

Assessing the Environmental Quality of Marina and Small Craft Harbours in Ontario*

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Abstract

As the population of Ontario and especially the greater Metropolitan Toronto area continues to grow, development pressures on the coastal communities will increase. The most critical result of this expansion is the increased rates of pollution entering local water bodies from a large number of sources. The marina and small craft harbour industry is one of many local and national industries that must begin to address their practices and procedures as they pertain to the environment. By doing this, the marine trades can encourage more appropriate behaviours and activities that sustain boating environments, enhance fragile ecosystems and embrace "Best Management Practices" (BMPs). This behavior in turn should increase the various enterprises' profitability while minimizing the destruction of coastal habitats.

In this respect, the marina and harbour facilities of Bronte, Port Credit and Oakville Harbours are used as case study sites to examine the issues and practices pertaining to the design and operation of small craft harbours in Ontario. The lack of controls on the location of activities and inappropriate operating practices at these harbours act as barriers to improving the environmental quality within the harbour region. By using a marina practices screening assessment, the case study sites were analysed to determine the present state of the policies, practices, designs and location of harbour infrastructure and operation.

The case study approach provided valuable information on the environmentally destructive practices being used at small craft harbours in Ontario today. Based on the results of the harbour analysis, recommendations to improve the effectiveness of regulations, the integration of planning and environmental assessment and improving marina operating practices are proposed. By identifying the practices that have a negative effect on this boating experience, marina management may begin to adopt policies and practices that can create economic and environmental benefits for everyone concerned.

Marina and Small Craft Harbours in Perspective

As the population of Ontario and especially the greater Metropolitan Toronto area continues to grow, development pressures on the coastal communities will increase. The recreational activities of the new residents, an increasing number of tourists

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and throngs of enterprises serving them, increase the pressure for urban expansion into fragile shoreline areas.

The result of this highly visible interaction is increased pressure on the natural systems that presently occupy the water and shoreline reaches of the Great Lakes. The most critical reaction of this expansion is the increased rates of pollution entering the local water bodies from a large number of sources. The marina and small craft harbour industry is one of many local and national industries that must begin to address its practices and procedures as they pertain to the environment. Since the ongoing activities along the shoreline are an increasingly visible element of our communities, it is in the long-term interests of marine trades such as marinas and their related service facilities to help their clientele take greater personal responsibility for their actions as they impact the environment and overall boater satisfaction. By doing this, the marine trades can encourage more appropriate behaviours and activities that sustain boating environments, enhance fragile ecosystems and embrace "Best Management Practices" (BMPs). This behavior in turn should increase the various enterprises' profitability while minimizing the destruction of coastal habitats (DeYoung 1997).

The marina facilities that we know today are a complex, requiring major capital investment and sophisticated scientific and engineering expertise. The awakening of environmental awareness and the subsequent desire to protect the fragile coastal environments have required the development of new areas of study and understanding for marina planning (Tobiasson and Kollmeyer 1991). Coincident to the desire to protect the marine environment, have been rapid changes in recreational boating. The development of low cost, mass produced boats has opened up a once limited market for the rich into a recreational activity that most individuals can afford. In the United States, nearly one quarter of the population is using that nation's waterways for recreational purposes (Tobiasson and Kollmeyer 1991).

Marina demand has continued to increase for the last three decades as illustrated by Blain (1993, 1995), Clark (1977), OMOA (1997), and Tobiasson and Kollmeyer (1991). This increased demand has brought many new players into the development of coastal communities. These individuals usually have little or no experience in the development or conservation of the valuable and sometimes irreplaceable resources occupying a given tract of shoreline (Clark 1983). The result has often been the creation of marina complexes that appear, on paper, as desirable facilities but in practice fail to provide environmental protection, safe and practical berthing, navigable waters and related services (Tobiasson and Kollmeyer 1991).

Marina and small craft harbour development often includes different types of land-uses that interrelate to form a specifically water oriented complex. There may be associations among recreational boaters, commercial vessels and operations such as marine shipping terminals, moorings, boat repair services, new and used boat sales, water transportation services, and the like. The planning of appropriate marina composition and design must address the diverse components of such complexes as well as the constraints and practical uses of the surrounding activities and related infrastructure. It is at the planning stage of the development process that most marina and small craft harbour related developments fail as illus-

trated by Clark (1983), Davies (1991), Ennis (1996) and Tobiasson and Kollmeyer (1991). The financial and political constraints associated with most types of development suggest an environment that creates developments that are inadequate, improper, and usually not compatible with the local natural, physical or socio-economic environment.

Spurred on by a growing population with greater affluence and more discretionary time, maritime recreation continues to develop worldwide. With this expansion comes the environmental problems, which result when crowding occurs in the marina complexes in the natural embayments. Some of the major environmental problems facing marina operators and local authorities include the discharge of raw sewage into water bodies, dumping of solid waste in the lake, chemical discharge into the water, petroleum based spills, and leaching of hydrocarbons or other contaminants and toxins into the soil, sediments and water from various sources (Marina Institute 1994, OMOA 1997). Such discharges are not only a serious public health threat but are visually and aesthetically repulsive.

Many publications illustrate best management practices such as Clark (1983, 1985), Marina Institute (1997) and OMOA (1997) but few if any are actually acknowledged by the boater. Beyond the requirements of existing legislation, many marine operations still lack the necessary infrastructure, such as pump-out facilities and chemical storage and disposal centers, necessary to protect and maintain the natural environments and aesthetic beauty of the site and region. The technology to properly design, maintain and operate a marina in an environmentally sensitive manner is presently available; however, it is not commercially available in such a way to be of practical use to a developer, marina operator or even a private boat owner.

The Objectives

The objectives of this research are to:

- determine whether there are deficiencies in the existing planning practice and environmental screening processes in Ontario;
- obtain an overview of marina and small craft harbour development in Ontario and its relationship with the environment;
- create an environmental screening framework that could help determine and identify impacts associated with small craft harbour development and operation;
- determine the state of the legislation as it pertains to marina and small craft harbour development in Ontario and to acknowledge the barriers to its effective application in practice; and,
- apply the assessment developed in this thesis to three harbours on Lake Ontario to observe the present state of this type of development.

Results

In order for marinas and small craft harbour to be a functional part of a coastal ecosystem, changes must be made in the way we view any relationship. The potential for contamination, coastal erosion or accretion, destruction of marine life and reduction in the leisure capacity for citizens is significant. Developers, harbourmasters, marina managers and boaters must begin to be accountable for their actions that reduce the environment's ability to sustain itself, intact. The fol-

lowing are recommendations that can promote a more sustainable working relationship between marinas and the environment:

- more scientific monitoring is needed to properly quantify environmental impacts from marinas;
- establishing key areas of concern can help marina operators formulate Environmental Policy guidelines;
- marina managers should consider voluntary codes of practice which include environmental audits of their facilities to pre-empt legislation;
- monitoring programs must be established to minimize the risk of severe impacts to the environment;
- more emphasis must be placed on environmentally friendly practices by marina management;
- marina management must take the lead in displaying and encouraging environmental stewardship;
- more research is needed on the regional impacts from dredging;
- water exchange must be improved in marina basins either through natural or artificial means to reduce the risk of water quality problems;
- water and sediment sampling must be performed on a regular basis in small craft harbours as a means of monitoring regional change; and,
- more enforcement of existing legislation is needed to control environmental impacts from uncontrolled practices.

Contributions of this Research

The main contributions of this research are considered to be:

- the development of an environmental screening assessment framework to identify environmental concerns in marina facilities (this assessment framework is the first of its kind in Ontario); and,
- the determination that little is known about the environmental quality of small craft harbours' in Ontario.

The application of the assessment to Bronte, Port Credit and Oakville harbours led to the following basic conclusions:

- many practices at marinas are going unchecked;
- major environmental impacts are occurring at the harbours and could be similar at all Ontario harbours;
- little in the way of controls exists on sewage pump-out, boat maintenance and repairs, surface water run-off, bilge and greywater management and boat storage practices;
- more education is needed for the boaters and marina management illustrating the economic and environmental benefits and alternative practices of a clean marina program;
- that the knowledge to address many of the environmental impacts that presently is available but not packaged in such a way as to be effective at the local level;
- boaters must be the main focus for any change to occur;
- information on environmentally sensitive practices is not reaching those making decisions in the boating industry;
- the assessment process developed during this research could be used by harbour management and individuals to improve the situation at small craft harbours; and,

- the dissemination of the results could help begin the needed consultation process for harbourmasters, boaters and other parties connected to the boating industry.

Final Comments

This research is significant in that it comes at a time when the environmental movement seems to have lost much of its attention in the mainstream news media. Furthermore, the growing imbalances in the physical environments and ecosystems of the world due to factors such as global warming, air pollution, toxic waste dumping at sea, and so on illustrate the importance of incorporating the concepts associated with sustainability and "best management practices" in all of our actions and decisions. Seeing the impact of its members, the Ontario Marina Operators Association has begun the process of self evaluation and monitoring of impacts associated with marina operations.

The process of establishing a working framework has just begun, and is intended to place the association's and marina management's own controls ahead of the legislation developed by the various government agencies concerned with the activities of marina and small craft harbours. The framework developed here has the same intention but focussed more on addressing the relationship between the impacts resulting from marina design, location and operations and the environment.

The process of developing this framework and conducting the research needed was limited by the amount of time available for this undertaking. The process was completed in five months, which is not enough time to address properly all the possible impacts from this industry. More research is required to address the environmental impacts associated with harbour design decisions and the role these decisions play in the movement of contaminants in water and sediments. Policy initiatives need to be developed that both embrace "the best management practices" and the relevant legislation governing the quality of the environment. This process will result in vast improvements to the way we look at this form of development and improve the frameworks that have been developed.

This paper is intended as preliminary input into the ongoing reform process. Most assuredly, more than what is written here will be required. To bring about dramatic changes on or near the coast will require both a new vision and greater thought and care in policy and practice.

References

- Blain W. 1993. *Marina Developments*. Computational Mechanics Publications. Southampton U.K.
- Blain W. 1995. *Marina III: Planning, Design and Operation*. Computational Mechanics Publications. Southampton U.K.
- Clark, J. 1983. *Coastal Ecosystem Management*. Krieger Publishing. Florida.
- Clark, J. 1985. *Coasts #3*. Research Planning Institute, Inc.: South Carolina, US.
- Davies, K. 1991. *Towards Ecosystem-Based Planning: A Perspective on Cumulative Environmental Effects*. Ecosystems Consulting Inc.: Toronto.
- DeYoung, B. 1997. "Surfing the Virtual Coast: Marine Electronic Communications and Collaboration Toward the 21st Century". In *Fourth National Marina Re-*

- search Conference Proceedings*. International Marina Institute. North Kingston Rhode Island U.S.A..
- Ennis, F. 1996. Planning obligations and developers: Costs and benefits. In *Town Planning Review*. 67(2):145-59.
- Marina Institute 1994. *Practices and Products for Clean Marinas: a Best Management Guide*. International Marina Institute. North Kingston Rhode Island.
- Marina Institute 1997. *National Marina Research Conference Proceedings*. International Marina Institute. North Kingston Rhode Island.
- OMOA 1997. *Clean Marinas: Practices Handbook*. Ontario Marina Operators Association. Kingston.
- Tobiasson, B. and R. Kollmeyer. 1991. *Marinas and Small Craft Harbours*. Van Nostrand Reinhold. New York.