

Chapter 9

Improving the Condition of Waterway Infrastructure

The Trent-Severn Waterway is a remarkable feat of engineering. The locks and dams provide for the movement of boats and the control of water through 18,000 square kilometres of watershed. Nearly 1,500 engineering structures and pieces of major equipment are required to keep it operating. Gabions and shore walls keep constructed channels open. Nearly 100 buildings provide service to the public and house the administrative staff who oversee the waterway operation. Dozens of specialized pieces of equipment from mobile cranes to huge planers for making log gates are required to keep the system in reasonable repair. More than 1,500 aids to navigation mark channels and hazards.

During our travels along the waterway, we marvelled at the extent and diversity of the infrastructure – even more so when we recognized that most of the major engineering works were constructed between 1845 and 1920. It is a testament to Parks Canada staff that they have been able to keep the system operating with minimal disruption in service despite the age of the infrastructure.

We also saw that this infrastructure is generally not in good condition. We saw leaking dams, deteriorating concrete, walls slipping into the channel and many other examples of public assets in disrepair.

Many of the citizens and organizations with whom we spoke during our consultations acknowledged that the waterway infrastructure was not in good condition. They commented on the loss of water through locks and dams. They expressed fears of catastrophic collapse of dams and resulting property damage and personal injury. They reported on damage to their boats from deteriorating concrete. They felt that operational breakdowns would become more frequent in the future and would affect both their use of the waterway and the ability of the waterway to attract and retain new users.

Parks Canada has provided us with information that was helpful in allowing us to understand the challenge of deteriorating infrastructure. This included their long-term capital plan as well as a 2006-7 assessment of major maintenance and recapitalization requirements and funding shortfalls. At the express request of the Panel, Public Works and Government Services Canada assessed the condition of major civil engineering works along the waterway.

Aging and broken infrastructure is now affecting the quality of experience of waterway users and making it more difficult for Parks Canada staff to keep the system operating. It is reasonable to expect that breakdowns will occur with increasing frequency in the future with associated disruptions in service. It is also evident that achievement of an effective water conservation regime in the watersheds will be virtually impossible without repair or replacement of the many leaking dams.

Recent engineering assessments of major civil works along the system do not suggest a significant risk of catastrophic failure of any of the dams with associated major damage to property and potential personal injury. We would note however that huge investment in the dams is required to bring them into compliance with the intent of the Canadian Dam Safety Guidelines. Parks Canada has provided some funding for this work, however there is much left to do.

We would like to make a number of specific observations with respect to infrastructure.

- There is an annual shortfall of tens of million of dollars in investment to maintain and replace the waterway's built assets.
- Staff cuts in the maintenance organization of the waterway have exacerbated the deterioration of assets and led to a loss of unique staff knowledge and expertise from which it will be difficult to recover.
- Priorities for investment in asset management seem to be based solely on asset condition when other considerations such as historic value and environmental factors need to be accorded greater value. We believe, for example, that investment in water conservation measures should be a high priority in the allocation of capital funding.
- The waterway long-term capital plan makes little or no provision for modernization of non-historic assets to improve their efficiency and permit them to serve new markets more effectively.
- The Parks Canada budget cycle for capital expenditures and the allocation of supplementary funding does not permit adequate time for planning and the development of sound project management expertise.

Establishing Appropriate Funding Levels

Using "rule of thumb" guidelines provided by the federal Treasury Board, there is a theoretical, annual shortfall of approximately \$46 million dollars in investment to maintain and replace built assets on the waterway.

The Treasury Board's "Guide to the Management of Real Property" states:

The informal rule of thumb is that a minimum of two per cent of what it would cost to rebuild an asset is what should be invested annually for its maintenance and repair ... an additional two per cent should be invested in capital projects to renew the life of the asset.³⁸

Using Parks Canada's estimate of \$1.4 billion as the replacement value of assets on the waterway, the Treasury Board formula suggests that \$56 million should be spent annually on maintenance and replacement of assets.

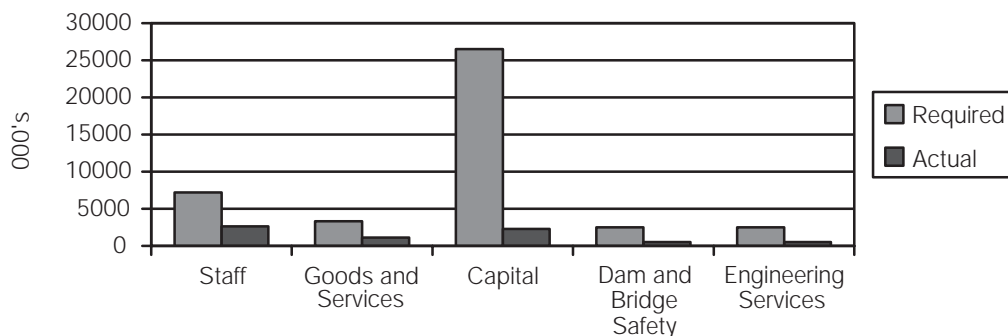
Currently, we estimate that the Parks Canada budget for engineering and maintenance on the waterway is \$5.7 million in operations and capital plus \$0.5 million in support from Public Works and Government Services Canada. To these figures we would add the notional amount of \$0.5 million in wages for lock operations staff who perform maintenance tasks making a total of \$6.7 million. In addition, Parks Canada has recently provided supplementary funding averaging \$3.5 million annually for emergency projects such as dam and lock repairs. This is not part of the fixed annual "A-Base" budget for the waterway, however, and is not guaranteed into the future.

By these estimates, the total current, annual expenditure for maintenance and asset replacement on the waterway is \$10.2 million, of which less than \$7 million is part of the fixed budget. This represents an annual investment of 0.73 per cent of the asset replacement value or, in starker terms, an apparent \$46 million annual shortfall when compared to the Treasury Board's guidelines.

³⁸ Canada, Treasury Board of Canada Secretariat, Section 3.2.2. "Integration with Strategic Planning," *Guide to the Management of Real Property*, last modified 26 June 2007. Retrieved from the World Wide Web: http://www.tbs-sct.gc.ca/rpm-gbi/gmrp-ggbi/gmrp-ggbi_e.asp.

Parks Canada's own figures suggest the need for an additional annual budget allocation for the waterway of \$35.5 million based on assessment of long-term capital and staffing requirements. Figure 1 shows the distribution of these estimates.

Figure 1 – Annual Maintenance and Capital Shortfalls³⁹



How much money should the federal government actually be spending to maintain and replace the waterway's built assets? The Treasury Board guidelines suggest the investment ought to be \$56 million annually. Although the four per cent guideline is an admirable target, we know of no public or private sector organization that invests that percentage in its infrastructure on an ongoing basis.

The nature of the waterway's assets should also be considered in the analysis. The 2006-7 Condition Assessment Report provided by Public Works and Government Services Canada confirms that most of the assets are large concrete structures. These structures, once replaced or repaired to modern standards, have a life expectancy that far exceeds most modern buildings and require considerably less annual maintenance attention.

We believe that the annual target for investment in repairs, maintenance and replacement of waterway infrastructure should be in the order of two per cent of the asset replacement value. This translates into a budget augmentation of \$21 million per year.

This additional funding should be phased in over a five-year period to allow the organization to recruit the engineering, technical and other expertise required to use the funding effectively. The monies should be dedicated funding in the form of an A-Base budget increase. The current Parks Canada practice of allocating supplementary capital funds on a competitive basis within a two or three-year time horizon prevents reasonable planning and project management from occurring.

RECOMMENDATION 25

Ensure that waterway infrastructure is maintained, repaired and replaced according to appropriate standards by increasing the annual infrastructure maintenance, repair and replacement budget by \$21 million per year on a phased-in basis starting immediately.

³⁹ Source: Parks Canada.

Rebuilding a Unique Engineering and Maintenance Organization

There is nothing “off the shelf” about most of the infrastructure on the waterway. Designed, in some cases, more than 150 years ago, the construction techniques and parts are unique. Maintaining these historic assets requires unique expertise. Unfortunately, this expertise is now largely absent from the Parks Canada organization due to downsizing and attrition. The individuals who knew how to repair things are mostly gone and the resources have not been available to ensure that younger men and women are trained to take their place.

Similarly, there is insufficient engineering and technical capacity within Parks Canada to manage a major repair and restoration program. Some political representatives with whom we spoke suggested that the federal government could demonstrate positive commitment to the waterway by launching major repair or replacement projects shortly after this report is submitted. Even if major funding were made available in the short term, it could not be effectively used given the current lack of in-place project management expertise. That is why we favour phased budget increases with initial concentration on building staff capacity.

We would also suggest that consideration be given to reconstitution of the “capital” crews that were historically responsible for most of the major concrete and lock gate construction projects. We suggest this for two reasons. First, describing much of this kind of work for purposes of calling tenders is almost impossible given that the engineers often can’t tell what a contractor will discover when restoration work on an historic structure begins. Contractors are aware of this and usually respond by building a very high risk factor into their estimates or by billing large amounts for “extras.” Second, the capital crews have, in the past, been an outstanding training ground for future maintenance personnel. Re-established crews would become part of a much needed succession program.

RECOMMENDATION 26

Ensure that the effectiveness of investment in maintenance, repair and replacement of waterway built assets is maximized through development of a cadre of well-trained and experienced personnel with a strong succession and training program.

Priorities for Infrastructure Investment

Even with major budget increases, there will never be enough money to do everything that really ought to be done. Clearly, a system that prioritizes investment is required. We offer a prioritizing scheme that takes a balanced approach. It allows for consideration of not only urgent repairs to permit continued operation but also protection of important heritage assets; improves efficiency for conservation purposes; and improves service to future users and the regional population. We recognize that several of these priorities may need to be addressed concurrently. Our list of priorities is as follows.

1. Urgent repairs and replacement of assets essential to continued operation.
2. Repair and restore Level 1 and a selection of representative Level 2 assets with a very strong emphasis on historic authenticity.
3. Repair and modernize the network of dams to improve their ability to contribute to a strong conservation regime and also to allow them to be more efficiently operated to equitably serve a broader range of water needs.
4. Renovate lock stations including associated public use areas to permit them to better serve the land-based visitor.
5. Upgrade interpretive signage and displays at lock stations.