsequently destroyed amidst substantial controversy. The Devil Lake option received a bit of attention during the 1880s when the Gananoque project was being boomed. Wise discussed several possible future dam sites in 1883. He was disinclined to rebuild the Devil Lake dam because he was convinced that it would result in excessive land damage costs. He suggested the possibility of connecting several lakes in the Devil Lake system and then bringing the surplus water to the Rideau at Buttermilk Falls (Tetts'). Hunter's mill site at Rock Lake (a feeder to Opinicon Lake between Chaffey's and Davis's locks) had been bought. The Department of Railways and Canals had the dam at Hunter's repaired and then placed it under the control of the Lockmaster at Foster's Lock (Davis). Wise wanted the Hart Lake dam repaired and completed with a slide. (35)

In February 1883 a petition was filed with the department requesting that improvements be made to the Devil Lake system. Superintendent Wise submitted a detailed report to Bradley expressing his doubts about the project. The two main problems were, not unexpectedly, the terrain and the cost. He argued that one could not draw away sufficient water while maintaining adequate navigational levels. He

noted that the 20,000 feet of channel to be deepened and widened - should the petitioners have their way - were "hardly navigable for canoes at low water." (36) Wise agreed that if the Devil Lake region was opened, it would permit the exploitation of vast quantities of cordwood, a not unimportant consideration in nineteenth century Canada. But that was not enough for Wise, who doubted the practicality of opening up such a bleak region: "what practical use of making a lock and passage in a country of that rocky description I fail to see." (37) Eventually Wise concluded that improving the Devil Lake system would not do much for the Gananoque, nor would it be of important benefit to the area through which the improved sections would flow.

However, doubts notwithstanding, Wise ordered a preliminary survey in the fall of 1883. Robert Rowan, an engineer from Kingston, was instructed to provide advice on two issues: was it feasible to provide significant quantities of Devil Lake system water for the Rideau? Was the proposed Gananoque system necessary? Rowan was also to keep in mind the possibility of opening navigation between the Rideau and several lakes to bringing to market new supplies of firewood, minerals and farm produce. (38) Rowan did his work and submitted a proposed route, with estimated costs:

BEDFORD MILLS: There is a 29 foot fall in 300 feet through a rocky gorge at the foot of Devil Lake. The Tett brothers maintained a dam at the head of this gorge to power their saw, shingle and grist mills. At this site Rowan proposed a set of combined locks with a waste weir alongside them. This would have necessitated the removal of the saw mill.

BIG MUD CREEK: This creek is entered after travelling for six miles through Devil Lake. A lock with a 14 foot lift was needed at the creek entrance. Also required here was a quarter mile cut through clay and rock to Big Mud Lake. An excavation of 700 feet was also needed through an outcrop of clay and rock between Big Mud and Buck Lakes.

DESERT CREEK: After following Birch Lake for one mile, Desert Creek is entered. This short creek, only 1 3/4 miles long, was clogged with sand and mud deposits. It would have to be dredged. There were also three obstructions across the creek that impeded both water flow and navigation: a rock ledge and two beaver dams. They would have to go.

MUD CREEK: Desert Creek leads to Desert Lake, which is followed for 3/4 of a mile to Mud Creek. It was only 3,000 feet long but was heavily silted and would have to be cleaned out.

KNOWLTON CREEK: Mud Creek leads to Mud Lake, which in turn leads to Knowlton Creek. This two mile long creek ran through peaty soil flanked by rocky cliffs. Dredging was required in order to gain access to Knowlton Lake.

The route to be rendered navigable from this point at Knowlton Creek to the Rideau was 17 miles long. Rowan also investigated two possible branch canals attached to the Devil Lake system:

OTTER LAKE BRANCH: This unit would be three miles in length and a third of a mile in width. It would be necessary to cut through two dams plus loose stone and clay.

CANOE LAKE BRANCH: This lake lies some fifteen feet above all the others so it would be necessary to cut a twelve foot passage through rock four feet deep. This would generate a reserve supply of water, some five miles long and a third of a mile wide.

The project would be expensive. The totals for the various components are as follows:

Bedford Mills	\$40,000
Big Mud Creek	\$27,960
Birch Lake	\$9,500

Desert Creek	\$19,750
Little Mud Creek	\$9,250
Mud Lake	\$18,750
Knowlton Creek	\$22,500
Canoe Lake	\$3,336
Otter Creek	\$3,175
Three Bridges	\$6,000
Additional costs for water supply	\$13,150
10% add-on	\$17,337
Total	\$190,708 (39)

Despite the high costs and difficulties caused by the terrain, more benefits were seen to emerge from this project than Wise had wanted to admit. The area is part of the Frontenac Axis and abounds with lakes and streams. It was felt that once the initial improvements had been made, it would require little trouble or expense to provide the region with an abundant supply of water. Many felt that the time was ripe for opening the Devil Lake watershed to development. If the proposed navigable canal was built along Rowan's lines, a steamer could travel from Devil Lake to Kingston in four and a half hours. This could be an important economic development. It would permit the exploitation of some 125 square miles of timber that ran at 30 cords per acre for a total of almost two and a half million cords of maple, beech and assorted softwoods. Kingston would be a ready market for this wood.

Rowan also reported preliminary sightings of several minerals (including zinc, asbestos and apatite) close to the line of the proposed canal. Also, while the region appeared best suited to mining and lumbering, Rowan noted that the land appeared to be of much better quality than originally

supposed. He felt that it would be well suited to grazing and fruit raising. Optimistic, if not downright incorrect, Rowan's boosterish prognostications were submitted as evidence and had to be considered. For Rowan and other promoters of the project, the only impediment to the opening of the Devil Lake country was the access problem.

Rowan submitted the figure of \$175,000 as the estimate for the proposed improvement. That figure did not include additional costs related to water supply. Nor did it include compensation for the Tett brothers. (40) The \$15,000 or so of additional costs related to water supply could be separated from the main proposal. That is, water supply could be increased without making the system navigable. This option would be relatively cheap, but would do nothing for the navigation situation.

It was assumed that the Tetts would put their dam at the head of Devil Lake into good repair and that the Department would assume responsibility for cutting a channel 12 feet wide and 8 feet deep through the ridge into Mud Lake. This would bring the Mud Lake waters under control. To achieve the same results with Birch Lake, a cut of similar dimensions would be made through the outcrop between Mud and Birch Lakes. After excavating six foot deep channels through two beaver dams in Desert Creek, sluices would be installed. This would enable the current to clear out the soft bottom and give four feet of surplus water to Desert Lake. From Desert Lake, excavations through two rock outcrops and a

controlling sluice at the outlet of Canoe Lake would allow that lake to be drawn off when needed. Previously, these waters had been controlled by the government dam at the foot of Hind Lake and numerous private dams. However, the abandonment of the Hind Lake, Tetts' (Mississauga Creek) and Hunter's (Rock Lake) dams resulted in serious freshet problems. It was hoped that either the modified or the full improvement plans for Devil Lake system would help to control this problem. (41)

The issue of improved water control policies was of concern to many groups and individuals, both public and private. The Department was besieged with petitions from a variety of groups that demanded that steps be taken to ensure that the various works along the Rideau be secure from flooding, but maintain sufficient water for industrial and navigational use throughout the entire season. (41) In December, 1885 a meeting was held at the Devil Lake school to consider the matter. This group of concerned local citizens resolved to remind the government of the urgency of the situation. Due to the deterioration and abandonment of various key dams, their roads were subject to annual flooding. Another group, consisting of Rowan (discussed above), J. Lakey, James Wilson, Hugh Campbell, David Ruttan and John Snook passed a resolution urging the government to utilize the sum of \$20,000 voted by the recent session of Parliament (and of which the Gananoque Water and Power Company was given \$8,000). This position was fully endorsed by 80 "prominent" county farmers. (43) Five years later, over

\$9,000 of the \$20,000 remained unspent which, given the \$8,000 transferred to the Gananoque Water and Power Company for their purposes, meant that very little had been employed in improving the Devil Lake reservoirs:

Purchase of Hunter's Dam Rights	\$500
Rebuilding Dams	\$650
Making Dams at Wolfe Lake Outlet	\$1,500
Total	\$2,650 (44)

It was clear that the Department remained undecided as to the best and most economical means to be used to control the upper waters. The first dilemma was the question of an entrance route at Bedford Mills. Rowan submitted two plans for circumventing the major obstacles at Buttermilk Falls and Mud Creek. The more expensive plan involved two locks at Bedford Mills and one at Mud Creek. Complete with dredging to produce a navigable channel, the total reached \$175,000. The second option provided only for a controlled water supply to the Rideau, and would cost only \$15,000. It provided for a few dams and minor channels connecting the lakes. The endless difficulties and expenses that continued to delay and obstruct the project produced great frustration, which was vented by Rowan himself: "It would be better, " he declared, "to build a railway." (45) Clearly, the Department shared Rowan's opinions as to the near futility of the scheme. It was nearly fifteen years before the Devil Lake improvement scheme surfaced again.

In the fall of 1903, two diverging estimates for

completing the Devil Lake project were submitted to Sir Collingwood Schreiber, a powerful public servant and chief engineer in the Department of Railways and Canals. The different proposals involved different routes, and they did not use the same system in calculating costs.

One proposal involved the indefatigable Kingston engineer, Rowan. In conversations with E.J. Walsh, an engineer, William Harty, Liberal M.P. for Kingston, J.M. Mowat and A.M. Chisholm, he discovered that a navigable waterway into Frontenac county was still wanted in the Devil Lake country and was advocated by some important personages. On November 9-10, 1903, Rowan and a group of associates travelled a potential route in order to make cost estimates and develop a proposal. Although their conclusion that what was needed were locks (133 feet by 33 feet by 5 feet) at Bedford Mills and the mouth of Mud Creek was the same as that contained in previous surveys, it met with a dispute over where the route should go from Bedford Mills. Some argued that the routes should be in the gorge at the mouth of Devil Lake. This would necessitate the removal of a saw mill, a grist mill and a grain elevator of 16,000 bushel capacity. These three facilities belonged to the Tetts, who wanted \$50,000 in compensation should the Canal go through their property. As the Tetts were building a new concrete dam adjoining their sawmill, it was suggested that a dam with a waste weir and controlling sluice be erected at the site of the old dam, 80 to 100 feet above the sawmill. Others argued for a route that was in a shallow back-water creek that had

been used as a piling ground for slabs. This latter route would require 800 feet of dredging and 600 feet of excavation through rock which could be used for lock walls. At an estimated cost of \$77,466.77, including property damages, the ravine route was not only straighter but more economical than the gorge route which was estimated at \$103,782.57. (46)

Only the entrance was in dispute. Everybody agreed about the rest of the route, which involved the usual series of improvements. Adjoining the Mud Creek lock would be a dam with a waste weir and controlling sluice. Four steel superstructure swing highway bridges (75 feet by 12 feet) would be needed at Bedford Mills, above Bedford Mills, at Mud Creek, and at Desert Creek. These bridges were to be quite sturdy in construction and were to be completed with concrete abutments, pivot piers, swing protections and stone filled crib work. Over two thousand feet of dredging was required to straighten the channel through Devil Lake below Mud Creek. Straightening and deepening were also needed in Mud Creek, Birch Lake, Desert Creek, and a few other places. In addition, it was considered essential to have a twelve foot wide by four foot deep feeder channel with weir and controlling sluices to Canoe Lake to ensure a sufficient water flow to Desert Lake. (47) The cost estimate for these various improvements was \$164,253.51. (48)

A.T. Phillips also submitted a report to Schreiber. His estimate was substantially higher than that of Walsh of the Rowan group, so he was promptly ordered to justify his

reasoning. In August, 1903, Phillips made a preliminary estimate of \$210,000, an increase from the \$175,000 estimated in 1884. The earlier estimate had not included compensation for the Tett brothers or other holders of drowned land. Also the 1884 estimate was based on smaller locks (120 feet by 26 feet). (49)

After completing an on-site investigation with Walsh in November, 1903, Phillips submitted a more detailed report in which he explained his relatively high estimates. Phillip's route was seven and a half miles longer than that of Rowan-Walsh: Phillip's canal route went to the head of Knowlton Lake and also branched off to Otter Lake. This \$59,400 extension was a part of the original 1884 proposal, but since then various proponents of the scheme had changed their minds. Unlike Walsh, Phillips had chosen the more expensive route at Bedford Mills. Rowan-Walsh had wanted to avoid purchasing Tetts' mills, but Phillips maintained that building a dam above the mills would greatly reduce power to the Tetts who would then have to be compensated in any event. Rowan-Walsh had made no provision for this expense. Due to his very extensive canal experience, Phillips was convinced that it would be simpler in the long run to buy out the Tetts and lease out any surplus water power to avoid future friction over adequate compensation and water supply. Therefore, if the Rowan-Walsh estimate is increased by \$35,000 for mill purchases, the estimate increases to \$199,253. Phillips also agreed to add to his estimate \$6,207 for a bridge considered necessary by Rowan-Walsh that

Phillips was convinced indeed necessary. When these various adjustments are made, a different set of cost estimate emerge:

Rowan-Walsh	\$199,253
Phillips	\$196,807

And, the route favoured by Phillips was seven and a half miles longer. (50) However, these careful studies combined with the pressure of regional interests produced no results. Kingstonians were irked, because they were anxious to exploit the extensive mineral deposits of Frontenac County. The Department received several petitions to this effect during the early years of the twentieth century. (51)

Yet another survey was instigated by A. Chisholm, a local mine owner who operated out of Kingston's Frontenac Hotel and H.A. Macleod, a surveyor. They investigated the same routes studied by the men discussed above, and came to similar conclusions. (52) A stumbling block to a new initiative probably remained the Tetts. By 1905, they had become even more demanding in their terms for compensation.

People like Chisholm retained their interest in the mineral wealth of the area in the vicinity of the proposed canal and, in particular, in the substantial quantities of feldspar at the Richardson Mine on Desert Lake. The Richardson Mine was an excavation of 200 feet by 150 feet by 40 feet comprising reserves of approximately 100,000 tons of feldspar. The mine was worked with two steam drills and a steam hoist with the product being carried out by horses and

wagons to the lake. Here it was dumped into cars ferried by tug and scow across Desert Lake to a tramway. The cars were then hauled by horses to the railway. This complicated and expensive route was in use for several years and did not prevent the mine owners from realizing a profit. A second feldspar mine was also in operation nearby with large untapped reserves of these crystalline minerals in the neighbourhood of Desert and Big Mud Lake. Feldspar was in great demand during these years, especially in the United States where it was more important in the manufacturing of fine porcelain. As it became recognized that the provision of effective water communications were not going to be realised, an attempt to solve the transport problems of the Desert Lake-Big Mud Lake mining area by the construction of a private railway was attempted but failed.

The surviving evidence does not permit firm or definitive answers concerning the failure to get the Devil Lake project off the ground. After 1910 the issue pretty much fades from view, but for a good thirty years the scheme was subject to substantial interest from both government and industry. The economic potential, and hence benefit, of the Devil Lake project was probably even more impressive than that of the proposed Gananoque Canal. The Frontenac County mining industry was profitable for many years and would have yielded much more in the way of minerals, jobs and multiplier effects had it been based on a substantially improved transportation system. (53) Certainly, the Rideau Canal most

definitely needed both a better regulated water control system and more water to ensure a full season of navigation and to meet other legitimate needs. The most logical way to accomplish this goal was to tap the water resources of the Devil Lake watershed. The need and desire were there. The question remains, why did it never happen?

Chapter Five: Water Levels and New Conflicts

With the onset of the twentieth century, plans for the expansion of the Rideau system's catchment area were shelved. But there was no slackening of the ever increasing demands for water. Indeed, the interests of the traditional users, the millers and "manufactories" of the nineteenth century, were increasingly challenged by new users. The navigation priorities of the Department of Railways and Canals and, after 1936, the Department of Transport, were questioned by those requiring water for hydro-electric power for industry, and urban lighting and sanitation. As if these were not enough, new trends in popular recreation and a new sensitivity for matters ecological served to compound the problem of managing the waters of the Rideau. Even an experienced Superintending Engineer such as A.T. Phillips was sorely tested, compelling him to admit that "...it is difficult to know just what to do in all cases." (1)

i. Regulating the Waters

With no promise of future expansion of the system, attention henceforth would be directed to improving the efficiency of the management of the waters available in the existing catchment area. These reservoir waters for the Rideau system derived from two main watersheds: the Rideau River basin, some 1500 square miles in extent, and, the Cataraqui River basin, some 500 square miles in extent. Together, these two systems allowed an impounding of 255,000

acre feet of water and also served in the regulating of flows to prevent floods and protect supplies.(2) After a century of operating the system, the problem was as complicated as ever. In 1930, Phillips had to contend with conserving water for navigation during the summer, retaining winter levels sufficient for power demands, and accommodate the perennial request "...to drain off the low-lying shores so as to enable the farmers to put in their crops."(3) And again, the freshets were still a force to be contended with, Phillips arguing that, indeed, they were more severe than ever:

The clearing and ditching of the country has rendered the freshets of shorter duration but of consequently greater violence than formerly, as the snow which used to be protected in the bush, is now melted quickly and the water instead of lying in the field, is carried down the ditches to the river, thus causing the latter to rise with greater suddenness.(4)

Good management required that water levels be carefully monitored at all lock stations and dams and that they be coordinated to ensure effective water control. From the very commencement of the operation of the Rideau system, observing, recording, and reporting water levels bulked large in the responsibilities of lockmasters. They had to record the water levels, at some stations take snow depths once a month and report on the thickness of the ice.(5) But regular "reading" of the water levels was essential:

...there were two markers, one on the upper, and one at the lower wing wall, and you could always tell exactly where the level of the water was. Well the lockmasters knew what the water level

should be, and if suddenly there was a big rain and the water came up an inch, they would run off that particular water into the next level. And if they heard...from the Gananoque Light and Power Company, a Mr. Campbell, that he was running water off Devil Lake or Buck Lake,...why then they would pass the water on down to his generating plants, or down the Rideau towards Kingston. (6)

Herman Warren of Chaffey's also recalled these practices, acknowledging his reliance upon direction but also asserting his independence of action:

Oh yes, always had to send in a report of the bywash every month...Well, you have to raise logs and let your water run through. Because the water was rising and they'd be probably calling for water at Chaffey's or Jones Falls and you'd get orders and you'd have to run water. But you always got your orders from the Department before you run the water...If I saw the water rising, if it was water rising above what it was supposed to keep, I'd raise a log and let some run through...Then when it come back down to its level, I'd drop the log back down again. (7)

As ever, coordination between these individual operators was essential. With the advent of the telegraph, and later the telephone, rapid communication between stations enhanced the reaction-speed of the system to hydrological variations. (8)

But this was essentially a reactive rather than a predictive approach to the problem. Prior to the 1940's, accurate predictions of annual water flow and availability was limited to observations of rain and snow falls and approximations of yields. In 1942 a more rigorous approach was introduced with accurate snow surveys being conducted at

the end of February each year:

with a view to securing additional information for use in the regulation of canal waters, it is hoped such surveys over a period of years will furnish useful data for short range forecasting of flow conditions on which regulation schedules may be based. (9)

In 1947, a new automatic water-stage recorder was installed at Poonamalie to keep a continuous record of Rideau River water levels. (10) With these innovations, together with the calculation of the quantity of snow and estimates of the water yield, it became possible to predict with greater accuracy the amount of "draw-down" required to accommodate the spring freshets and develop sophisticated mathematical models for better regulating the water (11) Within this system, the regulation of water levels followed a regular annual pattern with the key actors being the 65 or so regulatory dams located at critical locations along the line of the canal and throughout the watershed. The procedure for 1950 is typical:

It was not necessary to draw water from the storage lakes in the early part of the summer and a normal and uniform flow toward Ottawa was maintained. Approaching the end of the navigation season, water was made available for purposes from the storage lakes. In accordance with standard practice, the lakes in the southern descending levels toward Kingston were lowered after September 15 and reached their winter levels well before the formation of ice. An ample supply of storage water was available for power plants of the Kingston area and little water was wasted. (12)

With the establishment of more water gauges, the more

careful monitoring of capacities and flows, and the continued development of modelling the complex controlling variables, the operation and management of the Rideau waters is becoming increasingly sophisticated. Even so the basic mechanics of the operation and the fundamental concerns continue essentially unaltered.

ii. Urban Demands

As ever of the navigation were dominant. This is clearly stated as departmental policy, the regulation of the "Reservoir" being intended to

ensure the most favourable navigation conditions, but also giving special attention to the requirements of the various power houses and other interest as well, to the end that the flow might be distributed throughout the year to the best advantage of all interests concerned. (13)

But to attempt a harmony "of all interests concerned" was patently impossible. Many were quite irreconcilable. For instance, urban demands were increasing and diversifying as electrical power, electric lighting, and massive demands for sanitary purposes were directed to the Rideau catchment. Phillips patiently explained the essential dimensions of the problem to a complaining Mayor of Smiths Falls:

...I would remind you that one of the reasons of shortage of water in your town is the fact that it is increasing in size and the consumption of water is consequently increasing very largely also, but the supply in Rideau Lake remains the same; and, if an extraordinary quantity of water is run out of the Lake in the summer time, it

might create a very serious situation in Smiths Falls during the winter if the Lake got too low to supply enough for domestic and fire protection purposes. (14)

Phillips went on to demonstrate what he considered his primary responsibility and secondary obligations to be:

You realize, of course that our first consideration is the maintenance of navigation on the Rideau System between Smiths Falls and Ottawa:- the storage for which is Rideau Lake alone and, while we are and always have been, most anxious to keep the town supplied with water, yet in dry seasons there may not perhaps be enough for all purposes. (15)

Unnecessary use of water by the Woods Mill, leaks in the Town dam, the luxury of a Public Swimming Bath, all these and other matters were advanced by Phillips as demonstrations of the basic problem and to underscore his concern that the Rideau lake could not "...supply navigation, and...keep the town supplied for twelve months of the year." (16) Other communities were also involved and instructions were given to let water out of Bob's Lake, "Now that navigation is over,...so as to supply the Town of Perth with water for domestic purposes and fire protection..." (17) Similar requests to draw off water from Wolfe Lake to replenish the reservoirs of the Electric Light Station at the Village of Westport. (18)

As the century progressed, urban populations increased, per capita consumption of water increased, and the Rideau was called upon to furnish these demands. Luckily, the small scale development of hydro-electric power was accompanied by developments in long distance transmission of power generated

at large scale generators elsewhere. This, at least, eased the dependency upon the vagaries of the Rideau's waters.

iii. Protecting the Environment

The problem of regulating the waters was made even more complex by demands emanating from those charged with the management of wildlife. The rhetoric of the Annual Report paid lip service to the recognition of plural demands:

The proper storage and apportioning of this water in order to insure adequate power supply to obviate serious flooding and to protect fish and wildlife, is of utmost importance and forms one of the main features in the administration and operation of these two [Trent and Rideau] canals.(19)

The protection of "fish and wildlife" had come to constitute an important consideration in managing the Rideau waters. As early as 1869, the Department of Marine and Fisheries had asserted its authority in prosecuting those who polluted the waterway and "destroyed the fisheries".(20) In 1907, the concern was with the raising of water levels in spring and the flooding of the breeding grounds of wild ducks(21); on another occasion, it was complained that the lowering of water levels at the close of the navigation season killed small fish (22); other casualties were the muskrats whose houses and feeding grounds were left exposed so that "thousands upon thousands are destroyed every year."(24) A complaint that fisheries were being destroyed prompted Phillips to attempt to explain the complexities of his situation, one in which protecting small fish ran in the face

of economic development and community demands:

...the supply of water for manufacturing and electric purposes seems to conflict with the necessities of conservation of fish, so you can realize how difficult a matter it is for us to carry out the wishes of your Department [Fisheries] and the requirements of our own; but, as above stated, I shall be glad at all times to do everything in my power to cooperate with you. (22)

iv. Cottagers and Waterfronts

Clearly, in attempting to meet these contradicting demands, a major point of contention was that water-regulatory procedures produced major fluctuations in water levels in the reservoir lakes. Apart from problems of urban intakes and disruptions of ecosystems, shifting water levels irritated a new presence throughout the Rideau Corridor: cottagers. This new mode of popular recreational use of the Rideau was focussed on the lake and river shorelines and fluctuations in water levels were not conducive to recreational use by lake shore property owners and often resulted in complaints and agitation. For example, since the construction of a dam there in 1871, Bobs Lake had been one of the main reservoir lakes of the Rideau system, helping to augment and hold the level of Big Rideau lake via Christie Lake and the Tay River. Each year, the level there was allowed to rise 10 feet, being drawn off at the rate of 50 - 100 cubic feet per second until November by which time the lake had dropped to about 5 feet 4 inches at the sill of the

dam. (25) Even with its supplies, navigation in the Rideau fell to 4 feet 10 at the lock sill at Poonamalie. (26) Faced with this annual retreat of the water level at their properties, Bobs Lake residents were concerned and requested that action be taken:

...that the Dam at the N.E. End of Bobs Lake be repaired against leaks and that the Dam be raised by 5 or 6 feet. The raising of this Dam would allow the logs to be removed from a higher level than in the past and the result would be that the lake would remain at the present spring level. At present, logs are removed from June 1st and the lake is lowered by 6 to 8 feet. The Tourist business suffers and fishing has declined in the last few years and property owners in Bedford and Oso townships in Frontenac County are very concerned and ask that immediate action be taken. (27)

L.W. Clarke, the Superintending Engineer for the "Rideau and Nova Scotia Canals", could not favour this proposal as it would cause considerable flooding. Future problems, he noted, would arise when property owners built at the new level; without a drawdown of 10 feet the new construction could not be justified. (28) For him, the problem lay elsewhere:

The great difficulty with this lake is that the shoreline property owners fail to realize it is a storage lake subject to fluctuate each year. These same property owners sell cottage lots but neglect to tell the purchasers that this is a controlled lake subject to fluctuation. A great service would be done to this canal if the municipality were to notify all owners of shoreline property around this lake that Bobs Lake is the main storage lake for the Rideau System, and that its level is subject to fluctuations each year. Only when this information is got across to the land owners will

complaints in respect to the lake level decrease. (29)

Indeed, further to develop the efficiency of the Bobs Lake reservoir, Clarke recommended that a diversion channel be cut to Wolfe Lake and so directing the water to Upper Rideau Lake rather than Big Rideau Lake, and thus putting "this water at the summit of the Rideau Canal system." (30)

Obviously, another actor had been added in the ongoing dialogue between the administrators of the Rideau and the general public. Farmers, millers, industrialists, urban utility users, and private power companies had been joined by the recreation seeker and summer cottage owner. For the latter, the priority was maintenance of high water levels to ensure that their properties were, truly, waterfront properties and not mud flat properties. But given the function performed by lakes such as Bobs, Wolfe, and Rideau, this could not be guaranteed and served, therefore, to present yet another point of conflict.

It is patently obvious that the various user demands are often conflicting and sometimes irreconcilable. Allocating the waters of the Rideau, therefore, required the wisdom of a Solomon and the hydrological inventiveness of a Moses.

Chapter Six: A Canal and a River Basin

...The writer considers it his duty respectfully to offer the remark that it would be a wise policy for the government at once to establish the principle that the waters of the Rideau Navigation can in no way be diverted to its injury to benefit any other interest...and that the water communication itself must be distinctly held to take precedence over everything so ever which may come into opposition with it. (1)

Kingsford's recommendation reflected his appreciation of the primary purpose of the Rideau Navigation and the fundamental deficiencies of water supply. Increasingly, however, other "interests" did come into "opposition with it" and had to be accommodated.

- i. Navigation. Navigation continues to be the principal function of the Rideau and is the primary concern of its new administration, Parks Canada. Even though its economic role has atrophied, such is the volume, frequency, and popularity of its recreational use that the maintenance of sufficient water levels and the "protection of navigation" is as important as ever.
- ii. Power. The nineteenth century development of water powered manufacturing sites along the Rideau witnessed the expansion of grist and lumber mills as well as a diverse range of manufactories. These have gone. The hydraulic generation of electric power continues, however, and the Gananoque Electric Light and Water Supply Company generates approximately one third of its demand at its three stations in the Cataract basin and one in the Gananoque basin. (2) The total demand for water, together with the seasonal and hourly timing of these demands, continue to be problems in the effective management of the Rideau waters.
- iii. Wildlife. Effective management of water supply throughout the Rideau requires and often results in fluctuations in water levels throughout the reservoir lakes and along the distributories. These can disrupt, directly and

indirectly, the local ecosystems with severe impacts upon many species of animals and fish. This too needs to be minimized as much as possible by coordination with other users and the principal regulating authority.

- iv. Urban Demands. With greater dependence upon exogenous sources of electric power, the urban demand for water has diminished. Communities throughout the Rideau Corridor still rely on the Rideau for potable water and constitute another user. Such are the demands, however, that they pose no major pressure.
- v. Recreation. From a surprisingly early date, recreation seekers have used the Rideau Corridor for recreational purposes. Initially, as travellers along the line using the passenger steamers, their interests were indistinguishable from those of navigation. Later, with the emergence of residential resorts, albeit for limited numbers, fishing, boating, and hunting was introduced, especially in the Jones' Falls to Poonamalie section. Later, the advent of smaller pleasure craft in large numbers ensured the continued operation of the system and at a time when the commercial usage was declining. The most recent, user, the seasonal cottager has introduced another party interested in water levels as these control the quality of the recreational environment.
- vi. Residents. After over 150 years of living in close association with the waters of the Rideau, farmers and other shoreline residents are now familiar with, if not reconciled to, the vagaries in levels and variations in supply of the Rideau waters.

It is no wonder, therefore, that the Rideau has come to be conceived of as a multifunctional system serving the diverse interests of its host society. Navigation, hydraulic power, urban utilities, recreation, and ecology are matters of concern to administrators of the waters. That these include not only Parks Canada, but also the Ministry of Natural Resources, various Municipal authorities and utility companies, two Conservation Authorities (Rideau Valley and

Cataraqui), and several other agencies and associations is some measure of the diverse use to which the Rideau Canal is put in the 1980's. The officers of the Ordnance would, no doubt, have been appalled.

Footnotes

Frontespiece

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2. PAC, RG 43, Vol. 2018, Phillips to Bowden, March 26, 1919.
3. General Order, May 18, 1873.
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3. PAC, RG 11, B1(a), Vol.183, Slater to Trudeau, April 22, 1862.
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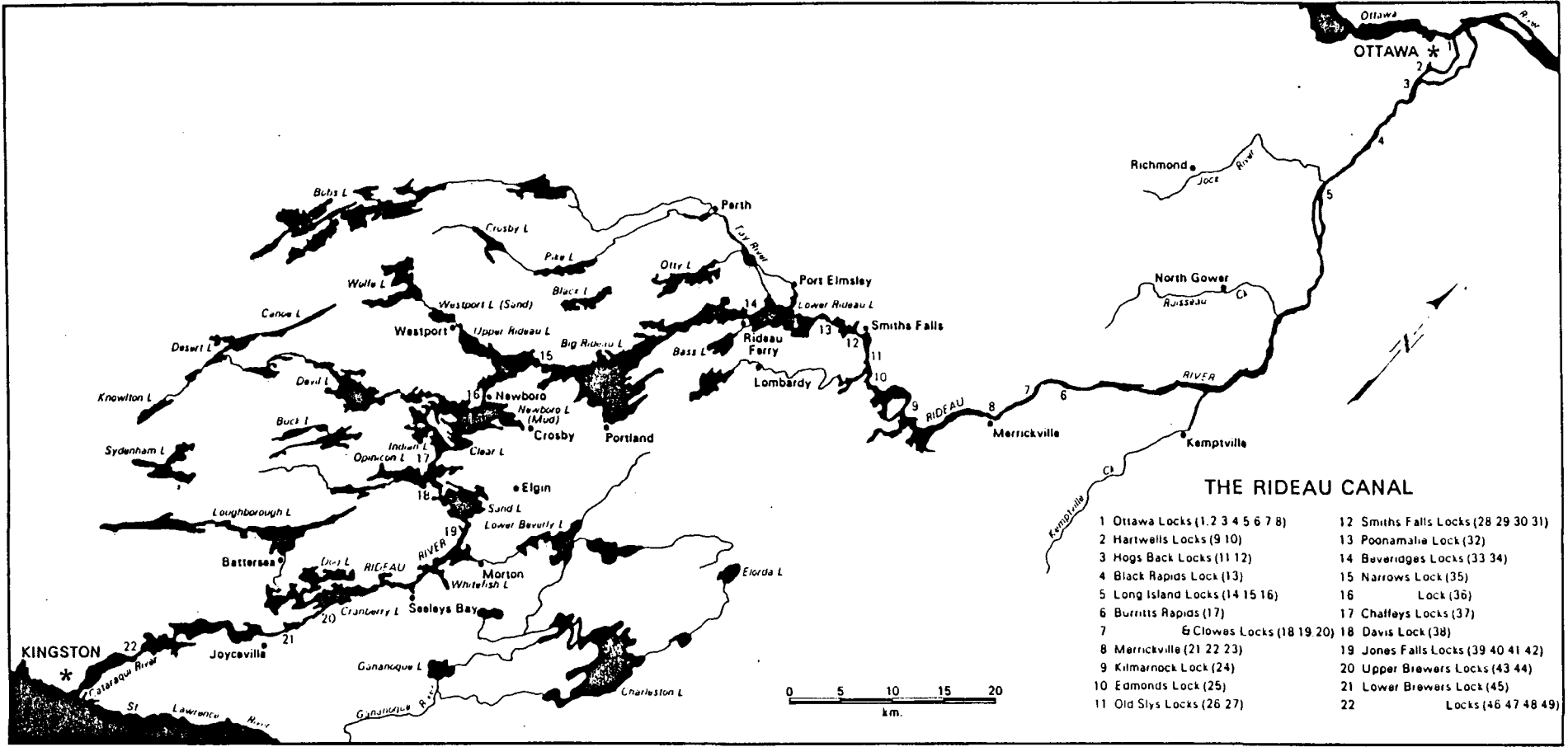


Figure 1

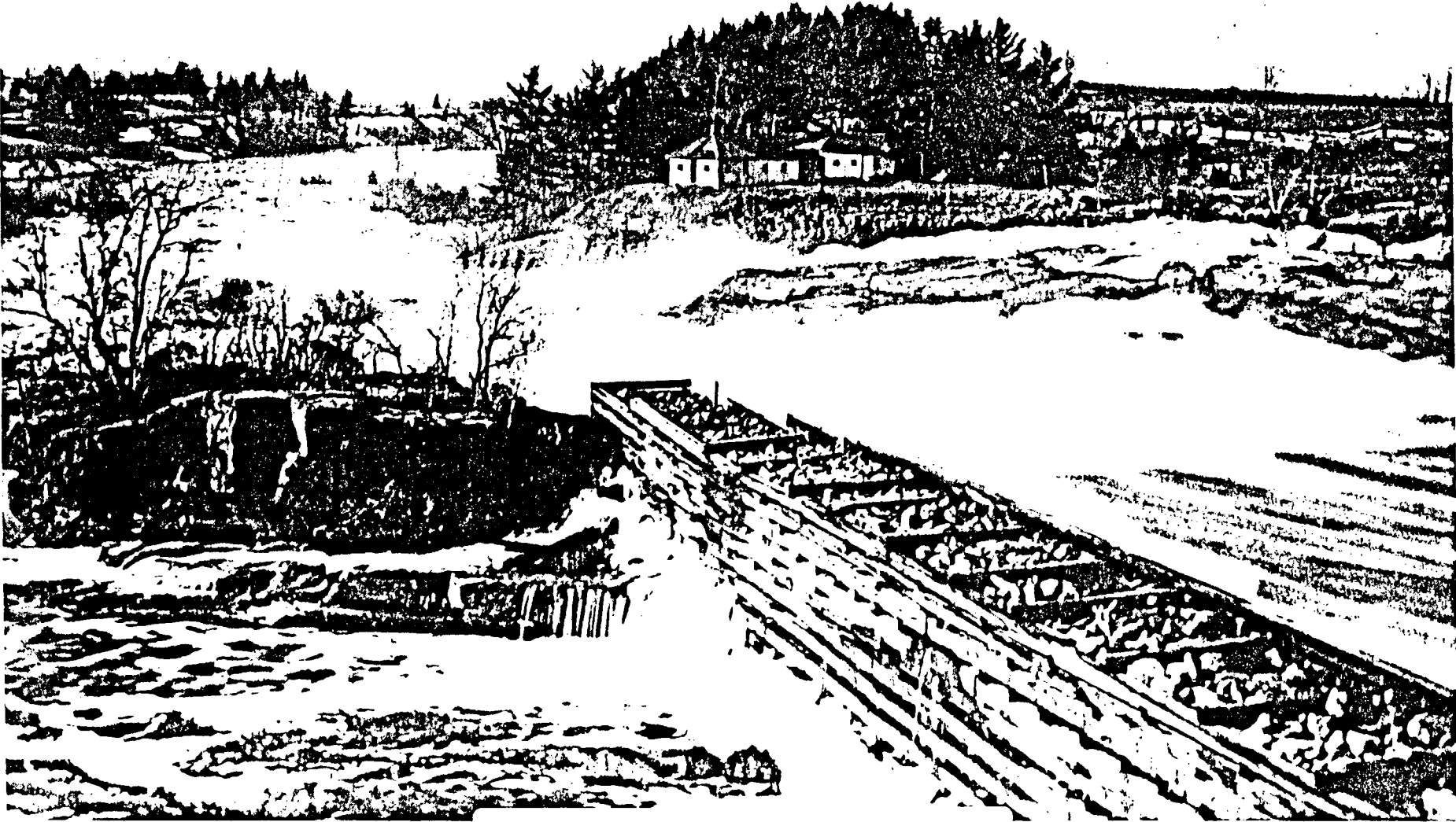
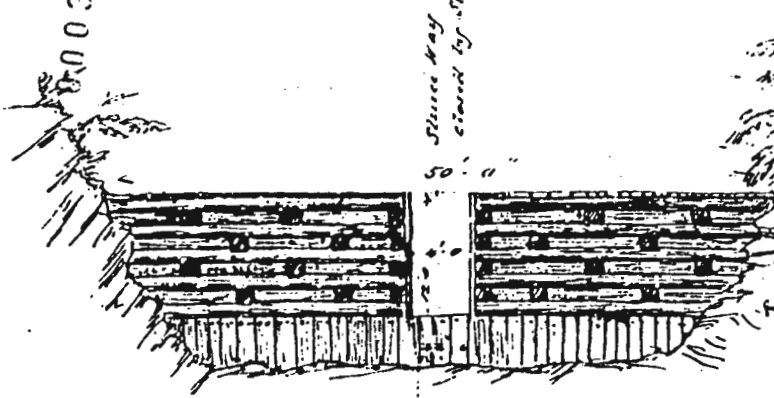


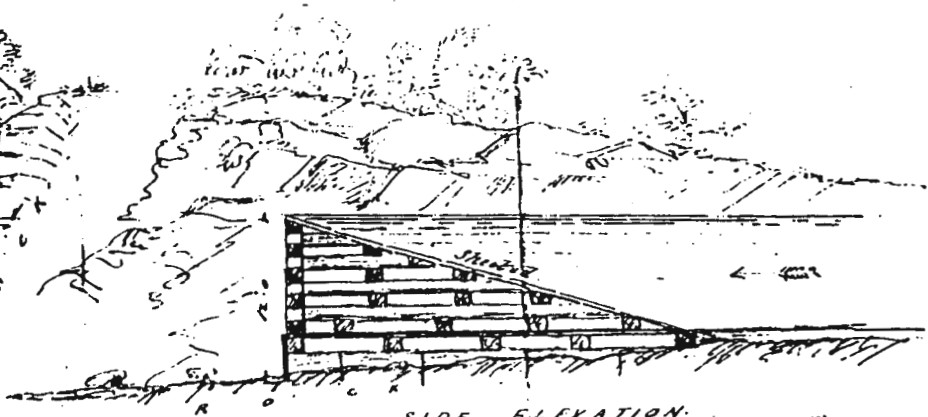
Figure 2

626004

Sluice way cleared by stop plant.



FRONT ELEVATION



SIDE ELEVATION

Sketch of "Chaffeys Dominion Dam"
 Lombard III Bedford

CA.

Figure 3

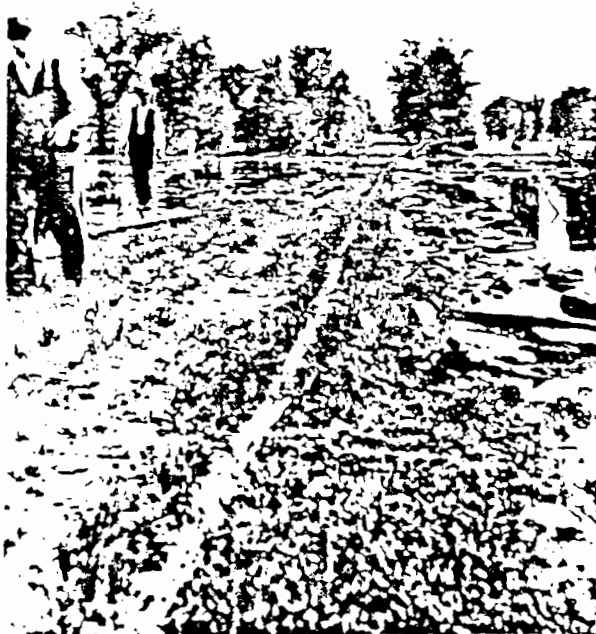


Figure 4

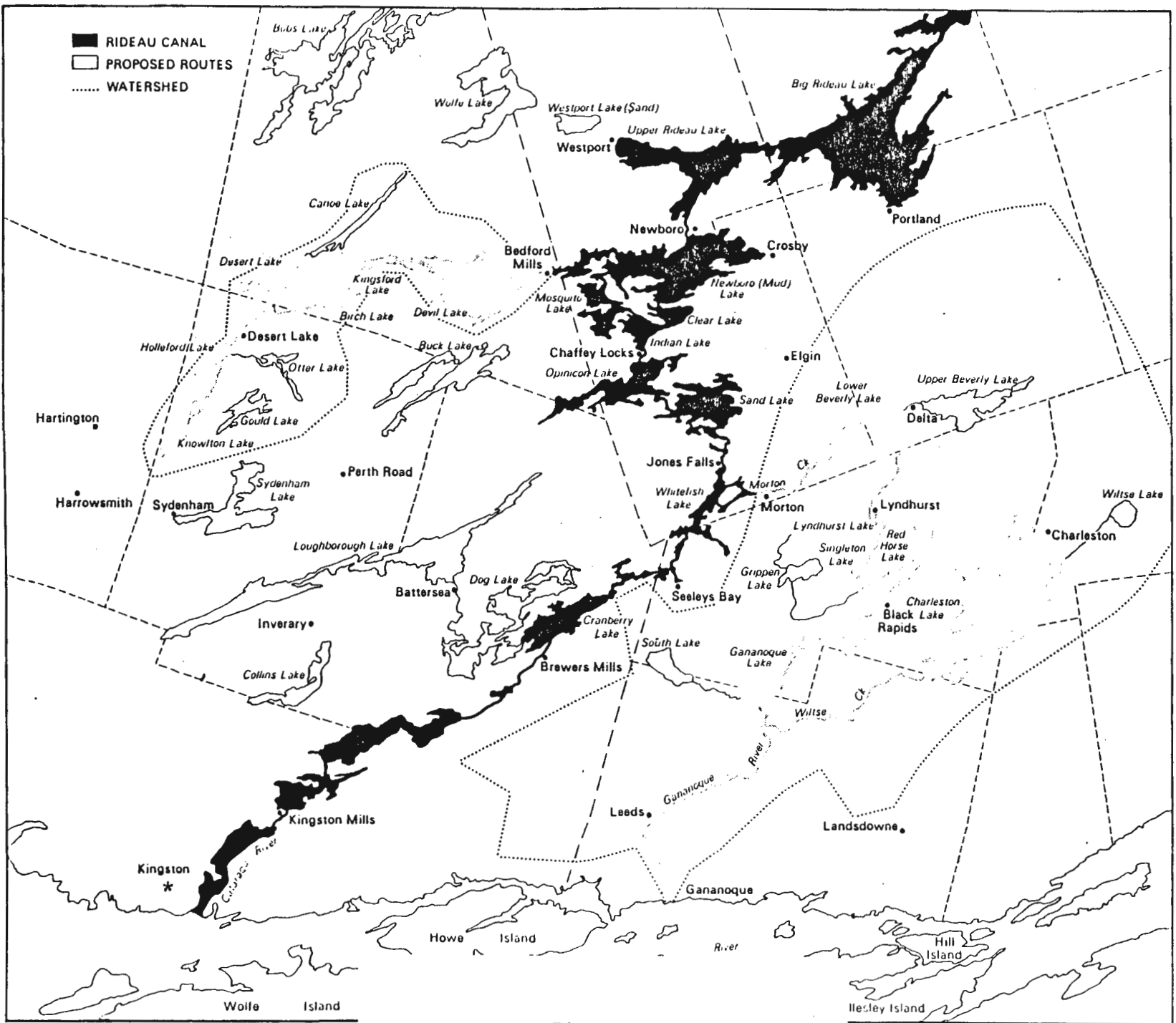


Figure 5

River Gananoque
Marble Rock

Scale 40 Feet to the Inch.

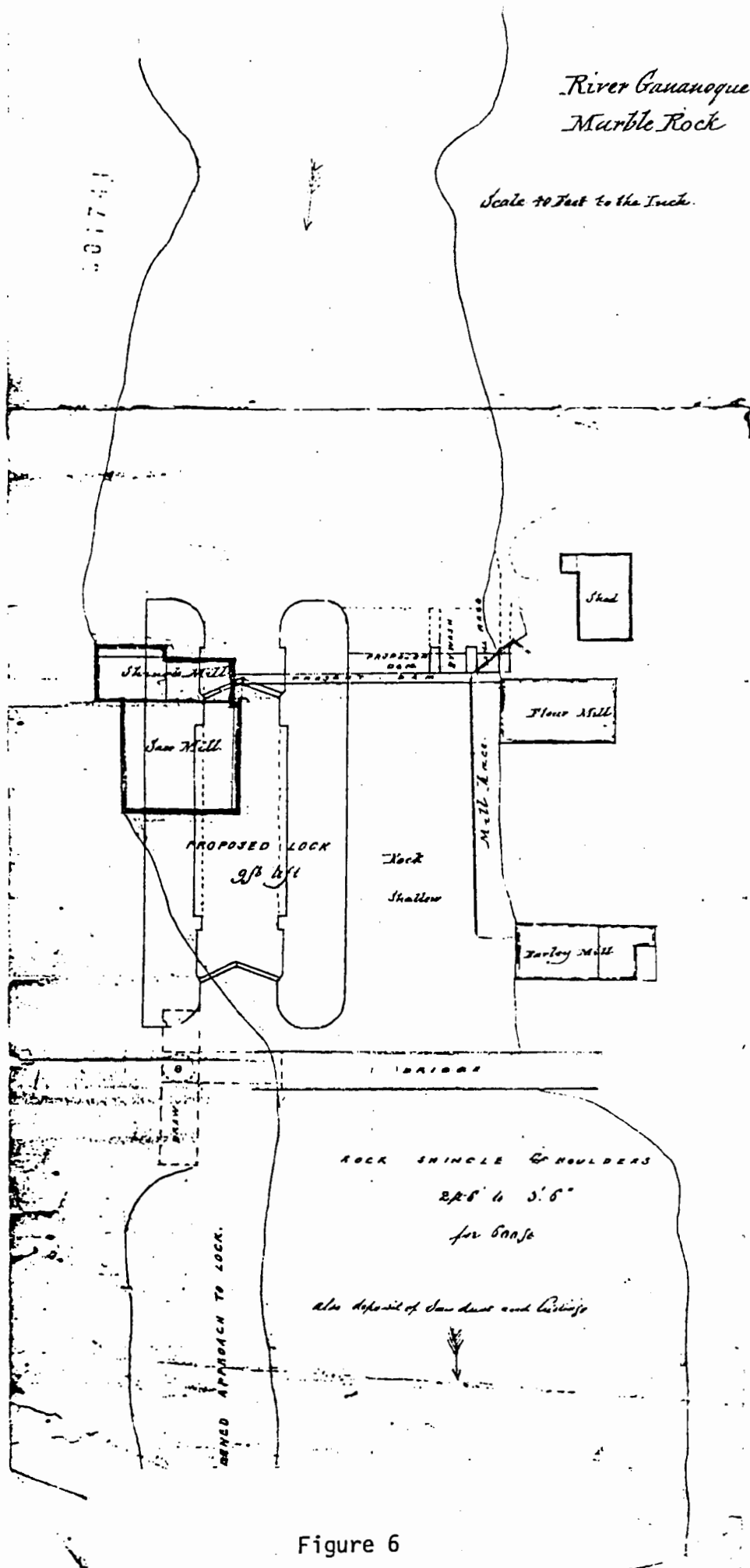


Figure 6

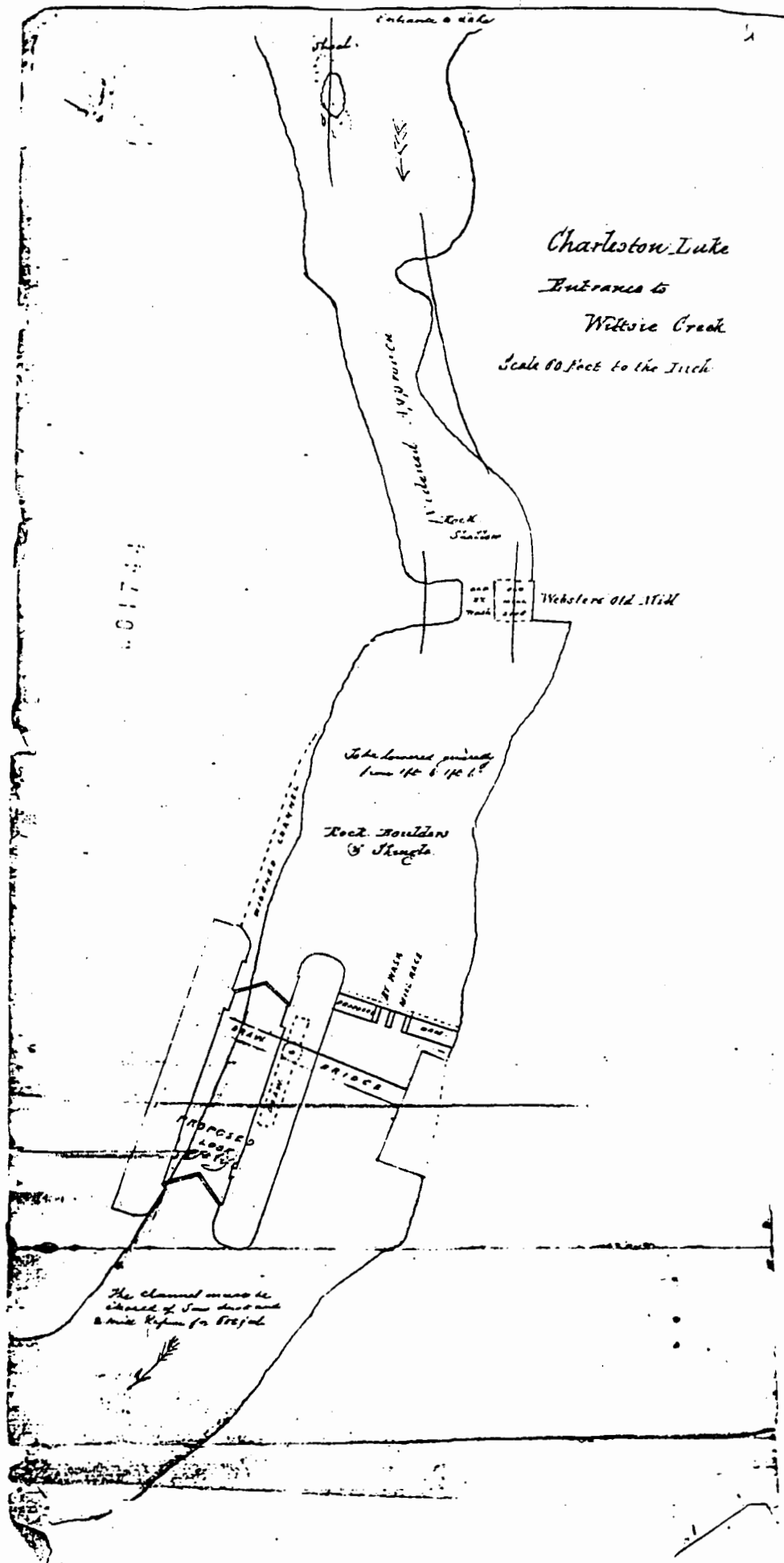
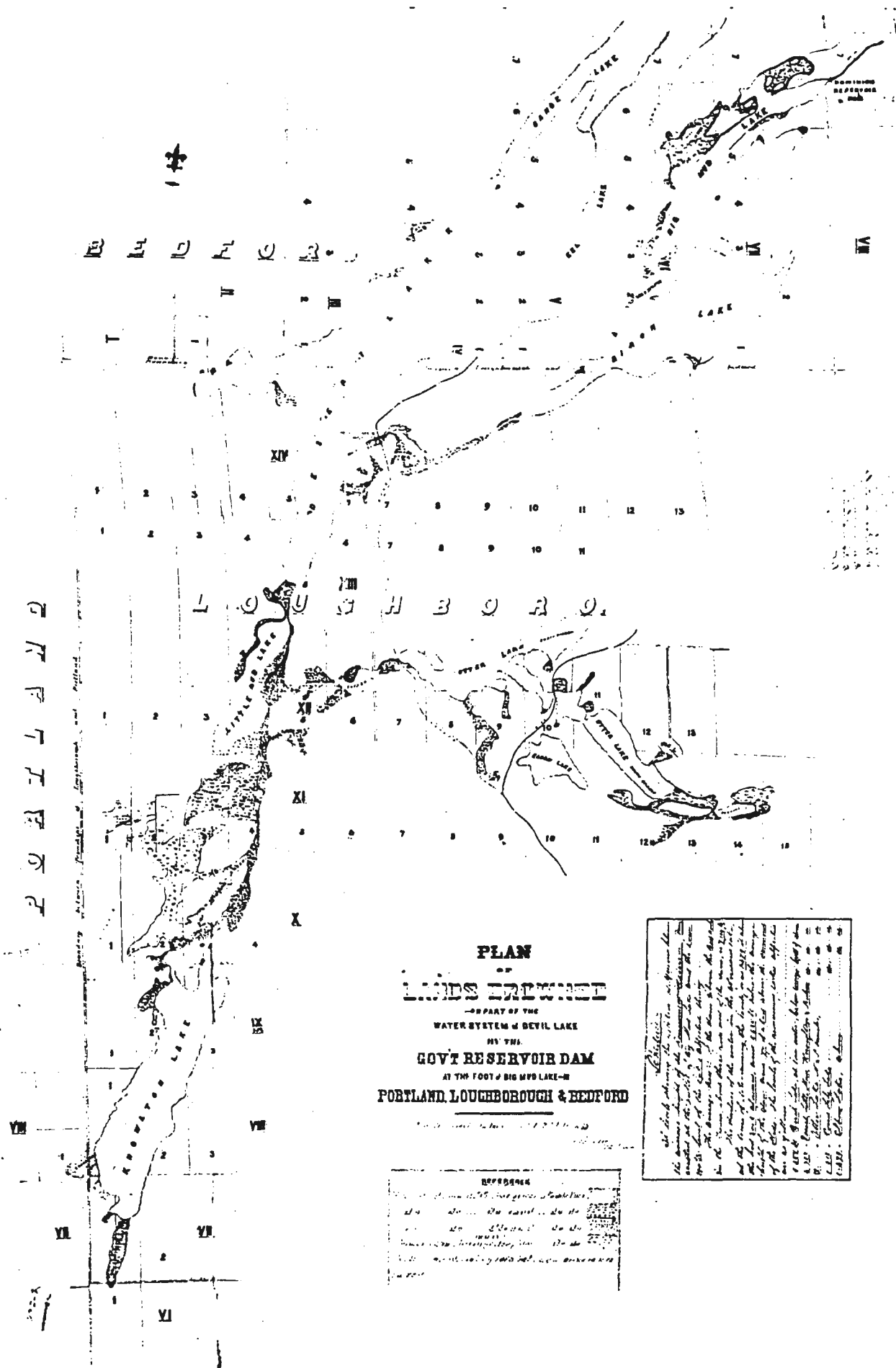


Figure 7



PLAN
OF
LANDS BREWED
 —A PART OF THE
 WATER SYSTEM OF DEVIL LAKE
 BY THE
GOVT RESERVOIR DAM
 AT THE FOOT OF BIG MUD LAKE—
PORTLAND, LOUGHBOROUGH & BEDFORD

REFERENCES

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

This plan shows the location of the lands brewed as shown on the map and the location of the water system of Devil Lake. The lands brewed are shown in the map and the water system of Devil Lake is shown in the map. The map is a plan of the lands brewed and the water system of Devil Lake. The map is a plan of the lands brewed and the water system of Devil Lake.

Figure 8

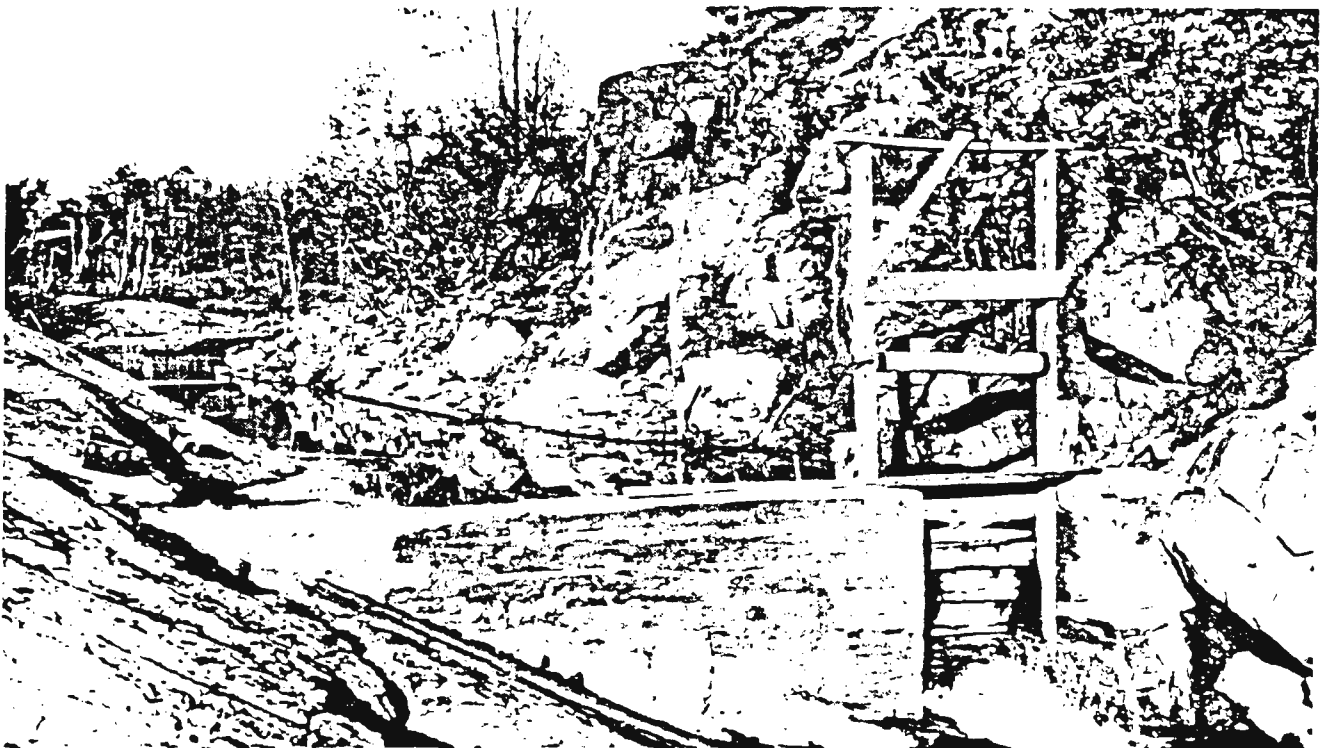


Figure 9

