



GREEN ANALYTICS
measuring environmental values

An assessment of the net economic value to the Crown of current cottage leasehold arrangements in Algonquin and Rondeau Provincial Parks

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Preamble and Acknowledgements

Green Analytics was commissioned by Ontario Ministry of Natural Resources to examine and assess the net economic value to the Crown of current cottage lot tenure arrangements in both Algonquin and Rondeau Provincial Parks. It is our understanding that this research is to help inform economic values for the rental of the cottage lots within these parks.

During the process of this research, policy proposals that would allow private cottage tenure to continue beyond 2017 for both Algonquin and Rondeau Provincial Parks were posted for comment on Ontario's Environmental Registry:

- Cottage Lease Policy in Algonquin Provincial Park – EBR Registry Number: 011-7289
- New Cottage Leases in Rondeau Provincial Park – EBR Registry Number: 011-1300

The present study does not respond to these proposals to extend cottage tenure beyond 2017. Our research has been conducted independently of the policy discussion and represents an unbiased assessment of net economic value of current cottage lot tenure arrangements to the Crown.

Our assessment relied upon information and insights from many staff within the Ontario Ministry of Natural Resources. We thank staff at Rondeau and Algonquin Provincial parks, the Parks and Protected Areas Policy Section, the Strategic Policy and Economics Branch, and elsewhere in the Ministry for providing us with raw data and reviewing our assessment of the data to ensure its correct interpretation and assessment. We thank Professor Peter Boxall, at the University of Alberta, for reviewing a draft of this report.

This report was submitted with spreadsheets that generate the results presented in this report.

Executive Summary

This report assesses the net economic value to the Crown of current cottage tenure arrangements in Rondeau and Algonquin Provincial Parks. This assessment was informed by detailed spreadsheets (submitted separately) and two appended reports from Metrix Realty of its estimate of the market value of Crown land used for cottage tenure. Crown policies and guidelines also informed the assessment, along with economic practices, ecological knowledge, and jurisdictional comparisons.

The net economic value to the Crown of current cottage tenure arrangements was calculated as the total revenue earned from cottage lot fees and rents, less the direct costs incurred by the Crown to manage tenure and service the lots and cottagers, and less the Crown's opportunity costs.

Opportunity costs measure the value of potential benefits that cannot be realized, but must be considered, in order to ensure that current arrangements provide the highest and best use of Crown resources. The report considered two alternatives: a financial-motivated alternative and a conservation-motivated alternative. A financial alternative is the foregone opportunity to the Crown of realizing the market value of the lands. A conservation alternative is the foregone opportunity to the Crown of using the land for other recreational and ecological purposes.

Rental revenue less direct costs was compared to an estimated market value of cottage lots, to derive a net economic rate of return to the Crown. This rate of return was benchmarked against the government's opportunity cost of capital (as a financial alternative), the economic value of foregone recreation and ecological opportunities (the conservation alternative), the rental rates of the Crown Land Rental Policy, and the rental rates of cottage lots in other relevant Canadian jurisdictions.

The Crown's current opportunity cost of capital was estimated at 3%, which is the midpoint of a range of 2% to 4% which is the current rate of return on a 5-year and 30-year provincial bond. This rate of return was interpreted to be a "fair market rate of return" insofar as it is also the current risk-free rate of return that could be earned by the private sector from holding these provincial bonds.

The Crown's conservation alternatives were assessed, but few of their foregone benefits could be estimated and economically valued. The best alternative conservation uses of lots in Algonquin were assumed to be for ecological refuge or enhanced backcountry campsites and recreation. The best alternative use of lots in Rondeau was assumed to be for ecological refuge alone. Ecological and economic information gaps limited the valuation of this conservation alternative to the foregone net annual revenue from backcountry campsites in Algonquin, which was estimated to be \$38,000.

Results show that the Crown is currently challenged to meet its goal of cost-recovery and earning a fair rate of return from cottage lots in Rondeau and Algonquin Provincial Parks. A private landlord attempting to compete against the Crown for leasing land near Rondeau or Algonquin Provincial Parks could be at a competitive disadvantage today, to the extent that it could not rent private land at the same low rental rates yet still cover its opportunity cost of capital.

Currently, 285 cottage lot tenure agreements in Rondeau provide about \$743,687 of annual revenue from fees and rents. This revenue is expected to be insufficient to cover this year's costs of \$217,216 plus a \$900,000 Payment-In-Lieu (PIL) of taxes from the Crown to municipalities on behalf of cottage tenure holders. It is expected that within the coming year, the Crown will no longer have to provide this PIL. Without a PIL, the Crown would achieve cost recovery from current tenure arrangements in Rondeau, and earn an annual net rate of return of 1.05% from the \$49.9 million estimated market value of crown lands under cottage tenure. Without making a PIL, the Crown would need to increase annual revenue from Rondeau cottagers by 131% in order to earn a fair rate of return of 3%. If the Crown were to continue to make the PIL on behalf of cottagers, revenue would need to increase by 252% in order to earn a fair rate of return.

In Algonquin, 303 cottage lot tenure agreements provide the Crown with about \$586,918 of annual revenue. The Crown spends between \$163,768 and \$296,026 to support cottagers, with this range accounting for uncertainties in the amount actually spent to support water control structures, which are one of many forms of infrastructure that provides benefits to cottagers. The Crown pays \$130,543 per year as a Payment-In-Lieu (PIL) of taxes on behalf of a minority of cottage tenure holders who do not pay a municipal tenure tax. Current revenue is sufficient to recover costs and the PIL, earning the Crown an annual rate of return between 0.6% and 0.33%. Without making a PIL, the Crown would earn between 0.86% and 0.59% annually (low-to-high cost range). To earn a fair rate of return of 3% from an estimated market value of \$49 million worth of Crown lands under cottage tenure, annual revenue would need to increase by 179% to 201% (low-to-high cost range).

The current net economic rates of return to the Crown from cottage tenure arrangements in Rondeau and Algonquin are below rental rates in Manitoba (4%) and Saskatchewan (1.92%). Cottage rental rates in Ontario are significantly less than the rental rate recommended by Ontario's Crown Land Rental Policy, which is significantly higher than the Crown's current opportunity cost of capital. However there are questions about whether and how this policy applies to cottage tenure.

This report does not assess nor recommend specific approaches to manage its conclusion of a significant revenue shortfall. Nor does this report assess recently-posted policy proposals to extend cottage tenure beyond 2017, which is currently the expiry of all cottage tenure agreements.

1. Introduction

Cottage lot tenure agreements have been in place in the Ontario provincial park system since the late 1800s, initially established to encourage tourism. Only two parks in the provincial system currently have such private cottage lot tenure arrangements: Rondeau and Algonquin.

In 1986 the Provincial Parks Council (predecessor to current Ontario Parks Board) held hearings and recommended the extension of cottage leases in both to 2017, and terminated thereafter. The Parks Council recommended an extension in part as a means of allowing cottagers to recoup their investments. Many sold their properties in the following years. Cabinet endorsed the Council's recommendation and passed a regulation to that effect. Tenure holders signed an extension agreement that stipulated the tenure would terminate on December 31, 2017.

The research outlined in this report documents an independent assessment of the net economic value to the Crown of current cottage tenure arrangements. This report does not calculate the net economic value to the private holders of the current cottage tenure arrangements. To assess this value would require knowing the tenure holders' full value for a park cottage lot in excess of the obvious cottage travel and maintenance costs and fees paid to the Crown.

This research sought to achieve three key objectives:

- Identify and quantify the direct, indirect and opportunity costs to the Crown of current cottage lot tenure arrangements
- Establish updated realty values for cottage lots
- Develop a valuation approach for determining the fair market value of cottage lot tenure.

The assessment of net economic value to the Crown is organized around the following chapters:

- *Current Tenure Arrangement* – Briefly outlines and describes the rights, services, and limitations of current tenure arrangements through leases, licenses of occupation and land use permits.
- *Full Value Accounting Framework* – Outlines and articulates the components of the overall accounting framework with particular emphasis on the economic and policy rationale.
- *Market Value of Cottage Lands* – Describes the methods and results relevant to establishing market values for cottage lot tenure arrangements for each provincial park.
- *Administrative Costs of Tenure Arrangements* – Describes the methods and results used to establish the administrative costs for tenure arrangements for each provincial park.

- *Opportunity Costs of Cottage Lot Tenure Arrangements* – Describes the methods and results used to establish the opportunity costs of cottage lots for each provincial park.
- *Integrated Assessment* – Presents the net economic assessment for arrangements in each park, integrating direct and opportunity costs and fair market rental rates.
- *Conclusions* – Summarizes the key findings of the assessment of net economic value to the Crown of cottage lot tenure arrangements.

2. Current Cottage Tenure Arrangements

There are currently 285 private cottages in Rondeau and 326 cottages in Algonquin Provincial Park. These cottages are regulated by one of three types of tenure: land lease; license of occupation; and land use permit. Rondeau has 284 leases and one license of occupation. Algonquin has 285 leases, 10 licenses of occupation and 8 land use permits, for a total of 303 active cottage tenure agreements. Most tenure agreements apply to one lot although some apply to double lots. Most lots contain one self-contained cottage unit, but some contain multiple units. All lots occupy Crown land within the boundaries of a provincial park. Tenure is granted to occupy land and to build cottages and other structures upon it. However these structures must be removed and the land must be rehabilitated upon termination of tenure.

All leases and licenses of occupation follow a generic template that specifies an initial lease rental rate, a schedule of potential future rental rate adjustments, along with a description of the site and the limitations of use. All leases and licenses of occupation specify an expiration date, and all the expiration dates are December 31, 2017. Cottage lot tenure agreements had been extended or renewed, often for long periods (such as 21 years) at a time. However, following public hearings by the 1986 the Provincial Parks Council (predecessor to current Ontario Parks Board) Cabinet endorsed the Council's recommendation that the cottage leases in both parks be extended to 2017, and terminated thereafter. This decision is reflected in the 1990 Rondeau Management Plan that The Parks Council recommended an extension in part as a means of allowing cottagers to recoup their investments. Many sold their properties in the following years. Cabinet endorsed the Council's recommendation and passed a regulation to that effect. Leaseholders signed extension agreements that stipulate the leases will terminate on December 31, 2017.

Cottage tenure agreements impose several conditions that restrict property rights, when compared to leases of private land which are regulated by a tenant protection act. Tenure holders do not have an inherent right to transfer, sublet, or assign their tenure to others, but may request this of the Crown, who has typically consented to transfers. Tenure holders cannot use the lots as a permanent residence. Tenure holders can also be bound by "further conditions or regulations which the Lessor may deem to be required from time to time..."

Tenure holders can sell their lease or license of occupation, along with any buildings and structures upon the land. Recent sales reveal a strong market valuation in spite of the leases set to expire on the last day of 2017. Although lessees have asked the Government of Ontario to reverse the 1990 land use decision and allow renewals or extensions, the 1990 decision remains.

A daily or seasonal vehicle permit is required for each vehicle used to access the cottage lots. In 2012, the cost of a daily vehicle pass was \$16.00 in summer and \$10.75 in winter. A yearly vehicle pass was \$150.50, with a summer seasonal pass (April to November) costing \$107.50. Each tenure agreement specifies an annual rent, averaging \$1420 per year in Algonquin and \$2040 per year in Rondeau. An annual service fee is paid per each cottage unit; this fee is currently \$204 per unit in Algonquin and \$421 per unit in Rondeau.

Rondeau cottage tenure holders do not currently pay municipal tenant tax, but this is expected to change in the next fiscal year. The Crown currently provides a \$900,000 Payment-In-Lieu (PIL) of taxes to local municipalities to compensate for this foregone tax revenue from Rondeau cottages. Most cottage tenure holders in Algonquin pay municipal tax on the market-assessed value of the cottages, as assessed by the Municipal Property Assessment Corporation. The Crown provides a PIL of \$130,543 for 44 cottage lots in Algonquin that do not pay municipal taxes.

The Ministry of Natural Resources provides cottagers with many services, such as garbage removal and the supply and maintenance of infrastructure used by tenure holders. An important service is the administration of leases and other forms of tenure. Administration includes: responding to requests from cottagers about potential building and lot improvements, facilitating lease assignments and transfers and sales and financial accounting, and addressing concerns with human-wildlife interactions. Some services are provided to all park users, which includes cottagers and non-tenured users such as campers and day visitors. Services vary by park. Cottagers enjoy these services without paying for them on a per-use basis.

3. Full Value Accounting Framework

Cottage tenure holders in Algonquin and Rondeau Provincial Parks enjoy exclusive benefits that are provided at a cost to the Crown and to the Ontario public that is served by the Crown.

A framework of full value accounting helps to identify and integrate the costs and benefits that are relevant to assessing the net economic value to the Crown of the current cottage tenure hold arrangements in these parks. This also helps to establish their fair market rental values.

Specific economic costs and benefits captured in this framework are:

- 1) **The Crown's benefit of allowing cottagers to rent land within the parks.** The value of this benefit is estimated as a fair market rental rate of the land in an unimproved state (without structures). Since rental rates are not determined in an open market, a range of fair market rental rates are proposed and applied to the market value of the land in an unimproved state. Expert realty judgment informed an estimate of the market value of the land, on the basis of principles and methods of the Appraisal Institute of Canada.
- 2) **The Crown's direct costs of serving the lessors and the lots they lease.** These costs are priced on the basis of how much the government pays its employees and non-government service-providers to render the goods and services that benefit the leaseholders, such as administering the leases and other tenure instruments, and sustaining the infrastructure that supports the lots.
- 3) **The Crown's opportunity costs of forgoing alternative uses of the land.** The government must ensure that leasing Crown land for recreational use and cottage development is the highest and best use of the land. This requires assessing alternatives. We considered two alternatives: a financial-motivated alternative and a conservation-motivated alternative. A financial alternative is the foregone opportunity to the Crown of realizing the market value of the lands. A conservation alternative is the foregone opportunity to the Crown of using the land for other recreational and ecological purposes as stipulated in the 1990 Rondeau Management Plan. The net value of these foregone alternatives was assessed by the expert judgment of ecologists and economists. Many of these benefits are measured by non-dollar metrics, but some are "price-able." The government's publications about recreation values and ecosystem service values provide a starting point for estimating these foregone benefits, which economists call "opportunity costs."

These three components must be concurrently considered in order to fulfill the Ministry of Natural Resources' Statement of Environmental Values, which states: "Natural resources should be properly valued to provide a fair return to Ontarians and to reflect their ecological, social and economic contributions" (MNR, 2013).

All components inform the Ministry about the extent to which cottage lot tenure is provided on the basis of *full-value recovery*. Full-value recovery is broader than cost-recovery, which is realized when the government collects as much in revenue as it spends for the provision and maintenance of leasing the cottage lots. The benefits to the lessors of leasing the land are not a cost of the government, but rather a reflection of societal demand for the specific lots. The government can capture this beneficial value from cottage lot tenure holders to prevent them from enjoying an unfair surplus of benefits that is not available to other Ontario taxpayers.

The *net economic value* to the Crown from the current tenure arrangements equals:

The revenue collected from the tenure holders,
Minus the fiscal costs incurred by the Crown to manage the tenure and service the lots,
Minus the opportunity cost of the foregone best alternative use of the cottage lots.

The *net economic return* from the Crown's tenure arrangements is equal to the *net economic value* as a proportion of the capital value of the Crown land. Since the net economic value is calculated over the span of a fiscal year, the net economic return is expressed as an annual rate. This makes the rate easy to compare against other rates, such as the opportunity cost of capital.

The net economic value to the Crown is maximized when a market rent is earned from leasing the lots. If the Crown earned less revenue than the full cost of leasing the lots, then the leases would provide no net benefit to the Crown and the Crown would effectively be subsidizing leaseholders. Conversely, if the leases were priced above market value, nobody in the marketplace would choose to rent the park cottage lots. If the market value for the cottage lots is insufficient to cover their costs, this would reveal that there is no economic rationale to rent land for this purpose.

The Crown must therefore assess a "fair market price" for renting the cottage lots, in order to justify the use of public resources for private cottage tenure. In setting the price of cottage tenure, the Crown affects the distribution of surplus value between itself and the leaseholders. Not surprisingly, the leaseholders would view any economic value earned by the Crown as a cost passed on to them.

Since the Crown does not own any improvements upon the land, and since the land tenure only reflects the value of the land and not the land plus the structure, then the Crown does not enjoy any

net economic value from the structures on the lots. Any surplus value from the structures is fully enjoyed by the private leaseholders. Thus, the leaseholders can still enjoy a surplus value of the cottage lots even if the Crown maximizes its economic value.

This accounting framework uses prices in Canadian dollars as a common metric. Accounting frameworks are powerful when their components are valued using a common metric. This power comes with a limitation that translating values to a common metric can introduce omissions. Omissions can be addressed by exploring ranges of high and low estimates and scenarios where probabilities are unknown. This is relevant for the opportunity costs since they are mostly unpriced whereas the other components are priced.

The following chapters describe the approach taken and present results for each of the key components of the framework.

4. Market Value of Cottage Lands

Tenure holders for cottage lots within Algonquin and Rondeau enjoy a benefit of occupying Crown land. The Crown must determine a lease rate that provides a fair return for this benefit. A market approach to estimating a fair return requires two key pieces of information: the market demand for these lots, and the Crown's expected rate of return from leasing its land. The former is a measure of society's maximum willingness to pay, and the latter is a measure of the minimum compensation that the Crown should be willing to accept.

The market demand for cottage lots was estimated by seeking comparable open market sales for vacant private land in close proximity to the parks. Comparable properties were assessed, and dissimilar characteristics were considered, in order to estimate a market value for the leased Crown lands. This estimate assumes "fee simple interest" property rights, in which absolute ownership is unencumbered by any other interest or estate, subject only to the limitations imposed by the governmental powers of taxation, expropriation, police power and escheat. Therefore, the market value of the leased Crown land is an appraisal of its likely sale price in an open market.

Table 1: Estimated market value of Crown land leased as cottage lots in Rondeau Provincial Park

Type of cottage lot	Number of lots	Total feet of frontage	Estimated Market Value of Land	
			Value per frontage foot	Total value
Waterfront*	239	13,677	\$3,500	\$47,869,500
Inland (road frontage)	48	2,588	\$800	\$2,070,400
Total	287	16,265		\$49,939,900

* Note that "waterfront" cottage lots provide water views but do not meet the water. Land between the water-facing edge of the lot, and Lake Erie, is accessible from cottage lots even though it is not included in their tenure.

Table 2: Estimated market value of Crown land leased as cottage lots in Algonquin Park.

Type of cottage lot	Number of lots	Estimated Market Value of Land	
		Value per lot	Total value
Road Access Lots - Front Country	49	\$215,000	\$10,535,000
Water Access Only Lots - Front Country	171	\$156,000	\$26,676,000
Water Access Only Lots - Cache Lake	62	\$156,000	\$9,672,000
Water Access Only Lots - Small Lakes	6	\$104,000	\$624,000
Back Country Lots	15	\$102,000	\$1,530,000
Total	303		\$49,037,000

Metrix Realty was employed to appraise the market value of the Crown land that is leased to cottages, in conformity with the Canadian Uniform Standards of Professional Appraisal Practice. Details of their methodology and results are attached to this report in Appendices A and B. Summary results are provided in Table 1 and Table 2. In Rondeau, some tenure agreements cover more than one lot, so there is a difference in the number of tenure agreements when compared to the number of lots in that park. Most tenure in Rondeau and Algonquin is provided by leases, but some are provided by Land Use Permits (LUPs) or Licenses of Occupation (LOs).

Results show that each park leases an estimated market value of almost \$50 Million worth of Crown land. Estimated market values on a per-site basis averaged higher in Rondeau Provincial Park than in Algonquin. Sites in Algonquin occupy significantly more area (315 acres total) when compared with the total area supporting sites in Rondeau (50 acres), so the market value of land varies greatly on a per-acre basis. This estimated market value of land can be considered the Crown's capital, against which costs and benefits – and rental rates – can be assessed.

5. Administrative Costs of Cottage Tenure Arrangements

Since administrative costs are meant to be recovered by cost-recovery fees levied to leaseholders, our assessment is informed by the government's *Costing and Pricing Policy*, and the accompanying *Costing and Pricing Guidelines* (Office of the Budget and Treasury Board, 2006). This is intended to ensure consistency with the Supreme Court decision involving *Eurig vs. the Crown*, which confirmed that cost-recovery fees must be attributable to the costs of servicing the fee-paying beneficiaries.

The administrative costs of cottage tenure arrangements were priced on the basis of how much the government pays its employees and non-government service-providers to render the portion of goods and services that benefit the tenure holders within the current 2012-13 fiscal year. Government expenses that benefit cottage tenure holders are not tracked in separate accounts from expenses that benefit other park users. Therefore several calculations and adjustments were needed.

For goods and services that benefit multiple user groups, the portion of benefits enjoyed by cottage tenure holders was estimated on the basis of shares of use within a year. For goods and services that provide benefits lasting many years, their annual costs were amortized over the expected lifespan of their benefits. Where costs were known over several fiscal years, their variability was assessed. This is acceptable because the standards and expectations of benefits enjoyed by cottage tenure holders have not changed over this time period. To make this comparison sound, costs in past years were priced in constant 2012 dollars to account for the effect of changes in consumer prices. Since there is no specific OMNR Park Price Index, the more general all-items Consumer Price Index for Ontario from Statistics Canada was used to convert costs of past years to 2012 dollars. Costs in 2012-13 were estimated to the end of the fiscal year because this fiscal year has not yet ended.

Costs were assessed for each park separately, using a consistent accounting approach and by grouping expenses in the same aggregated categories for ease of comparison and understanding. Almost all of the costs relate to benefits that are enjoyed somewhat equally by all cottage tenure holders within a park, so we did not allocate costs to specific cottage lots. When levying fees, the Ministry might consider whether the location, size, or other aspects of the lots imply that some tenure holders may enjoy a higher- or lower-than average share of benefits when compared to other tenure holders. We were not asked to assess this consideration.

Many costs are market-priced insofar as the Ministry acquires the good or service through a procurement process, or by directly purchasing them in a retail context at the cost of their price tag.

We call these “external costs” in contrast to the “internal costs” that are incurred by the government but do not have transactions in the marketplace. Internal and external costs are accounted for at the park level.

Following Treasury Board guidelines, direct costs at the park level are assumed to relate to a proportionate amount of costs from Parks and Protected Areas Policy Section, plus corporate costs in MNR (to account for fiscal controllership, human resources, Ministerial communications, and corporate management). These costs can be added, without an error of double-counting, to account for the full cost to the Crown. The Parks and Protected Areas Policy Section has a budget of about 2.6% of the size of operations, so this proportion was used to account for policy and science overhead, even though this is likely a significant underestimate. The Ministry’s Results-Based Plan reveals about 5.4% of the operating and capital budget of the ministry is administration, so this is added to program and policy.

Unlike Treasury Board guidelines, we did not distinguish between fixed, variable, and discretionary costs. These distinctions are not relevant to informing MNR about the net economic value of current cottage leaseholder arrangements, so were not distinguished as such. Many external costs imply a certain amount of internal costs of overhead, such as managing the contracts of waste contractors and going to stores to purchase supplies. However these internal costs are already captured by the fixed costs of park staff, since the park appears to have spending authority for these costs. There are a few limitations of our assessment with respect to the government’s costing and pricing guidelines. One limitation is that we did not directly access spending data from IFIS (the Integrated Financial Information System). We assessed data that was provided to us by various Ministry officials who know first-hand how much is spent on particular items. Some of this data appeared to be sourced from Purchase Card statements, which provides even more detail than would be found within IFIS data. In other cases, we were provided with an expert’s best guess of the cost, with documented or verbal logic, which we assessed and used when we felt it seemed reasonable.

Another limitation with respect to the government’s costing and pricing guidelines is the challenge of benchmarking costs to be sure that they are not more expensive than necessary. This is difficult to assess in the context of park-specific costs. Our best attempt to benchmark costs was to compare expenses that are common in both parks. In theory, unit costs of the same type of expenses should be comparable, notwithstanding the differences one would expect from different local market contexts, such as the concentration of competitive service providers.

5.1 Rondeau Provincial Park

Table 3 lists the costs that were considered in support of cottage tenure arrangements in Rondeau Provincial Park. Most costs were assessed from actual spending data that covered the last three fiscal years, which helped to reveal their frequency and annual variability. These costs are measured, and aggregated into broader spending categories, in Table 4.

Table 3: Costs considered that support cottage tenure arrangements in Rondeau Park

Cost Category	Considerations, limitations, and confidence
Garbage collection	These external costs are measured and known with confidence.
Electricity for streetlights	These external costs are measured and known with confidence. Electricity costs appear to have increased faster than the rate of price inflation.
Electrical maintenance	These external costs are measured and known with confidence, but they vary from year to year depending upon actual needs. Most costs relate to streetlight repair.
Road maintenance	An estimate of \$1000 per year covers the internal cost of sweeping roads and clearing debris for the benefit of leaseholders. An amortized cost of road infrastructure was not included.
Hydro corridor	MNR's maintenance of the hydro corridor was considered, but it is insignificant.
Land remediation	Occasionally a potential hazard is uncovered that is remediated for the health and safety benefit of cottagers. The reported cost corresponds to a single expense linked to a specific item that was remediated.
Biologist Staff time	Biologists help leaseholders to understand and manage wildlife on their lots.
Tree trimming	Hazardous trees are routinely removed by contractors for the benefit of cottagers.
Snow plowing	This is an estimate of the internal cost of removing snow from the portion of roads that benefit leaseholders. It includes an amortized cost of equipment plus labour.
Lease administration	This category counts materials and staff time that were directly attributed to the administration of leases and management of lease issues, and overhead that supports other spending, including 75% of the staffing cost of the Park Superintendent.
Surveys, surveying, titles	This category counts the costs of surveying and purchasing material that supports the administration of lease titles. Surveyors are employed by MNR to resolve missing or disputed lot boundaries. The need for surveyors exceeds the fiscal capacity of the park, but the reported amounts were actually spent.
Compliance and enforcement	About a third of the time of the Lands Technician in the park is spent dealing with compliance and enforcement issues related to leased land and leaseholders.
Gate coverage	Gates are staffed longer hours for the benefits of leaseholders, but the park could not specifically attribute a portion to leaseholders, so no value is reported.

Table 4: Estimated administrative costs of tenure arrangements in Rondeau Provincial Park. All costs are reported in 2012 Canadian dollars. Three-year average costs cover the last three fiscal years: 2012-13, 2011-12, and 2010-11.

		External costs (2012\$)			Internal costs (\$)	External + Internal (\$)	
		2010-11	2011-12	2012-13	2012-13	2012-13	3yr Average
Solid waste management	Garbage collection	15,863	20,661	25,524	-	25,524	20,683
Infrastructure	Electricity for streetlights	3,597	3,782	4,335	-	4,335	3,905
	Electrical maintenance	1,332	2,631	1,652	-	1,652	1,872
	Road maintenance	-	-	-	1,000	1,000	1,000
	Dock maintenance	-	-	-	-	-	-
	Hydro corridor maintenance	-	-	-	-	-	-
Land maintenance and wildlife management	Land remediation	-	-	297	-	297	99
	Biologist Staff time	-	-	-	7,175	7,175	7,175
	Tree trimming	5,221	12,246	8,663	-	8,663	8,710
	Snow plowing	-	-	-	5,437	5,437	5,437
Management of cottage tenure and cottagers	Tenure administration	102	1,433	315	119,814	120,130	120,431
	Surveys, surveying, titles	2,091	7,083	-	-	-	3,058
	Compliance/enforcement	-	-	-	26,667	26,667	26,667
	Gate coverage	-	-	-	-	-	-
Other direct costs not counted above		2,067	76	-	-	-	714
Direct costs (summed from above)		30,273	47,910	40,786	160,093	200,879	199,750
Policy and science costs (within MNR)		778	1,231	1,048	4,115	5,163	5,134
Ministry corporate costs (elsewhere within MNR)		1,684	2,665	2,269	8,905	11,173	11,111
SUM		32,735	51,807	44,103	173,113	217,216	215,995
Payment In Lieu of tenant taxes paid to municipality					900,000	900,000	900,000
SUM with PIL		32,735	51,807	44,103	1,073,113	1,117,216	1,115,995

Current tenure arrangements in Rondeau Provincial Park are expected to be supported by about \$200,000 in direct program expenditures this fiscal year, which is close to a 3-year average.

The most significant single cost of the Ministry is the Payment-In-Lieu (PIL) of taxes that it provides to municipalities to compensate for their inability to directly tax cottage properties. This is a benefit to cottagers, as a service to them of not having to pay municipal taxes. This arrangement is scheduled to change in the future, such that cottages will be directly taxed at rates that are based upon a market assessment by the Municipal Property Assessment Corporation (MPAC) of the value of the structures. For this reason, sums are provided with, and without, the cost of the PIL.

Leases and other tenure instruments are supported by policy development and interpretation, and other Ministry corporate costs. Interviews with staff at the program and policy level suggest that current tenure arrangements in Rondeau require a disproportionate share of issues management to deal with ministerial correspondence and complaints, which has risen in recent years as the tenure nears its end and policy proposals have been posted for public comment on the Environmental Bill of Rights website. Nevertheless, the merits of accounting for this in greater detail would likely outweigh its overall significance to the sum of the costs, so we assumed that policy and issues management spending remains proportional to the amount of direct program spending.

5.2 Algonquin Provincial Park

Table 5 lists the costs that were considered in support of cottage tenure arrangements in Algonquin Provincial Park. In comparison with Rondeau, more of these costs were estimated by approximating a cottager share of fixed and variable costs that support all park users.

Table 6 lists costs and aggregates them into broader spending categories that are consistent with the categories used to account for the costs of supporting leases in Rondeau. Current leasehold arrangements in Algonquin Provincial Park are supported by government expenditures ranging from about \$160,000 to \$300,000 depending upon the assumed annual maintenance costs of dams, and whether any of the capital value of the dams should be considered as a benefit to leaseholders.

Table 5: Costs considered that support cottage tenure arrangements in Algonquin Park

Cost Category	Considerations, limitations, and confidence
Garbage collection	These external costs are measured and known with confidence. However a cottage share needed to be estimated because the contract, and the infrastructure that supports it, relates to cottages, campsites, and interior park users. Estimates were made on the assumption that each campsite which uses the same garbage bins as cottages generates the same average waste as a campsite elsewhere in the park, where bins are used exclusively by campsites.
Road maintenance	This is an estimate of the cost to manage the portion of seasonal gravel roads that benefit cottage tenure holders. An amortized cost of the road was not included.
Dock maintenance	This is an estimate of the straight-line amortized cost of the portion of dock infrastructure that benefits leaseholders.
Water management	Many dams exist in the park for a historic benefit of supporting logging. They are currently managed for the benefit of controlling water levels for park users, which include cottagers, canoeists, commercial lodges, and camps. It is assumed that cottagers and commercial users enjoy 90% of the benefits because it protects their fixed infrastructure, while only 10% of the benefits are enjoyed by canoeists. This distribution of benefits was used to attribute the costs of operations and maintenance to cottagers. Annual dam operations cost \$2898 in MNR staff time. Annual dam maintenance is unknown, so high and low estimates were derived. A high estimate assumes that MNR budgets 1.5% of the asset value as an annual maintenance cost, based upon the recommendation of its Dam Asset Management Plan. A low estimate assumes that none of the annual maintenance costs should be attributed to cottagers.
Land remediation	There is a risk to MNR that potential hazards are uncovered that need to be remediated for the health and safety benefit of cottagers. There are no records of this happening in recent years, so this was not counted.
MNR staff time	This is an estimate of the cost of MNR biologist, planners, and GIS staff who help to manage the cottagers' portion of parkland and the wildlife that it supports.
Tenure administration	This category counts materials and staff time that were directly attributed to the administration of cottage tenure and management of tenure issues. Unlike the accounting of this cost for Rondeau, a cost of compliance and enforcement was not itemized separately.
Surveys, surveying, titles	This category counts the costs of surveying and purchasing material that supports the administration of lease titles. Unlike in Rondeau, surveyors have not routinely been employed to resolve missing or disputed lot boundaries.
Gate coverage	The park could not attribute a portion to cottagers, so no value is reported.

Table 6: Estimated administrative costs of cottage tenure arrangements in Algonquin Provincial Park. All costs are reported in 2012 Canadian dollars.

		External costs (\$)	Internal costs (\$)		External + Internal (\$)	
			Low estimate	High estimate	Low estimate	High estimate
Solid waste management	Garbage collection	45,216	-	-	45,216	45,216
Infrastructure	Road maintenance	-	25,733	25,733	25,733	25,733
	Dock maintenance	8,915	-	-	8,915	8,915
	Water management	-	2,898	125,208	2,898	125,208
Land maintenance and wildlife management	Land remediation	-	-	-	-	-
	MNR staff time	-	10,000	10,000	10,000	10,000
Management of cottage tenure and cottagers	Tenure administration	-	58,689	58,689	58,689	58,689
	Surveys, surveying, titles	-	-	-	-	-
	Gate coverage	-	-	-	-	-
Other direct program costs not counted above		-	-	-	-	-
Direct costs (summed from above)		54,131	97,320	219,630	151,451	273,761
Policy and science costs (within MNR)		1,391	2,502	5,645	3,893	7,037
Ministry corporate costs (elsewhere within MNR)		3,011	5,413	12,216	8,424	15,227
SUM		58,533	105,235	237,492	163,768	296,026
Payment In Lieu of tenant axes paid to municipality			130,543	130,543	130,543	130,543
SUM with PIL		58,533	235,778	368,036	294,312	426,569

6. Opportunity Costs of Cottage Tenure Arrangements

Making Crown land available for cottage lots through leases, licenses of occupation and land use permits limits the opportunity for other beneficial uses from being realized from the same parcel of land. Values of these foregone benefits are known as opportunity costs. To the extent that these costs are imposed upon the Crown, they should be compensated by fees paid by the lessors, on the basis of providing a fair return to Ontarians.

To properly account for opportunity costs, it is necessary to understand what opportunities are limited because the Crown lots are leased as cottages. In theory, opportunities could range from intensive use of the land for commercial purposes to its protection as an ecological refuge. In practice, opportunities would likely be determined through a park planning process that could involve stakeholder consultation among other factors that might influence the decision.

OMNR staff and park managers were consulted about alternative uses of cottage lots and alternative tenure arrangements. Alternatives are currently being considered within the context of leases that are set to expire by 2017. We were not privy to what alternative opportunities have been considered in past decisions to extend or renew leases, nor did we assess any of the policy proposals from the Crown that have been posted for public comment on the Environmental Bill of Rights.

Consequently, we needed to form our own opinion about reasonable alternatives that ought to be considered in order to assess the economic value of current tenure arrangements. In our opinion, there are two competing alternatives:

- Alternative 1: Maximizing the market value of current cottage lands. Knowing the market value of cottage lands, the Crown would want to ensure that it earns a net rent that is at least equivalent to its opportunity cost of capital. Its opportunity cost of capital is the rate by which it pays interest on bonds that it issues.
- Alternative 2: Maximizing the conservation potential of current cottage lands. If cottage lands were not leased, the lands could support alternative ecological and recreational opportunities. The value of these alternative opportunities should be no greater than the net value of current tenure arrangements.

The economic value of ecological and conservation opportunities are not market-priced to the same extent as the Crown's opportunity cost of capital. Consequently, alternative 2 is more challenging to assess and its value is likely to be a significant understatement of its true opportunity cost.

6.1 Opportunity costs of leasing Crown capital

Crown land is a capital asset, which can provide financial returns. A fair market rate of return is one that offsets the costs that would be expected if the Crown purchased or disposed of this capital asset in the marketplace. In either case, this rate of return would be informed by the Crown's financing rate, which it pays to bondholders as an opportunity cost of capital.

Hypothetically if MNR targeted a lower rate of return, then MNR could improve its financial position by disposing of the land and purchasing government bonds, to earn a return that could be used for other conservation purposes. Conversely, if MNR targeted too high of a rate of return, then its cottage leases could be priced out of the market. In this scenario, nearby private land owners could lease their lots for a lower price than the Crown, yet still earn a rate of return that is at least as great as their opportunity to earn revenue from investing in provincial bonds. We believe this logic to be inherent in the intent of the Crown Land Rental Policy (MNR, 2006), which is to "recover a return equal to that which would be sought by a private owner of similar property." The implications of the Crown Land Rental Policy are discussed in section 7.1 of this report.

The Ontario government's long-term provincial bond rate has changed over time and will continue to change. Short-term 5-year bonds currently earn about 2% annual interest and recent 30-year bond issues earn 4%. We use a mid-point rate of 3% as our best estimate of the Crown's current opportunity costs of capital, with later sensitivity test of 2% and 4% to explore the implications of these actual rates.¹ Assuming that the Crown could earn this value, then this is a minimum of the fair market rental rate from the perspective of the Crown because it is an opportunity cost to the Crown. Since government bonds are a risk-free investment available to be purchased by private landowners, this government bond rate should also inform the private sector's opportunity cost of capital. A private landowner renting private land should earn a comparable (if not higher) net rate of return as the government's opportunity cost.

Table 7 applies the Crown's opportunity costs of capital to the estimated market value of cottage lands in each park. Results show that the Crown ought to earn at least \$1.5 million per year from cottage leases in both parks in order to offset the foregone financial opportunities of earning a 3% rate of return on a capital stock of \$49 million.

¹ Current Ontario provincial bond rates are low by historic standards, but we must rely upon current rates rather than historic rates since the Crown's current opportunity cost of capital is based upon current rates. Holders of older fixed-rate bonds can continue to earn above-current rates until maturity, which prevents their rate from being an opportunity cost to government. Since tenure agreements allow rental rates to be adjusted every five years, a 2% rental rate would imply that current bond rates would not change over the horizon of 2012-2017. We felt it was prudent to use a 2% rate as a lower bound, and 4% as an upper bound reflecting current assumptions that rates will appreciate in the future.

Table 7: Opportunity costs of the capital value of the lands, assuming various rates of return.

Park	Estimated Market Value of Cottage Lands	Financial opportunity cost at various rates of return		
		2%	3%	4%
Algonquin	\$49,037,000	\$980,740	\$1,471,110	\$1,961,480
Rondeau	\$49,939,900	\$998,798	\$1,498,197	\$1,997,596

6.2 Opportunity costs of foregoing conservation alternatives

Conservation alternatives include recreational and ecological opportunities that are currently limited because lands are rented for cottage use. To the extent that foregone recreational benefits would compete with foregone ecological benefits, a decision must be made as to their specific mix, so that the sum of these components is not overstated (double-counted).

In Algonquin Provincial Park, the best alternative use of cottage lots was assumed to be a combination of ecological refuge and enhanced backcountry campsites and recreational opportunities. In Rondeau Provincial Park, the best alternative is assumed to be an ecological refuge for the area's scarce and valuable biodiversity. Cottages occupy irreplaceable prime shoreline, habitat for species at risk and limit public access to provincial waterfront

Table 8: Opportunity cost accounting framework. To the extent that each component is relevant, and can be quantified, then its economic value can be summed with other components.

Opportunity Cost Component		Items that could be considered for each component
Ecological	Reduced damages from cottagers' usage of the cottage lots and park	<ul style="list-style-type: none"> • Reduced threat of the spread of invasive species • Reduced organic pollution • Decreased fragmentation • Reduced degradation of vegetation structure and composition • Reduced litter
	Enhanced ecosystem conditions without the footprint of cottages	<ul style="list-style-type: none"> • Enhanced protection of endangered species and habitat • Enhanced provision of ecosystem services • Enhanced natural succession and other ecological processes
Recreational	Enhanced quality of non-cottage recreational experiences in the park	<ul style="list-style-type: none"> • Reduced likelihood of contact with other users • Value to park users of an increased sense of wilderness and biodiversity of the area
	Enhanced quantity of alternative recreational use of the area occupied by cottages (only applicable to Algonquin)	<ul style="list-style-type: none"> • Enhanced availability of recreational experience • Siting potential for retreat / learning centre

Although the quality of existing recreational opportunities may be enhanced, there would be no further quantity of opportunities if the cottages lots in Rondeau were not leased. Opportunity costs in both parks were assessed using the framework presented in Table 8 that describes potential foregone ecological and recreational opportunities.

To approximate the value of these unpriced benefits requires an approach referred in economics as non-market valuation.² There are number of valuation techniques that can be employed with varying strengths and limitations. The approach used in this research is called value (benefits) transfer.³

In assessing each potential foregone opportunity, the following logic was employed:

- Can a foregone opportunity be directly attributed to Crown land being leased for cottages?

To count a foregone opportunity as a cost, there must be evidence about how the physical footprint of cottages, or the impacts of cottagers on the park landscape, relate to changes in the number of units of ecological or recreational opportunity. If these relationships can be demonstrated, then another question must be answered:

- Is the foregone opportunity a fiscal burden to the Crown, or is it a societal burden?
 - If it is a fiscal burden to the Crown, then it should be passed on to cottagers.
 - Alternatively, if it is a societal burden, how can this burden best be managed?
 - If it can be addressed by restrictive conditions on tenure, then this burden is an economic cost to cottagers that would be reflected by the market discounting the value of the cottage tenure. Therefore no additional cost needs to be added..
 - If it cannot be addressed as a condition of tenure, then the Ministry must decide whether the value of the damage should be built into the cost of renting the land. If pursued, this would follow the polluter pays principle: the value of damages should be internalized so that private costs reflect societal costs. This would follow Canada's commitment to Principle 16 of the 1992 Rio Declaration on Environment and Development⁴.

² For a detailed overview of non-market valuation approaches see Champ and Boyle (2003)

³ For a comprehensive treatment of value transfer methods see Navrud and Ready (2007), Bateman and Jones et al (2000), and Groothuis (2005).

⁴ Text of this declaration can be accessed at <http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>.

6.2.1 Foregone conservation opportunities in Rondeau Provincial Park

Table 9 applies the opportunity cost assessment framework to Rondeau Provincial Park. Various approaches were considered to quantify opportunity costs, beginning with the number of units of ecological or recreational opportunity that are impacted by the existence of cottages and their users.

Table 9: Summary of Rondeau Opportunity Costs

Opportunity Cost Component		Approach / Assumptions
Ecological	Reduced damages from cottagers' usage of the cottage lots and park	To properly determine the extent of this opportunity costs, further information is required on the pressures imposed by usage of land. Some suggestions include: estimated number of fatalities and injuries of species from cottagers and their pets; the impact of septic/sewage emissions, and the impact of litter on the landscape, the likelihood of introduction of invasive exotic species by the cottagers.
	Enhanced ecosystem conditions without the footprint of cottages	Existing scarcity of species habitat and uniqueness of ecosystems in Rondeau Provincial Park suggests likely value placed on species habitat insofar as increased habitat area can improve the population of species at risk in the park. <ul style="list-style-type: none"> Existing research has examined a range of species at risk values. Lack of supporting information limited the ability to fully quantify the non-market implications on species at risk habitat There is also likely a non-use value for enhanced natural succession processes of the rare sand spit ecosystem. However, to date we have found no existing valuation research that can adequately be used to approximate this value.
Recreational	Enhanced quality of non-cottage recreational experiences in the park	The potential opportunity cost depends on the extent to which beach users would pay more for a more natural beach experience. Without conducting targeted research on beach user preferences it is difficult to conclude conclusively. Limited information was found that could be used to quantify this relationship.
	Enhanced quantity of alternative recreational use of the area occupied by cottages	A change in the quantity of recreational use of the park is not anticipated, since the proposal alternative scenario suggests the land will be returned a natural state. <i>It is assumed that there would no effect on day use permits.</i>

6.2.1.1 Ecological Pressures and Opportunity Costs

MNR ecologists were consulted to understand the potential opportunity costs arising from ecological pressures imposed from either the cottagers' use of the land or the physical footprint of the cottages. Table 10 outlines the priority ecological pressures related to cottage activities (as identified by MNR ecologists⁵) and provides a brief description of how these relate to opportunity costs.

⁵ Personal Communication (2013). Brad Steinberg, Acting Senior Conservation Ecologist, Ontario Ministry of Natural Resources.

Table 10: Relationship between Ecological Pressure and Opportunity Costs in Rondeau

Ecological pressure	Description of the issue related to cottage lots	Relation to opportunity costs
Invasive species	Cottage lots and activities may be a vector for invasive terrestrial plants such as Japanese barberry. Introduction rates of non-native and invasive species as a result of garden escape, planting and disturbance.	There is an ecological cost associated with the impact of invasive species on other species as well as the economic costs associated with attempted eradication/control programs which could be avoided (or minimized).
Water Quality	Impacts on natural nutrient cycles from septic systems	Avoided (or reduced) costs of managing nitrogen and phosphorous leaching into ground and surface water.
Erosion	Over 200 footpaths through savanna, prairie and dune ecosystems and associated with cottage access to the beach. This disturbance can lead to blowouts and erosion.	Reduced erosion associated with footpaths.
Habitat Fragmentation	Cottage lots and road access fragment the natural habitat connections between the lake and upland forest and savanna.	Habitat connectivity between the lake and upland forest is reduced. Capital costs of providing engineered connectivity (i.e. special culverts for species movement between habitats) could be used to approximate this opportunity cost.
	Edge effects from fragmentation and ability of the park to implement restoration programs such as prescribed burning are created from the arrangement and proximity of cottages lots.	Reduced ability to properly manage the ecological functions of the park's unique ecosystems.
Road Access	Access roads lead to predation, heat islands, invasive species movement and other ecological effects.	Avoided (or reduced) edge and fragmentation effects on plants and wildlife.
Species at Risk	Approximately 7km of access road results in road mortality cases for species at risk including Eastern Hognose Snake, Eastern Foxsnake, Eastern Ribbonsnake, Butler's Garternsnake, Milksnake, Five Lined skink-lined Skink and Fowler's Toad.	Avoided road mortality in species at risk resulting from a decommissioned road.
	The endangered Fowler's Toad buries under sand on the beach where the dragging of recreational equipment poses a crushing risk.	Avoided mortality for species at risk associated with recreational access to beach, assuming other park users would not use these beaches.
	House Wren populations are subsidized by on-lease lot bird-boxes, which compete with the population of endangered Prothonotary Warblers by using up all the nest cavities.	Increase in habitat available for cavity nesting species at risk.
Habitat Quantity	Numerous species at risk rely on savanna, prairie and dune ecosystems in Rondeau. There are 12 provincially rare ecosystems that are found within the beach/dune and tallgrass communities currently impacted by cottages.	Restoration of this habitat would bring Ontario closer to meeting stated conservation targets and increase overall habitat for species at risk and rare species. A value per hectare of these rare ecosystems from Troy and Bagstad (2009) could be used to establish an opportunity cost.

It should be noted that accounting for opportunity costs on a pressure by pressure basis could impose double counting. For instance, habitat fragmentation, road access edge effects, and species at risk road mortality are issues with closely related outcomes: impacted habitat or impacted species

populations. Consequently, we recommend accounting for opportunity costs using the framework outlined in Table 8. However, providing an inventory of the ecological pressures potentially associated with cottage lot leases helps ensure all factors are accounted for or at least noted.

In all cases, the opportunity cost of cottage lots in Rondeau is a healthier, more resilient ecosystem. However, quantification is limited by two important factors:

1. **An understanding of the marginal ecological benefit** – As Table 10 outlines, there are certainly pressures being imposed by cottage lots. However, the extent that the system would improve in their absence is not clear. Without a reasonable understanding of the marginal ecological changes, quantification in economic terms is difficult.
2. **The non-market value is an opportunity cost borne by society** – As mentioned above, it is important to consider whether these pressures impose an opportunity cost that is borne by the Crown or by society at large. In the case of non-market values the opportunity cost is societal in nature. This information is an important component of assessing the full cost of cottage lease arrangements from a policy perspective. In addition, the Crown has a responsibility to manage resources for society's collective benefit. However, these costs are not borne by the Crown, so it is not clear the extent to which these values should be accounted for within a net assessment of leasehold arrangements to the Crown. Rather, these must be considered from the perspective of additional management costs imposed by the existence of cottages.

6.2.1.2 Valuing an Increased Quantity of Rare Ecosystems

Cottage lots exist in provincially rare ecosystems including beach/dune, tallgrass and savannah communities (Dobbyn and Pasma, 2012). Research has shown that society values the protection of rare and endangered species that exist within these ecosystems. Indeed there is wide range of literature exploring the values of conservation (e.g. Wilson et al, 2012). Troy and Bagstad (2009) report average ecosystem service values for a range of ecosystem types. Relevant to the Rondeau Provincial Park are beach ecosystems, which were reported to have an average value of \$89,608 per ha largely as a result of recreational and avoided flood damage benefits.

These average non-market values were not derived from research in Rondeau Provincial Park, but they provide a sense that ecosystems in Rondeau probably provide valuable unpriced economic benefits. These benefits can help to understand the considered opportunity costs borne by society to the extent that cottage lot use or footprint can be related to changes in the provision of associated ecosystem services. As outlined above, these values do not influence the net benefit to the Crown

from the current tenure arrangement, yet should be considered to the extent that impacts can be avoided through conditions of the lease.

An alternative way of looking at ecological opportunity costs linked to cottage footprint would be the cost to restore and naturalize cottage area to its natural conditions, assuming that the damaged caused in not irreversible (such as the extinction of species or permanent damage to a highly sensitive ecosystem conditions). In cases where this assumption holds, restoration costs could be considered the capital cost necessary to provide a foregone benefit. In Southern Ontario restoration and naturalization costs have been reported to be about \$12,750 per ha (Kennedy and Wilson, 2010). With approximately 20 ha of cottage lot area in Rondeau, an approximate opportunity cost from the ecological pressures could be valued at \$255,000 plus the costs to demolish and remove any remaining cottages and associated structures.

6.2.1.3 Valuing an Enhanced Refuge for Species at Risk

Across the Ontario Park system, Rondeau Provincial Park supports one of the largest concentrations of rare and endangered species with a total of 132 provincially significant species including 28 endangered species (Dobbyn and Pasma, 2012). A literature review was conducted targeted at studies that quantified species at risk values. While numerous studies have been conducted on the topic, one particular study stood out as it is a synthesis of a wide range of species at risk valuations (Richards and Loomis, 2009). Using this research requires an understanding of how the species at risk populations are impacted by the presence or absence of cottage lots and the marginal value of those changes in population. Unfortunately no research was found that quantified the link between area of habitat and species population. However, it must be noted that recovery strategies for regulated Species at Risk apply to cottage lot areas, so while it may not be linked directly to populations, the habitat value is inherently high. Appendix C demonstrates an analytical process that could be used to quantify these impacts if and when more information becomes available.

6.2.1.4 Foregone recreational opportunities in Rondeau

Non-market valuation literature was reviewed to determine how the value of a beach experience is affected by preferences for natural beaches versus developed beaches. Results proved inconclusive. Some evidence suggests that beach user experience can be impacted by human built infrastructure (Blakemore et al, 2008). Other research demonstrates that habitat diversity and natural state of a beach has little impact on beach user values (Duck et al, 2009). Indeed, much of

the research on beach user experience is focused on beach litter, pollution, and water quality (Tudor and Williams, 2003) and less on the natural state of the surroundings.

Another important factor in the quality of a beach experience is the level of beach congestion. Research demonstrates significant reductions in willingness to pay when beaches are congested (McConnell, 1977; Penn et al, 2012). In the absence of cottage users, it stands to reason that other park users would have more beach space and congestion would be reduced. However, without detailed statistics on the usage of the beach by cottage users relative to peak total beach use, it is not possible to quantify these impacts.

6.2.2 Foregone conservation opportunities in Algonquin Provincial Park

Table 11: Summary of Algonquin Opportunity Costs

Opportunity Cost Component		Approach / Assumptions
Ecological	Reduced damages from cottagers' usage of the cottage lots and park	While a number of issues have been identified related to the use of the park by cottagers, marginal economic damages of such use are <i>largely</i> unknown. Existing water quality data suggests that a few of the lakes may be sensitive to additional pressures. For example, late summer dissolved oxygen in the hypolimnion is below recommended thresholds for lake trout in a few lakes in at least one year of sampling. ⁶ However there is not enough data at present to fully quantify these opportunity costs.
	Enhanced refuge for biodiversity without the footprint of cottages	While pressures from cottages may be low in extent relative to the size of the park, they could have localized intensity, depending on the pressure and the value being affected. For example, lake trout and brook trout lakes are rare in the Ontario so it is possible some foregone populations may result from the footprint of the cottages due to water quality degradation. However there are presently no modelling tools or data to quantify such marginal damages. ⁷
Recreational	Enhanced quality of non-cottage recreational experiences in the park	Changes in congestion on cottage lakes, reduced used of motorized boats, and improved natural shoreline aesthetic could produce changes in wilderness experience value for backcountry users. The size of this opportunity costs depends on the extent to which backcountry users would pay more for an improved wilderness experiences. Without conducting targeted research on the issue it is difficult to conclude. However, some research has been conducted in this area that provides insight on the potential opportunity cost.
	Enhanced quantity of alternative recreational use of lands	It is anticipated that, in the absence of cottages, lakes with cottages would be utilized by providing minimal backcountry campsites. This cost will be approximated using the following formula: <i>[number of additional campsites]*[utilization factor]*[backcountry user fee]</i>

⁶ According to Karen Hartley (Senior Protected Areas Ecologist, Ontario Ministry of Natural Resources), there are some tools such as the lake capacity assessment model that could help in the future to understand how cottages may be affecting water quality compared to other developments in the watersheds and in relation to "background" levels.

⁷ Personal Communication (2013). Karen Hartley, Senior Protected Areas Ecologist, Ontario Ministry of Natural Resources

Table 11 applies the opportunity cost assessment framework to Algonquin Provincial Park. Various approaches were considered to quantify opportunity costs, beginning with the number of units of ecological or recreational opportunity that are impacted by the existence of cottages and their users.

6.2.2.1 Estimation of Ecological Opportunity Costs

Table 12: Relationship between Ecological Pressure and Opportunity Costs in Algonquin

Ecological pressure	Description of the issue related to cottage lots	Relation to opportunity costs
Water quality	Effluent from septic systems and run-off from altered shoreline vegetation can cause increase in phosphorous and declines in dissolved oxygen, with associated impacts to lake trout and aquatic communities	Could be considered to the extent that this effluent exists in excess of the systems assimilative capacity.
Hydrologic and thermal regime	Water level regulation through the use of dams may have an effect on aquatic habitat. While it is recognized that no lakes water level is managed exclusively for cottage purposes, in a number of cases it is the primary driver of water level regulation. In one particular case (Whitefish Lake), water levels are primarily managed to maintain boat access to cottages. The dam on this lake is in need of repair. It is also noted that some dams may be acting as a barrier for invasive species.	Dam maintenance would not be an opportunity cost of current tenure arrangements. However, these are considered as part of the service / administrative costs borne by the Crown (see Section 5).
Invasive Species	Invasive species impact native species and communities. Invasive species can be introduced through activities associated with cottage use, such as use of motorboats, angling and gardening.	Without being able to attribute the introduction of invasive species to cottagers, the damage costs of invasive species cannot be counted.
Fragmentation	Developments along the shoreline fragment riparian and littoral habitats that are used by both terrestrial and aquatic species (Riverstone 2012). Access roads impact habitat connectivity within Algonquin Park as these linear anthropogenic features limit movement between local populations, increase the amount of edge habitat, increase mortality, function as a vector for introduction of exotic species, and provide increased access for humans to sensitive interior communities and species (River Stone, 2012).	Avoided management costs associated with addressing species at risk and invasive species issues.
Alteration of littoral and riparian habitats	In the littoral zone, aquatic vegetation and woody materials are removed or altered to improve recreational opportunities such as boating and swimming. The removal of this material results in reduced structural diversity and habitat fragmentation leading to a reduction in fish and aquatic invertebrates (River Stone, 2012). Riparian habitats are affected by reduction of the tree canopy and shrub and ground vegetation. These changes can affect the diversity, composition and abundance of birds, amphibians and mammals (Riverstone 2012).	Avoided damages and additional management costs associated with mitigating the impacts on the littoral zone and riparian habitats.

While Algonquin is one of the largest parks in the provincial park system, due to its proximity to population centres of the Greater Toronto and Ottawa areas, it is one of the most heavily utilized parks and as a result subject to a number of ecological pressures. A preliminary assessment of such ecological pressures in Algonquin in relation to cottage lots has been outlined by MNR.

Table 12 outlines the priority ecological pressures related to cottage activities (as identified by MNR ecologists) and provides a brief description of how these relate to opportunity costs. It is clear that some ecological opportunity costs exist in Algonquin, namely a healthier, more resilient ecosystem of some degree. Unfortunately, current information limits the ability to properly assess the non-market values associated with ecological pressures within the Algonquin context. In addition, there is some ambiguity on the applicability of these costs to the Crown for the same reasons as noted in the Rondeau case.

On the other hand, the Crown could measure these opportunity costs based on the avoided mitigation and ecological management costs that would occur in the absence of cottage leases. However, to include these risks would be double counting as many of these costs are captured in Section 5 on administrative costs. However, an argument could be made that the current costs spent on managing these ecological pressures are not sufficient since pressures continue to persist. Therefore, opportunity costs may not be fully captured in the costs outlined in Section 5.

6.2.2.2 Implications on Recreational Quantity

Opportunity costs associated with anticipated additional backcountry camping can be quantified using a straightforward market valuation process. With an assessment of the number of backcountry campsites that would exist in the absence of cottage lots, the market value can be calculated by multiplying the number of campsites by historical occupancy rates and the current backcountry fee. However, a couple of nuances exist.

First, it is difficult to know if new backcountry campsites would actually lead to increased backcountry permit sales for the park. Certainly, there would be more campsites available. However, utilization of these new campsites might result from substitution away from other currently existing campsites. The extent to which we can assume an increase in backcountry permit fees depends on the excess demand within the system. Consequently, weekly campsite utilization statistics were utilized to determine which months of the year have sufficient demand to justify assuming increased permit sales. Weeks with backcountry campsite utilization greater than 90% were assumed to exhibit excess demand within relevant lakes and utilization on those lakes during high demand weeks was equivalent to the park average utilization.

Table 13: Summary of Blended Permit and Reservation Fee Calculation (Based on 2012 Rate Structure)

Backcountry Permit Fee Component					
	Total Fee	HST	Base Fee	Weight*	
Regular (Age 6-17)	\$5.00	\$0.58	\$4.42	0.30	
Ont. Persons with Disabilities (Age 6-17)	\$2.25	\$0.26	\$1.99	0.00	
Regular (Age 18+)	\$11.25	\$1.29	\$9.96	0.68	
Ontario Senior (Age 65+)	\$9.25	\$1.06	\$8.19	0.01	
Ont. Persons with Disabilities (Age 18+)	\$5.75	\$0.66	\$5.09	0.00	
Average permit fee per person per night					\$8.18
Average canoe group size**					4.02
Average permit fee per night (excluding HST)					\$32.87
Reservation Fee Component					
	Total Fee	HST	Base Fee		
Reservation Fee	\$12.00	\$1.38	\$10.62		
Average nights per trip***					1.60
Average reservation fee per night (excluding HST)					\$6.64
Blended Rate					
Average blended fee per night (sum of permit fee and reservation fee)					\$39.50
Opportunity Cost to the Crown					
Additional campsite nights expected in the absence of cottage lots					5,292
Potential <i>new</i> annual Crown revenue from backcountry recreational opportunities					\$52,258
Additional Annual maintenance costs for additional campsites****					-\$14,100
Potential (gross) opportunity costs to the Crown					\$38,158

* Weights are based on proportion of permits issue in 2012 at access points associated with cottage lakes.

** Average canoe group size is based on the ratio between total party size and total number of permits issued at access points associated with cottage lakes.

*** Since the number of permit nights was not available by access point, average nights per trip is based on the ratio between total permits issued and total permit nights associated with backcountry canoeing across the entire park.

**** Additional annual costs includes \$9,700 of maintenance costs, \$1,400 of waste removal services, \$1,000 of other park infrastructure costs, and \$2,000 of amortized capital costs.

Second, the user fee is a per-person per night fee (inclusive of HST), which varies depending on camper age and whether or not the camper is a person with disabilities. In addition, most trips require a reservation which is subject to a per-booking reservation fee. For the purposes of this analysis, a blended rate was calculated based on the proportion of users in each category (for campsite fees), the average number of people per group (for reservation fees), and extracting HST. Table 13 outlines these calculations resulting in a blended average user fee of \$39.50 per night.

In 2012, there were 10 weeks where backcountry campsite utilization exceeded 90% across the park.⁸ Based on an assessment by Algonquin park managers, a total of 97 additional campsites could be added to lakes in the absence of cottage lots. Of the 97, 13 would be sites reserved for emergency purposes, leaving 84 available for booking.⁹ Assuming that campsite utilization for identified high usage weeks holds for lakes with additional campsites and that usage represents additional camping that would otherwise not have occurred, a total of 5,292 additional campsite nights would be expected. This amounts to a 17% increase in campsite nights, which is significant.

MNR estimates that these new sites would likely only increase campsite nights by 5-10% within the park, which implies that the park would gain revenue from just half of these additional nights.¹⁰ Assuming that half of this gain within the park would be gained at the expense of sites lost from other provincial parks, the Crown could expect new revenue from just one quarter of the 5,292 new nights spent on the new backcountry campsites. This results in potential revenue to the Crown of \$52,250 per year.

These new campsite nights would be earned at a cost to the Crown of additional infrastructure and services. The campsites would require upfront construction costs estimated to be approximately \$66,273¹¹ which we amortize at 3% per year (our assumption of the government's borrowing cost, which is its opportunity cost of capital) to yield an annual cost of about \$2000. We estimate that annual maintenance costs associated with the campsites would be \$9,700 per year.¹² We estimate that these additional campsite nights would need about \$1,400 worth of waste removal services,

⁸ These weeks included the week of the holiday weekend in May, and late June through early September.

⁹ Personal Communication (2013). John Swick, Acting Supervisor, Park Management Unit, Ontario Parks

¹⁰ Ibid.

¹¹ Based on information provided by Algonquin Provincial Park, it was assumed each campsite requires 1.5 days of work conducted by a two person team (one Canoe Route Technician and one Park Warden) for a total of 145.5 days of work to establish 97 campsites. The cost to the Crown for this effort, based on 2012 Collective Bargaining Agreement Rates, was \$402.15 per day for a total of \$58,513. In addition, each campsite require a thunder box (a pit toilet commonly used for backcountry campsites) costing \$80 each, for a total of \$7,760. Changes in administrative costs associated with issuing permits and other park management issues were assumed to be minimal.

¹² Based on information provided by Algonquin Provincial Park, it was assumed that the addition 97 campsites would require about 24 days of maintenance per year conducted by a two person team (one Canoe Route Technician and one Park Warden). The cost to the Crown for this effort, based on 2012 Collective Bargaining Agreement Rates, was \$402.15 per day.

based upon our assessment of the park's waste removal budget, and could account for about \$1,000 of road and dock infrastructure costs. Subtracting new costs from new revenue results in net revenue of about \$38,000 per year that is foregone because the land is leased to cottages.

6.2.2.3 Implications on Recreational Quality

Considering the implications on recreational quality that could exist in the absence of cottage lots resulted in a number of issues that need to be taken into consideration before attempting to quantify opportunity costs. Primarily, within the Algonquin context a distinction needs to be made between “frontcountry” and “backcountry” recreational experiences. In fact previous research has made a similar distinction stating “the experience offered by the outer edges of a backcountry area is qualitatively different from that offered by the interior” (Rollins et al, 1997).

For the purposes of this discussion the following distinction is made:

- Frontcountry – Canoe and kayak only campsites that are relatively close to access points and do not require portaging
- Backcountry – Multi-night canoe or kayak backcountry trips requiring portaging

In addition, the absence or presence of cottage lots was seen to influence recreational experience in four potential ways:

1. Change in congestion on access lakes
2. Change in congestion in the backcountry
3. Change in the landscape aesthetic
4. Change in the motorized boat policy on cottage access lakes

Table 14 outlines specifically how different experiences may be impacted by the presence or absence of cottage lots. In the absence of cottage lots, and assuming additional frontcountry campsites, changes in congestion at access points and on access lakes relevant to cottage lakes would be expected. Quantifying the change in congestion on those lakes generally depends on the difference in lake usage between cottage users and backcountry campsite utilization. Unfortunately, no data currently exists on the utilization of cottage lots by cottage users.¹³ However, it stands to reason that with the addition of 97 campsites more backcountry canoeists would pass through existing access points, potentially increasing congestion.

¹³ Personal Communication (2013). Luke Hillyer, Resource Management Technician - Lands, Waters and Forestry, Algonquin Provincial Park.

For those seeking a frontcountry experience this congestion may not significantly influence their overall experience since they are assumed to be seeking a “quasi-wilderness” experience and would have different expectations on the extent of solitude. Research has shown that preferences for solitude can vary depending on congestion point, activity, and site (Rollins, 2008). However, limited information exists on the preferences of these “frontcountry” campers and further research is needed to confirm this assertion.

Table 14: Distinguishing between Recreational Experiences in Algonquin

Camp Experience Type	Reduced / Increased Congestion on Access Lakes	Congestion on Backcountry Lakes	Reduced Sight of Cottages on Access Lakes	Motorized Boats
Frontcountry Camper	Restructuring cottage lakes to provide a more frontcountry experience could potentially result in increased congestion on access lakes and at access points. The impact on frontcountry is experience is uncertain.	Not Applicable	The absence of motorized boats and cottages would provide a quasi-wilderness experience to those seeking a wilderness type experience, but who prefer a less intense backcountry experience, because they lack the experience necessary for the backcountry or are not physically able to undertake such a trip.	
Backcountry Camper	With increased campsites on cottage lakes, congestion is likely to increase. The impact on the backcountry experience is uncertain. Some research shows congestion at these points can be positive under certain conditions.	Congestion in the “deep” backcountry is likely to remain constant with or without cottage lots. However, with 97 new frontcountry campsites some “near” backcountry camping may be substituted for frontcountry camping resulting in less congestion in “near” backcountry areas.	Solitude is assumed to be the primary preference factor of the backcountry camper. However, research has demonstrated that in Manitoba, canoeists would be willing to pay to avoid cottages suggesting that the sight of cottages has a negative impact on canoeing values (Boxall et al, 1996).	If the absence of cottage lots leads to a change in policy about allowing motorized watercraft on associated lakes, this will have some impact on the quality of the backcountry user experience. However, no data was found to support quantifying these impacts.

On the other hand, preferences for backcountry experiences have been studied in Algonquin demonstrating the importance of solitude and impact of congestion on the experience (Boxall, 2003). This research suggests that on the first and last day of a canoe trip, congestion is positive, as canoeists experience a “strong collegial effect” when meeting other canoeists during this portion of the trip (Boxall, 2003). However, this conclusion was based on grouping first and last day

experiences together in the analysis and anecdotal evidence suggests that this may hold only on the last day. This same research shows that while camping, portaging, or paddling the more groups encountered the lower the canoeists' value.

Without a clear understanding of how congestion is likely to change in the absence of cottage lots, it is difficult to quantify what net impact those changes would have on recreational user experience. As Table 14 outlines both positive and negative impacts would be anticipated from the absence of cottage lots. In addition, changes in these experiential values would have limited implications from the perspective of net benefits to the Crown, as they are benefits experienced by users of the park over and above the fees paid to obtain that experience. However, the Crown could be impacted if such changes are significant enough to influence park users' decisions to canoe in Algonquin. Regardless of their impact on net benefits to the Crown, changes in recreational experience are an important opportunity cost of cottage leasehold arrangements that ought to be considered when setting park policy.

6.2.3 Conclusions from assessing conservation alternatives

Our assessment of foregone conservation alternatives revealed many promising approaches that are presently challenged by data shortcomings. Foregone ecological opportunities in Rondeau and Algonquin are significant, but data limitations precluded their quantification. The economic value of these opportunities is a cost borne by society, not the Crown, and therefore do not reduce the net benefit to the Crown of current cottage leasehold arrangements. However, these foregone conservation opportunities must continue to be considered by MNR in fulfillment of its mandate and in the management of lands and wildlife within the park.

In Rondeau, research was inconclusive on the potential impact of recreational quality from cottage leasehold arrangements, thus we do not conclude that there are foregone recreational opportunities. However, the 1990 Rondeau Management plan noted a need for some increased public access points located in areas currently occupied by leased cottage lots. In contrast, we conclude that there are foregone recreational opportunities in Algonquin of backcountry camping. We estimate that these foregone recreational opportunities would provide the Crown with \$38,000 in additional revenue if lands were not leased for cottages. The foregone additional backcountry activity would have impacts on the general value of recreation in Algonquin. Congestion in the backcountry would be reduced, while we would expect an increase in congestion at access points. The new campsites could cater to new users seeking a wilderness-like experience without multiple-day backcountry canoe trips.

7. Integrated Assessment

The net economic value to the Crown of current cottage lot tenure arrangements was estimated by integrating the benefits and costs that were assessed in this report. Our framework of full value accounting considers the direct and opportunity costs of supporting current tenure arrangements and the net rent which should be earned as a fair return to the Crown for providing the benefits of cottage lots. This was compared to the revenue currently earned by the Crown, from current cottage leasehold arrangements, to assess the Crown's net economic return. Current statistics were also used to evaluate the Ministry's Crown Land Rental Policy, evaluating the net economic return that would have been earned if its recommended rental rate were used. Summary statistics reveal the extent to which the Crown meets its policy of cost-recovery and its policy of land rental rates.

7.1 Interpreting and applying Crown policy rental rates

Cottage lots have tenure documents that specify an initial "annual rent" and the years in which this rent may be adjusted. Notices of past adjustments appear to have rationalized changes on the basis of costs that need to be recovered and recent land value appraisals. A more detailed methodology is not provided in lease documents or adjustment letters, so our estimate of a fair market rent must be informed by more general government policy and practice.

The Government's Crown Land Rental Policy (MNR, 2006) informs the government about the rental rate that should be used to lease Crown land for various purposes. The policy has a goal of:

"...maximiz[ing] non-tax revenues in a fair and equitable manner through rents and fees that: a) are based on market value where market value can be readily determined in a cost effective manner; or b) recover MNR's administrative costs and reflect compensation for the foregone public use of the public land where market value cannot be determined in a cost effective manner."

The policy prescribes that private recreational sites with accommodation, such as cottages, should pay a 10% rental rate when leased with no option to purchase. Sites under a license of occupation should pay a 6% rental rate and sites under a land use permit should pay 5%. The fairness of these rates is justified on the basis of market rates of return:

"Fundamental to the concept of fair return to the public is the principle that public / Crown land is as valuable as comparable private land. The Crown will set rents and fees that

recover a return equal to that which would be sought by a private owner of similar property. This fair rate of return has been established by comparison with the private sector...”

Although the policy states that it applies to the calculation of “all rents and fees for the use of Ontario’s public lands” it notes an exception for “Provincial Park leases...or where other rents or fees are established by specific provisions within existing tenure agreements and / or other Public Lands Directives” (Section 3.1; MNR, 2006). MNR staff informed us that there is no other more specific directive for Provincial Park leases, so this more general policy remains the most instructive for informing tenure arrangements. MNR staff also informed us that this policy was applied to the calculation of Land Use Permit fees in Woodland Caribou Provincial Park, which should therefore rule out its categorical exception for provincial parks.

Application of this policy to Rondeau and Algonquin cottage lots is challenged by several factors. The policy is unclear whether its lease rates are meant to recover administrative costs inherent in providing tenure in addition to providing a fair rate of return to the Crown for lease its land. We interpret the policy’s lease rates as the rates which are meant to recover costs *and* earn a fair rate of return.

The policy is also unclear about how it derived its specific lease rates from its general intent of the Crown setting rents that will “recover a return equal to that which would be sought by a private owner of similar property.” Greater analytical detail would be necessary to ensure that the specific lease rates achieve their objective – or to assess what alternative lease rates would be necessary to achieve this goal. In the present context, we now have estimates of the market value of the Crown land and the costs of services provided to leaseholders. With this information we can both apply the policy rates, and derive what the rates should be in order to fulfill the goals of recovering service costs and the benefits of leased land. Consequently we do both:

1. We applied the policy lease rates to the market value of Crown land. When this information is integrated with direct costs and opportunity costs, we assessed whether the resulting return to the Crown would be considered fair, based on our knowledge of the direct costs of current tenure arrangements, and opportunity costs.
2. We applied our own estimate of a fair market rate of return to estimate a fair lease rate, beyond recovering costs. When this information is integrated with all costs, we calculated an all-in lease rate and compared it to the rates specified in the policy document.

Algonquin and Rondeau cottage lot tenure agreements impose conditions that restrict the property rights enjoyed by these cottagers, when compared to nearby private vacant land, whose selling price informed our appraisal of Crown land. Cottage tenure holders do not have an inherent right to transfer, sublet, or assign their lease to others; they must obtain the consent of the Crown to do this.

Tenure holders cannot use the lots as a permanent residence. Tenure holders face more restrictive conditions on landscaping than others in a private land context, and can be bound by “further conditions or regulations which the [Crown, as the] Lessor may deem to be required from time to time.” Current tenure holders also face an expensive risk that any structures and improvements to the lots would need to be removed when tenure expires in 2017. All of these restrictions would reduce the market rental rate when compared to equivalent rental rates of private land without this expiry. Therefore, a true market rental rate from Crown land must account for the impact of these differences in property rights. Although Metrix Realty noted some of these restrictions, they estimated the value of Crown land on a fee-simple interest basis – not a market leasable value. Consequently, we must assess the implication of these restrictions on a fair lease rate.

In 1993, the Ministry of Natural Resources commissioned David Nowlan to assess fair pricing for the disposition of Crown lands. In that report, Nowlan (1993) advocated that fee-simple market land values be discounted in order to assess a market rental rate, owing to restrictions on leases that would not exist in a private rental context. An important restriction is the possibility that future governments might not renew leases, which would impose significant costs on lessors because their improvements would need to be removed. He noted that a higher probability that leases would not be renewed, combined with a high value of the cottage on the lot, would imply a higher discount factor. He reviewed earlier appraisals of cottage lots in Algonquin and Rondeau and noted that Rondeau lots were discounted by 50% in spite of an expected (and since realized) 21-year lease extension. He noted difficulties in interpreting appraisals of Algonquin lots, but suggested that a 20% discount could have accounted for an offsetting park premium that was not captured by fee-simple comparisons. All considered, he suggested a relatively simple and general approach for adjusting fee-simple values: a 20% discount for short-term leases, a 60% discount for Land Use Permits, and a 50% discount for License of Occupation.

It is not clear if and how these discount factors informed the Crown Land Rental Policy rates, nor whether it ought to be considered, since the policy does not state its assumptions about restrictions that might be imposed upon renters of Crown land that cannot be imposed by landlords of private land. However the policy rates appear to follow some of the logic inherent in Nowlan’s analysis insofar as Land Use Permits and Licenses of Occupation command a lower rental rate than leases. This logic follows the principle that the latter forms of tenure convey fewer property rights than leases. The policy rate of 10% for leases would follow Nowlan’s analysis if this rate were applied to an adjusted (discounted) appraisal – or if this rate was intended for licenses *with the option to purchase*. Otherwise the policy rate of 10% seems high, and too general for a range of potential circumstances, such as the lease’s length of term and probability of renewal.

Since the policy is not clear about the property rights that are to be assessed when appraising Crown land, it is prudent that we apply its rate to both discounted and non-discounted values. We recommend discounting, although we have less confidence in which specific discount rate to use. The discount should relate to the value of structures and likelihood of renewals – both of which are unknown to us. In the absence of better information, we rely upon Nowlan’s insights to discount all fee-simple assessments for leases by 20% in both parks based upon Nowlan’s assumption that cottage tenure holders generally have high expectations that tenure would be renewed. Since the policy rates already instruct the ministry to significantly discount rents from lots under a License of Occupation and Land Use Permit, we do not apply additional discounts beyond this 20%.

Table 15 applies the Crown’s policy rental rates to both fee-simple and discounted lot values. Results show that policy rental rates would yield gross revenue of almost \$4 million for cottage lots in each park, assuming a 20% discount applied to fee-simple appraised market values. Without the discount, the Crown would earn close to \$5 million for cottage lots in either park.

Table 15: Potential annual revenue from cottage lots in Rondeau and Algonquin if policy rental rates were applied. Discounted lot values are 80% of the fee-simple appraised value.

Park	Form of tenure	Estimated cottage lot value		Rental rate	Annual gross rental revenue	
		Fee-Simple	Discounted		Fee-Simple	Discounted
Algonquin	Leases	\$45,742,000	\$36,593,600	10%	\$4,574,200	\$3,659,360
	License of Occupation	\$1,634,000	\$1,307,200	6%	\$98,040	\$78,432
	Land Use Permits	\$1,661,000	\$1,328,800	5%	\$83,050	\$66,440
	All (sum)	\$49,037,000	\$39,229,600		\$4,755,290	\$3,804,232
Rondeau	Leases	\$49,737,919	\$39,790,335	10%	\$4,973,792	\$3,979,034
	License of Occupation	\$201,981	\$161,585	6%	\$12,119	\$9,695
	All (sum)	\$49,939,900	\$39,951,920		\$4,985,911	\$3,988,729

7.2 Economic value of cottage tenure arrangements in Rondeau

The Crown currently earns a net economic loss from the land it leases for cottages in Rondeau Provincial Park. The Crown fails to recover all of its current costs, the most expensive of which is the Payment-In-Lieu (PIL) that it makes to local municipalities to offset foregone property taxes.

Table 16 reveals the net revenue earned by the Crown, and its implied net economic return relative to the market value of the land (as a capital stock). Since the Crown fails to recover costs, its net revenue is a subsidy. The Crown earns -0.75% per year on the capital value of its land. To recover costs, Crown revenues from Rondeau cottages would need to be 50% greater (row H). If the Crown

did not make a PIL payment on behalf of the cottages, yet it earned the same revenue, then it could recover costs and earn a net rent of 1.05% (row F).

Table 16: Evaluation of cost recovery, net revenue and the net rental rate in Rondeau Provincial Park.

	With PIL payment	Without PIL payment
A. Estimated market value of cottage site lands	\$ 49,939,900	\$ 49,939,900
B. Current Crown revenue from cottage sites	\$ 743,687	\$ 743,687
C. Current direct costs to the Crown	\$ 217,216	\$ 217,216
D. Current Crown PIL payment on behalf of cottages	\$ 900,000	\$ 900,000
E. Net revenue currently earned by the Crown = B-C-D	-\$ 373,529	\$ 526,471
F. Current net rental rate = E/A	-0.75%	1.05%
G. Additional revenue needed for cost-recovery (if E is negative)	\$ 373,529	\$ -
H. Additional revenue relative to current revenue = G/B	50%	0%

Table 17: Evaluation of the implications of opportunity costs upon the Crown's revenue and net return in Rondeau Provincial Park. References to rows A to H are for preceding table.

	With PIL payment	Without PIL payment
J. Net revenue needed to forego financial opportunity costs	\$ 1,498,197	\$ 1,498,197
K. Net revenue needed to forego conservation opportunity costs	\$ -	\$ -
L. Additional revenue needed to meet (J)	\$ 1,871,726	\$ 971,726
M. Additional revenue as % gain of current revenue = L/B	252%	131%
N. Additional revenue needed to meet (K)	\$ 373,529	\$ -
O. Additional revenue as % gain of current revenue = N/B	50%	0%
P. All-in (gross) rental rate needed for (J) = (J+C+D)/A	5.2%	3.4%

Table 17 reveals the implications of considering opportunity costs in assessing the Crown's net economic return. To recover its financial opportunity cost of 3%, the Crown would need to collect an additional \$1.8 million in annual revenue, which would amount to a 252% increase in revenue. In the absence of making a PIL payment, the Crown would need 131% more revenue in order to cover direct costs and financial opportunity costs. We assessed the implications of different opportunity costs of capital, but do not reproduce tables with this assessment. A 2% opportunity cost of capital would reduce the needed revenue increase to 185% and 64% with and without a PIL payment, respectively. A 4% rate would require increases of 319% and 198% respectively. We also assessed the implications of a 10% variance of the estimated market value of cottage lands, but do

not reproduce tables with this assessment. If lands were 10% more valuable than the estimate supplied by Metrix Realty, then revenue would need to increase by 271% or 150% with, or without, including a PIL payment, in order to earn a 3% rate of return. If the lands were 10% less valuable, then revenue would need to increase by 232% or 111% with or without the PIL, respectively.

Row P in Table 17 reveals an all-inclusive (gross) rental rate that could be applied to the estimated market value of cottage lots in order to fully cover costs and earn a fair rate of return. Note that these rates (with and without a PIL payment) are significantly lower than the all-inclusive 10% rental rate suggested by the Crown Land Rental Policy.

Table 18: Assessment of the Crown Land Rental Policy if it were applied to current cottage tenure arrangements in Rondeau Provincial Park.

Cost assumption:	With PIL payment		Without PIL payment	
	Fee-Simple	Discounted	Fee-Simple	Discounted
Appraised value of land:				
A. Estimated market value of cottage site lands	49,939,900	39,951,920	49,939,900	39,951,920
B. Current Crown revenue from cottage sites	743,687	743,687	743,687	743,687
C. Crown revenue if policy rental rates were charged	4,985,911	3,988,729	4,985,911	3,988,729
D. Current direct costs to the Crown	217,216	217,216	217,216	217,216
E. Current Crown PIL payment on behalf of cottages	900,000	900,000	-	-
F. Net revenue earned if policy rates charged = C-D-E	3,868,695	2,871,513	4,768,695	3,771,513
G. Net return on capital if policy rates charged = F/A	7.7%	7.2%	9.5%	9.4%
J. Additional revenue needed for policy rates = C-B	4,242,224	3,245,042	4,242,224	3,245,042
K. Additional revenue relative to current revenue = J/B	570%	436%	570%	436%

Table 18 reveals the implications of applying rental rates from the Crown Land Rental Policy. With our interpretation that these rates are meant to recover costs and to earn a fair return on capital, our integrated assessment reveals the Crown would earn above a 7% annual rate of return on its capital (row G). This rate of return is more than double our assessment of the Crown’s opportunity cost of capital – and likely the private sector’s opportunity cost of capital, thus contradicting the policy’s intention of “recover[ing] a return equal to that which would be sought by a private owner of similar property” (MNR, 2006). Attempting to achieve the policy rental rates, even if they are applied to a 20% discounted fee-simple appraisal, would require a 436% increase in revenue.

7.3 Economic value of cottage tenure arrangements in Algonquin

Our integrated assessment of cottage lots in Algonquin Provincial Park explores the implications of the low versus high cost estimates from section 5. Estimates differ by the portion of costs attributed to cottage lot tenure holders for water control structures in the park. The high estimate attributes 1.5% of the asset value of water control structures as an annual maintenance cost, based upon the recommendation of its Dam Asset Management Plan – even though we were not able to confirm whether these funds are actually expended. A low estimate assumes that none of the annual maintenance costs should be attributed to leaseholders.

Table 19 reveals that the Crown achieves cost recovery under both a low and high cost estimate scenario with and without the current PIL payment. The current net rental rate (row F) is between 0.6% and 0.33% with a PIL; excluding the Crown's PIL payment, the net rental rate is between 0.86% and 0.59% (for the low and high cost estimates, respectively). Table 20 reveals that revenues would need to increase by over 200% (row M) in order to cover the Crown's opportunity cost of capital of 3%, while still making a PIL payment. Without making a PIL payment, the Crown would need between 149% and 201% more revenue this fiscal year. Nevertheless the Crown earns enough net revenue from cottage leases to more than offset the \$38,000 in conservation opportunity costs whose value we were able to quantify and price.

We assessed the implications of different opportunity costs of capital, but do not reproduce tables with this assessment. A 2% opportunity cost of capital would reduce the needed revenue increase to 117% and 140% with the current PIL payment for the low and high-cost estimates, respectively. A 4% rate would require increases of 284% and 307%, respectively. Excluding the current PIL payment, a 2% rate would require a revenue increase of between 95% and 118%, while a 4% rate would require an increase of between 262% and 285% (for the low and high cost estimates, respectively).

We also assessed the implications of a different market value of cottage lands in the park, but do not reproduce tables within this assessment. The estimated market value of cottage lands provided by Metrix Realty generates a total value that is 10% less than the average of private land comparables outside of the park. We explore a scenario in which the market value of cottage lands within the park are equal to those sites outside of the park; this results in the Crown land being worth \$54 million. To earn a fair rate of return of 3% on this value of the lands would require increasing revenue by 248% or 226% with, or without the PIL payment, respectively, when applied to the high-cost estimate. When applied to the low-cost estimate, a 3% rate of return would require additional revenue of 176% or 153%.

Table 19: Evaluation of cost recovery, net revenue and the net rental rate in Algonquin Provincial Park.

<i>Cost estimate:</i>	Including PIL payment		Excluding PIL payment	
	Low cost	High cost	Low cost	High cost
A. Estimated market value of cottage site lands	49,037,000	49,037,000	49,037,000	49,037,000
B. Current Crown revenue from cottage sites	586,918	586,918	586,918	586,918
C. Current direct costs to the Crown	163,768	296,026	163,768	296,026
D. Current Crown PIL payment on behalf of cottages	130,543	130,543	130,543	130,543
E. Net revenue currently earned by the Crown = B-C-D	292,606	160,349	423,149	290,892
F. Current net rental rate = E/A	0.60%	0.33%	0.86%	0.59%
G. Additional revenue needed for cost-recovery (if E is negative)	-	-	-	-
H. Additional revenue relative to current revenue = G/B	0.0%	0.0%	0.0%	0.0%

Table 20: Evaluation of the implications of opportunity costs upon the Crown's revenue and net return in Algonquin Provincial Park.

<i>Cost estimate:</i>	Including PIL payment		Excluding PIL payment	
	Low cost	High cost	Low cost	High cost
J. Net revenue needed to forego financial opportunity costs	\$ 1,471,110	\$ 1,471,110	\$ 1,471,110	\$ 1,471,110
K. Net revenue needed to forego conservation opportunity costs	\$ 38,000	\$ 38,000	\$ 38,000	\$ 38,000
L. Additional revenue needed to meet (J)	\$ 1,178,504	\$ 1,310,761	\$ 1,047,961	\$ 1,180,218
M. Additional revenue as % gain of current revenue = L/B	201%	223%	179%	201%
N. Additional revenue needed to meet (K)	\$ -	\$ -	\$ -	\$ -
O. Additional revenue as % gain of current revenue = N/B	0%	0%	0%	0%
P. All-in (gross) rental rate needed for (J) = (J+C+D)/A	3.6%	3.9%	3.3%	3.6%

Table 21: Assessment of the Crown Land Rental Policy if it were applied to current cottage tenure arrangements in Rondeau Provincial Park.

	Cost assumption:		High cost estimate		
	Appraised value of land:	Low cost estimate	Discounted	Fee-Simple	Discounted
A. Estimated market value of cottage site lands		49,037,000	39,229,600	49,037,000	39,229,600
B. Current Crown revenue from cottage sites		586,918	586,918	586,918	586,918
C. Crown revenue if policy rental rates were charged		4,755,290	3,804,232	4,755,290	3,804,232
D. Current direct costs to the Crown		163,768	163,768	296,026	296,026
E. Current Crown PIL payment on behalf of cottages		130,543	130,543	130,543	130,543
F. Net revenue earned if policy rates charged = C-D-E		4,460,978	3,509,920	4,328,721	3,377,663
G. Net return on capital if policy rates charged = F/A		9.1%	8.9%	8.8%	8.6%
J. Additional revenue needed for policy rates = C-B		4,168,372	3,217,314	4,168,372	3,217,314
K. Additional revenue relative to current revenue = J/B		710%	548%	710%	548%

As in the case of Rondeau, the application of rental rates from the Crown Land Rental Policy would earn a net economic return in excess of our fair market benchmark of the Crown’s opportunity cost of capital. Table 21 reveals that the Crown would earn at minimum of an 8.6% net return on the 20%-discounted market value of cottage lots if it were to collect 548% more revenue in order to meet our interpretation of the Crown Land Rental Policy. Rates of return in row G appear to challenge the policy’s claim that its “fair rate of return has been established by comparison with the private sector” (MNR, 2006).

7.4 Jurisdictional assessment and benchmarking

Our approach to assessing the net economic value of current cottage lot tenure arrangements was benchmarked against other Canadian jurisdictions and governments that provide long-term leases of unimproved Crown land for the recreational purpose of cottages. The Federal Government and the provincial governments of Manitoba, Saskatchewan, and Alberta offer such arrangements. Quebec is among some Canadian jurisdictions that offer short-term leases of cottages lots *with* Crown cottages within Provincial Parks, so this was not considered relevant to the Ontario context. Our

assessment revealed some notable features of tenure arrangements in Manitoba, Saskatchewan, and federally (Parks Canada). We did not find the Alberta approach sophisticated enough to serve as a benchmark. We included the Crown land rental policy of British Columbia even though there are no leased cottage lands within provincial parks.

Manitoba's *Parks Fees Regulation* (1996) details fees and rental rates that are applied to cottage lots within provincial park boundaries. The regulation is notably detailed about how it calculates service fees and what it considers when assessing the full cost of its services. Amortized capital costs and interest are included for capital costs incurred "in connection with a service provided to or for the benefit of owners or occupiers of land with the whole or a specified area of a park district" (s 6(4); Government of Manitoba, 1996). The regulation lists various services whose costs are recovered, including garbage collection and removal, the maintenance of roads and docks, street lighting, and emergency services. To ensure year-over-year cost recovery, the regulation specifies that surpluses or deficits in cost-recovery from a previous year inform the next year's fees. The regulation clarifies that no service fees are payable if property taxes are payable to a municipality, which occurs in cases where park cottages are located on lands that are outside of a park district. Added to service fees is an annual lease of 4% of an appraised value of the residential lot within a park. Land appears to be appraised on the basis of the land's last appraisal, without any explicit schedule of future appraisals or updates based upon trends in consumer prices or the market land values.

Saskatchewan leases over 2100 cottage sites within many provincial parks. Sublets and assignment of leases are permitted under *The Parks Act (1991)*, and building permits are needed to erect and modify structures. In this respect, tenure seems similar to private land leases. Leaseholders as a group are charged for the full cost of providing services, with permanent residents paying 35% more than seasonal residents. Costs are adjusted annually, with a legislated reference to the "all items Consumer Price Index for Saskatchewan" and other adjustments "necessary to reflect any increased costs of providing direct services" (Government of Saskatchewan, 1991). Costs are "the total cost of providing direct services to all leaseholders within the park based on a reasonable estimate by the minister using the records maintained by the minister respecting the costs of providing direct services." In addition to these cost-recovery fees, leaseholders pay a rent of 1.92% of the "fair value assessment" of the land value (which was last adjusted in 2006). Surprisingly this rate is not adjusted for whether the person is a permanent resident or not. Assessments are visible on the web, revealing a value per square footage as an average "fair land value." It is not clear how the land values were appraised.

British Columbia's *Parks Act* (1996) specifies that Crown land in a recreation area cannot be sold and is generally not leased, unless explicitly approved by the Minister. The disposition of Crown Land for residential purposes outside of provincial parks is covered by a Land Use Operational Policy (Government of British Columbia, 2012), which we compared to Ontario's Crown Land Rental Policy. The British Columbia policy states that leases have a standard term of 30 years. Rents are informed by an appraised market value of land, if not the value used for taxation purposes. Licenses of Occupation for remote residential use have rental rates of 4.5% in contrast to a 5% rate for urban and rural residential and permanent residential leases. A rate of 3% applies to seasonal residential leases on shoreland. The policy states that a security deposit may be required in exchange for improvements or changes to the land. The policy is notable for specifying the possibility that the market value of land be "discounted" if deficiencies make it ineligible for sale. Otherwise the policy specifies that the full appraised market value (plus the value of any residual timber) is used when land is sold with fee simple property rights. Conversion of existing tenures to fee simple is allowed under certain circumstances.

Parks Canada leases land within National Parks. Yearly rental rates vary by park, with the highest rate of 6% being for lands in Jasper, Yoho, and Banff National Park used for the purpose of year-round residence, or adjusted for the portion of residence by the number of months occupied (Parks Canada, 2010). Unlike in Manitoba and Saskatchewan, there is no explicit distinction between rental rates and cost-recovery fees in the lease policy. Federal regulation specifies that rental rates are to be adjusted "throughout the term of the lease by compounding the rate of the average of the previous five years' Consumer Price Indices" with a maximum increase capped at 5%. This is a notable feature that allows the rental rates to remain real in between appraisals, whereas the other rental policies considered above are only real in the year in which their lands are appraised.

All considered, our jurisdictional benchmarking supports our conclusion that the rental rates from the Crown Land Rental Policy are too high, and the rental rates from current tenure arrangements in Rondeau and Algonquin are too low. Cottage lot leases in Rondeau do not earn enough revenue to recover costs, so their negative rates of return are far below Ontario's peers. Excluding this costly PIL payment, current revenue would recover costs – but would not earn enough net revenue to match any of the rental rates of its peers. The relatively low net rental rate in Saskatchewan would still yield more revenue than current Ontario arrangements. If MNR were to apply the current Crown Land Rental Policy rates of 10% for leases, it would stand out from its peers by generating the highest net economic rate of return – even higher than the Parks Canada lease rate of 6% that applies to year-round accommodation in Jasper and Banff parks which arguably command a greater economic return than Algonquin and Rondeau.

8. Conclusions

This report reveals the net economic value to the Crown of current cottage tenure arrangements in Rondeau and Algonquin Provincial Parks. The net economic value was calculated as the revenue earned from cottage lot tenure arrangements, less the direct costs incurred by the Crown to manage the leases and service the lots, and less the Crown's opportunity costs. This net economic value was compared to an estimated market value of cottage lots, to derive a net economic rate of return to the Crown. This rate of return was benchmarked against the government's opportunity cost of capital, which is our interpretation of a fair market rate of return.

Results show that the Crown is currently challenged to meet its goals of cost-recovery and earning a fair rate of return from cottage lots in Rondeau and Algonquin Provincial Parks. Revenue from leased lots in Rondeau is anticipated to be insufficient this fiscal year to cover the Ministry's costs, notably a Payment-In-Lieu of taxes that the Ministry makes to municipalities on behalf of cottage tenure holders. If this issue is rectified in the coming fiscal year (as currently expected), then we estimate that the Ministry will achieve cost recovery. However, it will be challenged to earn a fair return on its capital. A private landlord attempting to compete against the Crown for leasing land near Rondeau or Algonquin Provincial Parks could be at a competitive disadvantage today, to the extent that it could not rent private land at the same low rental rates yet still cover its opportunity cost of capital.

For the Crown to earn a fair 4% return upon the value of its capital stock of land, we estimate that it would need to collect over 200% more revenue than it does currently, effectively tripling fees and rents. This necessary increase would be 131% and 179% if the Crown were not making a PIL payment for Rondeau and Algonquin cottages, respectively. This would put Ontario rental rates in line with the 4% rental rates charged by the Government of Manitoba. To match the 1.92% rental rates charged by the Government of Saskatchewan, Ontario would need to raise revenue by 64% and 95% in Rondeau and Algonquin parks respectively.

This report does not recommend, nor assess, approaches that might be contemplated in order to enhance the Crown's net economic return from cottage lots today and into the future. Future changes in revenue, lease conditions, and durations could affect the market value of cottage tenure such that the present analysis would need to be revised – with different discounts. In attempting to apply the Crown Land Rental Policy, we suggested some ways that the policy could be enhanced for greater clarity and internal consistency, specifically how a lease rental rate should be derived.

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Appendices

Appendix A: How to Consider Non-Market Value

A1. Accounting for Impacts to Endangered Species

Richards and Loomis (2009) provide a detailed assessment of economic values related to threatened, endangered and rare species. It captures state-of-the-art valuations from 31 studies conducted across the United States. The results of this meta-analysis are particularly valuable for our exercise since the econometric analysis was conducted specifically to provide a function for value transfer.¹⁴

It should be noted that this approach depends on the ability to approximate the relationship between a percent change in species habitat with a percent change in species population. Currently, the cottage lots occupy approximately 20 ha of land or about 2.3% of the terrestrial area of Rondeau Provincial Park.¹⁵ If such a link could be quantified, then Table 22 provides the willingness to pay values for a range of increases species at risk population transferred to Rondeau Provincial Park.

Table 22. Willingness to pay per household by endangered species type and percent change in species population

Species Type	Percent Change in Species Total Population						
	0.1%	0.5%	1%	2%	5%	10%	20%
Fish	\$0.46	\$1.85	\$3.38	\$6.18	\$13.72	\$25.07	\$45.82
Bird	\$1.05	\$4.24	\$7.76	\$14.18	\$31.46	\$57.50	\$105.08
Reptiles	\$0.16	\$0.67	\$1.22	\$2.23	\$4.95	\$9.04	\$16.52

Should data become available to quantify this relationship, or there is a reasonable assumption that could be made, the table could be used in the following manner: if species habitat increases by 2% of the parks terrestrial area and we assume the population to increase proportionally, we can expect that value placed on fish, birds, and reptiles to be \$6.18, \$14.18, and \$2.23 per household, respectively.

¹⁴ Richards and Loomis (2009) report the value transfer error to be between 34% and 45%.

¹⁵ Area of cottages was approximated using by converting the average lot size (50ft x 150ft) to ha and multiplying by the number of cottages (286).

Issues for MNR to Consider when applying these non-market values:

- Can a reasonable assumption be made between change in species habitat and change in species population? If not further research should explore this relationship.
- What is the relevant population that holds these values? Using the population of Ontario would seem like an intuitive option. However, doing so implicitly assumes homogenous preferences across the entire province. This is likely an inaccurate assumption. For instance, people in Thunder Bay, Ontario are not likely to be willing to pay the same for species at risk protection in Rondeau as those in London, Ontario. To address this issue a distance decay function for willingness to pay values could be used from Hanley et al (2003).
- Given that these are social values and do not reflect any fiscal burden on the Crown, it is difficult to justify including these in an assessment of the net economic benefit to the Crown. However, they are important opportunity costs of the current tenure arrangements that would be considered when setting park policy.

An alternative way to utilize the information in Table 22 is with data on species at risk mortality (e.g. road mortality of endangered snakes) within the park. A study conducted in 2005 found that a total of 648 incidences of road kill within Rondeau Provincial Park (Farmer and Brooks, 2012). This included the following species at risk:

Species	At Risk Status	Number Road Kill Instances in 2005	Estimated Rondeau Population	Estimated impact on Population
Bard Swallow	Threatened	1	NA	
Five-lined Skink	Endangered	18	291 ¹⁶	6%
Eastern Foxsnake	Endangered	3	NA	
Eastern Hognose Snake	Threatened	2	NA	
Fowler's Toad	Endangered	12	400 ¹⁷	3%
Blanding's Turtle	Threatened	4	NA	
Map Turtle	Special Concern	3	NA	
Snapping Turtle	Special Concern	15	NA	

Unfortunately, it was not possible to translate the number of road kill instances into a percent change in species populations, since we do not know the impact of the mortality on their growth rate. The population estimates provided for Five-lined Skink and Fowler's Toad best estimates and population change estimates do not adjust for birth rates and should therefore be interpreted with caution.

¹⁶ Estimate from Seburn (2010).

¹⁷ Estimate from Green et al (2011).

However, this demonstrates ways to start synthesizing existing information to make it usable in a policy context.

Another issue to note is not all road kill instances within Rondeau can be attributed to cottage users. Roads supporting cottage lots in Rondeau amount to approximately 25% of total road length in the park.¹⁸ An adjustment to the road kill instance would need to be made. One could assume a proportional relationship between lengths of road used for cottages. However, it was noted that road mortality in areas with cottages is lower than other areas because the habitat is of lower quality and supports lower populations.

¹⁸ Personal Communication (2013). Brad Steinberg, Acting Senior Conservation Ecologist, Ontario Ministry of Natural Resources.