

Transforming Theory into Practice: Lakeshore Planning in Kings County, Nova Scotia

“...The transition to sustainable communities involves new kinds of adaptations, and some alternative ways of doing things. While we may find the transition difficult, the long-term rewards should prove well worth the effort.”

(Sustainable Development in Residential Land Use Planning Grant 1993: page 87)

INTRODUCTION

In the summer of 1997, Kings County Council adopted amendments to its Municipal Planning Strategy and Land Use Bylaw to manage land use around fresh water lakes. The amendments implemented a new approach to controlling shoreline development on freshwater lakes in Nova Scotia. This approach also relied on the Municipality’s adaptation of a scientific method that ties development controls directly to the capability of the lakes to sustain development.

The aim of this paper is to describe the new planning framework, the process which led up to it and Council’s expectations in terms of the benefits of a proactive watershed management program. This paper is one of a number of ways in which we are sharing the Kings County experience with interested municipalities and organizations. Not only do we believe the Kings County approach has put a tangible face on the notion of sustainable development, we have committed to a long-term monitoring program that sets out to prove it.

SHORELINE DEVELOPMENT AND THE STATUS QUO:

County Council and residents of Kings County take great pride in the pristine lakes and rivers that characterize the watersheds of the South Mountain Plateau. In the

1950s, 60s and 70s, cottage development spread around dozens of freshwater lakes in a 400 square kilometre watershed. At least three generations of cottagers have summered on many of these lakes.



Obliteration of a lakes natural shoreline, consequent habitat loss and reduced water quality.

Unfortunately, by the mid 1970s the more accessible lakes experienced stresses which led to public health concerns for recreational swimming. In fact, health officials closed the public beach at Lake George in successive years due to high coliform levels. The contamination was attributed to cottage development, and either the failure of or complete absence of private septic systems along the shoreline. In the face of a growing stigma of pollution on Lake George, cottage owners finally organized. With the support of the Provincial Department of Health, and a ground swell of citizen action, cottagers turned the situation around within just a few years. Almost twenty years later, Lake George can boast excellent water quality and a safe and appealing public beach despite a

significant amount of development along its shores.

At about the same time that the public was debating the pollution problem at Lake George, cottage owners on nearby (and downstream) Aylesford Lake were growing concerned on another front. Already sensitized to the potential for water quality problems associated with development, residents on that lake were preparing to fight some major development proposals.

The ensuing contest between proponents and objecting property owners generated a number of studies and reports on potential water quality impacts. The debate culminated in 1983, after the Nova Scotia Environmental Control Council ruled that the Province should place a moratorium on development on the east side of Aylesford Lake. The Environmental Control Council advised that the moratorium should remain in effect at least until a tool was developed for predicting water quality impacts. The Council further ruled that efforts should be directed at upgrading private septic systems on existing cottage lots, a recognized source of contamination.

Some in the development community contend that cottage owners are simply averse to any more lake shore development strictly because of the threat to their privacy. A water quality impact model offers assurance that any future question of over development is addressed on scientific grounds rather than political or emotional ones.

THE REAL PROBLEM

To quote from the 1986 Report on Trophic Status for the Ontario Lakeshore Capacity Study, "Community Planners have always found it difficult to determine objectively the impact of development on the natural environment." (Ontario 1986: page i). In the face of development proposals elected decision-makers are often torn between the

promise of economic gains (read increased tax base and employment) for the Municipality and the diverse interests of a community and its citizens. Community planners traditionally rely on general principles of site location and design in evaluating development proposals. At times, we need to be more precise and thorough in predicting the physical and social consequences of today's planning decisions on tomorrow's world.

In that respect, Kings County, is determined to learn from the experience of other communities. By understanding the pitfalls encountered by property owners, private developers and public agencies, the County is learning to adapt and apply strategies shown to be successful in the Muskokas Lakes District and the Rideau Valley.

While the practical results and on-going water studies of the Kings County resource management strategy are some years away, the fact that we are not in crisis affords us the opportunity to refine modeling technology, development controls and public education programs.

THE APPROACH TO PLANNING - 1979 TO 1998

Municipal Council embraced comprehensive land use planning in 1979, with the adoption of the Kings County Municipal Development Plan and Zoning Bylaw. The Plan focused on conserving the agricultural land base. It also provided for urban development away from what were considered rural resource districts including recreational lakes, the Minas Basin and Bay of Fundy shores.

The new approach to watershed planning builds on the original planning concept of protecting opportunities for recreational uses on and around fresh water lakes. That protection takes the form of controlling development around lakes, and providing

for direct public access to beaches and water. In the past 19 years, the Municipality has regulated subdivision, road building and lot and housing standards. The Municipality has acquired public access points on lake fronts through the five percent open space regulations and outright purchase of land. Promoting environmental awareness and stewardship are new and promising directions that Council is moving in. Lake capacity modeling is the catalyst for this change in attitude and this change in planning approach.

DEFINING WATER QUALITY

The emphasis of the Municipality's new planning approach is to minimize development impacts on water quality. Not surprisingly however, if three people were asked to define water quality, they would likely offer three different answers. Fundamentally, the goal of County Council is to try and prevent any further deterioration from the current – and relatively good– conditions, and encourage restoration where water quality seems to be threatened. For planning and regulatory purposes however, a more precise definition was essential. Consequently, in scientific and limnological terms we are talking about **trophic status**, or the level of nutrients in the water body. Many scientists equate this measure of water quality to its biological productivity. Eutrophic lakes which are very rich in organic content such as algae, as well as larger aquatic plants (pickerel weed, water lilies and cattails) make a great home for ducks and other waterfowl. Those in local sport-fishing circles know that bass also thrive in moderately enriched “mesotrophic” conditions.

For many lake users however, water quality concerns have to do with how suitable water is for recreational uses such as swimming, boating, and other water contact activities. For most, quality is subjective and a matter of aesthetics. Nevertheless, those aesthetics often have a direct connection with public

health and ecological stability. The revised planning approach also envisions possible future uses for lakes. Historically, County residents have enjoyed an abundant water supply from the ground. One day, communities may have to turn to other sources such as the lakes. Therefore, it is important to ensure good water quality, should the need arise.

Once it defined water quality, the Municipality was positioned to work within its authority to ensure new development does not diminish water quality or limit public access to lakes. Like agricultural conservation, watershed planning relies on partnerships with other authorities at the Provincial and Federal Governments levels.

Water Quality on Kings County lakes is defined on the basis of average concentration of two trophic state indicators, Total Phosphorus (TP) and Chlorophyll *a* (Chl *a*). TP is considered the limiting nutrient which drives the production of algae. Chl *a* is a measure of algal production and is a more visible indicator of water quality. Mean annual concentrations of TP=10µg/l generally typify the boundary between oligotrophic (nutrient poor) waters and mesotrophic (moderately enriched) waters. The Municipality uses the latter (mean concentrations of Chl *a*=2.5µg/l in the water column) as the actual criteria used to define Water Quality Objectives. These water quality objectives are used to determine suitable levels of development in a given watershed.

THE KINGS COUNTY LAKE CAPACITY MODEL

Although County Council's initial 1979 planning program identified and recognized the importance of recreational lakes in terms of ensuring continued public access in the

face of private cottage development, water quality was never directly addressed. The Environmental Control Council hearing presented a new challenge to any political takers. Even though it took almost another ten years of lobbying, the Lake George Property Owners' Society in concert with some property owners on Aylesford Lake, pursued the establishment of proactive planning and development limits on County lakes.

In 1992, the Municipality of Kings County committed to undertake a study to investigate lake capacity. The project that began officially in 1993 was a partnership representing provincial and federal agencies, the development sector and County Council. Moreover the project was a partnership with the cottager community namely the Lake George and Aylesford Lake Property Owners who persisted in seeing this matter addressed.

THE OUTCOME: Theory Meets Practice

Council with its Planning Advisory Committee received a consultant's report and recommendations from its technical steering committee in November of 1995. Recommendations focused on using a lake capacity model as advocated fourteen years earlier by the Environmental Control Council. In addition, the entire study was a learning exercise, which opened a door to understanding the effects of shoreline development, not only on water quality but, on fish habitat, waterfowl and other wildlife. More importantly, the study presented some simple steps, which the Municipality (with the cooperation of the public) can take to maintain water quality and the natural character of the lakeshore. As a major force behind this process, cottagers have inherited roles as stewards, which will influence the environmental and ecological integrity of the watershed for generations to come.

HIGHLIGHTS OF THE PLANNING APPROACH

Just as the adoption of Federal soils capability maps were an integral part of designating Agricultural Land Use Districts on the Valley floor in 1979, the Lake Capacity Model gave Council the ability to establish water quality objectives relevant to each lake in the watershed. The Municipality, by the end of the project, was in a position to set development limits on a scientific basis rather than a political one. Council favoured this new approach not only because it enabled all the stakeholders an opportunity to contribute equally in the solution, it cast the whole watershed in a new light. A study triggered by concern about development impacts from thirty or forty hectares of shorefront property on one lake, led to comprehensive planning for the entire watershed. On top of that, by leaving the responsibility of an on-going monitoring substantially in the hands of a volunteer group, (one staff member is assigned the task of coordination) Council has garnered the support from the community at large.

The following section summarizes how that technical approach translates into a combination of planning policy and development control.

1. Distinction between the Coastal and Freshwater Lake Shores

In 1979, Council designated Shoreland Districts on both inland lakes and coastal areas based largely on relative recreational capability; that is proximity to communities, transportation, access to beaches, facilities. (due to extreme tidal ranges, the Fundy coastline within Kings County offers limited opportunities for swimming or recreational boating.) Council's revised policies now distinguish shoreland zones along the Bay of Fundy and Minas Basin from

zones around inland lakes, primarily based on water quality concerns. The differing treatment has important implications for planning. Within the Watersheds of the South Mountain Lakes, Council has set fairly precise limits on development not only along the immediate shoreline of lakes, but for any form of development which is potential source of phosphorus contribution to tributary streams.

2. Provisions for Permanent Residential Development on Private Roads

Prior to the new Policies and regulations coming into effect in August 1997, Council restricted development on private roads to seasonal use only. Since August, Council has opened up all Shoreland Zones –both coastal and inland– to permit permanent year-round residential use on private roads. Given some reservations about long term land use implications for the Municipality, Council was emphatic that this concession is meant to accommodate that segment of the population which does not expect the level of municipal and other public available to residents along public roads. Those services include road maintenance, snow clearing, garbage collection, school buses, and emergency support.

3. Water Quality Objectives for Lakes in the South Mountain Watersheds

As the result of its study into Lake Carrying Capacity and shoreline development, the Municipality now has a planning tool in the form of a **predictive model** which can assess the relative impacts of development on water quality.

Since the cumulative effect of development over time has the potential to reduce water quality relative to set

objectives, Council has chosen to limit total cottage development where necessary, so that water quality remains within acceptable limits. Chlorophyll a concentration in lake water is an indicator of trophic state and the parameter which Council decided to use for the statement of water quality objective.

Based on this approach, actual development controls include:

- Limits on the number of new homes and cottages which may be eligible on water front lots under Shoreland zoning -by application for a development-building permit alone; and
- Policies to require the use of development agreements on lakes where greater control over development impacts is necessitated to prevent further reductions in water quality.

The ability to predict changes in water quality assumes a certain per unit contribution of phosphorus originates from each individual dwelling. The model assumes that there is a uniform amount of phosphorus generated and estimates a uniform “average user day or occupancy” per dwelling through the year. Whereas some cottages for example may be occupied a total of 30 days per year by 3 persons, others may provide year round housing for 5 or more occupants. Consequently, it is important to understand that proposed limits to development, are set on the assumption that with few exceptions, shoreline development will remain principally seasonal in nature; at most 1/3 permanent dwellings. Therefor, periodic monitoring of occupancy or user rates to determine the ratio of seasonal dwellings to permanently occupied (dwellings) will be necessary to ensure total cottage development is consistent with water quality objectives.



A Pristine Lake in Southwestern Nova Scotia

Adopting shoreline policies, which are targeted at preserving water quality, presents Council with a second opportunity. This initiative allows Council to raise public awareness of the connection between development, shoreline alteration (*contouring and grading of the slopes leading to the water*), and the ecological diversity at the edges of the land and water (the “*Riparian Zone*”). This ecological diversity translates into economic value in terms of property value, recreational swimming, boating and fishing, and tourism. Minimizing shoreline disturbance means encouragement of water front lot owners to use common boat launch facilities rather than private ramps, and therefore, better access to the water for all potential lake users. Ultimately, acceptance of this planning approach has the potential to lead to a genuine and lasting community ethic toward the environment - an essential cornerstone of sustainable development.

4. Waterfront Building Setbacks - Freshwater Lakes and Tributary Streams

While Council’s new lot development regulations are not rigorously stated, requirements for home building on waterfront lots include the following:

- A uniform building setback from the lakeshore of 65 feet -a 15 foot increase from the former 50 foot building setback.

- A restriction on “alteration of land levels” to encourage lot owners to maintain as much as possible, the natural grades within the 65 foot building setback;
- A restriction on the removal of vegetation within the 65 foot building setback;
- A minimum 4 foot setback for boathouses to reduce shoreline alteration and habitat destruction below the high water level.

5. Development Agreement Options

At the time of adoption the Municipality had modeled and set water quality objectives for eighteen of its more than 45 lakes. Except for those building lots already in existence, the policies provide for Council to control waterfront development on lakes in watersheds other than those modeled in the original watershed, through the use of development agreements as follows:

- Lakes with designated **Special Character Areas** such as ecologically diverse coves, embayments, channels and shorelines characterized by extensive wetlands.
- Substantially undeveloped Hardwood Lake, as the original carrying capacities study “Control” lake, to limit development related impacts as much as possible to provide a baseline for future testing of predictive modeling and low-impact (phosphorus retention) development methods;
- On tributary streams and non-**Shoreland District** lakes connected to downstream **Shoreland District** lakes;
- Lakes which have not been evaluated for development capacity relative to water quality objectives;

- Lakes which have been identified as at capacity relative to water quality objectives;
- Non-residential development such as resorts, fish hatcheries, or other eligible commercial uses.



Never too late: Loons still nest in remaining wetlands now protected by Open Space zoning adopted in 1997.

6. Wetlands Protection

Council's new management framework allows for zoning (to Environmental Open Space) of shoreland areas delineated on official Provincial Department of Natural Resources Forest Cover series maps (1996), as wetlands and unsuitable for active development. Now zoned Environmental Open Space, these valuable wetland areas are protected from filling and development.

7. Common User Facilities for Launching Boats

Council's lake development philosophy emphasizes shoreline protection. This means, that in the interest of water quality and wildlife conservation including (waterfowl, fish and amphibians) all property owners along the lakeshore are discouraged from significantly altering the shoreline in front of their property. As an incentive to discourage construction of private docks and boat ramps, the Municipality continues to work with cottage owners, sport fishers and other interested groups to make sure environmentally designed

facilities are located in strategic lakeshore sites. The first of several Municipal boat launches was constructed on Aylesford Lake and open for use in 1998.

8. Community Water Quality Monitoring Programs

Among its newly adopted policies, Council committed to set up a volunteer program in partnership with the Provincial Department of the Environment and any interested individuals and organizations, to monitor lake water quality in the South Mountain watersheds. Council followed through with that commitment and struck a Committee to establish a six-year program of water sampling on several lakes. In 1997 and 1998, volunteer lake monitors collected monthly samples and recorded temperature and Secchi disk readings from May through October.



Volunteers collect water samples from County lakes monthly, through the ice-free season.

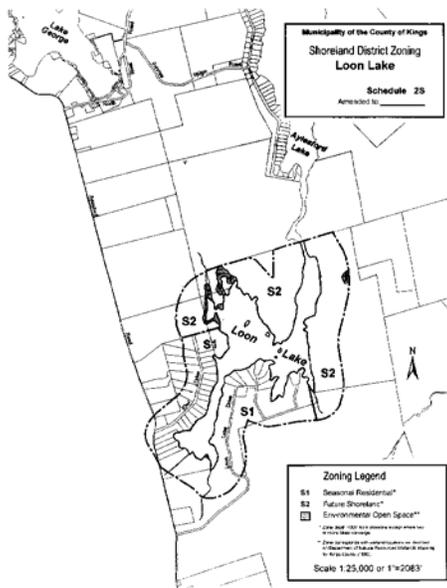
The data provided by the sampling program allows for ongoing refinement and validation of the Kings County trophic state model as a predictive tool for Nova Scotia Watersheds. As with any scientific methodology, refinements to the predictive capability of the model and ongoing monitoring of water quality should lead to corresponding reviews and improvements to shoreline policies from time to time. (A major research institution in the Province is already

engaged in a study of overland phosphorus export to obtain data specific to Nova Scotian landscapes).

Perhaps more importantly, the direct involvement of cottagers, anglers, boaters and other non-expert lake users in the collection of data is a way of educating the public and fostering stewardship.

9. Shoreland District Lakeshore Zoning Maps

As a result of adopting this watershed management approach, the Municipality adopted a series of 32 maps at a scale of 1:25,000 showing individual lakes and lake groups with more detail than previous 1:75,000 scale zoning maps. The new digital map base includes property information as well as wetland areas more than 1 hectare in size and within 300 metres of a lake.



10. Site Evaluation Guidelines

Adapted from a system used by the Rideau Valley Conservation Authority in Ontario, Kings County is developing

its own methodology for site assessments in the Shoreland District. Once complete the methodology will constitute the official manual for reviewing development proposals, with a focus on runoff control, habitat protection and visual resource management along the shoreline.

CONCLUSION

Trophic State Modeling is a valid and practical municipal planning tool. Kings County Council used its model to estimate the existing trophic state of individual lakes, and set official water quality objectives aimed at maintaining water quality within the current range. Through the use of water quality objectives in conjunction with appropriate site development practices and the public participation, the future of Kings County lakes is promising. While zoning and development controls are dependent on drawing some hard lines in terms of lot size requirements, or setbacks, or cottage limits, the Municipality recognizes that the model's predictive ability is a relative measure, not an absolute one. Therefore, Council adapted this technology to the local geographic and climatic context with a willingness to experiment, learn and readjust its watershed management techniques over time. Most agree that success in the long term depends on an open-minded approach and responsible leadership at the local level.

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