

**PROJECT NO. NSD18417**

**FINAL REPORT TO**

**DEPARTMENT OF ENVIRONMENT AND LABOUR  
PROVINCE OF NOVA SCOTIA**

**ON**

**SOCIO-ECONOMIC ANALYSIS OF DESIGNATING WILDERNESS AREAS  
WITHIN THE GULLY LAKE AND EIGG MOUNTAIN-JAMES RIVER CROWN PARCELS**

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## TABLE OF CONTENTS

	<b>Page No.</b>
1.0 INTRODUCTION .....	1
1.1 Wilderness Areas in Nova Scotia .....	1
1.2 Socio-economic Analysis of Wilderness Areas.....	2
1.3 Project Scope and Objectives.....	4
2.0 THE STUDY AREAS .....	6
2.1 History of the Study Areas.....	6
2.2 Gully Lake .....	6
2.2.1 Geographic Location.....	6
2.2.2 Physical Description .....	8
2.2.3 Encumbrances and Holdings.....	8
2.3 Eigg Mountain-James River .....	10
2.3.1 Geographic Location.....	10
2.3.2 Physical Description .....	12
2.3.3 Encumbrances and Holdings.....	12
3.0 IDENTIFYING THE VALUES .....	14
4.0 COMMERCIAL VALUES.....	17
4.1 Forestry .....	17
4.1.1 Gully Lake .....	18
4.1.2 Eigg Mountain-James River .....	21
4.1.3 Summary of Forestry Values .....	23
4.2 Mining.....	24
4.2.1 Gully Lake .....	25
4.2.2 Eigg Mountain-James River .....	27
4.2.3 Summary of Mining Values.....	27
4.3 Tourism.....	27
4.3.1 Gully Lake .....	29
4.3.2 Eigg Mountain-James River .....	30
4.3.3 Summary of Tourism Values.....	31
4.4 Research and Education.....	32
4.4.1 Gully Lake .....	32
4.4.2 Eigg Mountain-James River .....	32
4.4.3 Summary of Research and Education Values.....	33

5.0	INDIVIDUAL VALUES .....	34
5.1	Vehicle Use.....	34
5.1.1	Gully Lake .....	35
5.1.2	Eigg Mountain-James River .....	36
5.1.3	Summary of Vehicle Use Values.....	37
5.2	Fishing, Hunting and Trapping.....	38
5.2.1	Gully Lake .....	39
5.2.2	Eigg Mountain-James River .....	39
5.2.3	Summary of Fishing, Hunting and Trapping Values.....	40
5.3	Other Outdoor Recreation Activities .....	40
5.3.1	Gully Lake .....	41
5.3.2	Eigg Mountain-James River .....	44
5.3.3	Summary of Naturalists and Trekking Values.....	44
5.4	Existence Values.....	45
5.4.1	Summary of Existence Values .....	46
6.0	ECOSYSTEM SERVICE VALUES .....	48
6.1	Climate Change Mitigation.....	48
6.1.1	Gully Lake .....	49
6.1.2	Eigg Mountain-James River .....	50
6.1.3	Summary of Climate Change Mitigation Values.....	50
6.2	Water Regulation .....	50
6.2.1	Gully Lake .....	51
6.2.2	Eigg Mountain-James River .....	51
6.2.3	Summary of Water Regulation Values .....	52
6.3	Biodiversity Maintenance .....	53
6.3.1	Gully Lake .....	53
6.3.2	Eigg Mountain-James River .....	54
6.3.3	Summary of Biodiversity Maintenance Values .....	55
7.0	SUMMARY .....	56
7.1	Current Values .....	56
7.2	Examining the Trade-offs .....	58
8.0	REFERENCES .....	61
8.1	Literature Cited .....	61
8.2	Personal Communications .....	68

## LIST OF TABLES

	<b>Page No.</b>
Table 3-1 Selected Value Categories .....	15
Table 4-1 Stora Enso Forest Practices in the Gully Lake Crown Parcel.....	20
Table 4-2 Stora Enso Forest Practices in the Eigg Mountain-James River Crown Parcel.....	22
Table 4-3 Summary of Forestry Values in the Candidate Wilderness Areas.....	23
Table 4-4 Summary of Mining Values in the Candidate Wilderness Areas .....	28
Table 4-5 Economic Impacts of Tourism in Colchester, Pictou and Antigonish Counties, 2002.....	29
Table 4-6 Nature Tourism Areas near the Gully Lake Candidate Wilderness Area.....	29
Table 4-7 Nature Tourism Areas near the Eigg Mountain-James River Candidate Wilderness Area.....	30
Table 4-8 Summary of Tourism Values in the Candidate Wilderness Areas .....	32
Table 4-9 Summary of Research and Education Values in Candidate Wilderness Areas .....	33
Table 5-1 Summary of Vehicle Use Values in the Candidate Wilderness Areas .....	38
Table 5-2 Summary of Fishing, Hunting and Trapping Values in the Candidate Wilderness Areas .....	40
Table 5-3 Summary of Naturalists and Trekking Values in the Candidate Wilderness Areas .....	45
Table 5-4 Summary of Existence Values in the Candidate Wilderness Areas .....	47
Table 6-1 Summary of Climate Change Mitigation Values in the Candidate Wilderness Areas .....	50
Table 6-2 Summary of Water Regulation Values in the Candidate Wilderness Areas.....	52
Table 6-3 Summary of Biodiversity Maintenance Values in the Candidate Wilderness Areas.....	55
Table 7-1 Summary of Socio-economic Values.....	56
Table 7-2 Summary of the Distribution of Current Benefits.....	58
Table 7-3 Direct Impacts on Socio-economic Values with Designation .....	59

## LIST OF FIGURES

	<b>Page No.</b>
Figure 2-1	Gully Lake Candidate Wilderness Area ..... 7
Figure 2-2	Gully Lake Encumbrances and Holdings ..... 9
Figure 2-3	Eigg Mountain-James River Candidate Wilderness Area ..... 11
Figure 2-4	Eigg Mountain-James River Encumbrances and Holdings ..... 13
Figure 4-1	Mineral Interests Along the Cobequid-Chedabucto Fault Zone (Source: NSDNR)..... 26
Figure 4-2	IOCG Claim Staking on the Cobequid-Chedabucto Fault Zone (Source: NSDNR) ..... 26
Figure 5-1	Select Hiking Trails at Gully Lake ..... 42

## LIST OF APPENDICES

Appendix A	Nova Scotia Wilderness Areas Questions and Answers
Appendix B	Study Methodology
Appendix C	Organisations and Individuals Contacted

## EXECUTIVE SUMMARY

In its 2003 Green Plan, the Province of Nova Scotia committed to designating two new candidate Wilderness Areas within the Gully Lake and Eigg Mountain-James River Crown parcels, in northern Nova Scotia, between Truro and Antigonish. These two candidate areas will add to the province's existing system of 31 protected Wilderness Areas. An important objective of this decision is to secure, for this region of Nova Scotia, the ecological, wilderness recreation and nature tourism benefits and opportunities that can be realised within protected Wilderness Areas.

In order to satisfy the requirements of the Nova Scotia *Wilderness Areas Protection Act*, socio-economic analyses of designating the candidate Wilderness Areas have been conducted. This study presents the results of those analyses. It considers a comprehensive range of social and economic benefits and costs that may be associated with designation, with the ultimate goal of providing decision-makers, stakeholders and the public with the information necessary to support informed discussion and judgement respecting the designation of protected Wilderness Areas within both the Gully Lake and Eigg Mountain-James River Crown parcels.

Designated Wilderness Areas protect examples of Nova Scotia's varied landscapes, native biological diversity, and outstanding phenomena. They provide a protected land-base for scientific research, education, and a variety of recreational and nature tourism-related activities in a wilderness setting, including hiking, canoeing, kayaking, camping, sportfishing, hunting and trapping.

The two new candidate Wilderness Areas are both largely forested, mainly with rolling hardwood and mixed forest hills. The Gully Lake candidate includes headwaters of Truro's Salmon River and several small lakes. The Eigg Mountain-James River candidate includes headwaters of numerous small rivers, including James River and South Rights River, which drain through steep river valleys.

Together, the candidate Wilderness Areas encompass 1% of the land mass of Colchester, Pictou and Antigonish Counties. The Gully Lake candidate area is 3,810 ha in size, or about 83% of the larger Crown block. The Eigg Mountain-James River candidate area is 4,170 ha in size, or about 52% of the larger Crown block.

Designation of the candidate Wilderness Areas at the Gully Lake and Eigg Mountain-James River Crown parcels will involve the loss of commercial forestry values and any mining values that may be associated with mineral rights not yet established (note that existing rights for mineral exploration are honoured under the Act, subject to conditions). In addition to these prohibitions, the activities that may be restricted include the use of snowmobiles on existing trails, and the use of other off-road vehicles (*i.e.*, ATVs).

However, many of the most heavily utilised snowmobile and ATV routes through the Gully Lake Crown land and the Eigg Mountain-James River Crown land lie outside of the candidate Wilderness Area boundaries. Where this is not the case, regionally-significant connector routes may be maintained through some combination of the following: 1) authorisation under the Act; 2) exclusion from designation; and/or 3) developing alternative connector routes that bypass the candidate Wilderness Areas. Available information indicates that some current users may be inconvenienced, but will have alternate routes available. Thus, the actual impacts on vehicle users associated with designation are predicted to be small.

With designation of both candidate Wilderness Areas, the values that will increase include those associated with:

- Tourism;
- Research and education;
- Naturalists and trekking;
- Existence;
- Climate change mitigation;
- Water regulation; and
- Biodiversity maintenance.

## **1.0 INTRODUCTION**

### **1.1 Wilderness Areas in Nova Scotia**

The planning, designation and management of Nova Scotia's Wilderness Areas are the responsibility of the Department of Environment and Labour (NSDEL). This may be done in partnership with other agencies, and through agreements with non-government organisations. In 1998, 31 areas were designated under the *Wilderness Areas Protection Act* (1998, c.27) (the Act), comprising a total of 285,000 ha of provincial Crown land and representing approximately 5% of the land area of Nova Scotia, or 20% of provincial Crown land. Altogether, about 8% of Nova Scotia is currently protected.<sup>1</sup>

With release of its Green Plan in June, 2003, the Province committed to designating two new candidate Wilderness Areas within the Gully Lake and Eigg Mountain-James River Crown parcels, in northern Nova Scotia, between Truro and Antigonish. These two new candidate areas will add to Nova Scotia's existing system of 31 protected Wilderness Areas. An important objective of this decision is to secure, for this region of Nova Scotia, the ecological, wilderness recreation and nature tourism benefits and opportunities that can be realized within protected Wilderness Areas.

Under Section 15(4) of the Act, before the designation of a Wilderness Area, "...a socio-economic analysis of the impact of designation of a wilderness area shall be prepared for every wilderness area designated on Crown land after this Act comes into force...". This analysis is to be completed and made available to the public before a new designation is made. In order to satisfy this requirement, socio-economic analyses of designating the candidate Wilderness have been conducted. This study presents the results of those analyses. It considers a comprehensive range of social and economic benefits and costs that may be associated with designation, with the ultimate goal of providing decision-makers, stakeholders and the public with the information to support informed discussion and judgement respecting the designation of protected Wilderness Areas within both the Gully Lake and Eigg Mountain-James River Crown parcels.

The Act provides the legal framework for establishing, managing, protecting and using Nova Scotia's designated Wilderness Areas. The Act's primary objectives are to protect natural processes, biological diversity and outstanding natural features. The secondary objectives are use related. Activities such as wilderness recreation, nature tourism, environmental education and scientific research are encouraged. Sport fishing and traditional patterns of hunting and trapping are also generally permitted.

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<sup>1</sup> This includes Wilderness Areas, Nature Reserves, Provincial Parks, National Parks, National Wildlife Management Areas, and areas protected by non-government conservation groups.



Commercial resource development, such as forestry and road development, is not permitted in a Wilderness Area. Mineral exploration and mining is not permitted, except where pre-existing, valid mineral rights are held. Where this is the case, activities associated with mineral exploration and/or development may be conducted, subject to standard environmental approvals, and under the terms of a licence issued by NSDEL. New exploration licenses will not be issued.

Vehicle and bicycle use is generally prohibited in Wilderness Areas, but may be permitted in limited circumstances, as outlined in the Act. Snowmobiles may be permitted on designated and managed routes, and other vehicle access may be permitted by a licence in specific circumstances. As an interim measure, motorboat use is generally permitted in Wilderness Areas by individuals with a valid fishing licence for the purpose of sport fishing. Final recommendations of Voluntary Planning's Off-Highway Vehicle Task Force, now underway, may result in changes to permitted off-highway vehicle use (*e.g.*, snowmobiles, ATVs) in Wilderness Areas.

A number of other activities are also prohibited, except in certain circumstances, as outlined in the Act. For example, trails and related structures for wilderness recreation may be built and maintained within Wilderness Areas, if approved under the Act. As well, camping is encouraged, but must abide by certain standards to minimise environmental impacts. Appendix A provides more information on common questions regarding Wilderness Areas.

## **1.2 Socio-economic Analysis of Wilderness Areas**

What is a socio-economic analysis of a candidate Wilderness Area? As a first step, socio-economic analyses generally seek to describe the current conditions of the study area, which may include documenting:

- The characteristics of the land use activities (*e.g.*, types of land use activities, land management, frequency and extent of land use, use patterns);
- The characteristics of the user groups (*e.g.*, distinct types of users, linkages between user groups and communities);
- The economic value of the current uses of the land (*e.g.*, the gross output and/or value added to the economy from forestry, mining, tourism, and recreation);
- The social, cultural and heritage values associated with the land; and
- Ecosystem service benefits provided by the area (*e.g.*, regulation of climate, atmospheric carbon sequestration, maintenance of biodiversity, *etc.*).

Having such information is often critical to making good decisions regarding the appropriate designation of a protected area and the development of effective and socially accepted management plans.

In similar studies, a great deal of interest has focused on quantifying the economic values involved. A more traditional approach would be to examine more narrowly the commercial activities that use the land in question. This may typically include a description of the commercial revenues generated, the value added to the larger economy by the activities (GDP impact), and the direct and indirect employment.

Alternatively, one can broadly examine a more complete range of social values associated with the environment, working towards the development of a full accounting of the potential costs and benefits of designation. This means focusing not only on commercial uses, but also on the values that can be attributed to recreational uses, hunting and fishing, education and research (also known as information values), ecological services (*e.g.*, biodiversity maintenance, sequestration of atmospheric carbon dioxide, maintenance of water quality) and the existence of the protected area (*i.e.*, the values that people have for an area simply from knowing it exists, although they may never actually use the area). For a given study, the choice of which values to examine is driven by the specific policy needs for the study, and the socio-economic and environmental context of the study site.

Descriptions of these various values can be monetary, quantitative (but non-monetary), or qualitative. Quantitative measures are thought to be desirable because they are perceived to be more objective than qualitative descriptions. Monetary estimates, if they can be reasonably made, are particularly useful in that they permit a direct comparison of different values using the same measure (*i.e.*, dollars). However, there are limitations to placing numerical significance on many types of values, particularly social, cultural and heritage values for which there are no meaningful quantitative measures readily available (Glicken 2003). In particular, the use of monetary estimates may assume the substitutability of natural, social and economic values, whereas it has been argued that some values are not substitutable and, in the case of ecological services, may not be replaceable at all (*e.g.*, Ekins *et al.* 2003). Qualitative evaluation should, therefore, be incorporated to provide context and a deeper understanding of the values of individuals and communities.

Once the current values of the study area are described, the next step is to examine how these values may be impacted with the designation of the candidate Wilderness Area. Changes in the management and regulatory regime associated with the designation of a new protected area may result in substantial changes to the benefits that are received from the land. The prohibition or exclusion of certain activities within a new protected area will result in the loss of the benefits associated with those uses. Restrictions in the level of other activities may also lead to a reduction in benefits, although, in the long-term, it is possible that these can be offset by increases within a broader regional context. The exclusion or restriction of some activities may also result in an increase in the benefits associated with other

competing activities. For example, a reduction in the use of an area for forestry may ultimately lead to an increase in recreation benefits or ecosystem service benefits.

In short, there are socio-economic trade-offs and interdependencies that must be considered in making decisions regarding the management of the land. However, the results of this study should not be reduced to a cost-benefit analysis that is, in turn, used as the basis for a designation decision. As outlined in Section 1.1, the purpose of Wilderness Area designation is to help meet provincial environmental objectives that include maintaining ecological integrity and biodiversity, protecting representative examples of natural landscapes and ecosystems, and protecting natural features and phenomena, while also providing a protected land base for wilderness recreation, nature tourism and other low-impact uses. A candidate Wilderness Area is initially identified based on the ability of the area to help achieve these objectives.

In this context, the role of the socio-economic analysis is to provide information on the costs and benefits associated with designation so that there is a more complete level of knowledge regarding the impacts. Using this information, decision-makers can proceed with designation, with or without mitigation measures; or, if they believe that the socio-economic costs are too high, they can decide not to designate an area. Compensatory interventions may also be considered, so that losses associated with reduced activities in a designated area may be replaced by increased activities elsewhere. If an area is designated, decisions must also be made regarding those activities that are restricted but may be permitted. The results of the socio-economic analysis help identify those activities that have particular importance.

### **1.3 Project Scope and Objectives**

In order to satisfy the requirements of the Nova Scotia *Wilderness Areas Protection Act*, socio-economic analyses of designating Wilderness Areas within both the Gully Lake and Eigg Mountain-James River Crown parcels have been conducted. This study presents the results of those analyses. It considers a comprehensive range of social and economic benefits and costs that may be associated with designation, with the ultimate goal of providing the necessary information to support decisions regarding the designation and management of the land parcels in question. The study methodology is described in Appendix B. Existing documents and available secondary data were the primary sources of information within the limited scope of this study. However, in order to collect necessary site-specific information, a number of interviews were conducted with stakeholders. Those contacted and asked to provide information are listed in Appendix C. Consistent with the Act, the study is being made available to the public as part of a public consultation program.

The evaluation and conclusions contained in the study are based on an interpretation of conditions revealed through investigation and research within a defined scope. The results are necessarily limited by the information that was available. However, this study does provide the necessary detail to serve as

a basis for making informed decisions on the designation and management of Wilderness Areas within the Gully Lake and Eigg Mountain-James River Crown parcels.

On June 28, 2004, NSDEL released a draft of this final report to the public and stakeholders, coinciding with the launch of a public consultation process on the planned designation of the candidate Wilderness Areas. Individuals and organizations were given the opportunity to provide comments on the draft report. Some organizations were contacted directly to notify them of the opportunity for input. The consultation period ended on August 13, 2004. All comments received were subsequently reviewed by Jacques Whitford. The final report is available from the internet site of NSDEL ([www.gov.ns.ca/enla/pareas/gullyEigg.htm](http://www.gov.ns.ca/enla/pareas/gullyEigg.htm)) or by calling: (902) 424-2117.

## **2.0 THE STUDY AREAS**

### **2.1 History of the Study Areas**

The Province of Nova Scotia's commitment to establish a comprehensive system of parks and protected areas in Nova Scotia reflects, in part, a growing realisation that natural areas continue to shrink in number and size as land development and resource use expands (NSDNR 1994). This realisation is now expressed in a number of national and international protocols and targets to respond to the Brundtland Commission's recommendation that 12% of bio-productive area be protected for biodiversity preservation (Brundtland 1987). As well, all provincial governments in Canada signed on to the Endangered Spaces Campaign, a World Wildlife Fund initiative to ensure the completion of a network of all Canada's landscape and habitat types to ensure that areas are conserved.

In the early 1990s, the Province began conducting a review of all Crown lands as part of a parks and protected areas system planning process (NSDNR 1994; NSDEL 2001a). The Eigg Mountain-James River and Gully Lake Crown parcels were not assessed at this time because of established forest access roads and because the process initially focused on intact natural areas greater than 2,000 ha in size. As a result, no candidate areas were identified for wilderness protection designation in the northern portion of Nova Scotia's mainland.

By October 1999, there was increasing interest among stakeholder groups to consider establishing protected areas in the Pictou-Antigonish-Colchester counties. The Eigg Mountain-James River area and Gully Lake were suggested for consideration to be designated Wilderness Areas. In 2001, preliminary assessments were conducted on the areas to establish the environmental values (*i.e.*, ecological characteristics, representation, watershed values, outstanding natural features, and wilderness recreation values). In June, 2003, the Province committed to designating new candidate Wilderness Areas within the Gully Lake and Eigg Mountain-James River Crown blocks. Further to the Act's stipulations, a socio-economic analysis for the candidate areas was undertaken.

## **2.2 Gully Lake**

### **2.2.1 Geographic Location**

The Gully Lake Crown land parcel is located northeast of the town of Truro (population 11,457), and southwest of the towns of New Glasgow (population 9,432), Trenton (population 2,798), Stellarton (population 4,809) and Westville (population 3,879) (Figure 2-1). It is located on the Colchester and Pictou County lines and is approximately 4,600 ha in size. Within this parcel, 3,800 ha are in relatively natural condition, and approximately 800 ha have, in recent years, been actively utilised for commercial forest harvesting and related management activities (NSDEL 2001b).

**Figure 2-1 Gully Lake Candidate Wilderness Area**

The parcel has a number of abutting properties, with a total of 64 individual properties immediately adjacent to the Crown lands (Nova Scotia Geomatics Center 2003). Of these sites, 49 are owned by private individual landowners, 11 are owned by Kimberly-Clark Inc., and the remaining four properties are registered under private business names.

The candidate Wilderness Area within the Gully Lake Crown land is 3,800 ha in size, comprising approximately 83% of the Crown block (Figure 2-1). This represents about 0.6% of the land area of Pictou and Colchester counties together.

### **2.2.2 Physical Description**

The Gully Lake Crown parcel is predominantly within the Cobequid Mountain Natural Landscape, which is a mixed forest type landscape consisting of very broad, flat topped to gently rounded individual deciduous hills surrounded by coniferous undulating terrain and stream valleys (NSDEL 2001b). It has a linear drainage pattern and includes the headwaters of many rivers. A smaller portion of Gully Lake is in the area of the Central Rolling Hills Natural Landscape, characterized by an elevated series of rolling hills and undulating terrain supporting Acadian mixed forest types. The upper reaches of the Salmon River flows through the Gully Lake Crown land. Elevations range from 135 m (450 ft) in the vicinity of the Salmon River, to more than 305 m (1,000 ft) on some of the hilltops (NSDNR 2004a). The headwaters of the River John flow northerly to the Northumberland Strait from the area, and the Salmon River flows southwesterly to the Minas Basin.

### **2.2.3 Encumbrances and Holdings**

Within the Gully Lake area, there are licence agreements to use Crown lands (Figure 2-2). StoraEnso Inc. has a 50-year license and management agreement for harvesting wood and carrying out forest management, including silviculture (NSDEL 2004b). There is also an area along the Salmon River in Colchester County that is part of a 10-year wood volume agreement with J.D. Irving Inc. A section of the licensed 104 Snowmobile Trail also crosses through the Crown lands (Figure 2-2).

Within the Gully Lake Crown block, there have been 16.5 km of usable roads constructed mainly related to forestry operations (*e.g.*, access roads). These roads include the Kemptown Road, Mount Thom Road, and a number of additional access roads constructed to facilitate forest management activities.

**Figure 2-2 Gully Lake Encumbrances and Holdings**



There are a number of mineral interests. Three small portions of pre-existing mineral licenses lie within part of the Gully Lake candidate Wilderness Area. Two of the portions are held by Scott Grant (totalling about 50 ha), while the third is held by Avard Hudgins (totalling about 55 ha) (NDSEL 2004b).<sup>2</sup> These licensed areas are part of extensive mineral interests in the area based on potential iron-oxide-copper-gold (IOCG) class of deposits in and around Mount Thom and extending towards the southeast (Avalon Ventures Ltd. 2003; Candor Ventures Ltd. 2003).

In addition to these licensed Crown lands, there is one rudimentary camp that exists in the area. In the late 1990s, under the authority of NSDNR, it was built for Willard Kitchner MacDonald (also called “the Hermit of Gully Lake”) (O. Maass, Pers. Comm., 2004; Redwood 2000; MacLean 2000). This camp is a very basic building structure located on the north side of the forest access road. No other campsite leases exist within the Gully Lake Crown parcel.

## **2.3 Eigg Mountain-James River**

### **2.3.1 Geographic Location**

The Eigg Mountain-James River Crown land is located in the Pictou-Antigonish Highlands Natural Landscape, northwest of the Town of Antigonish (population 4,754), and northeast of the towns of New Glasgow (population 9,432), Trenton (population 2,798), Stellarton (population 4,809) and Westville (population 3,879) (Figure 2-3). It is approximately 7,950 ha in size, of which 1,280 ha have, in recent years, been actively utilised for commercial forest harvesting and related management activities, and 6,600 ha are relatively undisturbed, natural area (NSDEL 2001a). The majority of the land lies within Antigonish County, with a small portion of the western edge lying within the Pictou County delineation (NSDEL 2001a).

The Eigg Mountain-James River Crown block has a large number of abutting properties, with a total of approximately 230 individual properties being immediately adjacent (Nova Scotia Geomatics Centre 2003). Of the non-Crown holdings in the central portion, a large number are held by the Town of Antigonish (11) as part of the watershed that supplies municipal water to the community, with the others being held by Aliant Telecom and private landowners.

The candidate Wilderness Area within the Eigg Mountain-James River Crown land is 4,170 ha in size, comprising approximately 52% of the Crown parcel (Figure 2-3). This represents about 1% of the land area of Pictou and Antigonish counties together, or 2.8% of Antigonish County alone.

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<sup>2</sup> In addition to the existing mineral rights, an application for a special mineral exploration license has been made to NSDNR that represents an additional area of overlap with the candidate Wilderness Area. A special license can be granted for a closure, such as the Gully Lake candidate Wilderness Area. As of the date of this report, the special license has not been granted.

**Figure 2-3 Eigg Mountain-James River Candidate Wilderness Area**

### **2.3.2 Physical Description**

The Eigg Mountain-James River Crown land parcel reflects the typical landscape found in the Pictou-Antigonish Highlands Natural Landscape, which consists of upland areas of rolling hills dissected by steep-sided ravines and gullies. Rivers and streams are abundant, while lakes, ponds and wetlands are less common. A smaller portion of the Crown parcel falls within a coastal natural landscape, which consists of smaller hills and undulating terrain on the Northumberland coast.

Biophysical elements of interest in this area include the potential for the development of old-growth forest and the inclusion of several watersheds. The area contains large areas of forest between 21 and 60 years of age, and a considerable number of large, uneven-aged stands. The area is a landscape where old-growth forests could recover and develop with undisturbed interior forest conditions, thereby restoring habitat for old growth-dependent species of flora and fauna. For example, a critical component of the habitat for many old growth-dependent animals is natural or excavated cavities that occur in large-dimension dead snags, in large living trees with heart-rotted interiors or in logs on the forest floor. The Eigg Mountain-James River Crown land also encompasses the headwaters of several watersheds including a portion of the James River Protected Watershed, which supplies water to the Town of Antigonish (Figure 2-3).

### **2.3.3 Encumbrances and Holdings**

Approximately 7,800 ha or 97% of the Eigg Mountain-James River Crown block is under a forest management license to StoraEnso Inc. (Figure 2-4) (NSDEL 2004a). There is also a site leased to a telecommunications company (Aliant Telecom), with right-of-way for access to the site off the Browns Mountain Road. A communications tower is located on the site. Nova Scotia Power holds a right-of-way for a power line that parallels the Browns Mountain Road from the east, and then continues west across three fingers of the Crown land. There was also a portion of land formerly licensed to Devon Canada Corporation for petroleum development under their exploration agreement for 191,381 ha spanning part of the Eigg Mountain-James River Crown area and a large portion of Antigonish County. This license has since lapsed (NSDEL 2004a) (H. Radomsky, Pers. Comm., 2004).

The Eigg Mountain-James River Crown block also spans 2,347 ha or 61% of the 3,859 ha James River Protected Water Area. The Town of Antigonish obtains drinking water from this area (Figure 2-4) and owns a central portion, consisting of 1,146 ha or 30% of the drinking water supply area. The Town's lands are surrounded by the Crown parcel. This watershed provides the main drinking water supply for the area. In addition, there are three additional privately owned land parcels near Eigg Mountain enclosed within Crown parcels (Figure 2-3) (NSDEL 2001a).

**Figure 2-4 Eigg Mountain-James River Encumbrances and Holdings**

### 3.0 IDENTIFYING THE VALUES

There are a number of frameworks that can be used to describe the values attributable to the environment or to parks and protected areas. Most essentially contain the same or similar elements, but the values are categorised differently. For example, the Federal Provincial Parks Council developed a framework for estimating the benefits of parks and protected areas that includes personal benefits (the benefits accruing to stakeholders), commercial benefits as measured by economic impacts, and what it terms societal benefits (benefits through the “public good” characteristics of the site in question, including, for example, benefits from biodiversity, water production, and scientific and educational benefits) (The Outspan Group 2000).

Environmental or ecological economists tend to use a somewhat different categorisation (*e.g.*, Pearce and Turner 1990; Phillips 1998; Turner 1999; Pearce *et al.* 2002). A distinction is usually made between direct use values, indirect use values, and non-use values. Direct use values include those from direct use of the land, including recreation, tourism, natural resource harvesting, hunting and fishing, and education and research. These uses can be commercial or non-commercial. Non-commercial uses of the land are not captured by traditional measures of economic activity (such as GDP). Indirect use values focus on the services provided indirectly to people by ecosystems, including such things as maintenance of water quality, creation of soil, and maintenance of biodiversity. Non-use values, also known as existence values, are the values that people have for an area simply from knowing that the ecosystem exists in a given state or condition, regardless of whether there is actual or potential use of that environment.

Although rooted in economics, these categories are useful to use in identifying and describing the various values. This is true whether or not monetary, quantitative (but non-monetary) or qualitative information is used in the socio-economic analysis. Wilson and Colman (2001) employed a similar approach in an effort to fully account for the values associated with the forests of Nova Scotia.

Note that the above approaches are inherently anthropocentric. That is, there is no accounting for any possible intrinsic values of biodiversity. As this study is a socio-economic analysis and not an assessment of the independent ecological values, any values unrelated to humans will not be considered further. In other words, the analysis will identify only those values that contribute directly or indirectly to human welfare (see Bockstael *et al.* 2000).

A categorisation of the socio-economic values is presented based on a review of the literature (*e.g.*, Loomis and Richardson 2000; Krieger 2001) and consideration of the specific characteristics of the Gully Lake and Eigg Mountain-James River Crown parcels (Table 3-1). Those most appropriate for use

in an analysis of the impacts of Wilderness Area designation in this context were selected. In particular, selection of the most appropriate categories considered:

- The types and characteristics of the personal and commercial uses of the study areas;
- The biophysical characteristics of the environment;
- The types of indirect use and non-use values that can be anticipated based on the characteristics of the environment and the relationship of the environment to humans and communities; and
- The technical characteristics of the available socio-economic studies in the literature from which value estimates may be applied.

<b>Value Category</b>	<b>Values</b>
<b>Commercial Values (direct use)</b>	Forestry
	Mining
	Tourism
	Research and Education
<b>Individual Values (direct use and non-use)</b>	Vehicle Uses
	Fishing
	Hunting and Trapping
	Other Recreational Uses
	Existence Values
<b>Ecosystem Service Values (indirect use)</b>	Climate Change Mitigation
	Water Regulation
	Biodiversity Maintenance
Note: Vehicle uses include snowmobiles, ATVs, and other off-road vehicles. Other recreational uses include wildlife viewing, hiking, camping, cross-country skiing, canoeing and boating.	

*Commercial values* are values directly attributable to economic production that use the natural resources in the study area. The commercial activities in the Gully Lake and Eigg Mountain-James River Crown parcels include forestry, mining, tourism, and, to a more limited extent, research and education.<sup>3</sup>

*Individual values* are those values that occur directly to individual users, and for which there is no direct commercial sale for the use itself. This includes outdoor recreation involving the use of motorised vehicles (snowmobiles, ATVs, and other off-road vehicles), fishing, hunting and trapping, and other outdoor recreational uses (such as walking, canoeing, kayaking and cross-country skiing). Also included as an individual value are existence values. These include personal spiritual and psychological values where there is no actual use of the environment. People may hold values for particular natural

<sup>3</sup> A power transmission line and Aliant Telecom communications tower within the Eigg Mountain-James River Crown parcel are both excluded from the candidate Wilderness Area. Operation of this infrastructure should not be affected by designation and, thus, will not be considered further in this report.

areas simply because they know they exist, even though they do not visit or use the land in question. Within this latter category is also included the value that current generations have for conserving natural environments for future generations (*i.e.*, known as bequest values).

*Ecosystem service values* measure the importance of the indirect role of the environment to providing valued ecological services to humans. These include, in particular, climate change mitigation (*e.g.*, the carbon sequestration function performed by trees, thus offsetting greenhouse gas production), regulation of water (*e.g.*, management of water flows across landscapes to prevent extreme flow events that can cause flooding and soil erosion, and maintenance of water quality in streams and lakes), and biodiversity maintenance (*i.e.*, helping to ensure the diversity of plant and animal life that contributes to a well-functioning ecosystem and, in turn, supports many commercial and individual values).

It is important to note that the ecosystem service values described in this study are not complete. There are a number of ecosystem service functions for which we cannot provide reasonable estimates or describe because the available information is not sufficient. However, by focusing on climate regulation, water regulation and biodiversity maintenance, the critical values, for which there is information available, are described. In addition, those three key sets of ecosystem values may serve as proxies for other ecosystem service functions not included here. For example, effective water regulation by forests will, in general, also mean that soil erosion is prevented.

There are other categories of values that have been identified in the literature, but are not distinguished in the approach taken for this study (Table 3-1). For example, the impact of greenspace on property values has been addressed in other studies. However, the research that has been conducted to date has been primarily concentrated within urban or residential development areas, and impacts have been shown to be specific to location, the type of land development in question, and market conditions. Given the state of knowledge, it is not possible to examine the property value issue, as adjacent property values can increase or decrease, depending on a number of factors. The positive value of health impacts associated with the use of parks and protected areas has also, to a limited extent, been addressed in the literature. Again, limits to the state of knowledge and the amount of secondary information available for the Gully Lake and Eigg Mountain-James River areas prevents a reasonable examination of these values within the scope of this study.

## 4.0 COMMERCIAL VALUES

### 4.1 Forestry

Within the Province of Nova Scotia, growth in the forestry industry over the last decade exceeding that of all other industries in Nova Scotia (APEC 2003). 2001 unemployment rates were at an all-time low for the industry at 12.5%; however, this rate is high among other industries in Nova Scotia (APEC 2003). In 2001, the forestry industry in the Province directly accounted for approximately 2.8% of all employment, or about 12,000 jobs. Of those, approximately 4,300 individuals were employed in the primary forestry industry (*i.e.*, logging), 4,000 in wood products, and 3,700 in pulp and paper (APEC 2003). Overall contribution of the forestry sector to the economy averaged about 2.4% of provincial GDP throughout the 1990s, or a total of about \$450 million in 1998 (APEC 2003).

Regionally, total employment in forestry and forest product industries accounted for approximately 4.9% of those employed in the County of Colchester, 5.8% in the County of Pictou, and 2.7% in the County of Antigonish. The number of jobs in logging alone is approximately 520 in Colchester, 525 in Pictou, and 240 in Antigonish (APEC 2003).

During consultations related to the establishment of Wilderness Areas, several concerns and issues have been expressed by forestry industry stakeholders with respect to forestry values. Among these include:

- The belief that Nova Scotia cannot afford to forgo the economic benefits of forestry by designating Wilderness Areas given the limited wood supplies (NSDNR 1995).
- The concern that designation of additional Wilderness Areas and the removal of additional forestry land currently under license will negatively influence the ability of forestry companies to provide for timber and other values as described by established forestry management plans (Stora Enso Port Hawkesbury Ltd. 2004).
- The view that some of the lands in Gully Lake and the Eigg Mountain-James River areas represent hardwood particularly valuable to the forestry industry. The Gully Lake Crown land is approximately 90% reconveyed to the Crown, having been purposely purchased or obtained in land trades in an effort to consolidate land to support the forest industry (NSDNR 2004b). Similarly, the Eigg Mountain-James River Crown land is approximately 80% reconveyed.



- Concern that the process of designating Wilderness Areas is inconsistent with the results of NSDNR's Integrated Resource Management (IRM) planning process. Both the Gully Lake and Eigg Mountain-James River areas have been classified under the IRM planning process as Crown lands with predominantly C2 classification. This means that they are considered, under that process, to be lands with recognized special values that can be accommodated in conjunction with other resource sector uses, as long as they are planned in such a way "as to protect the integrity of predominant values" (NSDNR 2001).

#### **4.1.1 Gully Lake**

*"During the 1930's my father and many others of his generation spent their winters in the logging camps of what was known as the 'Big Woods' in the Gully Lake area"*

Shunpiking Magazine (2000)

NSDNR defines approximately 97% of the Gully Lake Crown block as productive forest land, with less than 3% of the block considered unproductive (NSDNR 2004b). Approximately 50% of the total area of Gully Lake is classified as hardwood cover type. The majority of these stands are 40 to 60 years old (NSDNR 2004b). Sugar maple, yellow birch, and beech hardwood forest is present on most hill slopes. The growth potential of hardwood forests is more limited on the upper elevations where damage is caused by winter weather (NSDNR 2004a). Many stands of uneven age are located along stream gullies and other linear depressions and lower areas (NSDEL 2001b). Mountain maple, striped maple and hobblebush are common understory species in these hardwood stands.

On the land currently unlicensed, the estimated total merchantable hardwood volume in the Gully Lake Crown block is 358,739 m<sup>3</sup> (NSDNR 2004b). The hardwood growth rate is estimated to be 2.8 m<sup>3</sup>/ha/year, and up to 3.5 m<sup>3</sup>/ha/year if intensely managed. The remainder of stands in the area, which covers approximately 1,200 ha of the Crown block, is softwood stands less than 60 years old, some of which is within plantations. The softwoods in these areas include balsam fir, red spruce, and black spruce. The estimated total merchantable volume of softwood in the Crown block is 189,845 m<sup>3</sup> (NSDNR 2004b).

Forest on the Crown land parcel at Gully Lake is of particular interest to the forestry industry as it is an area of tolerant hardwoods, which have a potential greater economic value than other wood (D. Eidt, Pers. Comm., 2004). NSDNR has been limiting private access to the area in recognition of this resource with the intention of harvesting it in the future (D. Eidt, Pers. Comm., 2004). There is an interest from local sawmills who desire tolerant hardwood.

## Licences

There are two forest licence agreements that overlap with portions of the Gully Lake Crown block. These include Stora Enso's licensed agreement for harvesting and silviculture on approximately 882 ha in the northeast portion of the block, and JD Irving's sawmill licensing agreement for harvesting and silviculture for an area of approximately 439 ha on the southwest portion of the block (NSDNR 2004b). In addition, there are several research sites established by the NSDNR in the centre of the site. Forestry-related activities that have been undertaken in the Gully Lake area in the last 10 to 15 years represent expenditures of over \$300,000 over that time, and include (NSDNR 2003; NSDNR 2004b):

- Harvesting;
- Weedings;
- Pre-commercial/commercial thinning (*e.g.*, commercial thinning for hardwoods);
- Plantations (*e.g.*, development of several plantations for red spruce and Norway spruce); and
- NSDNR Forest Research Section Test Plots (*e.g.*, hardwood spacing and fertilization trials since 1978 on the northern half of the block).

JD Irving's licence for the land is a 10-year Wood Volume Agreement with the Province of Nova Scotia which allows the company to manage the Crown land for harvesting purposes and operate on a yearly volume allocation (K. Larlee, Pers. Comm., 2004). This agreement began in the 1970s and was up for renewal on June 1, 2004.

Stora Enso is the major licensee of Crown lands in eastern Nova Scotia. Under the Crown License Agreement, the company has the right to carry out harvesting, forest management and road building activities. The term of the license is 50 years, renewable every 10 years (last renewed in July, 2002) (Stora Enso Port Hawkesbury Ltd. 2004). The Gully Lake Crown land represents approximately 0.2% of the operable defined forest area (DFA) under Stora Enso's licence (Stora Enso Port Hawkesbury Ltd. 2004).

Stora Enso has a developed and approved long-term forest management plan for their license that includes the Gully Lake area. This is a component of the certification received under Canadian Standards Association (CSA) Z809-96 and A.F. and P.A. Sustainable Forestry Initiative (Stora Enso Port Hawkesbury Ltd. 2004). Their approved long-term plan for the area includes a number of practices that are designed to reflect the recognised special features of the area. This involves planning around view and recreation issues, old forests, municipal watersheds, riparian zones, and steep slopes (Table 4-1).

<b>Table 4-1 Stora Enso Forest Practices in the Gully Lake Crown Parcel</b>	
<b>Special Feature and/or Recognised Value</b>	<b>Intended Practice</b>
View and Recreation	No more than 30% of productive forest to be clear-cut, and logging designed to minimise negative aesthetic effect.
Old Forest	Work towards meeting the eco-region objective of maintaining at least 8% of old forest condition.
Riparian Zones	Meet or exceed provincial regulations for a minimum 20 m buffer zone.
Source: Stora Enso Port Hawkesbury Ltd. (2002)	

### **Forestry Values of the Gully Lake Candidate Wilderness Area**

As stated previously, the candidate Wilderness Area within the Gully Lake Crown land is 3,800 ha in size, comprising approximately 83% of the Crown block (Figure 2-1). Excluded from the candidate Wilderness Area is approximately 800 ha of land currently under license to Stora Enso and Irving. This leaves approximately 520 ha of forest land currently under license and 3,280 ha unlicensed that is to be included within the candidate Wilderness Area.

Based on the total hardwood area not under license agreements to Stora Enso or Irving within the Gully Lake candidate Wilderness Area (approximately 2,350 ha), the following are estimates of the annual economic value of the forest land currently not under licence (NSDNR 2004b). In the first scenario, we will assume that there is no silviculture (*i.e.*, natural growth). Under this condition, the growth rate is estimated at 2.8 m<sup>3</sup>/ha/yr. Assuming industry prices for a typical product mix (5% veneer, 30% sawlog and 65% pulpwood), the annual value of the roundwood is \$178,000 (2004 dollars) for roadside sale.<sup>4</sup> In the second scenario, we will assume that there is silviculture. Under this condition, the growth rate is estimated at 3.5 m<sup>3</sup>/ha/yr. This corresponds to an annual value of \$222,600 for roadside sale. Thus, total potential annual forestry revenues from the unlicensed Crown land for hardwood harvest is estimated at \$178,000 to \$222,600. This corresponds to a present value (*i.e.*, the current gross revenue value of the future harvest stream) of approximately \$2,967,000 to \$3,710,000 (assuming a 6% discount rate).

To this estimate, we must add the value of unlicensed softwood areas and the value of the current Crown land under license to Stora Enso and Irving that would become part of the candidate Wilderness Area. Based on information received from Stora Enso Port Hawkesbury Ltd. (2004), and extrapolated to include the Irving block, the estimated present value of the harvest from these licenses is \$804,000 (assuming a 6% discount rate) at current prices. The timber supply model used to derive this estimate from Stora Enso considers information regarding the age class and cover type for the Gully Lake license area, and an 80-year planning horizon for all harvests directly linked to the Gully Lake Crown land as defined by the approved long-term forest management plan (Stora Enso Port Hawkesbury Ltd. 2004). This assumes that forest harvests follow the intended practice as described in Table 4-1.

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<sup>4</sup> Note that this estimate also includes a 40% reduction in the volume productions to account for requirements under regulation, guidelines, and the IRM objectives.

Using information provided separately by NSDNR (2004b) and Stora Enso Port Hawkesbury Ltd. (2004), the gross present value for the harvest of land in the Gully Lake candidate Wilderness Area averages approximately \$1,563/ha assuming silviculture and retention of land in accordance with long-term forest management plans, guidelines and regulations.<sup>5</sup> If we further assume that net values (producer surplus or “profit”) is approximately 22% of gross, then the net present value (NPV) is approximately \$344/ha.<sup>6</sup> Applying these values to the whole 3,800 ha of land within the candidate Wilderness Area, the total gross present value of forest harvests is approximately \$5,939,000, and the NPV is approximately \$1,307,000.<sup>7</sup>

#### **4.1.2 Eigg Mountain-James River**

Resource management in the Eigg Mountain-James River area is a challenge because of the fragmented nature of many parcels of Crown land and the number of small private land owners (NSDNR 2004a). The majority of the Eigg Mountain-James River area is dominated by shade tolerant hardwoods, with a smaller portion being climax coniferous species (predominantly red spruce and white spruce, with some balsam fir, eastern hemlock and white pine) and mixed wood (NSDEL 2001a). The distribution of forest by age-class within the Eigg Mountain-James River Crown land indicates that only few small parcels of land in the region support even-aged forests more than 80 years in age. The majority of the land is within the zero to 20-year age class. There is a considerable amount of forest classified as uneven-aged, some of which may be old and dominated by climax species (NSDEL 2001a). Cutting in the area has been limited in recent years and centred on the few existing roads in the parcel of land.

During the provincial IRM process, a 1,432 ha block of land – of what is now included in the candidate Wilderness Area – was categorized as C2 old growth. The area was identified with the NSDNR’s Old Forest Policy as being an area in relatively steady state which warranted protection (NSDNR 2004a). Given its location and current stand age class, NSDNR’s IRM team concluded that the Eigg Mountain-James River area is the only area left in Antigonish County that could adequately satisfy a significant portion of the old growth commitments for the ecoregion (NSDNR 2004a).

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<sup>5</sup> The NSDNR estimate is an average of \$1,579/ha, while the Stora Enso estimate is \$1,546/ha. Note that these estimates are very close, despite the different approaches taken. The Stora Enso harvest estimate is based on their timber supply model, while the NSDNR estimate is based on their in-house knowledge of the harvest potential of the area and current market prices.

<sup>6</sup> Stumpage rates are approximately 22% of roadside value which, theoretically, correspond to the land rent. This estimate of producer surplus is also supported by information from the provincial input-output accounts for the forestry sector.

<sup>7</sup> Because specific information was not readily available for unlicensed softwood areas in the Gully Lake candidate Wilderness Area, the gross and net values were estimated as approximately equivalent to the average values (\$/ha) estimated for the licensed areas and unlicensed hardwood areas.

## Licences

Under their Crown License Agreement, Stora Enso has a licence to harvest within the Eigg Mountain-James River Crown block, representing approximately 97% of the total area of the block. The licensed area represents approximately 2% of Stora Enso's operable defined forest area (DFA) under the Crown Licence Agreement (Stora Enso 2004).

The company's forest management plan also applies to the Eigg Mountain-James River lands. As for Gully Lake, it involves planning around view and recreation issues, old forests, municipal watersheds, riparian zones, and steep slopes (see Table 4-2).

<b>Special Feature and/or Recognised Value</b>	<b>Intended Practice</b>
<b>View and Recreation</b>	No more than 30% of productive forest to be clear-cut, and logging designed to minimise negative aesthetic effect.
<b>Old Forest</b>	Work towards meeting the eco-region objective of maintaining at least 8% of old forest condition.
<b>Municipal Watershed</b>	No more than 20% of the watershed to be clear-cut
<b>Riparian Zones</b>	Meet or exceed provincial regulations for a minimum 20 m buffer zone (and a 30 m buffer zone in a municipal watershed area).
<b>Steep Slope</b>	No harvesting on slopes >30%.
Source: Stora Enso Port Hawkesbury Ltd. (2002)	

## Forestry Values of the Eigg Mountain-James River Candidate Wilderness Area

Based on information received from Stora Enso Port Hawkesbury Ltd. (2004), and extrapolating this to apply to the relatively small area of unlicensed Crown land within the candidate Wilderness Area, the estimated potential gross present value of a harvest from all Crown land within the Eigg Mountain-James River candidate Wilderness Area is \$6,805,000 (assuming a 6% discount rate) at current prices, and the NPV is \$1,497,000. This corresponds to an average gross present value of approximately \$1,632/ha, or an average NPV of \$359/ha. The timber supply model used to derive this estimate from Stora Enso considers information regarding the age class and cover type for the region that includes the Eigg Mountain-James River area, and an 80-year planning horizon for all harvests directly linked to the Crown land as defined by the approved long-term forest management plan (Stora Enso Port Hawkesbury Ltd. 2004). This assumes that forest harvests follow the intended practice as described in Table 4-2.

It should be noted that 1,432 ha within the candidate Wilderness Area (or 34% of the area) had been identified as old forest under NSDNR's IRM process. According to NSDNR, this area would only be harvested in limited circumstances. It could be argued that this area should not be counted as lost harvest value with designation of the Eigg Mountain-James River candidate Wilderness Area. However, as this does not constitute legislated protection and circumstances may arise under which harvesting would occur, it is decided to not exclude this area for the purposes of this report.

### 4.1.3 Summary of Forestry Values

Table 4.3 provides a summary of the forestry values for both the Gully Lake and Eigg Mountain-James River candidate Wilderness Areas. The total estimated present value of potential wood harvests for the Gully Lake area is \$5,939,000, and for the Eigg Mountain-James River area is \$6,805,000. These value estimates are gross present values – in other words, they are the total potential revenues that may be received by forestry companies if forestry occurred within the whole of the candidate Wilderness Areas.

<b>Table 4-3 Summary of Forestry Values in the Candidate Wilderness Areas</b>	
<b>Gully Lake</b>	<ul style="list-style-type: none"> <li>• Total estimated gross present value of potential harvest revenues (licensed and unlicensed Crown land) of approximately \$5,939,000, and net present value (NPV) of \$1,307,000.</li> </ul>
<b>Eigg Mountain-James River</b>	<ul style="list-style-type: none"> <li>• Estimated gross present value of potential harvest revenues from all Crown land of approximately \$6,805,000, and NPV of \$1,497,000.</li> </ul>

More appropriate for analysis of the potential impacts associated with designation is an examination of the net present values (NPVs), or potential “profit”, associated with forestry in the candidate Wilderness Areas (see Appendix B for further discussion of the methodology). The total estimated NPV of potential wood harvests for the Gully Lake candidate Wilderness Area is \$1,307,000, and for the Eigg Mountain-James River candidate Wilderness Area is \$1,497,000.

Stora Enso is entitled to compensation for lands withdrawn from their license, the details of which will be subject to negotiations between the Province of Nova Scotia and the company. This cost of this compensation is unknown at this time. This is not an additional cost associated with designation *per se*, but is a distributional effect between the province and Stora Enso.

Limiting access to the forests in the area due to the establishment of a Wilderness Area could be viewed as representing a lost opportunity to the forestry industry. On the other hand, it could be argued that prior over-harvesting and loss of valuable tolerant hardwoods in Nova Scotia represents a current loss to the forest industry. From that perspective, prior depletion of a valuable resource requires present protection in order to restore lost values (*i.e.*, restoration of natural capital assets). In addition, protected areas contribute more broadly to the achievement of existing forest management objectives and commitments.

With respect to the Eigg Mountain-James River Crown block, the regulations respecting the management of activities within the James River Protected Water Area are currently under review by the Town of Antigonish’s James River Stewardship Board, in cooperation with NSDEL. The James River Protected Water Area regulations are established under authority of the *Environment Act*. The new regulations may further restrict or prohibit forestry activities. This is irrespective of the designation of the candidate Wilderness Area. A recent report recommends forest management practices within the Protected Water Area to maintain the existing natural forest types, or that restore old field spruce areas

to the natural forest type, if forestry is permitted (CBCL Limited 2003). If new James River Protected Water Area regulations restrict or prohibit forestry activities, the actual impact on forestry values attributable to the designation of the Eigg Mountain-James River Wilderness Area would be substantially less than that estimated here, as 38% of the candidate Wilderness Area is within the watershed.

## 4.2 Mining

The estimated value of mineral production in Nova Scotia for the year 2001 totalled \$316 million (MacDonald 2003). This included production of gold, coal, gypsum and anhydrite, salt, barite, limestone and dolomite, clay, silica sand, dimension stone, slate, peat moss, and aggregate resources. Provincial employment in the mineral industry totalled 1,988 (MacDonald 2003).

Throughout Nova Scotia, mineral exploration field expenditures in 2002 were approximately \$2.0 million (McCulloch 2003). This compares to \$2.9 million in 2001 and \$3.5 million in 2000. Exploration was reportedly focused on industrial minerals and gold. At the end of 2002, 12,780 claims for all commodities were in effect, covering an area of 206,882 ha or about 3.8% of the Province (McCulloch 2003).

There are a number of concerns and issues that mining industry stakeholders have raised in relation to mining activities and the designation of the two candidate Wilderness Areas.<sup>8</sup> These include:

- The potential for protected area designation to have a negative influence on exploration and mining development investment on the lands adjacent to the study sites, and in other areas of the province. It is the view of some mining industry stakeholders that this could be a detriment to Nova Scotia as it is reportedly experiencing its greatest influx of mining interest since the late 1980s and the greatest increase in interest in base metals since the 1970s (J. O'Sullivan, Pers. Comm., 2004).
- The concern that there may be additional mineral closures related to other protected area designations in addition to the Gully Lake and Eigg Mountain-James River candidate Wilderness Areas (*i.e.*, designation of the two candidate areas is yet another incremental loss of land in the province, and this continues the precedent for future, currently unknown designations) (J. O'Sullivan, Pers. Comm., 2004). Mining industry stakeholders expressed the view that this may make it difficult to raise investment capital (NSDNR 1995).

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<sup>8</sup> Petroleum interests were also examined as part of this study. Devon Canada Corporation has relinquished its holdings in the Gully Lake study area. The NSDNR recognises that Devon still has a petroleum license that overlaps with the Eigg Mountain-James River study area. Devon's current holding in the area is 191,381 ha. The agreement expires on September 15, 2004 (NS Department of Energy 2004). Devon plans to either relinquish this land back to the Crown or assign control of this area to another company (H. Radomski, Pers. Comm., 2004).

- Geological studies have not been completed on the mineral potential of areas before they are designated as Wilderness Areas (A. Hudgins, Pers. Comm., 2004). There is concern that decisions regarding the designation of the candidate Wilderness Areas will occur before possible economic deposits are identified.

#### **4.2.1 Gully Lake**

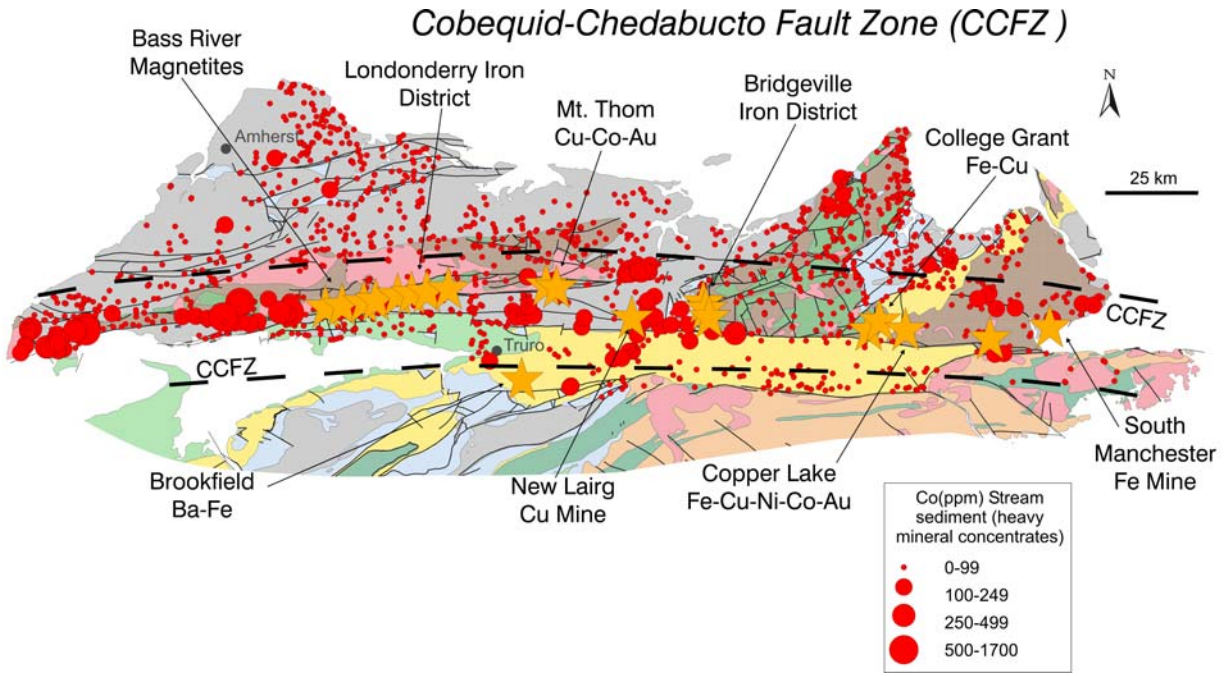
There are existing mineral rights in the southern portion of the Gully Lake Crown block and in the surrounding areas (Figures 2-2 and 4-2). These rights are currently held by a small number of individual prospectors and junior mining companies (some rights have been subsequently optioned to other parties). 50 ha of the Mount Thom property on the southern edge, optioned by Avalon Resources, overlaps with the Gully Lake candidate Wilderness Area. In addition, as noted previously, Avarud Hudgins holds a mineral license area of about 55 ha that lies within the area.

In addition to the existing mineral rights, an application for a special mineral exploration license has been made to NSDNR since the closure, and this area overlaps with a portion of the Gully Lake candidate Wilderness Area. A special license can be granted for the closure, but this would contravene the intention of the current moratorium on new land use commitments for this area. As of the date of this report, the special license has not been granted.

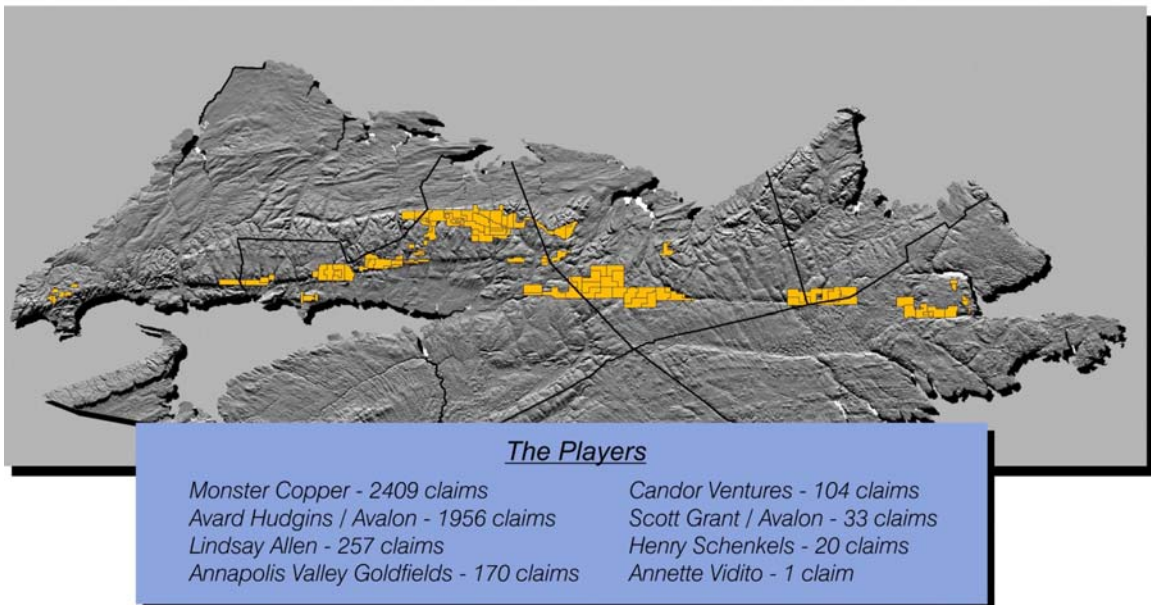
Portions of the Gully Lake Crown block lies on the 300 km Cobequid-Chedabucto Fault Zone that runs from Cape Chignecto to Chedabucto Bay (Figure 4-1). The zone is considered one of the most prominent geological features in the Province of Nova Scotia (NSDNR 1996). Mineral inventory studies carried out near Gully Lake have indicated there is a potential for deposits of the economically important iron-oxide-copper-gold (IOCG) association, which is a diverse family of ore deposits, usually of massive size (O'Reilly 2001). These deposits are similar to those found in Australia's Olympic Dam project, and in other regions including Brazil, Finland and the Yukon (J. O'Sullivan, Pers. Comm., 2004).

The Mount Thom property, which is centred about 2.5 km from the southern boundary of the Gully Lake Crown block (Figure 2-4), has been identified and promoted in the past by the Province of Nova Scotia as a copper-cobalt prospect. It was originally discovered and explored for copper by Esso Minerals in the 1970s (NSDNR 1996; O'Reilly 2001). Within this area, A-type granites have been found during exploration, which are recognised as having potential economic importance because of their relationship as precursors to IOCG deposits (O'Reilly 2001). Exploration rights for the Mt. Thom property have been optioned from a local prospector, Scott Grant of Pictou, by Avalon Ventures Ltd. The area totals approximately 1,230 ha, of which about 50 ha lies within the Gully Lake candidate Wilderness Area. The option includes a commitment by Avalon Resources for \$500,000 in exploration expenditures on the property over four years (Mining in Nova Scotia 2004).





**Figure 4-1 Mineral Interests Along the Cobequid-Chedabucto Fault Zone (Source: NSDNR)**



**Figure 4-2 IOCG Claim Staking on the Cobequid-Chedabucto Fault Zone (Source: NSDNR)**

Several companies have also begun to explore for IOCG deposits elsewhere near the Gully Lake study area. These include Monster Copper Corporation and their joint venture partner, the Wallbridge Mining Company (Figures 2-4 and 4-2). They are looking for mineralization at sites at Copper Lake and Lansdowne (Mining in Nova Scotia 2004). Wallbridge Mining Company is also working with Avalon Ventures to explore for IOCG deposits north of Truro. Under the joint venture agreement, Wallbridge has funded \$50,000 in initial exploration and staking along the Cobequid-Chedabucto Fault line and Monster Copper expects to fund the next \$50,000 worth of work (Chamber of Mineral Resources of Nova Scotia 2003).

Within the Gully Lake candidate Wilderness Area, there are a number of significant magnetic anomalies that could be associated with IOCG mineral deposits (A. Hudgins, Pers. Comm., 2004; J. O'Sullivan, Pers. Comm., 2004). These anomalies were detected by an aerial magnetic survey and have not been subject to systematic mineral exploration (J. O'Sullivan, Pers. Comm., 2004). Fully evaluating the mineral potential of the high magnetic anomalies would take a substantial exploration investment.

If, through mineral exploration activities, an economic deposit is found, a mine must be developed to extract and process the minerals. There are no mine developments in or near the Gully Lake Crown land. All current activity is in exploration by junior mining companies and local prospectors. Economic deposits have yet to be identified in the region.

#### **4.2.2 Eigg Mountain-James River**

There are no mineral rights that overlap with the Eigg Mountain-James River study area. The research for this study failed to identify specific exploration interests. This region of Nova Scotia does, however, have general potential for zinc deposits, but there has been no notable exploration in the area from which an assessment of the mineral potential can be provided.

#### **4.2.3 Summary of Mining Values**

Within the Province of Nova Scotia, individual prospectors and junior mining companies are active in exploration activities. If and when a promising mineral deposit is located, these smaller operators typically option the mineral rights to larger mining corporations. It is not possible to estimate the economic value to the Province of Nova Scotia of a mine development until an economic deposit has been identified and a specific plan to develop a mine has been implemented. There are currently no developed or planned mines in or adjacent to either the Gully Lake or Eigg Mountain-James River Crown lands.

However, exploration is active in the region around the Gully Lake candidate Wilderness Area. Maintaining mineral rights and exploration activities by themselves require expenditures and generate income. For instance, along the Cobequid-Chedabucto Fault line, upon which part of the Gully Lake Crown parcel falls, there are nearly 5,000 exploration claims. Simply to maintain these claims, not

including specific exploration that may be undertaken, requires annual fieldwork (*e.g.*, geological surveys) at a cost of approximately \$200 each. There are a very small number of claims that actually overlap with the Gully Lake candidate Wilderness Area. The income associated with the maintenance of these mineral rights is, therefore, insignificant. In any event, these claims are considered a pre-existing interest, which are honoured under the Act, subject to conditions.

What is potentially more significant is the local exploration expenditures themselves. Investment in the Mt. Thom area have reportedly totalled approximately \$600,000 since 1995, while \$400,000 to \$500,000 has been spent to explore the area from Lower Mt. Thom to Salt Springs, and \$2 million has been spent in the Upper Cobequid area (Figure 2-3) (A. Hudgins, Pers. Comm., 2004). Expenditures associated with individual mineral rights vary widely, depending on the characteristics of the site and the results that are obtained. Annual expenditures can typically range from \$100,000 to \$250,000 for a promising area. Again, these values can not be attached to the Gully Lake candidate Wilderness Area itself given the lack of exploration activity (Table 4-4).

<b>Table 4-4 Summary of Mining Values in the Candidate Wilderness Areas</b>	
<b>Gully Lake</b>	• Potential exploration expenditures of areas of interest, value unknown.
<b>Eigg Mountain-James River</b>	• None identified.

### **4.3 Tourism**

Tourism is an important industry in Nova Scotia with an estimated \$1.3 billion in business revenue generated from tourism-related activities in 2002, up from \$1.1 billion in 1998 (NSTPC 2003). The Nova Scotia Tourism Partnership Council states that the tourism products that customers desire while visiting Nova Scotia include scenic touring, outdoor and nature activities, Acadian experiences, golfing, cuisine and wine-production related activities (NSTPC 2003). Outdoor recreation can include kayaking, canoeing, biking, hiking, whale watching, birding and recreational walking (NSTPC 2003). Wilderness Areas can provide a protected land base that is suitable for delivering many of the desired outdoor and nature tourism products.

In 2002, tourism generated \$62.8 million in revenue for Colchester County, \$44.1 million in revenue for Pictou County, and \$26.2 million in revenue for Antigonish County (Table 4-5).

	Colchester County	Pictou County	Antigonish County
<b>Revenues (million \$)</b>			
Tourism Revenues	62.8	44.1	26.2
<b>Taxes (million \$)</b>			
Municipal	1.1	0.8	0.8
Provincial	4.6	3.3	1.9
Federal	4.1	2.9	1.7
Total Taxes	9.8	7.0	4.1
<b>Employment</b>			
Direct	600	400	200
Indirect	200	200	100
Total Employment	800	600	300
Source: T. Cyr, Pers. Comm., 2004 (preliminary statistics for 2003 report)			

### 4.3.1 Gully Lake

The County of Colchester has been developing a strategy to develop marketing of tourism in the province (A. Parks, Pers. Comm, 2004). Part of the plan is to develop a “destination identity” for the region based on types of tourism such as ecotourism.

The Central Nova Scotia Tourist Association (CNSTA), which includes the counties of Colchester and Cumberland, conducted a survey in early 2004 among its membership in relation to branding potential for the region. Visioning included the adoption of increased outdoor attractions and several themes suggested included nature trails, outdoor adventure, ecotourism, and natural wonders (CNSTA 2004).

There are number of nature tourism areas found near the Gully Lake candidate Wilderness Area which are currently used for various activities (Table 4-6).

Name	Type	Location
Economy River Wilderness Area	Wilderness Area	Colchester County
Thomas' Cove		Colchester County
Five Islands Provincial Park	Provincial Park	Colchester County
Cobequid Trail	Municipal Trail	Truro, Colchester County
Cariboo Park	Provincial Park	Pictou County
Munroe's Island	Nature Conservancy Land	Pictou County

The available data does not allow for a reasonable estimate of the specific contribution of the Gully Lake candidate Wilderness Area to tourism-related business revenue and employment in Colchester and Pictou Counties. The area is, however, reportedly well know as a backcountry recreational tourism area (MJ MacKay, Pers. Comm., 2004). Outdoor recreation activities in Colchester County are considered to be important, especially in the area of North Colchester where Gully Lake is located. As there are designs to create a major tourism attraction on the coast near Tatmagouche, there are potential synergies

with other outdoor recreation activities (A. Parks, Pers. Comm., 2004). This attraction will be relatively close to the Gully Lake candidate Wilderness Area and is of interest.

### 4.3.2 Eigg Mountain-James River

A representative of the Antigonish Eastern Shore Tourist Association (AESTA) expressed the view that the designation of the Eigg Mountain-James River as a Wilderness Area would not have significant direct benefits or value to add to the tourism product in the area (M. Broomfield, Pers. Comm., 2004). The operators who are members of the AESTA, however, tend to be accommodations, restaurants, and gift shops, and not local tour operators (M. Broomfield, Pers. Comm., 2004). It can be expected that many members of the organisation would have limited familiarity or knowledge of the nature tourism market. The AESTA target market strategy involves developing the tourism industry within an 8-hour drive of Antigonish. Tourism in Antigonish is characterized by its function as a corridor to Cape Breton. Over 800,000 people pass through the region every year (M. Broomfield, Pers. Comm., 2004). There are number of popular tourism activities in the Antigonish area, including sightseeing and festivals (*e.g.*, the Highland Games).

Eigg Mountain is reportedly known for its scenic escarpments, hiking areas and waterfalls (MJ MacKay, Pers. Comm., 2004). In addition, the study area includes trails linked to the Arisaig Provincial Park trails and the Cutie Hollow Trail. Nature tourism areas found near the Eigg Mountain-James River candidate Wilderness Area, which are currently used for various activities, are shown in Table 4-7.

<b>Name</b>	<b>Type of Area</b>	<b>Location</b>
Beaver Mountain Area	Provincial Park	Antigonish County
Keppoch Mountain		Antigonish County
Cariboo Park	Provincial Park	Pictou County
Munroe's Island	Nature Conservancy Land	Pictou County

As for Gully Lake, the available data does not allow for a reasonable estimate of the specific contribution of the Eigg Mountain-James River candidate Wilderness Area to tourism-related business revenue and employment in Pictou and Antigonish Counties. The Eigg Mountain-James River area does offer high-quality woodland and wilderness recreational opportunities (NSDEL 2001a). The area's proximity to the towns of Antigonish, Pictou and New Glasgow, the region's main population centres, enhances its value as a publicly-owned wilderness recreational resource. The predominance of tolerant hardwood forests in the study area also makes it a significant asset for the important fall colour season (NSDEL 2001a).

### 4.3.3 Summary of Tourism Values

There can be strong economic linkages between tourism and protected areas. A study commissioned by the Nova Scotia Department of Economic Development and Tourism found that nature tourism travellers typically stay longer and spend substantially more than other tourists (NSED 1997). The Nova Scotia Department of Tourism and Culture is actively promoting outdoor recreation as part of the tourism product (MJ MacKay, Pers. Comm., 2004). Both Gully Lake and Eigg Mountain-James River are considered good examples of the natural provincial landscape. It has also been noted that it is important to have a balance of protected natural areas along all provincial travel ways. There are currently no Wilderness Areas in this area of the province. Designation of the two candidate Wilderness Areas will support ongoing marketing efforts (Nova Scotia Department of Tourism, Culture and Heritage 2004).

*“Healthy wilderness landscapes are part of our tourism product and tourism is a resource dependent industry. Its value is intricately linked to promoting Nova Scotia as a destination of choice. The ecotourism and recreation potential of this area is significant for both the distance traveller and for Nova Scotians.”*

Darlene Grant Fiander, Tourism Industry  
Association of Nova Scotia (EAC 2003).

Eagles and McCool (2002) describe the linkages between protected areas and tourism as follows:

1. Visitor expenditures contribute to the economic viability of local communities. These expenditures come primarily from individuals outside the local area and, thus, can be an important source of “export” income to communities.
2. The landscape provided by protected areas can serve as a scenic backdrop to adjacent communities, which in turn makes nearby communities attractive locations for residents and businesses.
3. Employees of parks and private tourism-related businesses reside in the local communities and spend their salaries and wages on needed goods and services within the community.

Table 4-8 summarises, in a qualitative manner, the tourism values associated with the Gully Lake and Eigg-Mountain-James River candidate Wilderness Areas.

<b>Table 4-8 Summary of Tourism Values in the Candidate Wilderness Areas</b>	
<b>Gully Lake</b>	<ul style="list-style-type: none"> <li>• Important locally as a backcountry recreational tourism area.</li> <li>• Potential for further development as part of the outdoor recreation tourism product in Conchester and Pictou Counties.</li> </ul>
<b>Eigg Mountain-James River</b>	<ul style="list-style-type: none"> <li>• Important locally for its wilderness recreational opportunities, including scenic escarpments, hiking areas and waterfalls.</li> <li>• Potential for further development as part of the outdoor recreation tourism product in Pictou and Antigonish Counties.</li> </ul>

Given the lack of available secondary data, it is not possible to reasonably quantify the tourism values that are currently associated with the Gully Lake and Eigg Mountain-James River candidate Wilderness Areas. Similarly, it is not possible to predict how these values may increase over time with designation. However, experience elsewhere in Nova Scotia (*e.g.*, Kejimikujik National Park) and in other jurisdictions indicates that nature-related tourism does develop in close association with protected areas.

#### **4.4 Research and Education**

Natural environments can be particularly important as sites for research and education. Species and ecosystems have value as sources of information that can not be obtained elsewhere. This information can be in the form of something as specific as the genetic make-up of unique populations of species, or the composition of unique natural chemicals. At a broader scale, research in natural areas is important to increase our knowledge of how ecosystems are structured and how they function. This becomes important knowledge in managing our interactions with the environment. Protected areas are particularly useful for such research because the extent of human impacts is limited. As such, these areas serve as long-term reference sites for research activities. Use as field sites for education at all levels (primary school to post-secondary education) also contributes to building awareness among the general population regarding habitat management issues and natural heritage values.

##### **4.4.1 Gully Lake**

With the exception of the activities of NSDNR, there are no known research and educational activities taking place in the Gully Lake area. As previously mentioned, NSDNR currently maintains Forest Research Section Test Plots (*e.g.*, hardwood spacing and fertilization trials) on the northern portion of the Gully Lake candidate Wilderness Area.

##### **4.4.2 Eigg Mountain-James River**

A limited number of research and educational activities were identified within the Eigg-Mountain-James River Crown block. These include: use in university education as part of biology and geology course

work, use for watershed restoration research, use in elementary school field trips, and use in government research pilot projects.

Saint Francis Xavier University (Antigonish) has an initiative through its Aquatics Department that involves using the James River Protected Watershed Area as an educational site (DFO 2003). Students from first, second and third year biology and wildlife classes take field trips annually to build awareness on habitat management issues, restoration techniques and to experience hands-on learning for watershed areas (C. MacInnis, Pers. Comm., 2004).

As part of the protection and compensation efforts related to the James River Watershed supply, the Town of Antigonish has also made money available for research on restoration in the watershed, and several students have conducted graduate thesis research on the James River (C. MacInnis, Pers. Comm., 2004). Geology students from a number of universities have also known to use the Eigg Mountain-James River area for field trips.

In the past, Eigg Mountain has been used an educational field trip area for environmental and heritage learning at the elementary school level (Redwood 2000). A former teacher states:

*“I used to take students over to that area and teach them about the environment, animal tracks [...], the Scottish heritage, and the effects of clear-cutting.”* The Daily News

A number of government research activities are underway in the Antigonish area at the West River, James River and Brierly Brook. These are projects to restore salmon pools, and spawning and rearing habitat for both salmon and trout. The total budget for these projects is approximately \$60,000 to \$80,000 a year, and the projects have been ongoing since 1990 (DFO 2003). Such restoration activities, in turn, help protect water quality in streams and biodiversity.

#### 4.4.3 Summary of Research and Education Values

Table 4-9 summarises the research and education values for the Gully Lake and Eigg Mountain-James River candidate Wilderness Areas. The information provided is mostly qualitative in nature, as it is usually difficult to establish quantitative indicators for research and education uses.

<b>Table 4-9 Summary of Research and Education Values in Candidate Wilderness Areas</b>	
<b>Gully Lake</b>	• Forest research sites established by NSDNR.
<b>Eigg Mountain-James River</b>	• Use in university education as part of biology and geology course work, use for watershed restoration research, use in elementary school field trips, and use in government research pilot projects.

Designation of the candidate Wilderness Areas will not negatively impact on these values, except for forest research sites at Gully Lake that may utilise harvesting, silviculture or fertilisation. Over time, the value of the candidate Wilderness Areas for research and education can be expected to increase as there is increasing recognition and utilisation of the protected natural areas for this purpose.



## **5.0 INDIVIDUAL VALUES**

### **5.1 Vehicle Use**

Vehicle use includes the use of snowmobiles, ATVs, and other off-road vehicles. As previously discussed in this report, vehicle use is generally prohibited in Wilderness Areas, but may be permitted in limited circumstances, as outlined in the Act.

The stakeholders are represented by a number of organisations, including the North Shore ATV Mudrunners, the Dalhousie Mountain Snowmobile Club, and the Antigonish Sno-dogs. These ATV and snowmobile organisations advocate for the provision of recreational opportunities, the safe and responsible use of vehicles and trails, and the general advancement of their sport (J. Corlett, Pers. Comm., 2004; G. Prichard, Pers. Comm., 2004; G. Murray, Pers. Comm., 2004). The North Shore ATV Mudrunners have a current membership of approximately 150, the Dalhousie Mountain Snowmobile Club have a membership of 100, and the Antigonish Sno-dogs have a membership of 67. Members are primarily from central and northern Nova Scotia, including, in particular, the counties of Pictou, Colchester and Antigonish (J. Corlett, Pers. Comm., 2004; G. Prichard, Pers. Comm., 2004; G. Murray, Pers. Comm., 2004).

There are a number of concerns and issues that these groups have raised in relation to vehicle use and the designation of candidate Wilderness Areas within the Gully Lake and Eigg Mountain-James River Crown parcels. These include:

- Snowmobilers would like to be treated separately from other off-road vehicle users. They consider themselves to be stewards of the area that they use, and feel their sport has minimal impact on the environment (J. Wolverton, Pers. Comm., 2004).
- Users believe that existing trails are required as means to access other areas and trail networks (J. Corlett, Pers. Comm., 2004). This existing use can respect the designation of remaining areas as Wilderness Area.
- The belief that active participation of club members can contribute to effective management of the environment through trail development and management designed to minimise environmental impacts.
- There is a well-utilised, existing trail network through both Crown parcels, including purpose-built trails and old roads. The areas are not “untouched”. Some of these trails are authorised, and some are not.

The Province of Nova Scotia established an Off-highway Vehicle (OHV) Task Force to address growing user issues across the province related to off-highway vehicles such as snowmobiles and ATVs. The interim draft report recommends the full ban of OHV use in Wilderness Areas, as well as specific direction on OHV use on Crown lands and private lands (OHVTF 2004). Recommendations may differ in the final report, which has not yet been released. Thereafter, it will be up to the Province of Nova Scotia to respond to the final recommendations. However, ATV and snowmobile users are interested in continued trail use in the Gully Lake and Eigg Mountain-James River areas.

### **5.1.1 Gully Lake**

There are a number of ATV and snowmobile trails in the Gully Lake Crown block, which is valued as an area for recreational vehicle use (J. Corlett, Pers. Comm., 2004; G. Murray, Pers. Comm., 2004). The trails include a licensed off-road vehicle trail, part of the 3,400 km Trans Canada Snowmobile Trail (J. Wolverson, Pers. Comm., 2004). This section of the trail was developed through agreement between the Snowmobile Association of Nova Scotia (SANS) and the province, and is a non-exclusive license agreement to use 14.6 km of snowmobile trail over two sections that cross Gully Lake Crown land (see Figure 2-2). A portion of this 14.6 km trail section utilises existing forest access roads (including a portion within the candidate Wilderness Area) and most of the remainder follows older, smaller roads. It provides access to an additional five snowmobiling areas beyond Gully Lake (G. Murray, Pers. Comm., 2004). SANS is working with Nova Scotia Tourism, Culture and Heritage to develop the trails for tourism use (J. Wolverson, Pers. Comm., 2004). It was noted during interviews that snowmobiling is becoming increasingly destination oriented (*e.g.*, individuals travel 200 to 250 km a day), requiring an interconnected trail network (G Murray, Pers. Comm., 2004). The new provincial snowmobile trail map published by SANS (under the Nova Scotia Tourism, Culture and Heritage Destination Opportunities Program) publicly advertises the Trans Canada Snowmobile Trail 104 system along the Pictou County side of the block (NSDNR 2004b).

Snowmobile and ATV rallies are held on the 104 Trail annually, attracting dozens of participants to each event (NSDNR 2004b). In addition, there are over 14 interconnected ATV and snowmobile trails running through the Gully Lake Crown land (both well-used and ungroomed) that have been identified by current users (NSDEL 2004c). The local ATV club located its clubhouse near the Gully Lake Crown parcel because of the good access to Crown land and the existing trail network (J. Corlett, Pers. Comm., 2004).

Snowmobile outings during the winter typically involve weekend-long trips. From interview information, personal expenditures are approximately \$150 per day including accommodation, fuel and food. The snowmobiling season typically lasts for 10 to 12 weeks during the winter; thus, local operating expenditures are estimated at \$3,000 to \$3,600 for each snowmobile used, assuming use every available weekend. With an initial investment of \$10,000 for a snowmobile, the equivalent annual

capital cost of a machine is \$500 (5% discount rate) to \$1,000 (10% discount rate).<sup>9</sup> Thus, the total cost associated with the use of each snowmobile is \$3,500 to \$4,600 per year. In addition, snowmobile clubs receive revenues through club memberships (\$200 each per year), trail pass sales (\$85 per year for province-wide access) and fundraisers, primarily to cover costs associated with trail grooming. Approximately 450 snowmobilers utilise the trails through the Gully Lake Crown land, including 100 club members and 350 trail pass users. Assuming the equivalent of approximately 250 full-time users (based on membership and allocation of revenues from trail pass sales) and a 50% dependency on Gully Lake Crown land trails, this is an estimated equivalent expenditure of \$438,000 to \$575,000 per year.<sup>10</sup>

Personal expenditures for each ATV trip are reported to be \$50 to \$75, including fuel, food, vehicle maintenance and event fees, as appropriate. Trails are used daily, typically involving two to six individuals on each trip. In addition, the local club organises three rallies per year and occasional “fun runs” involving over 50 people.

### **5.1.2 Eigg Mountain-James River**

There are also a number of ATV and snowmobile trails through the Eigg Mountain-James River Crown land, with over 15 interconnected routes. ATV and snowmobile trail use is centred predominately in the southwest and northwest portions of the area. Some of these routes are powerline cuts and old roads (NSDEL 2004c). The new provincial snowmobile trail map published by SANS (under the Nova Scotia Tourism, Culture and Heritage Destination Opportunities Program) publicly advertises feeder trails on the south, west, and north sides of Eigg Mountain that connect to the Trans Canada Snowmobile Trail (NSDNR 2004a).

The Eigg Mountain-James River Crown block is reported to be particularly excellent for snowmobiling, with the trail system representing over 50% of the total trail system available in the region (G. Prichard, Pers. Comm., 2004). Most of the existing trails are older roads and logging roads, and are distributed throughout the Crown parcel. From information collected during interviews, approximately 70 club members utilise the trails through the Eigg Mountain-James River Crown parcel, in addition to a number of trail pass users. Assuming there are the equivalent of approximately 180 full-time users (based on membership and allocation of revenues from trail pass sales) and a 50% dependency on Eigg Mountain-James River Crown land trails, there is an estimated equivalent expenditure of \$315,000 to \$414,000 per year (using cost estimates for the Gully Lake area) associated with the use of the Eigg Mountain-James River area.<sup>11</sup>

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<sup>9</sup> Discount rates of 5% and 10% are assumed to reflect the opportunity cost of capital.

<sup>10</sup>  $(\$3,500-\$4,600)(250)(50\%)$

<sup>11</sup>  $(\$3,500-\$4,600)(180)(50\%)$

No quantitative information was readily available regarding the scale of ATV use through the Eigg-Mountain-James River Crown land.

The Eigg Mountain-James River Crown land is also popular for mountain biking and trails have been described in some guide books for the region (NSDEL 2001a). The most popular routes follow the “Old Trunk Road” and several modern logging roads (NSDEL 2001a).

### **5.1.3 Summary of Vehicle Use Values**

As outlined above, the total estimated equivalent expenditures for both the Gully Lake and Eigg Mountain-James River Crown lands associated with snowmobile use is estimated at \$753,000 to \$989,000 per year. No quantitative estimates are readily available regarding ATV use. However, the available qualitative information indicates that ATV use values are comparable to snowmobile use values for Gully Lake. These expenditures are likely an underestimation of the value that individuals place on use of the areas because actual expenditures are likely less than the maximum that individuals would be willing to pay (*i.e.*, there is consumer surplus).

However, some of the most heavily utilised snowmobile and ATV routes through the Gully Lake Crown land lie outside of the candidate Wilderness Area boundaries. It is further expected that use of the regionally important connector trails, particularly the 104 Snowmobile Trail licensed to SANS, will be maintained or replaced through a variety of options. Under the *Wilderness Areas Protection Act*, the 104 Trail could be authorised for snowmobile use as a pre-existing legal interest. Another option may be to authorise use through a trail management agreement that would allow both snowmobile and ATV use (this option assumes OHV use in Wilderness Areas will not be prohibited following government’s response to a final report from the OHV Task Force). Regionally important connector routes could also be excluded from designation, and alternate routes could be developed to replace closed routes. It is expected that the province will work with user groups to implement some combination of these options.

As indicated by other research (NSDEL, unpublished data), four to five remaining trails within the proposed boundaries are utilised by ATV users, outside of the 104 Trail. One of these trails is also used by snowmobilers, although to a limited extent, as a shortcut while travelling the 104 Snowmobile Trail. Available information indicates that some current users may be inconvenienced, but will have alternate routes available. Thus, the actual impacts on vehicle users associated with designation of the Gully Lake candidate Wilderness Area are predicted to be small.

In the Eigg Mountain-James River area, most existing snowmobile and ATV routes are excluded from the candidate Wilderness Area. There are two roads that currently cut through the proposed Protected Area (running east-west), but it is understood that both will be excluded from designation. Similarly, the north-south road from Marshy Hope will also be excluded where it passes through the candidate area. As indicated by other research (NSDEL, unpublished data), there are two remaining ATV trails

within the proposed boundaries. Both, however, are considered non-essential connections to the broader trail network.

Table 5-1 summarises the vehicle use values for the areas. As discussed above, because most existing trails through the Gully Lake and Eigg Mountain-James River Crown lands are expected to be excluded from the designated Wilderness Areas, or otherwise licensed for use, rerouted, or brought under a management agreement, the impacts of designation are predicted to be small.

<b>Table 5-1 Summary of Vehicle Use Values in the Candidate Wilderness Areas</b>	
<b>Gully Lake</b>	<ul style="list-style-type: none"> <li>• Approximately 450 snowmobilers utilising the trails through Gully Lake Crown land, with a total estimated equivalent expenditure of \$438,000 to \$575,000 per year.</li> <li>• Unquantified level of ATV use within Gully Lake Crown land, but qualitative information indicates that values are comparable to snowmobile use values.</li> <li>• Minimal impact with designation with exclusion of trails, or trails otherwise licensed for use, rerouted, or brought under a management agreement.</li> </ul>
<b>Eigg Mountain-James River</b>	<ul style="list-style-type: none"> <li>• Approximately 400 snowmobilers utilising the trails through Eigg Mountain-James River Crown land, with a total estimated equivalent expenditure of \$315,000 to \$414,000 per year.</li> <li>• Unquantified level of ATV use within Eigg Mountain-Gully Lake Crown land.</li> <li>• Low relative level of trail use within the candidate Wilderness Area.</li> </ul>

## 5.2 Fishing, Hunting and Trapping

Hunting, fishing and trapping are generally permitted within Wilderness Areas. These activities would largely continue after designation. Impacts may occur with the concurrent restriction on the use of off-highway vehicles, on which many hunters depend to gain access into forests.

There are concerns and issues that have been raised in relation to fishing activities by stakeholders within the Gully Lake and Eigg Mountain-James River candidate Wilderness Areas. These include:

- Growing concern over the protection of salmon habitat, including in particular habitat for spawning in the Gully Lake and Eigg Mountain-James River Crown lands. Both areas include headwaters for some of the healthier Atlantic salmon rivers in mainland Nova Scotia.
- Many stakeholders feel that Wilderness Areas may represent the only wilderness fishing experiences available in the province and see the value in protecting this activity (NSDNR 1995).

Hunting and trapping is a traditional activity integral to the way of life for many Nova Scotians, particularly those living in rural areas (NSDNR 1995). Specific concerns and issues raised by stakeholders regarding the establishment of Wilderness Areas as they relate to hunting and trapping activities include the use of motorised vehicles for travel, as this would be generally prohibited. However, there is a strong interest in using motorised vehicles (NSDNR 1995).

Hunting and fishing is an individual, non-commercial use of land. However, we also included trapping in this category because of its similarity, in many ways, to hunting, although trapping is done primarily for commercial purposes.

### **5.2.1 Gully Lake**

The NSDNR's Significant Habitat database identifies the Salmon River and its tributaries as important habitat for salmon and trout (NSDNR 2004b) (D. MacLean, Pers. Comm., 2004). The Gully Lake Crown land includes the headwaters and upper reaches of the Salmon River, which flows into the Bay of Fundy. The water quality in the Salmon River is reportedly good overall, but with some agriculture and sewage related problems, particularly in the lower reaches. In general, the area supports healthy salmon and trout populations, whereas poor water quality has limited fish production in many other areas of Nova Scotia (D. MacLean, Pers. Comm., 2004).

Angling is reportedly limited in the Gully Lake Crown block (D. Huggard, Pers. Comm., 2004; D. MacLean, Pers. Comm., 2004). Figures specific to the area are not possible to obtain.

Given the available information, it is similarly not possible to reasonably estimate hunting and trapping activities that occur within the Gully Lake candidate Wilderness Area. Over the past few years, NSDNR has authorised two to four registered bear hunting stands in the northern half of the Gully Lake Crown block, where bears are attracted through the use of bait (NSDNR 2004b). This supports hunting activities from August through October annually. Trappers, who primarily use snowmobiles and ATVs to access trap lines, are active from October to February (M. O'Brien, Pers. Comm., 2004). Statistics on trapping are available at the county level. For Colchester County, the total value of the fur bearer harvest has ranged from approximately \$26,500 in 2000/01 to nearly \$53,000 in 2002/03 (M. O'Brien, Pers. Comm., 2004). Individuals are allowed to trap on any undeveloped forested land, unless otherwise posted.

### **5.2.2 Eigg Mountain-James River**

The Eigg Mountain-James River Crown land has several smaller watersheds (the James River and Powers Brook-South Rights Rivers watershed) in its boundaries that are part of the larger West River watershed. Both the South Rights River and the West River have significant populations of salmon and sea run trout. In the James River, salmon can not pass the water supply dam that is located downstream of the candidate Wilderness Area. In the South Rights River, sea run trout and salmon occur in the upper portions of the watershed, throughout the candidate Wilderness Area (NSDEL 2001a). It has been noted that people fish these rivers from all over the province, Canada and internationally (R. Plourde, Pers. Comm., 2004).

*“I have family who live not far from this [James] River, and I have fished it for the last 20 years. I feel it is an absolute necessity to protect this special place – and other places like it – now before we have no wilderness left to protect.”*

Local Resident, The Daily News (2003)

Angling is reported to be limited in the Eigg Mountain-James River Crown block (D. MacLean, Pers. Comm., 2004). Again, figures specific to the area are not possible to obtain.

Given the available information, it is similarly not possible to reasonably estimate hunting and trapping activities that occur within the Eigg Mountain-James River candidate Wilderness Area. Several groups do use the region for hunting. For example, the Browns Mountain Sporting Club uses a camp located 1 km west of the James River Falls. Statistics on trapping are available at the county level. For Antigonish County, the total value of the fur bearer harvest has ranged from approximately \$20,000 in 2000/01 to over \$36,000 in 2002/03 (M. O’Brien, Pers. Comm., 2004).

### 5.2.3 Summary of Fishing, Hunting and Trapping Values

Table 5-2 summarises the fishing, hunting and trapping values for the two candidate Wilderness Areas.

<b>Gully Lake</b>	<ul style="list-style-type: none"> <li>• Limited use for angling.</li> <li>• Unquantified level of hunting and trapping. For trapping, area contributes to county-level harvest valued at \$53,000 per year.</li> </ul>
<b>Eigg Mountain-James River</b>	<ul style="list-style-type: none"> <li>• Limited use for angling.</li> <li>• Unquantified level of hunting and trapping. For trapping, area contributes to county-level harvest valued at \$36,000 per year.</li> </ul>

The predicted impacts (either positive or negative) associated with designation of the candidate Wilderness Areas are minimal as hunting, fishing and trapping are generally permitted within Wilderness Areas. The use of bait stations will no longer be permitted, which can be expected to impact on bear hunting success rates within the Gully Lake area. Some individuals may be impacted due to the restriction on the use of off-highway vehicles and, thus, restricted in the forest areas that are accessible in this fashion. It should be emphasised, however, that a limited number of existing ATV trails will be “eliminated” with designation of the Gully Lake and Eigg Mountain-James River candidate Wilderness Areas (see Section 5.1).

### 5.3 Other Outdoor Recreation Activities

Other outdoor recreation activities as defined for this study include a number of activities such as hiking, camping, nature viewing, boating (e.g., canoeing, kayaking), and other sporting activities (e.g., cross-

country skiing, snowshoeing). These interests are represented by a number of groups that promote and organise outdoor activities. The groups place an emphasis on low impact use, outdoor education, appreciation for the conservation of species and habitats, and awareness of natural history.

Some of the expressed perceptions of these stakeholder groups regarding the Gully Lake and Eigg Mountain-James River Crown lands include the following:

- They are excellent natural areas for outdoor activities and exploration (C. Cron, Pers. Comm., 2004).
- In particular, the steep aspects and ravines of Eigg Mountain and the hike to James River Falls are very beautiful, as is the walk to MacIntosh Lake in the Gully Lake area (K. McKenna, Pers. Comm., 2004).
- The areas play an important role for local and neighbouring communities (M. Stratton, Pers. Comm., 2004).
- Eigg Mountain is a great place for peaceful recreation (R. Lauff, Pers. Comm. 2004).

### 5.3.1 Gully Lake

*“My grandfather took my father to the West Branch for recreation, and my father took me, and I have taken his grandchildren. That’s four generations in my memory, to say nothing of those who came before. It is true to say that the Logans have been recreating in the Gully Lake area since colonial times, so I have a strong interest in its preservation.”*

Resident of Pictou County, The Daily News (2003)

In the Gully Lake Crown block, there are 16.5 km of usable roads through forestry operations (e.g., access roads) which are used recreationally. Some of these roads also provide access to trail heads (NSDNR 2004b). Approximately 22 km of multi-use recreational trails have been maintained south of MacIntosh Lake and Gully Lake. Several of these trails were reported during interviews to be heavily used, and follow the Salmon River, Juniper Brook, Gully Lake Brook and MacIntosh Lake (Figure 5-1).

The County of Colchester’s Leisure Services Department promotes trail use in the Gully Lake area as one of ten popular trails in the county for recreation (Municipality of the County of Colchester 2004). The Gully Lake trail area is one of the trail networks that is under development by the Municipality. Currently there are seven trails that are inter-connected around Gully Lake. The total network is approximately 41 km (Figure 5-1). Along the trails are two popular observation areas. One overlooks a hardwood forest near MacIntosh Lake. The second is along side Gully Lake Brook and overlooks a bog. Access to this network of trails can be made off Proudfoot Road and River Road in Upper Kemptown.





Source: Municipality of the County of Colchester (2004)

**Figure 5-1 Select Hiking Trails at Gully Lake**

The Gully Lake Trails are reported to be popular for hiking and snowshoeing (S. Burley, Pers. Comm., 2004). Through the County of Colchester's Mayor's Challenge, which encourages physical fitness programs for local residents, the Leisure Services Department plans to organise some hikes in the Gully Lake area in the summer months. The Gully Lake Crown land has also been described in Hiking Trails of Nova Scotia as having an informal trail network. One hike described begins at a distance of 19 km from the Town of Truro (Haynes 1995). The Colchester YMCA Youth Environmental Education Program has also outlined several unofficial hiking trails in and around Salmon River, MacIntosh Lake, and Gully Lake Brook (Colchester YMCA 1993). The Gully Lake area is popular for hiking, in part, because of its proximity to Salmon River, exposure to a diversity of forest types, and a variety of terrain that is accessible for day hikes or short overnight trips (NSDEL 2001b).

In addition, there are also a number of trails in Colchester County that could be linked physically or promotionally to recreational trail activity in the Gully Lake Crown block. These include (Municipality of the County of Colchester 2004): Cobequid Trail; Gully Lake Trail Development; Five Islands Provincial Park; Shubenacadie Wildlife Park; Trans Canada Trail; Kenomee Trail; Victoria Park (Town of Truro); MacElmon Pond Provincial Park; and Valley Community Nature Loop.

The County of Colchester is exploring, both municipally and through organisations such as the Colchester Trails Association, the development of a regional trail plan across the county. Currently, the planned alignment for the Trans Canada Trail runs along the Northumberland Strait Coast (A. Parks, Pers. Comm., 2004). There are also plans to develop a system of trails on a north-south line between Tatamagouche near Gully Lake and down to Truro (A. Parks, Pers. Comm., 2004).

The Pictou County Regional Planning Commission is planning some recreational developments across the county for outdoor recreation. There are currently developments that have been planned, including (V. Parker, 2004):

- The Wilderness Corridor Plan (a 15 km trail to be developed between Trenton, Stellarton and Westville along the East River); and
- The Water Park (to be created in New Glasgow with canoeing, kayaking and other water sports for local residents).

In addition, a leisure services survey was conducted earlier this year across Pictou County to determine the key activities undertaken by county residents (J. Turnbull, Pers. Comm. 2004). Although not yet available, the results ranked walking and hiking in the area as a popular activity.

In addition to the naturalists and trekking groups, the Big Cove YMCA Camp, based in Merigomish Harbour in Pictou County, uses the Gully Lake area for wilderness camping excursions as part of its programs (E. Haynes, Pers. Comm., 2004). The program serves youth ages 7 to 17, and involves weekly trips of 10 to 20 youth each, of 2 to 3 day duration, over the months of July and August. Total costs to

participants for these trips are \$150 to \$200 each, for a total expenditure of approximately \$21,000 per year.

There are a limited number of usable boating areas in the Gully Lake Crown block. Salmon River, and its tributaries at Gully Lake, are not believed to be usable as canoe routes (NSDNR 2004b).

### **5.3.2 Eigg Mountain-James River**

The Eigg Mountain-James River Crown land is known for outdoor recreational use. There is one trail in the area, Cutie Hollow's Trail, which extends from Brown's Mountain to the James River Falls, which is described in Hiking Trails of Nova Scotia (NSDEL 2001a). Portions of this trail cross through the candidate Wilderness Area. Old roads and cart tracks leading from the coast of the Northumberland Strait are also popular routes used for hiking to the Eigg Mountain area (NSDEL 2001a). Activities include bird watching and natural history appreciation.

The Antigonish Regional Development Authority has completed Phase I of a feasibility plan to establish an outdoor area in the Keppoch/Beaver Mountain Area. This would consist of a ski hill (100 acres) in Keppoch and would be linked to an existing passive provincial park in Beaver Mountain (300 acres). This area is south of the proposed Wilderness Area and there may some synergies developed between both areas in the future (K. Watkins, Pers. Comm., 2004).

In addition to uses by naturalists and for trekking, the limited harvesting of apples is also noted. As one resident mentions:

*“When we were kids, we used to go to Brown's Mountain to pick apples. It was rough terrain and harder to get to but there were plenty of wild apples to pick.”*

Resident of Antigonish (2004)

The apple trees were likely planted by Samuel Mills in the mid-1850's who had a homestead in the area and it is likely that families still use the area for apple picking (J. Gillis, Pers. Comm., 2004). The picking of berries and other fruit for personal consumption is permitted within Wilderness Areas, although individuals are asked to keep harvests modest. In any event, it is not believed that the mentioned site is within the Eigg Mountain-James River candidate Wilderness Area (see Figure 2-3).

### **5.3.3 Summary of Naturalists and Trekking Values**

From the results of the interviews conducted as part of this study, it is estimated that 1,000 person-day trips occur annually within both the Gully Lake and Eigg Mountain-James River candidate Wilderness Areas by naturalists and trekking groups. Using an average expenditure of approximately \$14 per day (2004 dollars) (Environment Canada 2000), this translates to total expenditures of \$28,000 per year total

for both areas.<sup>12</sup> This expenditure estimate is in keeping with the information collected during the interviews. As will all types of individual uses, these expenditures are likely an underestimation of the value that individuals place on use of the areas because actual expenditures are likely less than the maximum that individuals would be willing to pay (*i.e.*, there is consumer surplus).

Table 5-3 summarises the naturalists and trekking use values for the Gully Lake and Eigg Mountain-James River candidate Wilderness Areas.

<b>Table 5-3 Summary of Naturalists and Trekking Values in the Candidate Wilderness Areas</b>	
<b>Gully Lake</b>	<ul style="list-style-type: none"> <li>• Wilderness camping for about 120 youth per year, involving annual expenditures for excursions of approximately \$21,000.</li> <li>• Approximately 1,000 person-days spent by naturalists and trekkers, with total expenditures of \$14,000.</li> </ul>
<b>Eigg Mountain-James River</b>	<ul style="list-style-type: none"> <li>• Approximately 1,000 person-days spent by naturalists and trekkers, with total expenditures of \$14,000.</li> </ul>

Designation of the candidate Wilderness Areas will positively impact on these values. It is not possible to reasonably estimate the increase with the limited available secondary information. However, use by naturalists and individuals using the areas for trekking will increase as the areas become increasingly known as areas that are relatively undisturbed and for which competing resource users (*e.g.*, forestry, ATV use) are excluded.

## 5.4 Existence Values

There are a number of real, non-use benefits that can be provided by protected areas. These include:

- Strengthening cultural identity and heritage values in Nova Scotia, by contributing to the survival of landscapes and ecosystems that people identify with, such as scenic coastlines, highlands, lake country and forests.
- Inspiring writers, poets, musicians and artists.
- Inspiring a philosophy of life that recognises certain ethical values relating to natural landscapes, and that encourages conservation and lifestyle choices that contribute to sustainable development.

Within this category, we also include bequest values. These are values that people hold because of their desire to conserve natural environments for future generations. Many feel it is important to “develop a legacy” (J. Cabrita, Pers. Comm., 2004). In an extended capital accounting framework, these bequest values have real economic value, as depreciation of natural capital assets will occur at the expense of

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<sup>12</sup> Based on expenditure from Environment Canada (2000) for “wildlife viewing” daily expenditures for Nova Scotia, adjusted to 2004 dollars using Nova Scotia CPI for recreation.

future generations. For example, the potential harvest of valuable and increasingly rare tolerant hardwoods today will be shown as present income on this analysis (see Section 4.1), but may result in a depreciation of the existence value associated with the remaining forest if further loss of species diversity occurs.

A recent survey commissioned by the Ecology Action Centre found that the majority of Nova Scotians believe more publicly owned Crown land should be protected in Nova Scotia. The poll conducted by Corporate Research Associates included a representative sample of 400 adult residents from across the province, and had a 96% response rate (EAC 2004). The formal question sent out for response was the following:

*“Some people say that protecting more wilderness areas in Nova Scotia is necessary to conserve native plants and animals for outdoor recreation. Others say there are already enough protected areas, and that to create more would be too costly, particularly for resource-based industries such as forestry and mining. All things considered, do you personally believe there should be more, the same amount, or fewer protected wilderness areas on publicly owned Crown land in Nova Scotia?”*

The results indicated that 69% believed that there should be more protected areas, 28% believe that the number of protected areas should remain the same, and 3% believe that there should be less protected areas. Survey results will be affected by the specific wording of the question that is posed (and it should be noted that the question led individuals to consider use values, rather than existence values *per se*). However, it is a strong indication of the relative value that individuals in Nova Scotia place on protected areas, as it can be expected that many of the respondents would never have visited a Wilderness Area nor plan to do so in the foreseeable future. Additionally, the initiative to evaluate the Gully Lake and Eigg Mountain-James River areas as potential Wilderness Areas was driven, in part, by more than 100 letters, as well as by a petition signed by over 1,000 individuals, calling for the province to designate the two sites. This is another indicator of the social values.

#### **5.4.1 Summary of Existence Values**

The quantitative measurement of existence values is relatively complex. Results tend to be very specific to the study in question, and are highly dependent on the methodology employed. There are no existing studies on the existence values associated with protected areas in Nova Scotia from which we can derive estimates for the Gully Lake and Eigg Mountain-James River candidate Wilderness Areas. In the future, the use of specific valuation methodologies could be used in Nova Scotia to improve our understanding of the magnitude of existence values. Studies for other regions are available (*e.g.*, Reid *et al.* 1995) but their application here would be suspect. For this reason, no monetary estimate of existence values is attempted. These values are, however, very real.

Table 5-4 qualitatively summarises the existence values for the Gully Lake and Eigg Mountain-James River candidate Wilderness Areas.

<b>Table 5-4 Summary of Existence Values in the Candidate Wilderness Areas</b>	
<b>Gully Lake</b>	<ul style="list-style-type: none"> <li>• Contribution to provincial cultural identity and heritage values.</li> <li>• Inspiration of art and a philosophy of life that recognises certain ethical values relating to natural landscapes.</li> </ul>
<b>Eigg Mountain-James River</b>	<ul style="list-style-type: none"> <li>• Contribution to provincial cultural identity and heritage values.</li> <li>• Inspiration of art and a philosophy of life that recognises certain ethical values relating to natural landscapes.</li> </ul>

Designation of the candidate Wilderness Areas will positively impact on these values. Over time, the existence values can be expected to increase as there is increasing recognition of the natural capital assets that are conserved within the areas.

## 6.0 ECOSYSTEM SERVICE VALUES

There are a number of important services provided by ecosystems. Those that have been identified in the literature include: generating and maintaining soils, maintaining hydrological cycles, nutrient cycling and storage, assimilation and elimination of pollution and wastes, regulating disturbances, maintaining species and genetic resources, maintaining biogeochemical cycling, and regulating weather and climate (*e.g.*, de Groot 1994; Folke *et al.* 1994; Bingham *et al.* 1995; Costanza *et al.* 1997; Myers 1996).

Forests, in particular, provide a number of important ecosystem services (*e.g.*, Loomis and Richardson 2000; Krieger 2001). These include the regulation of climate, sequestration of atmospheric carbon dioxide, the filtering of air for improved air quality (*e.g.*, uptake of NO<sub>2</sub>, particulate matter, and volatile organic compounds), and the regulation of water flows. Natural, multi-species, multi-aged forests have been shown to improve water quality, reduce runoff and erosion (thereby preventing transport of sediment and chemicals to streams), and facilitate recharging of the ground water supply.

Even when reasonably good data exist for some ecosystem services, there have been no comprehensive estimates that take into account the full range of values provided by forests. Most studies have been limited to one or a few components only (*e.g.*, carbon sequestration) that can be readily monetarised. Such numbers can also be heavily influenced by site-specific factors. Furthermore, it must be acknowledged that monetarisation is generally a poor tool with which to value non-market ecosystem services that may nevertheless have substantial, if not irreplaceable value. Only a limited number of ecosystem service values will be highlighted here – climate change mitigation, water regulation, and maintenance of biodiversity, and only one of these (carbon sequestration) will be monetarised. Thus, the total value of ecosystem service benefits will be underestimated in this report.

### 6.1 Climate Change Mitigation

Forests represent an accumulation of biomass. As they grow, they sequester carbon dioxide, thus offsetting our contribution to climate change due to the destruction of forests (land clearing and burning of biomass) and the burning of fossil fuels.<sup>13</sup> Newly planted or regenerating forests will act as a net sink for carbon for up to 50 years or more after establishment, depending on the species mix and site in question, until capacities for net carbon uptake become limited (Intergovernmental Panel on Climate Change 2000). At this stage in the development of a forest, the uptake of carbon by new biomass is more or less offset by the loss of carbon through death and decay.

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<sup>13</sup> Note that the amount of carbon sequestered through the growth process is somewhat offset by respiration. There is some debate as to the extent that increased forestation will be able to offset climate change impacts due to our burning of fossil fuels (Pearce 1999).

The impacts of climate change include an increase in average temperature, a change in precipitation patterns, an increase in the frequency of extreme events (*e.g.*, storms, drought), and a rise in sea levels. This will, in turn, result in a number of negative impacts, such as an increase in damages to structures from storms, a loss of land from sea level rise, changes in fish stocks due to changes in water temperature and chemistry, and declines in certain agricultural products due to changes in weather and precipitation patterns, and increases in the costs of supplying water to people and communities.

There are a number of ways to approach the valuation of carbon sequestration (*e.g.*, see discussions in Kulshreshtha *et al.* 2000; van Kooten *et al.* 2004). As one option, an economic value on the climate change mitigation function performed by forests may be accomplished by estimating the value of the damages avoided. However, it is challenging to estimate these values because of the various uncertainties and unknowns involved (*e.g.*, prediction of local or regional impacts over time; estimation of economic value of the impacts themselves, including when they occur). As another option, one may look to industrial carbon credit markets as an indication of the dollar value that existing markets place on emissions, which, in turn, is ultimately linked to the price of least-cost alternatives for avoiding atmospheric carbon emissions. Both valuation methodologies will be assumed here as an indication of the range of values placed on the sequestration of carbon. The range of values varies substantially based on the valuation methodology employed.

Bein and Rintoul (1999) estimate the total global value of damages avoided by carbon sequestration to be \$325/tC, which is also in agreement with the range of estimates summarised by the Intergovernmental Panel on Climate Change (2000, 2001). A reasonable estimate of the market value of carbon credits is \$20/tC (*e.g.*, Kulshreshtha *et al.* 2000). It is important to note that both estimates are present values (*i.e.*, it is not an annual value, but a total).

Recent studies indicate that the conversion from old-growth to young forests produces a net loss of carbon to the atmosphere, even when the carbon uptake of new forests is taken into account (*e.g.*, Kurz *et al.* 1998; Schilze *et al.* 2000). Older forests contain a greater amount of biomass than young or second growth forests (*e.g.*, Harmon *et al.* 1990). Accounting for the long-term storage of carbon in wood products from harvesting, and considering the total carbon storage in plant biomass and soils typical of the forest types found in the candidate Wilderness Areas, the difference in the long-term storage of carbon between managed (harvested) and unmanaged, natural forest is estimated to be 15 to 30tC/ha (Kurz *et al.* 1998; Kulshreshtha *et al.* 2000).

### **6.1.1 Gully Lake**

The total size of the land parcel that comprises the Gully Lake candidate Wilderness Area is approximately 3,810 ha. Using the damage cost avoidance estimate for the global value of carbon sequestration, protection has a present value of approximately \$18,574,000 to \$37,148,000 over the



managed forest option. Using the carbon credit market value estimate, protection has a present value of approximately \$1,143,000 to \$2,286,000 over the managed forest option.

### 6.1.2 Eigg Mountain-James River

The total size of the land parcel that comprises the Eigg Mountain-James River candidate Wilderness Area is approximately 4,170 ha. Using the damage cost avoidance estimate for the global value of carbon sequestration, protection has a present value of approximately \$20,329,000 to \$40,658,000 over the managed forest option. Using the carbon credit market value estimate, protection has a present value of approximately \$1,251,000 to \$2,502,000 over the managed forest option.

### 6.1.3 Summary of Climate Change Mitigation Values

Table 6-1 summarises the climate change mitigation values for the candidate Wilderness Areas, with monetary estimates provided for the difference between a managed forest (allowing harvesting) and protection as Wilderness Areas. It is important to note that these are global values – that is, these are the values associated with climate change mitigation world-wide based on the carbon sequestration capabilities of the two candidate Wilderness Areas.

<b>Table 6-1 Summary of Climate Change Mitigation Values in the Candidate Wilderness Areas</b>	
<b>Gully Lake</b>	<ul style="list-style-type: none"> <li>• Carbon sequestration value for avoiding future damages due to climate change.</li> <li>• Protection has a present value of approximately \$1,143,000 to \$37,148,000 over the managed forest option.</li> </ul>
<b>Eigg Mountain-James River</b>	<ul style="list-style-type: none"> <li>• Carbon sequestration value for avoiding future damages due to climate change.</li> <li>• Protection has a present value of approximately \$1,251,000 to \$40,658,000 over the managed forest option.</li> </ul>

## 6.2 Water Regulation

The water regulation functions provided by forests include: regulation of runoff and flood prevention; water catchment and groundwater recharge; and prevention of soil erosion and sediment control (*e.g.*, de Groot 1994). This, in turn protects water quality in streams and lakes. Riparian habitats are particularly important to prevent turbidity and sedimentation in streams, and to moderate temperatures to maintain suitable habitats for fish.

The focus for this study is the role of the forest environment in maintaining water quality, as well as moderating water flows, for community water supplies. There is growing evidence that protected areas can help maintain water supplies for urban centres, and that there are long-term cost savings associated with the protection of watersheds (World Bank and World Wildlife Fund 2003). For example, in 1997, the City of New York acknowledged the cost savings of investing in watershed protection versus building a new water filtration plant. A new plant would have cost \$6 to \$8 billion to build and between \$300 to \$500 million to operate annually. As an alternative to building the new plant, a watershed

protection plan was implemented, with a projected cost of \$1 to \$1.5 billion over 10 years (Parlange 1999; Daily and Ellison 2004). Thus, with protection of the watershed, water quality objectives were able to be met at a substantial cost saving. According to Myers (1997), the price of water from a forested watershed catchment with undisturbed forest increases twofold after a forest is logged, and fourfold after uncontrolled logging.

### **6.2.1 Gully Lake**

The Gully Lake study area is not currently being used to supply community water. However, as noted previously in this report, the study area includes the headwaters and upper reaches of the Salmon River, which flows into the Bay of Fundy. There are other headwaters that originate in the area and feed into river systems where salmon runs are protected. The maintenance of water quality and quantity in the study area is important to retain these fish habitat values.

The forest ecosystems within the Gully Lake study area has notable value for contributing to the stabilisation of water flows in the Salmon River, and contributes to the regulation of flows affecting downstream, developed areas (NSDEL 2001b).

### **6.2.2 Eigg Mountain-James River**

The Town of Antigonish relies on the 3,890 ha James River Protected Water Area (Figure 2-4) as the community water supply. This serves a population of approximately 4,800. Thirty percent of the watershed is owned by Antigonish, and another 61% rests within the Eigg Mountain-James River Crown parcel. Of the Crown portion, 68%, or 1,595 ha, is within the candidate Wilderness Area. This means that 41% of the Protected Water Area is within the candidate Wilderness Area.

As defined by the James River Watershed Protected Water Area Designation and Regulations (under the provincial *Environment Act*) the following stipulations are made:

- No person shall undertake any activity that causes soil erosion resulting in sedimentation of any watercourse.
- Any person who proposes to undertake any mining or forestry operation, or construction activity, or who proposes any land clearing or drainage work for any purpose, shall notify NSDEL.
- No person shall operate or use any pit, mine or quarry for extraction of gravel, rock or minerals unless he has applied for, and received, approval of the minister.
- No person shall deposit, release or allow the deposit, release, discharge or drainage or emission of oils, petroleum products, toxic chemicals, pest control products, garbage, litter [...] or any other material that may cause pollution into a watercourse, or anywhere within the Protected Water Area.

These regulations are designed primarily to protect water quality and help ensure regulated water flows, and are currently under review by the James River Stewardship Board, with approval of the regulations for the watershed required by NSDEL. A report that examined the options for management of the watershed (CBCL Limited 2003) is currently being considered by the Town of Antigonish. CBCL Limited (2003) note that the existing water treatment plant for the Town of Antigonish does not provide water that consistently meets water quality guidelines, and there have been some consumer complaints regarding the colour and taste of the treated water. The focus of water management should be on the effective removal of organics and suspended solids before the water reaches the distribution system (CBCL Limited 2003).

The Town of Antigonish has invested approximately \$1 million in the watershed impoundment area (K. Proctor, Pers. Comm., 2004), just outside the candidate Wilderness Area boundary. A second dam will be required in the near future, as well as an upgrading of the current water treatment system. Periodic water shortages are presently experienced, as annual variations in yields are reportedly quite extreme (K. Proctor, Pers. Comm., 2004). The addition of impoundments is very early in the planning stage. The NSDEL has advised the Town of Antigonish that such infrastructure, where it may affect the candidate area, can be licensed as a pre-existing interest that can be honoured under the *Wilderness Areas Protection Act*.

The regulation of water flows (*i.e.*, reducing peak flow volumes and increasing low flow volumes) and the prevention of soil erosion in the James River Protected Water Area is key to ensuring that water quality and quantity objectives for the community water supply are met. Mature forest ecosystems provide these functions. Development must be managed with the appropriate buffers to prevent deterioration of the water supply.

As discussed previously, the Eigg Mountain-James River Crown block is part of the larger West River watershed. Thus, the maintenance of water quality and quantity in the study area is also important to retain fish habitat values (NSDEL 2001a).

### 6.2.3 Summary of Water Regulation Values

Table 6-2 summarises the water regulation values for the study areas.

<b>Table 6-2 Summary of Water Regulation Values in the Candidate Wilderness Areas</b>	
<b>Gully Lake</b>	<ul style="list-style-type: none"> <li>• Maintenance of water quality and quantity to retain fish habitat values and regulation of downstream water flows.</li> </ul>
<b>Eigg Mountain-James River</b>	<ul style="list-style-type: none"> <li>• The candidate Wilderness Area encompasses 41.3% of the James River Watershed Protected Water Area, the water supply for the Town of Antigonish (population 4,800). Regulation of water flows and the prevention of soil erosion provided by the forest environment helps ensure water quality and quantity objectives for the community water supply are met.</li> <li>• Maintenance of water quality and quantity to retain fish habitat values.</li> </ul>

Designation of the candidate Wilderness Areas will secure water regulation values, and may result in increases over time. With the current level of information, it is not possible to reasonably estimate the improvements that may be realised in water flow management or water quality maintenance. However, with protection, the risks of adverse water quality impacts is reduced and expenditures to manage the community water supply can be expected to be reduced.

### **6.3 Biodiversity Maintenance**

Forests are complex functioning ecosystems. In addition to water and climate regulation, they provide for the storage and recycling of nutrients and organic matter, the formation of soil and maintenance of soil fertility, the fixation of nitrogen, and the maintenance of migration and nursery habitats for wildlife, to name but a few (*e.g.*, de Groot 1994; Pimental *et al.* 1997). Taken as a whole, it is important to maintain biodiversity itself to ensure the continuation of this complex set of functions and relationships.

Biodiversity is the information database for ecosystem organisation, and the ability of an ecosystem to regenerate and persist is a function of the species available (Kay and Schneider 1994; Kay *et al.* 1999). A genetically diverse ecosystem will have a greater ability to adapt to environmental change. Maintaining a diverse assemblage of species is critical for the long-term survival of forests.

Several species are dependent on older forests for their survival, using large snags, cavities and fallen logs as habitat. Studies have also found that forest fragmentation and edge effects caused by clearcutting and roads can have severe impacts on species that: require large territories and/or large, uninterrupted tracts of forests; are susceptible to predation and parasitism by “edge-loving” species; are sensitive to human contact; or do not traverse large openings (Schonewald-Cox and Buechner 1992). Species and groups of species identified as sensitive to clearcutting and associated with mature forests include several species of lichens, plants, and arthropods, flying squirrels, moose, marten, fisher, lynx, trout, wood turtles (classified as vulnerable), yellow-spotted and red-backed salamanders, spring peepers, wood frogs, hawks, barred owls, thrushes, warblers, and woodpeckers. To date, very few studies have examined the effects of forest fragmentation and harvesting of mature forests on wildlife in Nova Scotia, but it is likely that protected area status can maintain, enhance, and protect the habitat of key species of flora and fauna.

#### **6.3.1 Gully Lake**

The Gully Lake candidate Wilderness Area has distinct conservation value because it consists of a relatively undisturbed, large, core natural area with limited fragmentation of the land (NSDEL 2004b). It straddles portions of both the Cobequid Mountain and Central Rolling Hills natural landscapes. Fragmentation of landscapes is a well-documented cause of declines in biodiversity (*e.g.*, see discussion in NSDEL 2001b).

In addition, old-growth forests are now very rare in Nova Scotia, constituting approximately 0.16% of the province's forest area. To restore these forest ecosystems requires that areas of relatively young forests be left to mature to develop old-growth features, with their characteristic suite of species.<sup>14</sup> As discussed in Section 3.1, much of the Gully Lake Crown land consists of forest of less than 80 years of age. The forests of Gully Lake will require approximately 50 to 75 years of growth to start to develop old-growth structure, and longer to truly become old-growth hardwood forest (NSDEL 2001b).

As noted previously in this report, the Salmon River is identified by NSDNR as significant habitat (NSDNR 2004b). The Salmon River valley contains spruce-balsam fir stands in streams and wetland gullies, and on the tops of hills in undeveloped portions (NSDEL 2001b). The majority of stands are 20 to 60 years old, although some stands have been identified as being 60 to 80 years of age. As with the hardwood forest within the Gully Lake study area, these softwood stands will develop old-growth characteristics if allowed to persist undisturbed for a further 50 to 75 years (NSDEL 2001b). Again, the Gully Lake area is important for the maintenance of biodiversity because it is one of the few, relatively unfragmented areas in mainland Nova Scotia where mature, old-growth forests may be able to develop, and where species with a preference for such forest can thrive.

### **6.3.2 Eigg Mountain-James River**

The Crown land block that comprise the Eigg Mountain-James River area is notable in the length of edges relative to its overall size (*i.e.*, a relatively small interior to edge ratio) (Figure 2-1). This decreases its biodiversity conservation value in its current configuration. The area does contain two notable large areas of unfragmented, interior habitat, and a large number of smaller patches (NSDEL 2001a). However, within the Pictou-Antigonish Hills Natural Landscape, the Eigg Mountain-James River Crown block is the least fragmented area of Crown land remaining (NSDEL 2001a). As such, it is seen as the only remaining opportunity to establish a protected area of sufficient size to contribute to maintaining forest biodiversity.

The Eigg Mountain-James River area is home to a remnant moose population (NSDNR 2004a). Moose are currently classified as endangered on mainland Nova Scotia. The population is believed to be able to persist because, in part, of the relatively high elevations in the area, which protects the population to some extent from the parasitic nematode (the "brain worm") that is threatening moose populations in other parts of the province (largely because the habitat of this moose population at the higher elevations does not overlap to a great extent with whitetail deer, which is a carrier of the parasitic nematode) (NSDNR 2004a). Road access has been linked as an important factor affecting the presence of moose populations in mainland Nova Scotia, with relatively large roadless areas correlating to higher numbers of Moose (Snaith 2001; Beazley *et al.* 2004). This is also an area where one can find Northern

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<sup>14</sup> NSDNR's Old Forest Strategy aims to maintain 8% of Crown lands in older forest condition. Forests at least 40 years of age that are within Wilderness Areas are counted towards meeting this objective.

Goshawk, a species that prefers unfragmented, interior forest habitat. Northern Goshawk is considered sensitive (yellow-listed) according to NSDNR's General Status Ranks of Wild Species in Nova Scotia.

### 6.3.3 Summary of Biodiversity Maintenance Values

Table 6-3 summarises the biodiversity maintenance values for the study areas. For both candidate Wilderness Areas, protection will secure the development of climax species-dominated forests in northern mainland Nova Scotia. This will, in turn, enhance the identified biodiversity values and will help protect a number of important species.

<b>Gully Lake</b>	<ul style="list-style-type: none"> <li>• Potential for the development of mature, old-growth forests because of the relatively undisturbed, large, core natural area with limited fragmentation of the land.</li> <li>• An undeveloped portion of the Cobequid Mountain and Central Rolling Hills Natural Landscapes, with typical flora, fauna and natural processes of these landscapes (representation value).</li> <li>• Includes special habitats, such as wetlands, small lakes and floodplain forest at Salmon River and Juniper Brook.</li> </ul>
<b>Eigg Mountain-James River</b>	<ul style="list-style-type: none"> <li>• Potential for the development of mature, old-growth forests as the least fragmented land remaining within the Pictou-Antigonish Hills Natural Landscape.</li> <li>• An undeveloped portion of the Pictou-Antigonish Hills Natural Landscape, with typical flora, fauna and natural processes (representation value).</li> <li>• Home to a remnant population of the endangered (red-listed) mainland moose and Northern Goshawk, a yellow-listed (sensitive), forest-interior species.</li> <li>• Include special habitats, such as waterfalls, steep-sided ravines, a wetland complex, and floodplain forests.</li> </ul>

## 7.0 SUMMARY

### 7.1 Current Values

Table 7-1 presents a summary of the socio-economic values previously described in this report. It is also important at this point to summarise the distribution of the current benefits that are associated with these various values. Specifically, the allocation of benefits is described according to those that are enjoyed by:

1. Individuals world-wide (*i.e.*, global values);
2. The Province of Nova Scotia as a whole;
3. Counties and municipal centres (*e.g.*, the Town of Antigonish); and/or
4. Local landowners and corporate lease holders.

The distribution of the current benefits is summarised in Table 7-2. Further detail regarding the allocation of values is to be found in the descriptions provided in Sections 4, 5 and 6.

<b>Value</b>	<b>Gully Lake Candidate Wilderness Area</b>	<b>Eigg Mountain-James River Candidate Wilderness Area</b>
<b>Forestry Values</b>	<ul style="list-style-type: none"> <li>• Total estimated gross present value of potential harvest (licensed and unlicensed Crown land) of approximately \$5,939,000, and net present value (NPV) of \$1,307,000.</li> </ul>	<ul style="list-style-type: none"> <li>• Estimated gross present value from all Crown land of approximately \$6,805,000, and NPV of \$1,497,000.</li> </ul>
<b>Mining Values</b>	<ul style="list-style-type: none"> <li>• Potential exploration expenditures of areas of interest, value unknown.</li> </ul>	<ul style="list-style-type: none"> <li>• None identified.</li> </ul>
<b>Tourism Values</b>	<ul style="list-style-type: none"> <li>• Important locally as a backcountry recreational tourism area.</li> <li>• Potential for further development as part of the outdoor recreation tourism product in Conchester and Pictou Counties.</li> </ul>	<ul style="list-style-type: none"> <li>• Important locally for its wilderness recreational opportunities, including scenic escarpments, hiking areas and waterfalls.</li> <li>• Potential for further development as part of the outdoor recreation tourism product in Pictou and Antigonish Counties.</li> </ul>
<b>Research and Education Values</b>	<ul style="list-style-type: none"> <li>• Forest research sites established by NSDNR.</li> </ul>	<ul style="list-style-type: none"> <li>• Use in university education as part of biology and geology course work, use for watershed restoration research, use in elementary school field trips, and use in government research pilot projects.</li> </ul>
<b>Vehicle Use Values</b>	<ul style="list-style-type: none"> <li>• Approximately 450 snowmobilers utilising the trails through Gully Lake Crown land, with a total estimated equivalent expenditure of \$438,000 to \$575,000 per year.</li> <li>• Unquantified level of ATV use within Gully Lake Crown land, but qualitative information indicates that values are comparable to snowmobile use values.</li> <li>• Minimal impact with designation, due to exclusion of trails, or trails otherwise licensed for use, rerouted, or brought under a management agreement.</li> </ul>	<ul style="list-style-type: none"> <li>• Approximately 400 snowmobilers utilising the trails through Eigg Mountain-James River Crown land, with a total estimated equivalent expenditure of \$315,000 to \$414,000 per year.</li> <li>• Unquantified level of ATV use within Eigg Mountain-Gully Lake Crown land.</li> <li>• Low relative level of trail use within the candidate Wilderness Area, with minimal impact caused by designation.</li> </ul>

<b>Table 7-1 Summary of Socio-economic Values</b>		
<b>Value</b>	<b>Gully Lake Candidate Wilderness Area</b>	<b>Eigg Mountain-James River Candidate Wilderness Area</b>
<b>Fishing, Hunting and Trapping Values</b>	<ul style="list-style-type: none"> <li>• Limited use for angling.</li> <li>• Unquantified level of hunting and trapping. For trapping, area contributes to county-level harvest valued at \$53,000 per year.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited use for angling.</li> <li>• Unquantified level of hunting and trapping. For trapping, area contributes to county-level harvest valued at \$36,000 per year.</li> </ul>
<b>Naturalists and Trekking Values</b>	<ul style="list-style-type: none"> <li>• Wilderness camping for about 120 youth per year, involving annual expenditures for excursions of approximately \$21,000.</li> <li>• Approximately 1,000 person-days spent by naturalists and trekkers, with total expenditures of \$14,000.</li> </ul>	<ul style="list-style-type: none"> <li>• Approximately 1,000 person-days spent by naturalists and trekkers, with total expenditures of \$14,000.</li> </ul>
<b>Existence Values</b>	<ul style="list-style-type: none"> <li>• Contribution to provincial cultural identity and heritage values.</li> <li>• Inspiration of art and a philosophy of life that recognises certain ethical values relating to natural landscapes.</li> </ul>	<ul style="list-style-type: none"> <li>• Contribution to provincial cultural identity and heritage values.</li> <li>• Inspiration of art and a philosophy of life that recognises certain ethical values relating to natural landscapes.</li> </ul>
<b>Climate Change Mitigation Values</b>	<ul style="list-style-type: none"> <li>• Carbon sequestration value for avoiding future damages due to climate change.</li> <li>• Protection has a present value of approximately \$1,143,000 to \$37,148,000 over the managed forest option.</li> </ul>	<ul style="list-style-type: none"> <li>• Carbon sequestration value for avoiding future damages due to climate change.</li> <li>• Protection has a present value of approximately \$1,251,000 to \$40,658,000 over the managed forest option.</li> </ul>
<b>Water Regulation Values</b>	<ul style="list-style-type: none"> <li>• Maintenance of water quality and quantity to retain fish habitat values and regulation of downstream water flows.</li> </ul>	<ul style="list-style-type: none"> <li>• The candidate Wilderness Area encompasses 41% of the James River Watershed Protected Water Area, the water supply for the Town of Antigonish (population 4,800). Regulation of water flows and the prevention of soil erosion provided by the forest environment helps ensure water quality and quantity objectives for the community water supply are met.</li> <li>• Maintenance of water quality and quantity to retain fish habitat values.</li> </ul>
<b>Biodiversity Maintenance Values</b>	<ul style="list-style-type: none"> <li>• Potential for the development of mature, old-growth forests because of the relatively undisturbed, large, core natural area with limited fragmentation of the land.</li> <li>• An undeveloped portion of the Cobequid Mountain and Central Rolling Hills Natural Landscapes, with typical flora, fauna and natural processes of these landscapes (representation value).</li> <li>• Includes special habitats, such as wetlands, small lakes and floodplain forest at Salmon River and Juniper Brook.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential for the development of mature, old-growth forests as the least fragmented land remaining within the Pictou-Antigonish Hills Natural Landscape.</li> <li>• An undeveloped portion of the Pictou-Antigonish Hills Natural Landscape, with typical flora, fauna and natural processes (representation value).</li> <li>• Home to a remnant population of the endangered (red-listed) mainland moose and Northern Goshawk, a yellow-listed (sensitive), forest-interior species.</li> <li>• Include special habitats, such as waterfalls, steep-sided ravines, a wetland complex, and floodplain forests.</li> </ul>



<b>Table 7-2 Summary of the Distribution of Current Benefits</b>		
<b>Value</b>	<b>Gully Lake Candidate Wilderness Area</b>	<b>Eigg Mountain-James River Candidate Wilderness Area</b>
<b>Forestry Values</b>	<ul style="list-style-type: none"> <li>Corporate (Stora Enso and Irving), regional (employment and local spending) and provincial (spending and provincial revenues).</li> </ul>	<ul style="list-style-type: none"> <li>Corporate (Stora Enso), regional (employment and local spending) and provincial (spending and provincial revenues).</li> </ul>
<b>Mining Values</b>	<ul style="list-style-type: none"> <li>Corporate (junior mining companies), regional (employment and local spending) and provincial (spending and provincial revenues).</li> </ul>	<ul style="list-style-type: none"> <li>Corporate (junior mining companies), regional (employment and local spending) and provincial (spending and provincial revenues).</li> </ul>
<b>Tourism Values</b>	<ul style="list-style-type: none"> <li>Counties of Colchester and Pictou (employment and local spending), and provincial (provincial revenues).</li> </ul>	<ul style="list-style-type: none"> <li>Counties of Pictou and Antigonish (employment and local spending), and provincial (provincial revenues).</li> </ul>
<b>Research and Education Values</b>	<ul style="list-style-type: none"> <li>Provincial.</li> </ul>	<ul style="list-style-type: none"> <li>County of Antigonish schools and St. Francis Xavier University.</li> </ul>
<b>Vehicle Use Values</b>	<ul style="list-style-type: none"> <li>Counties of Colchester and Pictou (including non-market benefits and local spending).</li> </ul>	<ul style="list-style-type: none"> <li>Counties of Pictou and Antigonish (including non-market benefits and local spending).</li> </ul>
<b>Fishing, Hunting and Trapping Values</b>	<ul style="list-style-type: none"> <li>Counties of Colchester and Pictou (including non-market benefits and local spending).</li> </ul>	<ul style="list-style-type: none"> <li>Counties of Pictou and Antigonish (including non-market benefits and local spending).</li> </ul>
<b>Naturalists and Trekking Values</b>	<ul style="list-style-type: none"> <li>Counties of Colchester and Pictou, and other regions of central and northeast Nova Scotia (including non-market benefits and local spending).</li> </ul>	<ul style="list-style-type: none"> <li>Counties of Pictou and Antigonish (including non-market benefits and local spending).</li> </ul>
<b>Existence Values</b>	<ul style="list-style-type: none"> <li>Provincial (and global).</li> </ul>	<ul style="list-style-type: none"> <li>Provincial (and global).</li> </ul>
<b>Climate Change Mitigation Values</b>	<ul style="list-style-type: none"> <li>Global.</li> </ul>	<ul style="list-style-type: none"> <li>Global.</li> </ul>
<b>Water Regulation Values</b>	<ul style="list-style-type: none"> <li>County of Colchester.</li> </ul>	<ul style="list-style-type: none"> <li>Town and County of Antigonish; Province of Nova Scotia</li> </ul>
<b>Biodiversity Maintenance Values</b>	<ul style="list-style-type: none"> <li>Counties of Colchester and Pictou, provincial (and global).</li> </ul>	<ul style="list-style-type: none"> <li>Counties of Pictou and Antigonish, provincial (and global).</li> </ul>

## 7.2 Examining the Trade-offs

The previous sections of this report describe the socio-economic values associated with the Gully Lake and Eigg Mountain-James River candidate Wilderness Areas, as well as the estimated changes with designation. A range of socio-economic values (Table 7-1) was examined. In order to support decisions regarding the appropriate management of the land parcels, it is important to use this information to examine the potential trade-offs involved with designation. It should be noted that the NSDEL identified the boundaries of the candidate Wilderness Areas, with key input from stakeholders, with the goal of meeting the objectives of designation as defined by the Act, while minimising negative impacts on competing resource users.

Tables 7-3 summarises the direct impacts on the various socio-economic values that can be expected to occur with designation. The trade-off analysis relies on both quantitative and qualitative information. A simple framework is presented in order to help understand how the proposed boundary delineations, as

well as possible changes in what activities are allowed to continue within the parcels, may affect socio-economic values. A change in the management of the area will undoubtedly affect commercial operators, individuals and communities. What changes can be anticipated to occur with designation?

<b>Value</b>	<b>Gully Lake Candidate Wilderness Area</b>	<b>Eigg Mountain-James River Candidate Wilderness Area</b>
<b>Forestry Values</b>	• Loss of identified value (NPV of \$1,307,000)	• Loss of identified value (NPV of \$1,497,000)
<b>Mining Values</b>	• Loss of potential, unknown value	• No identified impacts
<b>Tourism Values</b>	• Increase in identified value (unknown magnitude)	• Increase in identified value (unknown magnitude)
<b>Research and Education Values</b>	• Increase in identified value (unknown magnitude)	• Increase in identified value (unknown magnitude)
<b>Vehicle Use Values</b>	• Loss of identified value (small)	• Loss of identified value (small)
<b>Fishing, Hunting and Trapping Values</b>	• Potential increase in fishing • Variable impact for hunting and trapping (dependent on species and method of hunting)	• Potential increase in fishing • Variable impact for hunting and trapping (dependent on species and method of hunting)
<b>Naturalists and Trekking Values</b>	• Increase in identified value (unknown magnitude)	• Increase in identified value (unknown magnitude)
<b>Existence Values</b>	• Increase in identified value (unknown magnitude)	• Increase in identified value (unknown magnitude)
<b>Climate Change Mitigation Values</b>	• Increase in identified value (by present value of \$1,143,000 to \$37,148,000)	• Increase in identified value (by present value of \$1,251,000 to \$40,658,000)
<b>Water Regulation Values</b>	• Increase in identified value (unknown magnitude)	• Increase in identified value (unknown magnitude)
<b>Biodiversity Maintenance Values</b>	• Increase in identified value (unknown magnitude)	• Increase in identified value (unknown magnitude)

As discussed in the Introduction, the primary purpose of Wilderness Area designation is to help meet provincial environmental objectives that include maintaining ecological integrity and biodiversity, protecting representative examples of natural landscapes and ecosystems, and protecting natural features and phenomena. The secondary objectives are use related. Activities such as wilderness recreation, nature tourism, environmental education and scientific research are encouraged. Sport fishing and traditional patterns of hunting and trapping are also generally permitted.

Designation of the Gully Lake and Eigg Mountain-James River Crown parcels as Wilderness Areas will involve the loss of commercial forestry values and any mining values that may be associated with mineral rights not yet established (note that there will be no effects on existing rights to develop mines). In addition to these prohibitions, the activities that may be considered for restriction include the use of snowmobiles on existing trails, and the use of other off-road vehicles (*i.e.*, ATVs).

However, as previously described, many of the most heavily utilised snowmobile and ATV routes through the Gully Lake Crown land and the Eigg Mountain-James River Crown land lie outside of the

candidate Wilderness Area boundaries. Where this is not the case, government intends to use some combination of the following to address regionally-important connector trails: 1) authorisation under the Act; 2) exclusion from designation; and/or 3) developing alternative connector routes that bypass the candidate Wilderness Areas. For the Gully Lake candidate Wilderness Area, secondary trails are expected to be closed to OHV use (approximately four to five remaining trails within the proposed boundaries). For the Eigg Mountain-James River candidate Wilderness Area, there are two ATV trails within the proposed boundaries that are proposed for closure. Available information indicates that some current users may be inconvenienced, but will have alternate routes available. Thus, the actual impacts on vehicle users associated with designation are predicted to be small.

With designation of both candidate Wilderness Areas, the values that will increase include those associated with:

- Tourism;
- Research and education;
- Naturalists and trekking;
- Existence;
- Climate change mitigation;
- Water regulation; and
- Biodiversity maintenance.

Within the scope of this study, it is not possible to reasonably estimate in a quantitative manner the extent to which these values will increase over time.

It must be emphasised that this analysis relies on using different qualitative and quantitative measures, monetary and non-monetary. In effect, what is presented in this report are a number of indicators of value. As such, direct comparisons between different types of value are difficult. However, the analysis is useful in contributing to well-informed decision-making regarding designation.

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**APPENDIX A**

**NOVA SCOTIA WILDERNESS AREAS  
QUESTIONS AND ANSWERS**

**APPENDIX B**

**STUDY METHODOLOGY**

**APPENDIX C**

**ORGANISATIONS AND INDIVIDUALS CONTACTED**