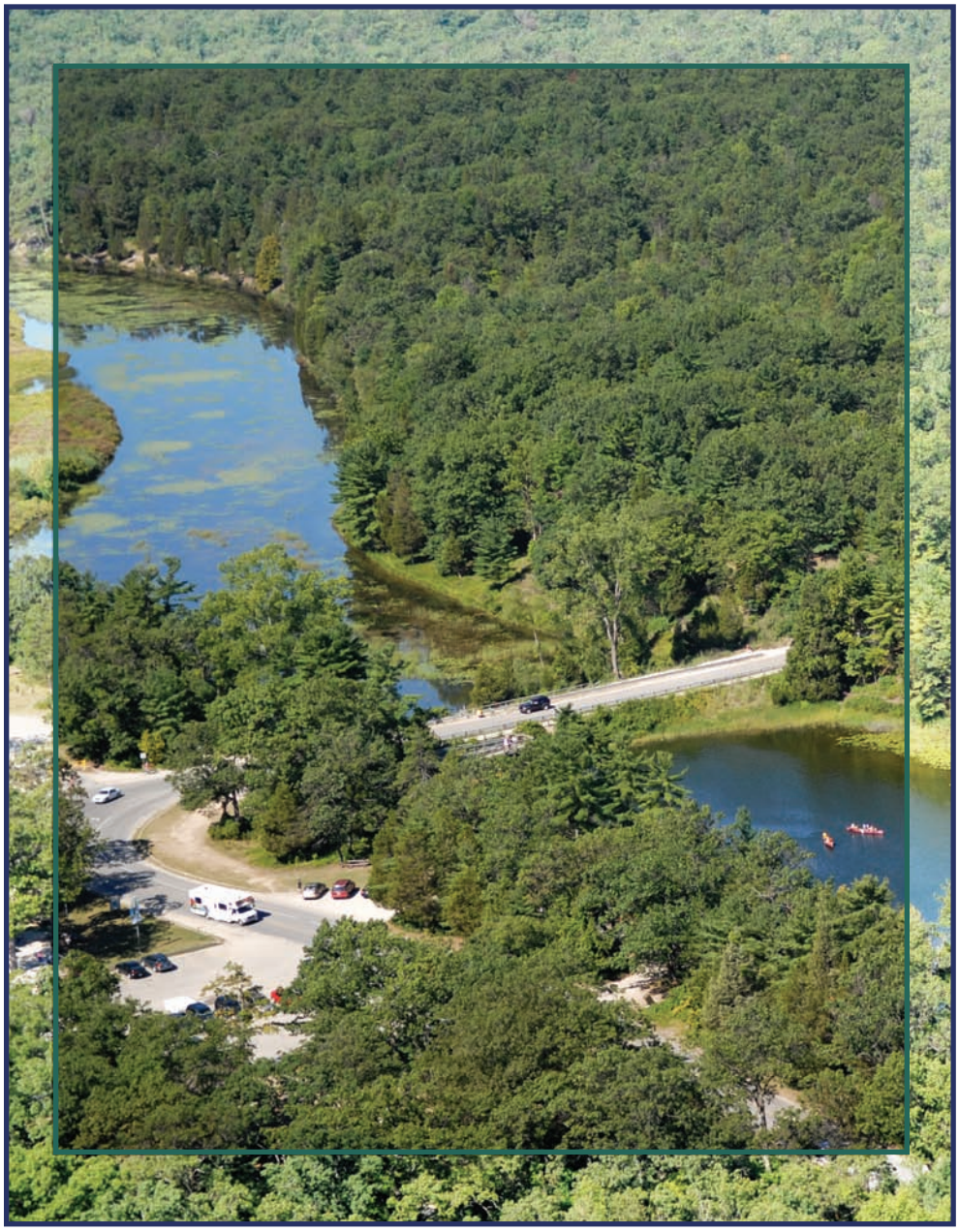
A Management Plan for the Old Ausable Channel Watershed



Developed by the
Grand Bend Community and Stakeholders

2008

A Management Plan for the Old Ausable Channel Watershed

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Prepared for:

Grand Bend Community Foundation
The Community of Grand Bend
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Ausable Bayfield Conservation Foundation
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Pinery Provincial Park
Fisheries and Oceans Canada

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Executive Summary

The Old Ausable Channel, near Grand Bend Ontario, is a unique feature in the southern Ontario landscape. It is a disconnected portion of the Ausable River, and is recognized as an ecosystem gem. It provides essential habitat for many species at risk, including three fishes: pugnose shiner (*Notropis anogenus*); lake chubsucker (*Erimyzon sucetta*); and grass pickerel (*Esox americanus vermiculatus*). The watershed is also home to many other rare and interesting flora and fauna. This includes a globally significant oak savanna ecosystem on its shores. The watershed contains a residential area as well, with approximately 700 homes, just south of Grand Bend. In 2006, the Grand Bend community and the Ausable Bayfield Conservation Authority embarked on a planning process to develop a long-term management strategy for the Old Ausable Channel. A stakeholder steering committee was formed consisting of representatives from the Ausable Bayfield Conservation Authority, the Pinery Provincial Park, the Municipality of Lambton Shores, the Universities of Western Ontario and Waterloo, Fisheries and Oceans Canada and volunteers from the five main residential communities including: Southcott Pines; Pinedale; Beach O' Pines; Wee Lake; and Huron Woods as well as representatives from the village of Port Franks.

This management plan completed for the Old Ausable Channel watershed documents the current status of the physical, biological and economic characteristics of this area. The management plan outlines approaches designed to protect and enhance the Old Ausable Channel for the following components: hydrology; attributes of succession; water quality; aquatic and terrestrial flora and fauna; tourism; recreation; and land use and development. For each of these components it provides; background information, a summary of current issues, and recommended actions. Recommendations include approaches for stewardship education, management, maintenance and monitoring of each of the topics based on their current status and their anticipated future status.

Management recommendations are prioritized from activities that need to be completed within two years, to other actions which should be considered over the next ten years. They are provided for individuals, the community and agencies for enhancement and protection of this area. Natural succession within the channel is a major consideration that the community and technical stakeholders had to address over the past two years. Succession is the transformation of an aquatic ecosystem to a more terrestrial one, in this case from a slow flowing channel to a pond, to a marsh and finally to a forest. The progression of succession will take place over many years. This natural process has implications for the species at risk and other components of the watershed. The Committee has recommended that further investigation, study and monitoring be implemented to provide additional information about the rate of succession. Short-term actions such as: using native vegetation in landscaping; and investigating the protection of the whole Old Ausable Channel as a provincially significant wetland (PSW), were also recommended.

Acknowledgements

Thank you to the Old Ausable Channel Management Plan Steering Committee for your input and review of this document:

Alistair MacKenzie, Pinery Provincial Park
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Shawn Staton, Fisheries and Oceans Canada
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***In Memory of a Valued Contributor**

Dr. Anwar Maun passed away during the development of this document in the fall of 2007. Dr. Maun was a valued member of the Old Ausable Channel Management Plan Steering Committee. The research he conducted in the Old Ausable Channel over the years has been extremely important to understanding this unique system, and his input to this document was invaluable and appreciated. He will be missed.

A Message from the Old Ausable Channel Management Plan Steering Committee Co-chairs:

LOOKING TO THE FUTURE:

Healthy Environment = Healthy Communities

If you are reading this message then you have in your hands a document that represents a Community Based Integrated Watershed Management Strategy. This document exists because of the commitment and effort of individuals with a passion about the Old Ausable Channel and the financial support of community groups such as the Grand Bend Community Foundation. These individuals donated their time, knowledge and expertise to meet, discuss, review and support the development of strategies for the Old Ausable Channel. Strategies that will inform, educate, and guide the future of the Old Ausable Channel.

Whether it is species at risk, water quality or recreational activities the interests and demands on the Old Ausable Channel can impact the future of the Old Ausable Channel. We see this document as a valuable tool for individuals and the larger community to understand the connection between their interests and the future of the watershed environment. By working together we will collectively achieve the needs and interests of all who care about the Old Ausable Channel.

The leadership of Kari Killins from the Ausable Bayfield Conservation Authority played a key role in the success of this project.

From Co-Chairs

Tom Purdy *Tom Prout*

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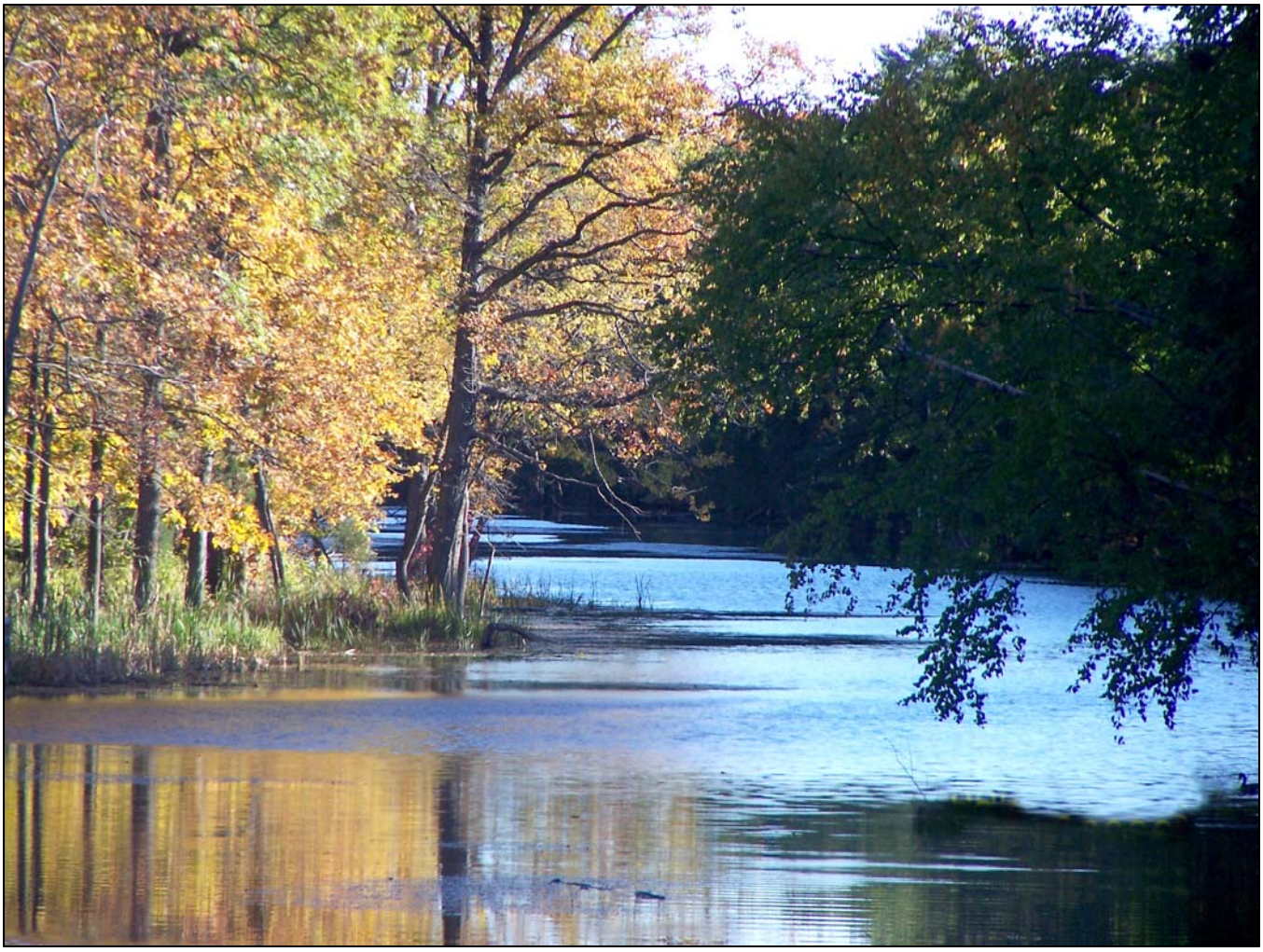
1.0 Introduction



Old Ausable Channel in Pinery Provincial Park

1.1 Definition of the Old Ausable Channel

The Old Ausable Channel is a disconnected portion of the Ausable River. The channel was once part of the Ausable River, but was isolated through human intervention near the end of the 19th century. Today the Old Ausable Channel is no longer part of a flowing river, and consequently is characterized by still, clear water and dense aquatic vegetation more typical of ponds. The Old Ausable Channel is approximately 14 km in length, ranges from 0.5 - 4.5 metres deep, 20 - 80 metres wide and drains an area of 24.5 km^2 (Steinbachs 1999). For ease of reference, the Old Ausable Channel will be referred to by the acronym OAC within the body of this document.

1.2 Geographical Location of the Old Ausable Channel

The Old Ausable Channel is located in south western Ontario within the municipality of Lambton Shores. The OAC lies in a northeast to southwest orientation between the Villages of Grand Bend and Port Franks. For the purposes of this management document, the geographical boundaries of the OAC are as follows: the north eastern origin is its most upstream point and is located in Grand Bend immediately adjacent to the mouth of the Parkhill Creek (adjacent to Grand Bend harbour), the south western outflow is located near Port Franks. The OAC's eastern and western boundaries are defined by Highway 21 to the east, and Lake Huron to the west. These geographical boundaries define the OAC management plan study region (Refer to Figure 1).

View of Old Ausable Channel with Lake Huron in the distance, Pinery Provincial Park (D. Holm)

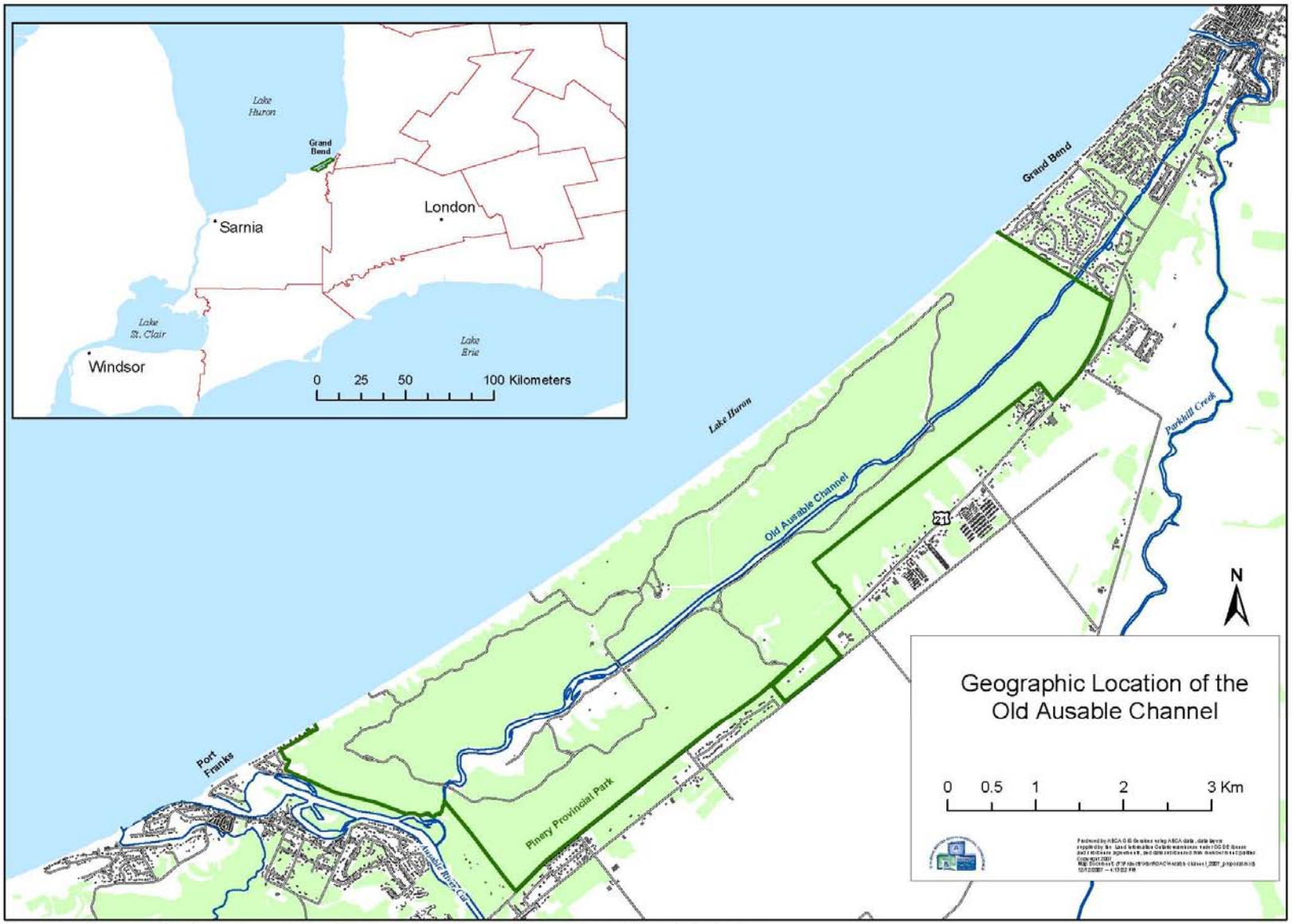


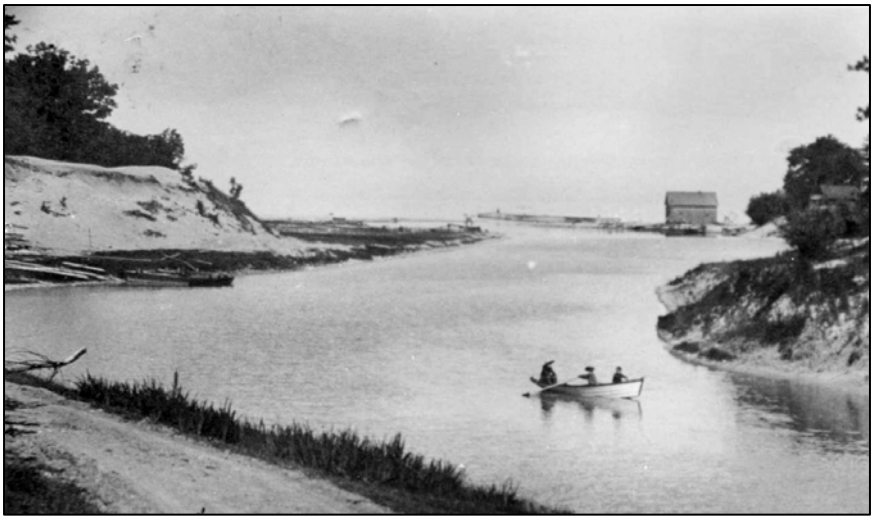
Figure 1: Geographic location of the Old Ausable Channel near Grand Bend, Ontario

1.3 History of the Old Ausable Channel

Historically, the Ausable River used to flow north to the town of Grand Bend, where it abruptly swept south, creating the “grand bend” for which the town was eventually named (Refer to Figure 2). On a geological timescale, back to the end of the ice age, the Ausable River outlet was once right at Grand Bend (Dixon 1963). But years of sediment deposits by the currents of Lake Huron, and outflow from the river resulted in the damming of the river mouth and caused the outlet to progressively move southwards. Sediment deposition caused the gradual formation of the “grand bend”, and the river flowed parallel to the shore of Lake Huron for about 21 km where it finally broke through the shore dunes and emptied into Lake Huron at Port Franks (Refer to Figure 2)(Dixon 1963).

This was the path of the Ausable River until 1873. At this time the Canada Company, who purchased all the land in the area from the Crown in 1826, began construction of what is known as the “The Ausable River Cut” to relieve flooding. This “cut” was excavated from a point east of Port Franks where the river was flowing northward, to the river mouth at Port Franks (Refer to Figure 3). As a result, the present outlet of the Ausable River empties directly into Lake Huron at Port Franks. Since the completion of “The Cut” in 1875, no water from the Ausable River has flowed into Grand Bend. There is a stretch of dry riverbed that extends northward from the Cut’s origin to the point where the Parkhill Creek joined the original course of the Ausable River as a tributary. The water from Parkhill Creek flowed north to Grand Bend and then parallel to the lakeshore before empting into Lake Huron (Dixon 1963).

In 1892, the residents of Grand Bend decided to make a second “cut” at the “grand bend” out to Lake Huron in order to create a harbour for their town. This caused Parkhill Creek to outlet directly to Lake Huron at Grand Bend, as it still does today (Refer to Figure 4). This diversion terminated the flow of water from Parkhill Creek parallel to Lake Huron, and resulted in the formation of the isolated Old Ausable Channel as we know it today (Refer to Figure 5). The 14 km stretch of river that flowed southward from



Harbour at Grand Bend ~ 1900 (Lambton Heritage Museum)

Grand Bend to Port Franks (the OAC), no longer received any inflow from upstream sources. The OAC is fed only by precipitation, groundwater seepage (springs) and minimal runoff (Steinbachs 1999). The south end of the OAC was left open, and still "outlets" into the present day Ausable River Cut. Water from the Ausable River Cut enters the OAC through back flushing under certain conditions. The OAC is now a tributary of the Ausable River, instead of part of its main channel.

Present-day Grand Bend Harbour (D. Holm)

Figure 2: Historic configuration of the Ausable River - the pre-settlement course of the river

Figure 3: Configuration of the Ausable River after the diversion in 1873 to 1875

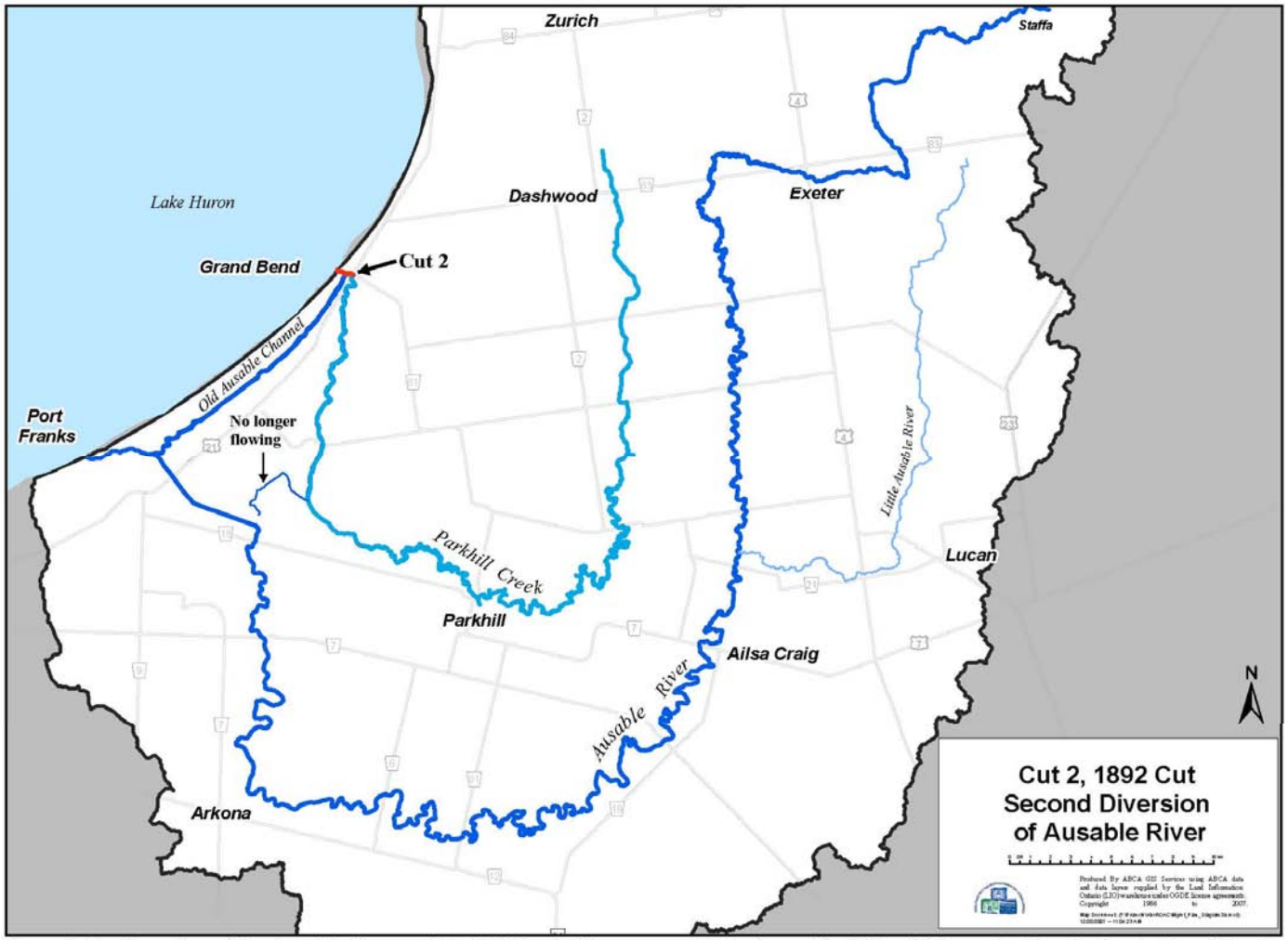


Figure 4: Configuration of the Ausable River and Parkhill Creek after a second diversion cut in 1892, which resulted in a harbor in Grand Bend

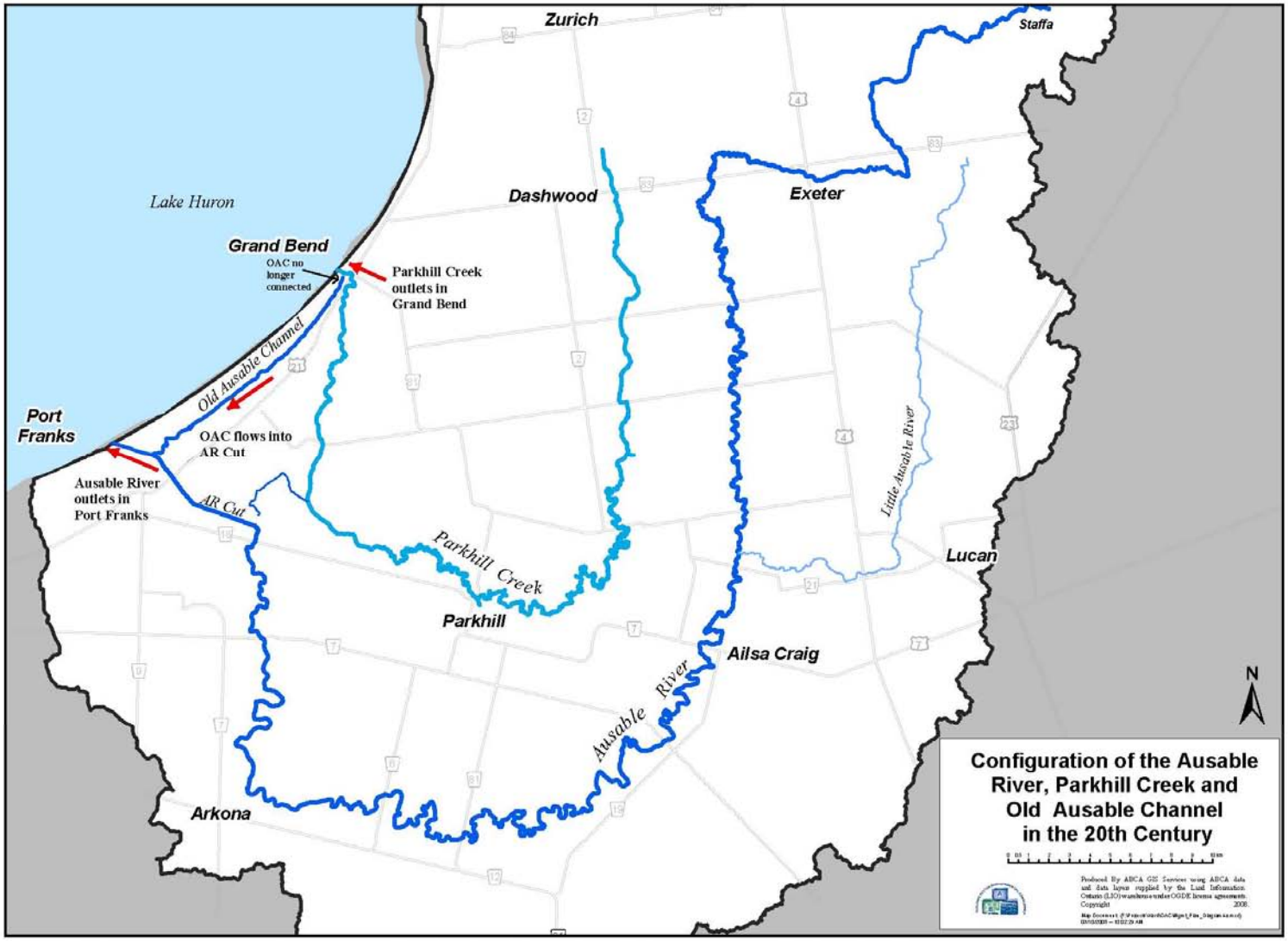


Figure 5: The present day configuration of the Ausable River, Parkhill Creek and the Old Ausable Channel, near Grand Bend Ontario

1.4 Property Ownership in the Old Ausable Channel Management Plan Study Area

The majority of the OAC lies within the boundaries of the Pinery Provincial Park, with a small upstream portion of the northern end being abutted by residential and local business properties, and a small downstream portion at the southern end being abutted by Scouts Canada and Ausable Bayfield Conservation Authority (ABCA) properties (Refer to Figure 6). The Pinery Provincial Park manages all land found within in its property boundaries according to the Pinery Provincial Park Management Plan (OMNR 1986) and other guidance documents.

There are three residential regions in the management plan study area. The biggest residential area, comprised of approximately 700 homes at the northern end of the watershed is divided into five neighbourhoods. Beginning at the extreme north and moving south towards the Pinery Provincial Park these include; Southcott Pines, Pinedale, Beach O' Pines, Wee Lake and Huron Woods (Refer to Figure 6). The Municipality of Lambton Shores owns some small sections immediately adjacent to the water's edge of the OAC in these neighbourhoods, as this area was once part of an historic road access. Local business properties border the OAC in the northern end on the east side of the channel.

In addition to these neighbourhoods there are additional residential and business properties which do not border the OAC, but are adjacent to the Pinery Provincial Park's land. The most northern end of this residential area is known as Dalton subdivision. These residences and businesses are accessed off of Highway 21, just south of the village of Grand Bend (Refer to Figure 6).

A residential area included in the OAC management plan study area, known as Armstrong East, exists in Port Franks along Lake Huron, as well (Refer to Figure 6).

At the southern end of the Pinery Provincial Park's boundary, east of the OAC's outlet, a small section of land known as Camp Attawandaron is privately owned by Scouts Canada. The Scouts own this small parcel of land and lease a large section of land from the neighbouring property owner, the ABCA. The Scouts have cabins on their property and use the adjacent ABCA property for day use activities related to scouting (Refer to Figure 6).

The ABCA owns the remaining two strips of land on either side of the OAC's outlet adjacent to the Ausable River Cut (Refer to Figure 6). The section of land on the west side of the OAC, where the Ausable River Cut and OAC meet to Lake Huron, is referred to as the Sherwood Fox Plant Preserve. The rest of the ABCA's land is referred to as the Ausable River Cut Conservation Area. The ABCA imposes very little development on its land and leaves it quite natural. The University of Western Ontario has an agreement to use some areas of the ABCA's property for terrestrial research as needed.

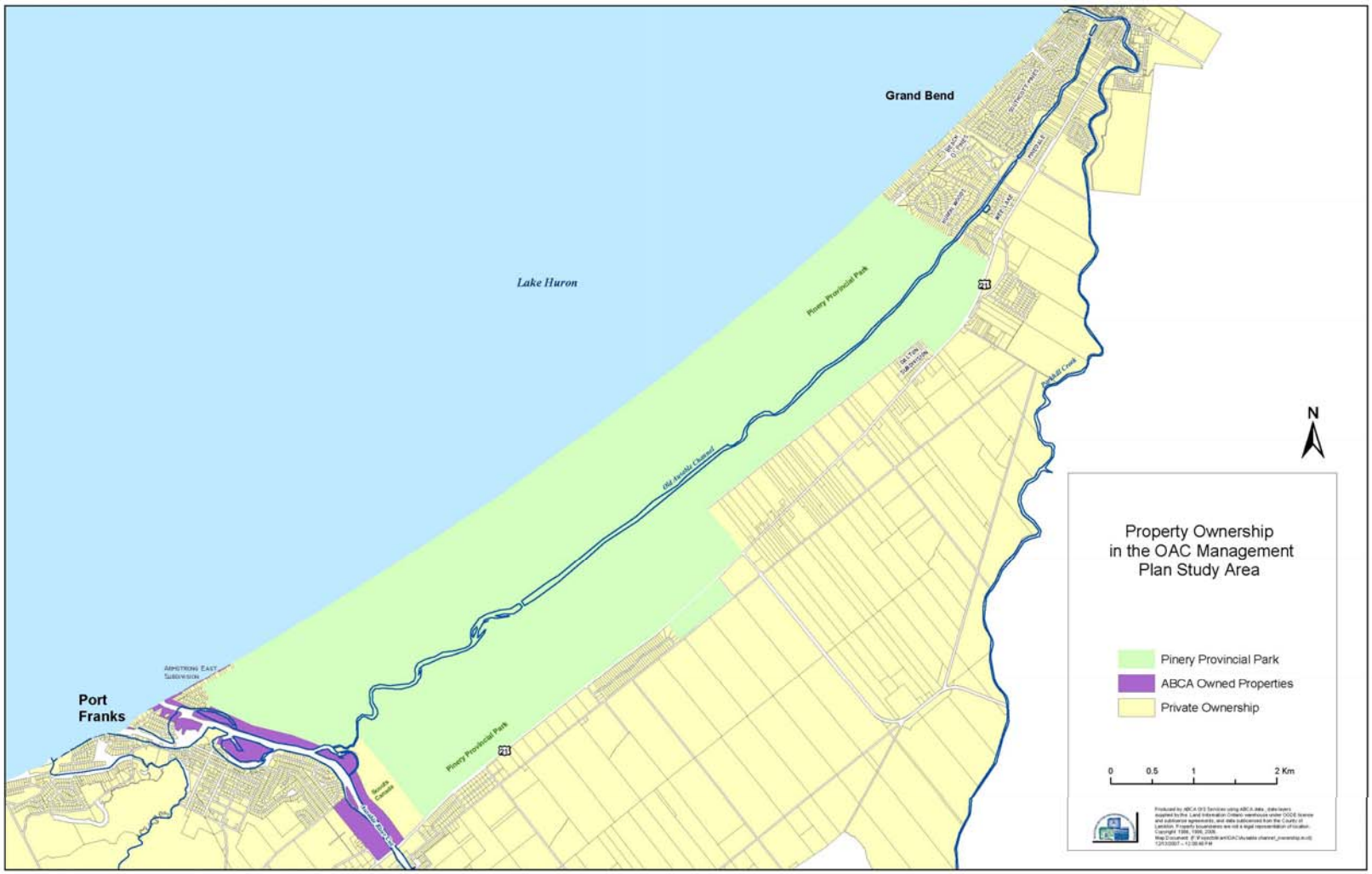


Figure 6: Property Owners in the Old Ausable Channel Watershed

1.5 Important Natural Features of the Old Ausable Channel Watershed

Dunes Watershed

Within the greater Ausable River watershed, the OAC's drainage is part of a sub-watershed known as the Dunes Watershed (Snell 1995, Veliz *et al*. 2006). Refer to Appendix 1 for additional detail on this watershed. Watercourses in the Dunes include the OAC and also the downstream end of the current Ausable River referred to as the "Ausable River Cut". The Dunes watershed boundaries are defined by the ABCA (Refer to Figure 7). Dunes watershed, or catchment basin drains an area of 27km^2 in total (Veliz *et al*. 2006). The Dunes watershed is essentially a sand plane with dune ridges. In general, soils in this watershed are made up of 95% sand, 4% sandy loam and 1% organic material (Veliz *et al*. 2006).

The Dunes watershed was created by sand deposits derived from lakeshore bluff and near-shore erosional process occurring over thousands of years. This watershed is an internationally important example of dune succession and it contains a rare oak savanna community, including provincially and nationally significant flora and fauna (Veliz *et al.* 2006). The Dunes also contain two large Areas of Natural and Scientific Interest (ANSIs). One is within the boundaries of Pinery Provincial Park; and the other is the Port Franks Forested Dunes and Wetland Complex. Carolinian Canada has identified the ANSIs in their *Big Picture Initiative* as one of their core areas for protection and enhancement. The *Big Picture* is an analysis which identifies a natural heritage system of large core natural areas, other significant natural areas and corridors and linkages connecting the system together. It is meant to complement other analyses of natural heritage conducted by municipalities, conservation authorities, provincial and federal departments (www.carolinian.org 2007). The *Big Picture* Port Franks Wetlands and Forested Dunes Signature Site includes the Pinery Provincial Park down to Kettle Point.

Old Ausable Channel

The OAC has been designated as an Environmentally Significant Area (ESA) by the ABCA, as its watershed includes an oak savanna forest ecosystem and many species at risk (SAR). The SAR include; rare types of vegetation, insects, reptiles, birds, fishes, and mammals (Natural Heritage Information Centre, 2006 & Veliz *et al.* 2006).

An area within the OAC management plan study region has been designated as a provincially significant wetland (PSW) (Refer to Figure 8). These wetlands, which are adjacent to the Pinery Provincial Park boundary in the mouth region of the OAC, were evaluated as part of the Port Franks Wetlands (pers. comm. Sanders 2007). Provincially significant wetlands are those areas identified by the province as being the most valuable and they are given extra protection. The OAC itself has never been evaluated for this special designation. However, the ABCA has designated the entire OAC as a regulated water body, which means permits may be required for works within or in proximity to the OAC.

Figure 7: Dunes Watershed

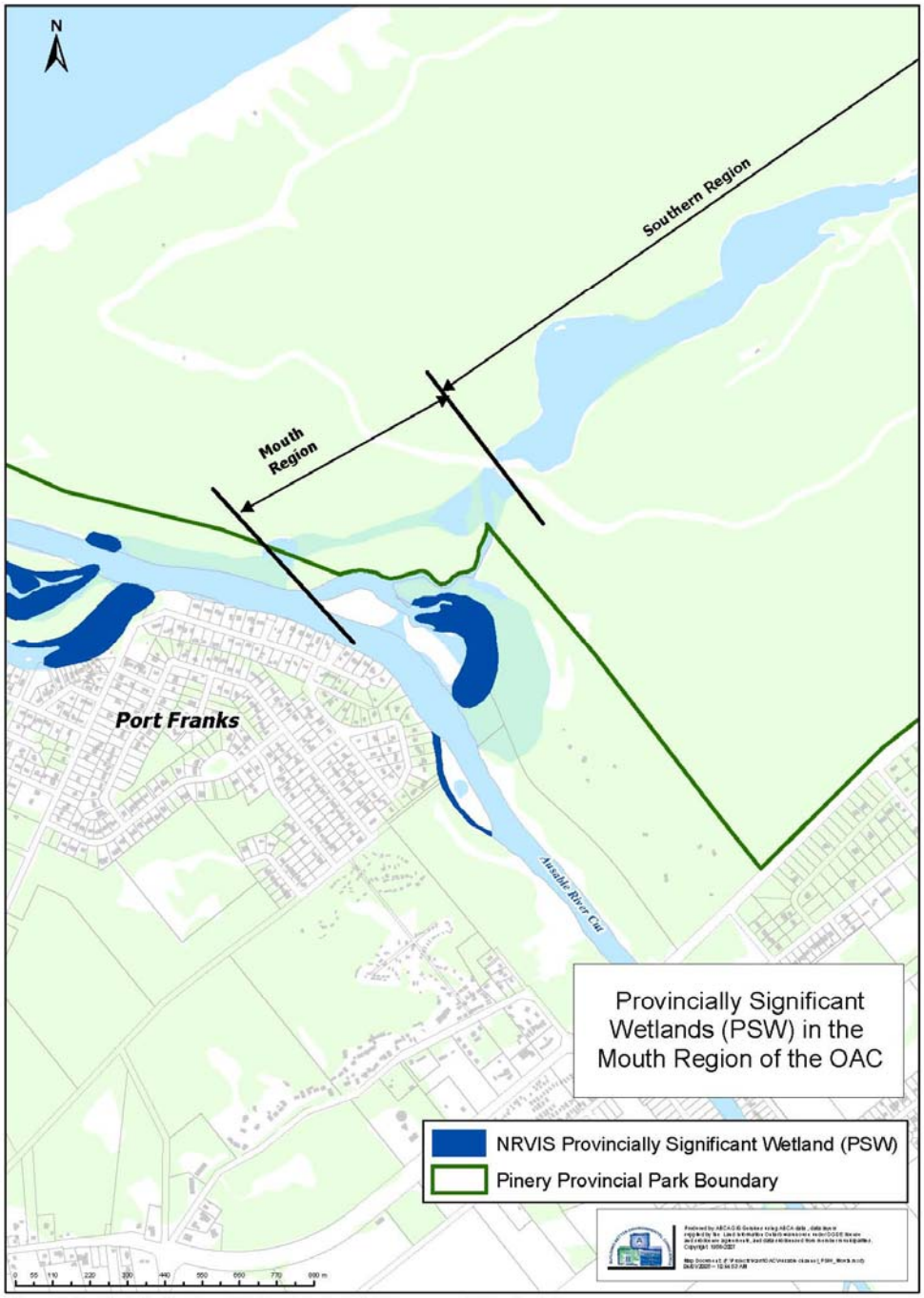


Figure 8: Provincially Significant Wetlands in the OAC Management Plan Study Area

1.6 Important Man-made Features of the Old Ausable Channel

Following the human intervention in the latter part of the 19th century additional man-made alterations were imposed that have further changed the OAC. The Pinery Provincial Park was established in 1957 and officially opened in 1959 (OMNR 1986). A dam was constructed on the OAC near the centre of the park in 1962 (Refer to Figure 9). This dam was constructed to increase water levels in the OAC for recreational purposes (OMNR 1986). The dam is important to maintain the upstream water depth. In addition to the Pinery Park dam, there were also a series of culverts constructed along the OAC from the northern residential area down to south of the Park dam (Refer to Figure 9). Beginning at the very top of the OAC's origin at River Road and moving south, culverts exist in the following locations (Refer to Figure 9);

In the residential area:

- a culvert drains under River Road north into the Parkhill Creek
- no culvert exists at Lake Road (segregating the northern section of the OAC from the rest of channel)
- Lakeview Avenue
- Pinedale Road (this is a road allowance that is not travelled by vehicles, only by hikers)
- Beach O' Pines Road
- Pinetree Drive

In the Pinery Provincial Park:

- North Bridge
- Pinery Park Dam
- Burley Bridge

In addition to culvert and dam construction it should be noted that areas of the OAC were also dredged in the past. The segregated section of the OAC between River Road and Lake Road (Refer to Figure 9) was dredged approximately 15 years ago. The very north end of Southcott Pines, downstream of Lake Road, was dredged in the 1970s.

Pinedale Road Culvert

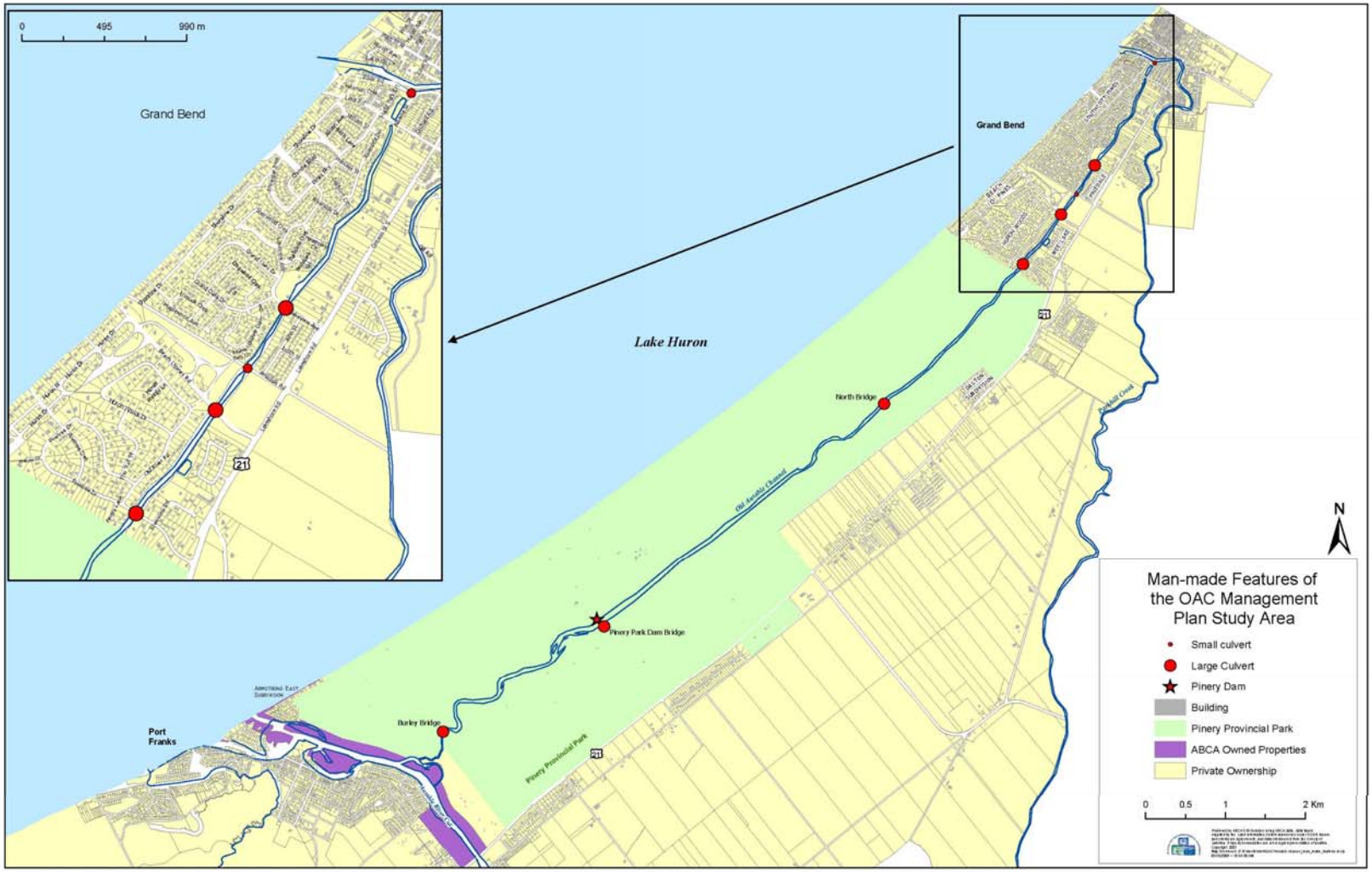


Figure 9: Pinery Dam and Culverts on the OAC

1.7 Project Background

The Old Ausable Channel is characterized by clear water with dense aquatic vegetation. Due to its lack of flow, the old river channel is believed to be converting to a more pond like ecosystem that may eventually become less aquatic and more terrestrial over a series of many years through natural succession. The OAC has been identified as an important ecosystem in the Ausable River Recovery Strategy (2005), as it is home to three species at risk fishes, and the oak savanna forest on its shores is internationally significant. Due to its unique ecological and recreational attributes there was a need to protect and enhance the OAC for the long term hence initiating the development of a management plan.

There are various agencies that own or manage land adjacent to this unique system including: the Pinery Provincial Park, Ausable Bayfield Conservation Authority, Scouts Canada, and the Municipality of Lambton Shores. There are also many private residents and patrons of this natural area, including those who enjoy outdoor activities such as camping, canoeing, hiking and cross-country skiing. To date there has been no organized attempt to ensure that the management of the adjacent lands are coordinated amongst the various stakeholders. This was the main reason for the initiation of the management plan development process.

In 2006, the Grand Bend community and the Ausable Bayfield Conservation Authority embarked on a planning process to develop a long-term management strategy for the Old Ausable Channel. A stakeholder steering committee was formed consisting of representatives from the Ausable Bayfield Conservation Authority, the Pinery Provincial Park, the Municipality of Lambton Shores, the Universities of Western Ontario and Waterloo, Fisheries and Oceans Canada and volunteers from the five main residential communities including: Southcott Pines; Pinedale; Beach O' Pines; Wee Lake; and Huron Woods as well as representatives from the village of Port Franks. By unifying efforts between the various stakeholders and developing a management direction through the implementation of this plan, local agencies and residents can better utilize and protect this unique ecosystem.

The management plan for the OAC watershed will:

1. **Provide a unified vision for management of this unique system across the different agencies and stakeholder groups**
2. **Promote protection and conservation of significant species and habitat**
3. **Identify long-term management direction and actions**
4. **Identify educational and recreational opportunities**
5. **Provide guidelines for adjacent land use activities**

There is a need to balance environmental and community usage objectives. The OAC is a natural area that has been developed, but people choose to live here because of these natural attributes. By protecting nature, economic benefits become a positive spin-off for the community. Protecting the ecosystem will not only provide benefit to the natural environment – it will also indirectly provide longer term economic benefits to the community. The guiding philosophy of this document will be one that is to protect and enhance this natural ecosystem.

1.8 Project Goal and Objectives

Goal

To protect and enhance the integrity and environmental values of the OAC, and where necessary restore ecosystems, representative populations and historic qualities that make the OAC significant, while recognizing development, recreation and tourism needs.

Objectives

Protection:

To protect natural heritage and biological features of provincial significance.

Education:

To increase awareness and understanding of the ecological integrity of the OAC and promote better land use practices through education.

Recreation & Tourism:

To provide opportunities to discover and experience the unique character of the historic channel.

1.9 Plan Format and Methodology

Topics and issues pertaining to the OAC included in this document were identified by stakeholders, which consisted of the management plan steering committee, the general public/local community and involved agencies. The document was reviewed by the committee of stakeholders, including technical advisors. The OAC Management Plan was written to be a broad, encompassing document that provides education as well as management for the resource. It describes existing knowledge and potential issues related to physical processes such as hydrology, succession and water quality; biological resources such as aquatic vegetation, fisheries, terrestrial vegetation and fauna; and economical considerations including recreation, tourism and land development. The format for each chapter is the same and includes:

- The background on the chapter topic
- The topic's main management challenges and issues
- Management objectives for each chapter
- A summary chart of recommended actions to address the challenges and issues, including a priority time frame, an approach type and the responsible agency*
- Broad management recommendations for each chapter

***** It should be noted that the definition of responsibility for the identified "responsible agencies" is that these groups will take the leadership role in initiating the implementation of recommended actions. Other agencies may also become involved as actions evolve.

Priority Time Frame for Action Item Completion

The recommended actions are organized in a logical order of completion priority. The following definitions indicate the recommended time frame for completion of action items, with short term being the most important to complete first.

Priority Time Frame is defined as:

Short-Term – completed within 2 years (2010)
Mid-Term – completed within 5 years (2013)
Long-Term – completed within 10 years (2018)

Priority time frame terms will be implemented starting from the year 2008.

OAC Management Regions

The OAC has been divided into sections for the purpose of providing appropriate management recommendations (Refer to Figure 10). The sections will be referred to as the following in this document:

Origin – the most northerly section of the OAC between River Road and Lake Road (this section is isolated from the rest of the channel because there is no culvert at Lake Road)

Northern Region – the residential area of the OAC – Lake Road to the northern boundary of the Pinery Provincial Park

Central Region – northern boundary of the Pinery Provincial to the Pinery Dam

Southern Region – the Pinery Dam to Burley Bridge in the Pinery Provincial Park

Mouth Region – the Burley Bridge to the outlet of the OAC into the Ausable River Cut

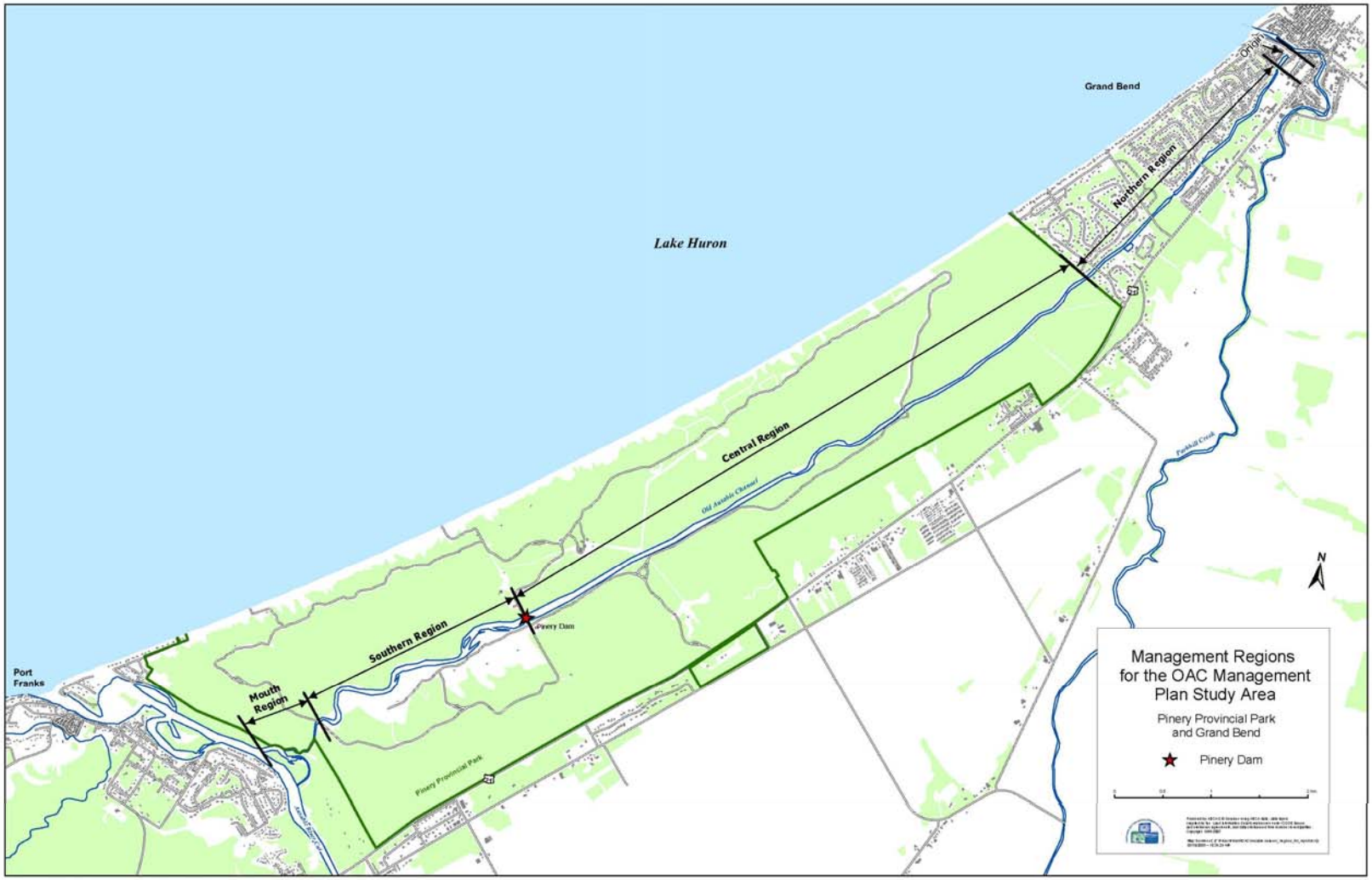


Figure 10: Management Plan Regional Breakdown of the OAC

2.0 Management Issues in the Old Ausable Channel Watershed

Old Ausable Channel (D. Holm)

2.1 Physical Management Components for the Old Ausable Channel Watershed

Old Ausable Channel, Pinery Provincial Park (D. Holm)

2.1.1 Hydrology & Succession

Background

Hydrology

Being cut off from the Ausable River and naturally having a low gradient, the OAC appears to have no flow. However there is a minimal amount of detectable flow in the spring, virtually no flow by July and usually very low flow again in the fall (Maun *et al*. 1998). Having no tributaries the OAC flows very slowly through nearby sand dunes and is entirely fed by groundwater input, precipitation and minimal surface runoff (Steinbachs 1999). Studies have found that the OAC is almost exclusively recharged by groundwater (Simpson 2001). This ground water is recharged from precipitation, a significant portion of which is derived from the spring snowmelt (Simpson 2001). The ground water is not significantly recharged by surface water bodies, (Lake Huron, Parkhill Creek, Ausable River) or deep ground water (Steinbachs 1999). The OAC runs through, and is bordered by a large sand dune system. Groundwater flow in the OAC watershed is controlled by this sand dune topography. The OAC receives water from the dunes which act as an open aquifer system (Steinbachs 1999).

Both shallow and bedrock aquifers containing groundwater occur in this watershed. The shallow Pinery Aquifer is an important source of water for the OAC. This aquifer is located within the large deposited sand dunes near the shore of Lake Huron, and has been found to have elevated levels of nitrates and occurrences of E. coli (Veliz *et al*. 2006). The bedrock aquifer has had elevated levels of sulphates and hardness making it undesirable for drinking water (Veliz *et al*. 2006). A thick sequence, underlying the sandy dune deposits, comprised of mostly fine-grained glacial sediment separates the shallow aquifer from the bedrock aquifer in this area (Veliz *et al*. 2006). The dune ridges found on either side of the channel also help to funnel precipitation and groundwater into the OAC (www.pinerypark.on.ca 2007). Over the last 100 years the accumulation of organic material and sand in the OAC riverbed has created the shallow, slow-flowing river that exists today (Steinbachs 1999).

Groundwater base-flow increases in a southerly direction from Grand Bend along the OAC, due to the catchment area increasing and the aquifer sediments become both wider and deeper (Steinbachs 1999). Seepage rates of groundwater are lower toward the northern portion of the OAC, due to the decreased thickness of the aquifer sediments. Therefore this northern are does not contribute as much groundwater to the channel (Steinbachs 1999). This results in the northern end of the OAC being more stagnant and having quite a low water level during the summer months. The extreme northern section, the Origin, is very shallow and normally dries up completely during the summer. It has been disconnected from the main OAC by Lake Road's lack of culvert. It has become more of a non-open water wetland (wet meadow) as opposed to a river.

The OAC experiences significant evaporation, especially during the summer and fall months (Simpson 2001). As a result of evaporation and decreased recharge in the summer and fall months, water volumes in the OAC are normally lower in the fall and winter months. Water volumes are usually at their highest levels in the late spring and summer following the snowmelt and spring rains (Simpson 2001). The Pinery Provincial Park dam has proven to be very important in maintaining deeper upstream water levels,

and has significantly increased the annual volume of water retained in the OAC. In addition to the Pinery dam, the series of culverts upstream of the dam, and one culvert south of it, also contribute to water level maintenance in the OAC (Refer to Figure 9). Frequent beaver dams built in the culverts cause elevated water levels. The OAC surface water levels downstream of the Pinery dam are influenced by Lake Huron's levels (Steinbachs 1999). Back flushing of Ausable River Cut water in to the OAC can increase the water depth below the dam.

Pinery Park Dam, looking upstream through culvert at the bridge

Succession

Over several years, due to the lack of flow, the OAC will slowly change from an aquatic, pond-like ecosystem to a more terrestrial marshy system. This is a process known as natural succession or the gradual replacement of one type of ecological community by another in the same area. It involves a series of orderly changes, especially in the dominant vegetation.

Succession is a very slow process. But it has been, and continues to be, observed in the OAC and can be directly linked to its unique hydrology. Human alterations to the original course of the Ausable River eliminated the upstream source of flushing water, drastically accelerating the natural evolution of the OAC. Lack of flow allowing the proliferation of aquatic plants throughout the OAC increases the amount of organic matter deposited in the channel, leading to infilling of the channel and hastening succession. This is expected due to the slow-flowing nature of the present channel. When there is no flow to carry the particles, they fall out of suspension and settle at the bottom of the river.

As a result of being cut off from the main body of the OAC, the Origin has experienced the fastest rate of succession and has become a more terrestrial wetland area. The shallower Northern Region is also experiencing a more rapid rate of succession due to its hydrology (less groundwater input). The Central Region has and will continue to experience a less rapid rate of succession due to a greater water depth created by the Park dam (pers. comm. Wiklund 2007) and also increased amounts of groundwater input. The Southern and Mouth Regions most resemble a riverine system and have experienced the least rapid rate of succession.

Management Challenges & Issues

Water Flow & Succession

There is a lack of significant water flow in the OAC. The types of vegetation growing in certain reaches of the OAC prefer unmoving, still water. The lack of flow allows the vegetation to proliferate, becoming quite dense and also results in the channel water being stagnant, especially in the Northern Region of the OAC. Lack of flowing water is causing the acceleration of in-filling by allowing decaying plant matter to build up on the stream bed. The shallow OAC allows for increased aquatic plant establishment and growth. Some residents throw organic matter in the form of leaves and brush into the OAC, which is also helping to speed up succession since there is no flow to carry this downstream.

Old Ausable Channel, Northern Region in summer (D. Holm)

The natural succession of the OAC from an aquatic system to a more terrestrial system over many years is a difficult management challenge. Human intervention in the OAC in terms of dredging, increasing flow and depth or reducing vegetation is not a favorable response at this time. This ecosystem provides significant habitat to many species, and critical habitat to species at risk. More information regarding the rate at which succession is happening is required. Leaving the OAC as natural and unaltered as possible is the preferred option. However, it is evident that most residents in the OAC watershed would like the OAC to remain as more of a pond, and not to evolve into a terrestrial system. The fact that succession is slowly occurring prompts further investigation into this problem. Time series data indicating what is happening and how fast in terms of succession is required. It is apparent that succession is happening at different rates in each of the five regions (Origin, Northern, Central, Southern, Mouth) of the OAC. This may require or allow for different management techniques for each of the sections. In the meantime, protection and enhancement of the OAC and its natural attributes is important.

Pinery Dam and Culverts

Maintaining the water level in the upper OAC is important to all components of the system. The Pinery dam is essential to retain high water levels upstream in the OAC. There is a need to keep the dam in good repair with regular maintenance.
In addition to the culvert at the Pinery dam - the neighbourhood and additional park culverts in the Pinery can also affect the water levels in the OAC. Debris sometimes builds up around the culverts in the form of tree limbs, garbage, etc. Beavers inhabit the OAC and sometimes build their dams in the culverts, especially in the Pinery. The dams they build can affect the water flow and ultimately the water levels in the OAC.

Maintenance of culverts is the responsibility of Lambton Shores with the exception of Beach O' Pines Road, as it is a private road. The Pinery maintains its own culverts.

Management Objectives

Initiate time series data collection which will indicate what is happening and how fast in terms of succession. Monitoring and assessment of succession over the long term will be necessary to guide future management decisions.

Maintain the water levels in the OAC via the Pinery dam. This is an important consideration to all aspects of the channel. Plans will need to be put into place for regular maintenance of the Pinery dam, as well as keeping the series of culverts that exist throughout the OAC clear of debris.

Protect and enhance the OAC as it currently exists.

Summary of Recommended Actions

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2010)	Water Flow and Succession	Habitat Assessment	Investigate the feasibility of designating the entire OAC as a provincially significant wetland (PSW) through in-field site evaluation	ABCA Ministry of Natural Resources
Short Term (2010)	Water Flow and Succession	Background Studies	Compile a literature review specific to the issue of succession to provide background information Compile a summary report investigating possible course of actions to manage the ecosystem in order to slow down succession and infilling. The report would identify and outline different management options as well as legal requirements and regulation for alterations in the OAC to manage succession	ABCA Pinery Provincial Park

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Mid Term (2013)	Water Flow and Succession	Education	Develop educational material on succession and the OAC including actions residents can take to slow down the rate of succession or infilling (e.g., not throwing leaves into the channel)	ABCA
Mid Term (2013)	Water Flow and Succession	Monitoring	Develop and implement long-term monitoring of the rate of succession and inventory the aquatic vegetation to assess changes and provide data to guide future management through research and studies (e.g., core sampling of OAC sediment) Develop and implement monitoring programs to detect changes and make future management decisions for the following: elevation of the channel, water levels, sediment depth	ABCA Pinery Provincial Park

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Mid Term (2013)	Water Flow and Succession	Background Studies	Investigate the feasibility of improving the OAC Origin (small isolated area north of Lake Road) through a site assessment and report detailing wetland restoration options	ABCA
Mid Term (2013)	Pinery Dam and Culverts	Monitoring	Implement a monitoring program/protocol to keep the Pinery Dam in place and in good repair as to ensure water levels are kept at a certain depth Monitor culverts in the Provincial Park to keep them free of debris and garbage	Pinery Provincial Park

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Mid Term (2013)	Pinery Dam and Culverts	Local Management Education	Monitor and assess the beaver dams in the culverts to ensure they are not in danger of creating problems on a case by case basis. Pinery is responsible for park beaver dams, Lambton Shores is responsible for neighbourhood beaver dams Develop a protocol for their safe removal (if removal is necessary) Provide some education on beaver ecology to the public in the form of a fact sheet and as part of the OAC website	Pinery Provincial Park Municipality of Lambton Shores ABCA
Mid Term (2013)	Pinery Dam and Culverts	Local Management	Implement a monitoring program with local neighbourhoods and local municipality to keep area around and within culverts clean and free of debris to be assessed on a yearly basis Implement and development of a biannual cleanup day to clean up in and around culverts and also litter	Municipality of Lambton Shores Local Neighbourhood Associations

Recommendations for Management

Baseline data collection and ongoing monitoring of the state of the OAC in regard to succession rate and infilling of the channel is very important.

It is highly recommended that further investigation and study be initiated to assess changes and provide data to guide future management.

The benefits to the users and residents by implementing these recommendations: insight will be gained regarding the changes the OAC is undergoing so that we may better manage it for the long term.

2.1.2 Water Quality

Background

In 2006, at the outset of the Old Ausable Channel Management Plan process, there was limited data to characterize water quality in the Old Ausable Channel. Beginning in 2006 and continuing in 2007, the ABCA and the Pinery Provincial Park have collected surface water samples at two locations monthly. One site is located just upstream of Pinery dam and the other location (added in 2007) is just upstream of Pinetree Drive in Huron Woods (Refer to Figure 11). Water was tested for *Escherichia coli* (E.coli) and nutrients including; total phosphorus (TP), dissolved phosphorus, nitrate-nitrite, ammonia and total kjedhal nitrogen (TKN).

To date, concentrations of TP and E.coli have been summarized (Refer to Table 1). Full water quality data results for 2006 and 2007 can be found in Appendix 1. The median concentration of TP in the OAC is 0.02 mg/L . Compared to a median concentration of 0.08 mg/L in Ausable Bayfield area streams (Veliz *et al.* 2006), concentrations in the OAC are generally low. The geometric mean concentration of E. coli in the OAC is 4.49 colony forming units per 100 mL. The geometric mean concentration of E. coli in Ausable Bayfield area streams is comparatively higher at 233 colony forming units per 100 mL. As noted in Table 1, the OAC concentrations of TP and E. coli are below the provincial guidelines. The provincial objective is 0.03 mg/L of TP. Concentrations of TP greater than 0.03 mg/L result in enhancement of plant growth and contribute to excess algae and low oxygen within a water body. The Ontario Ministry of Health has established a bathing recreation standard for E. coli of 100 colony forming units per 100mL of water. Concentrations of E. coli higher than this standard have potential for water to carry disease-causing organisms.

Table 1. Water Quality Data in the OAC

Site	Total Phosphorus mg/L (Provincial Guideline 0.03 mg/L)	E. coli CFU/100mL (Provincial Guideline 100 CFU/100mL)
Pinery 2006 (9 samples)	0.01	4.87
Pinery 2007 (9 samples)	0.02	2.69
Huron Woods Neighbourhood 2007 (9 samples)	0.03	6.93
All samples collected in 2006 and 2007	0.02	4.49
Ausable Bayfield area streams	0.08	233

Figure 11: Water Quality Sampling Locations

Relative to the rest of the Ausable River watershed, the water quality in the OAC is quite good as a result of its isolated nature. Its disconnection from the main river coupled with no agricultural, commercial or industrial influences result in the OAC being much less turbid, (the water clarity is quite clear) and less nutrient rich than the Ausable River. The quality of the water in the OAC has potential to be influenced by three main factors; the Pinery Dam providing a division in the channel, the concentration of residential homes and businesses in the Northern Region and the difference in quantity of groundwater entering the OAC from north to south in terms of dilution. It is possible for the water quality in the Origin, Northern and Central Regions to be affected by human activities in the residential neighbourhoods and the Pinery. The water quality in the Southern and Mouth Regions is influenced by back-flushed Ausable River Cut water entering the OAC at its outlet (Wiklund 2001).

OAC outlet into Ausable River Cut in early spring – note difference in water colour (Pinery Provincial Park, A. MacKenzie)

Origin, Northern and Central Regions

Studies have indicated that the residential development at the north end of the channel is possibly a minor source of contamination to the OAC in the form of septic effluent and nutrients (Steinbachs 1999). Surface runoff from lawns, driveways and roadways may carry road salt, nutrient rich fertilizers, herbicides and pesticides into the river channel. Contaminants, such as nutrients, can contribute to eutrophication which can result in excessive aquatic vegetation growth. Minor amounts of septic system effluent may be entering the river channel via groundwater discharge (Steinbachs 1999). The current method for treating domestic wastewater is through the use of septic systems in the developed area of the Northern Region. Municipal sewer services are said to be planned for this area over the long term.

Evidence of these small septic effluent and nutrient concentrations in the north end of the OAC are likely due to the low discharge rates of groundwater combined with the very high evaporation rates in summer providing less potential for dilution or flushing of contaminants (Steinbachs 1999). Very low amounts of septic effluent were detected near the Pinery. In the Pinery, the river channel is less affected due to fewer pollution sources and higher rates of groundwater discharge resulting in greater dilution of any contaminants (Steinbachs 1999). Pinery Park has made a commitment to go to sewers, and are currently working towards installing those for June 2009. Septic impacts will then be eliminated in the Pinery. In general there is higher potential for groundwater and surface water impact in the Northern Region because of less groundwater input for dilution and more contaminant sources from neighbourhoods. However, water quality in general is quite good, and impacts overall quite low.

Southern and Mouth Regions

The water quality in the most southern portion of the OAC, below the Pinery dam, is negatively influenced by the backwash effect of Ausable River water coming in from the Cut (Wiklund 2001). This influx of Cut water contributes nutrients and sediment from the mainly rural areas that the Ausable River flows through as it winds its way through the watershed.

Management Challenges & Issues

State of Water Quality

Not enough consecutive long-term water quality data has been collected to really gain insight as to what is occurring in the OAC both upstream and downstream of the dam. Previous studies (Steinbachs 1999) have indicated that the residential areas and the Pinery are likely contributing some minor contamination. However, most studies completed are no longer current, thus we don't have a solid understanding of how water quality is being affected to date. Although the most recent data indicates water quality is good, there is insufficient data to draw conclusions.

Data collection over the long term at the two existing water quality sites will provide guidance about OAC water quality, and will help give us a better understanding of what's happening throughout the OAC. Additional water quality monitoring sites throughout the OAC could also better inform us on the water quality. Different types of sampling may give an indication as to whether inputs to the system are contributing to the excessive vegetation growth in the Northern Region.

Education and Stewardship

Water quality is quite good in the OAC, but is susceptible to contamination by residents that border the channel. Education provided to residents would ensure that it stays that way. There is a general lack of knowledge in local residents regarding possible forms of contamination. Education and information on the use of lawn chemicals and having adequate septic systems in good repair would be a proactive approach to ensure that the OAC maintains its level of good water quality. Septic maintenance may be a short-term problem if planned municipal sewer services are eventually carried out. However in the meantime it must be ensured they are not posing a threat to the water quality in the OAC.

ABCA staff conducting water sampling at the Huron Woods site

Management Objectives

Conduct a long-term surface water sampling program throughout the OAC to gain a better understanding of the system to guide future management decisions. A more thorough examination of water quality may be required to determine the role of nutrients on the vegetation growth in the Northern Region of the OAC

Take a proactive approach to protecting the water quality in the OAC by providing landowners with education about their gardening, landscaping and septic management options. This approach is very important to maintaining and enhancing the already good water quality.

Summary of Recommended Actions

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2010)	State of Water Quality	Monitoring	Maintain existing water sampling of two locations in the OAC and expand water sampling program to other locations by choosing additional water sampling sites Develop and implement a more extensive water quality sampling program throughout the entire OAC with specific protocol to gain more data and knowledge in coordination with partner agencies – extensive sampling program could include water quality probe data collection and turbidity readings (e.g., look at turbidity through turbidity tube to determine at what depth plants will die) Develop a consecutive long-term monitoring program to evaluate trends or changes in water quality over time	ABCA Pinery Provincial Park

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2010)	Education and Stewardship	Education	Provide information and education on contamination sources and solutions in the OAC to the local landowners in the form of fact sheets and workshops related to this topic Including: alternatives to lawn chemicals, keeping their septic systems in good repair, Best Management Practices to help decrease excess nutrients entering the OAC	ABCA
Short Term (2013)	Education and Stewardship	Local Management	Work with local municipality to develop and set up a program for septic inspections leading to fixing faulty systems and establishing homeowner septic maintenance plans for regular maintenance Work with municipality to determine when and if sewers are an option in the Northern Region	ABCA Municipality of Lambton Shores
Short Term (2010)	Education and Stewardship	Education	Provide self-evaluation workshops to local residents so they can assess actions they are conducting on their properties that may be impacting the water quality of the OAC	ABCA
Mid Term (2013)	State of Water Quality	Monitoring	Compile a state of the resource report (part of a watershed report card process) for the OAC, using monitoring data to report on its health and quality every five years so any change can be noted	ABCA

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Long Term (2018)	State of Water Quality	Background Studies	Conduct specific studies to determine road salts, lawn chemicals/nutrients and septic system impacts on water quality in the OAC	ABCA Pinery Provincial Park

Recommendations for Management

It is strongly recommended that water quality monitoring for the existing sampling sites continue, and a long-term program be further developed and implemented between Pinery Provincial Park and the ABCA.

It is also recommended that education be provided to local landowners to protect the unique water quality of the OAC.

The benefits to the users and residents by implementing these recommendations: by maintaining the good water quality in the OAC, the integrity of the system will not degrade. Through further water quality sampling, we may be able to identify any issues that could contribute to excessive vegetation growth.

2.2 Biological Management Components for the Old Ausable Channel Watershed

Old Ausable Channel (D. Holm)

2.2.1 Aquatic Vegetation

Background

The OAC is extremely slow-flowing with high water clarity, providing ideal conditions for the growth of abundant aquatic vegetation. Evidence of relatively thick vegetation growth can be found throughout the channel, but it is more apparent in the Northern Region likely due to the shallowness in this area. The Origin, as mentioned previously, is cut off from the main body of the OAC and contains water at only seasonally. Vegetation found here is more of a terrestrial wetland variety, as opposed to the aquatic vegetation growth found in the main OAC.

Dense aquatic vegetation growth is often linked to nutrient or contaminant loading, which allows plants to proliferate excessively. Other factors influencing aquatic vegetation growth are sediment, water velocity and light penetration. The Northern and Central Regions of the OAC are excluded from agricultural, commercial or industrial inputs, but may be receiving very small amounts of contamination from residential areas and the Pinery. These inputs have been found to be relatively minor in past studies within the OAC, and also as part of current water quality sampling (Steinbachs 1999, ABCA 2007). However, a 2004 study found that the OAC is displaying symptoms of eutrophication and some of the plant species indicative of high nutrient conditions (watermeal, duckweed, some curly-leaved pondweed) have already started to invade the northern parts of the channel (Schincariol *et al.* 2004). Nutrients may play a role in the aquatic vegetation growth, but the Northern Region of the OAC would have this kind of growth regardless by its very nature – which is relatively open, still, shallow, clear water (pers. comm. Wiklund 2007). Denser vegetation in the Northern Region is also likely a result of less groundwater input (Steinbachs 1999). Less flow allows the plants to establish themselves better. The deeper waters and increase in ground water inputs in the Central and Southern Regions result in less dense aquatic vegetation.

The Southern and Mouth Regions of the OAC are subject to periodic inflow conditions from the Ausable River Cut. During high waters, the Cut water is known to flow into the OAC mouth, bringing with it nutrients and contaminants transported from the greater Ausable River watershed, as well as an increase in water velocity and turbidity (Wiklund 2001). Therefore conditions in these lower regions of the OAC are different from regions upstream of the Pinery dam.

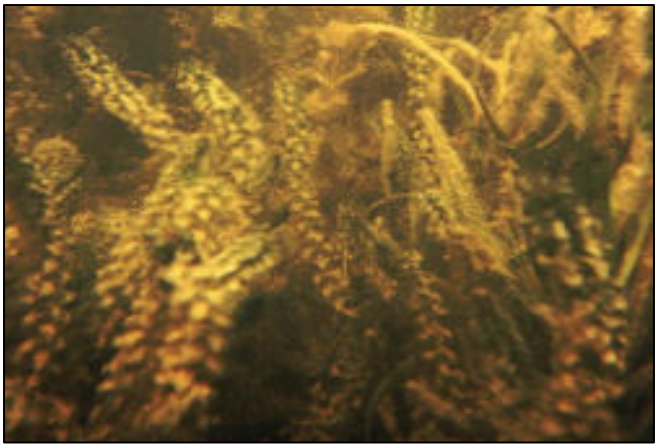
Aquatic Plant Species

Several major vegetation types were recognized during a research study of the OAC by Wiklund (2001). The study area extended from the Mouth Region outlet, north into part of the Northern Region. Analysis of dominant plant species and four environmental variables (water depth, turbidity, sediment ammonium concentrations, fine sand content) showed a highly significant correlation. Each vegetation type is associated with a particular set of environmental conditions in different regions of the channel.

There were 29 species of aquatic vegetation documented in the 2001 study of the OAC. Six of these species dominate certain sections of the river:

- Chara or muskgrass *(Chara vulgaris)*
- Canadian waterweed *(Elodea canadensis)*
- Eurasian water milfoil *(Myriophyllum spicatum)*
- Tape grass or wild celery (*Vallisneria americana)*
- Watermeal *(Wolffia sp.)*
- Duckweed (*Lemna minor)*

Chara in the OAC (J. Wiklund)



Canadian waterweed in the OAC (J. Wiklund)

Eurasian water milfoil in the OAC (J. Wiklund)

Tape grass in the OAC (J. Wiklund)

Watermeal and duckweed bloom on the OAC (J. Wiklund)

OAC, Northern Region in summer (D. Holm)

These major vegetation types are commonly found growing in various associations which make up five major community types. These five major plant community types can be described as being dominated by; chara, Eurasian water milfoil, Canadian waterweed tape grass and watermeal. Eurasian water milfoil is considered an aquatic invasive species and is not native to Canada. This plant is known to form dense stands near the water's surface over large areas, suppressing other native plants, and possibly impacting fish populations by interfering with spawning. It can also affect human use of habitats for recreation and other activities (www.cws-scf.ec.gc.ca 2003).

Wiklund's 2001 study found that there are differences in aquatic vegetation types above and below the dam in the Pinery.

Above the Pinery Dam

Above the dam, the dominant species is chara, which creates a dense mat on the bottom of the channel. This species is present due to the low turbidity and bicarbonate rich groundwater that feeds the system in this section of the river. Chara is, by far, the most dominant aquatic macrophyte in the OAC. Chara is a naturally occurring, native species. It is present in most bodies of water as a minor associate with other aquatic vegetation. However, if the body of water has high calcium levels and the water is clear with no sediments, it proliferates. It requires light and high amounts of calcium bicarbonates and carbonates, as found in the OAC (pers. comm. Maun 2006). It is most dominant from the Pinery dam up to Beach O' Pines Road. This species grows as a submerged anchored macrophyte and is dominant because of two main factors found in this region: low turbidity and low phosphate content of water. Chara doesn't like excessive nutrients. Whorled watermilfoil (*Myriophyllum verticillatum*) is an important secondary species within the chara dominated region, particularly in the shallow to moderate depths.

Chara also grows in association with the lily pads, *Nymphea odorata* (white flower) and *Nuphar variegatum* (yellow flower) in shallow depths of near-shore regions.

Lily pads with white flower in the OAC

The watermeal and duckweed community is found in the same zone as chara between the Pinery dam and the Beach O' Pines road. These floating aquatic plants carpet the area between Pinetree Drive and Beach O'Pines Road by late summer. The submerged anchored chara communities are dominant from spring to mid summer after which the floating species, watermeal and duckweed communities become dominant. Closest to Grand Bend these two species become very abundant later in summer and cover the water surface (they look like algae blooms on the surface).

Below the Pinery Dam

Below the dam in the Pinery, the turbidity of the water in the channel increases (Wiklund 2001). The water conditions in this section of the channel are heavily influenced by the Ausable River Cut. The water from the Cut is higher in nutrients primarily because of inputs from the agricultural land base of the upstream Ausable River watershed. Therefore in contrast, chara was almost completely absent south of the dam due to higher turbidity and nutrient levels from periodic "back-flushing" of waters from the Ausable River Cut. Wiklund (2001) found that in the Southern Region, Eurasian water milfoil and Canadian waterweed are the dominant macrophytes where excess nutrients and turbidity eliminate the highly competitive chara. These two plant species thrive under these conditions. Canadian waterweed is dominant where sediments are rich in nutrients and Eurasian water milfoil becomes abundant where sediments have low to moderate ammonium content. Eurasian water milfoil tends to dominate the first 1.5 km region south of the Pinery dam, likely due to the shallower depths of water. Conversely, Canadian waterweed dominates the next 1.5 km stretch to the Burley bridge. This is likely due to water depth and ammonia found in this stretch (pers. comm. Wiklund 2007).

South of the Burley Bridge, a completely different set of conditions exist. A flow of water is visible as the channel significantly narrows and backwash from the Ausable River Cut occurs under certain conditions (e.g., heavy rains). Tape grass becomes the dominant macrophyte in this region due to its considerable rooting strength and tolerance to higher nutrient and turbidity conditions. Tape grass also dominates near the confluence with the Ausable River Cut due to the increased velocity and turbidity of the water in this area. Similarly, knotty pondweed (*Potamogeton nodosus)*, is also suited to the fluctuating flow and low light conditions south of the Burley Bridge (pers. comm. Wiklund 2007).

<u>Management Challenges and Issues</u>

Succession

Wiklund's (2001) aquatic vegetation research also included a sediment study. Findings indicated that the centre of the channel is filling in with sediment. Fine materials are collecting where it is deepest due to gravitational sediment transport down slope (pers. comm. Wiklund 2007). This process is expected due to the slow-flowing nature of the

present channel. When there is no flow to carry the particles, they fall out of suspension and settle at the bottom of the river. Accumulation and decay of organic material such as leaves and dead plants in the river bed may be further contributing to the excessive plant growth (Steinbachs 1999), and also accelerating the rate of succession through in-filling. More study may be needed in the Northern Region, where vegetation is most dense and succession appears to be occurring more rapidly.

Recreation and Aesthetics

Residents in the Northern Region of the channel are unhappy with the dense vegetation at the height of the summer. It is visually unappealing to a number of landowners and it can sometimes hinder recreational activities on the channel such as canoeing and fishing. Some residents would like to remove or decrease the level of vegetation through various means such as; increasing flow or depth, aeration mechanisms, using chemicals or dredging in the Northern Region. These are unlikely options at this time, given that we have no data regarding the rate of succession, and also because the vegetation is currently providing excellent habitat for the pugnose shiner and lake chubsucker.

Critical Habitat

The aquatic vegetation, in particular chara, provides important habitat to species at risk fishes. Therefore maintaining chara (which requires good water quality) as the dominant vegetation type is likely key to protecting other aquatic components of the OAC's ecosystem. Vegetation reduction or removal is unlikely as it provides an essential component of critical habitat for the pugnose shiner and lake chubsucker and supports grass pickerel as well.

<u>Management Objectives</u>

Collect data to monitor succession and vegetation growth over time and into the future which will better inform management decisions. Any future management actions that may be considered should be consistent with all applicable recovery strategies for fish species at risk (both ecosystem based and species specific).

Find a balance between maintaining the aquatic vegetation to provide critical habitat for SAR fishes, succession and aesthetics.

Summary of Recommended Actions

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2010)	Succession	Background Studies	Compile a literature review specific to the issue of succession and aquatic plants to provide background information Compile a summary report investigating possible course of actions to manage the ecosystem in order to mitigate the dense aquatic vegetation and accelerated succession. The report would identify and outline different management options as well as the legal requirements and regulations for alterations in the OAC to manage aquatic vegetation	ABCA Pinery Provincial Park
Short Term (2010)	Succession	Monitoring	Develop and implement monitoring programs to detect changes and make future management decisions for the following: Types of vegetation, abundance of vegetation, sediment depth, role of nutrients in excessive growth, oxygen demand Develop long term monitoring of the rate of succession and the composition of aquatic vegetation to assess changes and provide data to guide future management through research and studies	ABCA Pinery Provincial Park

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2010)	Critical Habitat	Education	Provide education in the form of signage, lectures, workshops and fact sheets to explain the role that the OAC's aquatic vegetation plays in providing habitat for SAR fishes	DFO ABCA
Short Term (2010)	Recreation and Aesthetics	Education	Provide education to landowners regarding the need to reduce the input of nutrients and contaminants into the OAC that could contribute to increased vegetation growth (proactive approach to combat any future nutrient input problems resulting in more vegetation growth) Provide education promoting the planting of more trees and riparian vegetation to encourage nutrient uptake and also to provide shade which will reduce aquatic vegetation growth Provide education on why some portions of the OAC are prone to aquatic vegetation over growth and why some vegetation management options aren't possible or could be futile	ABCA

Recommendations for Management

Excessive aquatic plant growth and succession are some of the most challenging management concerns for the OAC. Ongoing monitoring of the state of the OAC in regard to aquatic plant growth, succession rate and infilling of the channel is very important. Plans will need to be put in place to monitor and assess this situation into the future. Any management actions that may be considered should be consistent with the recovery needs of the fish species at risk occurring within the OAC.

It is highly recommended that further investigation and study be initiated to assess changes and provide data on which to guide future management.

The benefits to the users and residents by implementing these recommendations: by collecting data regarding the aquatic vegetation and succession we will be able to better manage the OAC's ecosystem over the long term.

2.2.2 Fisheries

Background

Habitat

The OAC is a warm–water, low–flow, pond–like ecosystem that is fed by surface runoff, precipitation and groundwater inputs. It is characterized by still, clear water and dense aquatic vegetation. Thick aquatic vegetation provides ideal habitat for a diversity of fishes. The substrate is mainly composed of fine sand, silt and organics.

Fish Community

The OAC is a unique ecological area that is home to a diverse fish community. It supports a warm-water fishery with top predators such as; northern pike (*Esox lucius*), largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), smallmouth bass (*Micropterus dolomieu*), yellow perch (*Perca flavescens*), pumpkinseed (*Lepomis gibbosus*), bluegill (*Lepomis macrochirus*) and longear sunfish (*Lepomis megalotis*). Three species at risk are found within the OAC. These include the pugnose shiner (*Notropis anogenus)*, the lake chubsucker (*Erimyzon sucetta)* and the grass pickerel (*Esox americanus vermiculatus)*, all of which are listed under the Species at Risk Act.

The fish community is comprised of approximately 50 species, and mainly consists of minnows and sunfishes (Refer to Appendix 2 for a complete list of species recorded from the OAC and a fish fact sheet). A 2004 study conducted by Fisheries and Oceans Canada (DFO) found the fish assemblage downstream of the Pinery dam to be dominated by sunfish species, while the fish assemblage upstream of the dam was dominated by minnow species (Edwards *et al*. 2005). The study documented the species composition as being very similar upstream and downstream of the Pinery dam. Twenty two different species were detected downstream of the dam, versus twenty species upstream of the dam, and there were eighteen species in common to both reaches. The habitat on either side of the dam was noted to be similar (Edwards *et al.* 2005). However depth is drastically different and quite variable, especially on the downstream side (pers. comm. MacKenzie 2007). As discussed previously, habitat conditions below the dam are somewhat degraded compared to upstream, where there are no influences from the Ausable River Cut.

Although there were 18 species in common on both sides of the dam, the relative abundance of species differed. Of the fishes detected downstream, approximately 60% were sunfishes, predominantly pumpkinseed and longear sunfish, while the next most abundant group were minnows at 25%. In contrast, of the fishes detected upstream of the dam, almost 70% consisted of four minnow species: blackchin shiner (*Notropis heterodon*), golden shiner (*Notemigonus crysoleucas*), blacknose shiner (*Notropis heterolepis*), and pugnose shiner with just 7% consisting of sunfish species. Members of the perch family (predominately yellow perch) were the second most abundant group upstream and the third most abundant downstream (Edwards *et al.* 2005).

Previous studies by the Royal Ontario Museum (ROM) and DFO (1982, 1997, 2002 & 2004) indicate shifts in the fish community from a minnow-dominated one to one increasingly dominated by sunfishes. The OAC is essentially divided into two sections

by the dam within Pinery Provincial Park and it creates a barrier to fish movement. Beaver dams occur periodically at some of the other culvert crossings within the OAC. They too may be impeding fish movement. Edwards *et al.* (2005) noted that the stretch upstream of the dam had the highest numbers of pugnose shiner and lake chubsucker for the entire channel and relatively low numbers of sunfishes compared to downstream of the dam. Pugnose shiner and lake chubsucker populations may depend on low relative abundances of sunfish populations, as members of this fish family are the main predators for these two SAR species. The Pinery dam may be playing a role in segregating the fish populations and keeping sunfish numbers low on the upstream side. This may be more to habitat conditions, versus a physical barrier. The dam is also vital to controlling undesirable species invasion into the upstream portion of the OAC. For example common carp *(Cyprinus carpio*) are currently in low numbers above the dam and it is important to ensure their numbers don't increase (pers. comm. Staton 2007). The dam is also essential in maintaining water levels and the resultant high quality habitat for SAR fishes.

Species at Risk Fishes

The OAC is one of two known suitable habitats within the Ausable River watershed for the SAR fishes. Lake chubsucker and grass pickerel (but not pugnose shiner) were found in L Lake, an old oxbow of the Ausable River near Port Franks, in 2007. The OAC has been identified as an area of high conservation priority in the Ausable River Recovery Strategy, as it supports one of the most significant populations of pugnose shiner and lake chubsucker in Canada (ARRT 2005). All three SAR fishes are included in the ecosystem based Ausable River Recovery Strategy. The pugnose shiner, lake chubsucker and grass pickerel have all been captured both upstream and downstream of the Pinery dam. The Ausable River Recovery Team has recommended that portions of the OAC upstream of the dam be designated as critical habitat for both pugnose shiner and lake chubsucker. Once designated in a recovery strategy or action plan, critical habitat is protected under the federal Species at Risk Act (SARA).

Pugnose Shiner (Endangered – COSEWIC/SARA status)

Pugnose Shiner (DFO)

The pugnose shiner is a globally rare species that has a limited, fragmented Canadian distribution. The species has only ever been recorded in Ontario in six general locations. The OAC is one of four areas where the species still occurs. The isolated nature of its occupied habitat may prevent interchange between existing populations, affecting gene flow and possibly inhibiting re-colonization of other suitable habitats. Declines in Canadian populations of the pugnose shiner are likely related to the species extreme sensitivity to turbidity (it requires clear water) and its need for densely vegetated aquatic habitats. In addition, increased predation, and the introduction of Eurasian milfoil may have contributed to its decline in some areas (COSEWIC 2002). It is almost always found in association with aquatic vegetation, particularly chara (*Chara vulgaris*). Pugnose shiners consume chara as part of their diet, and require it and other dense aquatic vegetation for cover and spawning (COSEWIC, 2002). A species specific recovery strategy is currently in development for the pugnose shiner (Matchett and Staton 2008).

Lake Chubsucker (Threatened - COSEWIC/SARA status)

Within Canada, the lake chubsucker is only found in a few locations in Ontario, the OAC being one of them. Remaining populations have only been documented in the drainages of the Niagara River, and lakes Erie, St. Clair and Huron in southwestern Ontario. Similar to the pugnose shiner, the preferred habitat of the lake chubsucker is clear, still well-vegetated waters of rivers and lakes. The lake chubsucker is intolerant of turbidity and high levels of siltation caused by poor land practices. Siltation, increased turbidity and loss of habitat are among the factors contributing to the decline of the species (COSEWIC, 2005). A species specific recovery strategy has been prepared for the lake chubsucker (Vlasman and Staton 2007).

Lake chubsucker – Adult (top) and juvenile (bottom) (DFO)

Grass Pickerel (Special Concern - COSEWIC/SARA status)

The grass pickerel occurs within Canada only in extreme southwestern Quebec and southern Ontario. This species prefers still, shallow, clear water with extensive floating, submergent and emergent aquatic vegetation, including chara for cover and spawning (COSEWIC, 2005). The overall decline of this species appears to be related to degradation and loss of habitat due to channelization and dredging operations in still waters/wetland areas that it prefers. Loss of aquatic vegetation and increased turbidity are the primary threats to this species (COSEWIC, 2005). A species specific management plan is currently in development for Canadian populations of the grass pickerel.

Grass Pickerel

<u>Management Challenges & Issues</u>

Species at Risk and Fish Community

The OAC provides very important and unique habitat that is scarce and fragmented in southern Ontario for the three SAR fishes. Therefore, efforts to protect and enhance the habitat in the OAC should be strongly encouraged to ensure the continued survival of these species.

Additional research and monitoring is required to successfully manage the fish community and to provide reliable data on SAR populations and trends. Previous fish

community sampling has demonstrated that a combination of boat seining and boat electro-fishing yielded the greatest diversity of fish species. A standardized sampling protocol and additional sampling in some reaches is necessary to gain a more complete picture of the fish community throughout the entire OAC. In particular, more research is needed at the north end of the channel and in the reaches below the Pinery dam. Monitoring of the fish community over the long term is essential to detect changes, especially for the SAR species and will contribute to prudent management. Thus further research and the development of a monitoring protocol are needed.

Habitat Threats

Inputs of sediments, nutrients and other potential contaminants from various sources could degrade habitat quality and may be especially detrimental to sensitive SAR fishes. Disturbances and contaminants that directly impact aquatic vegetation may be particularly detrimental to the OAC's fragile ecology. Over the long term, the progression of succession will eventually eliminate the habitat for the fishes.

Fisheries Management

Fisheries management may be necessary in the OAC. Previous studies indicate the relative abundance of sunfishes has increased over time in the OAC. The continued health of the pugnose shiner and lake chubsucker populations could depend on maintaining low sunfish numbers, as they are common predators of the two SAR fishes. The Pinery dam plays a role in maintaining the present fish communities in terms of making habitat available. It is also probable that fishing pressure on sunfishes is much higher above the dam and this may be a contributing factor influencing the community composition. More research is required to effectively manage the fish community as a whole.

Common carp occur in the OAC and are known to uproot aquatic vegetation, increase turbidity and degrade habitat. If the present densities of common carp increase impacts to the OAC fish habitat may be a concern (particularly for SAR fishes that are quite sensitive to turbidity and require dense aquatic vegetation). Monitoring of the overall fish community will provide data on population trends of common carp.

Education and Awareness

Fish education and awareness for anglers, residents and patrons of the OAC would benefit the fish community. There is potential for non-native species to be released into the OAC. The use of baitfish is currently banned in Pinery Provinical Park, however this ban needs to be further communicated to the public, and should also be extended into the northern portion of the channel outside of the park. Anglers using the OAC that dump their baitfish could be releasing undesirable species. This could be detrimental to the existing fish community, specifically the pugnose shiner and lake chubsucker. Released baitfish which may not be native to the OAC could out-compete native fishes for food and habitat. Conversely, those illegally harvesting bait, or collecting bait for angling may be capturing SAR fishes.

There may be anglers unaware of fishing regulations regarding the species found in the OAC.

The release of undesirable fish into the OAC is also a concern. Studies and personal sightings indicate evidence of people releasing exotics, such as goldfish, into the OAC's unique ecosystem, despite prohibitions of such releases. Koi, a type of carp, have also been observed in the OAC (pers. comm. MacKenzie 2007). The release of such pet fish is harmful to the existing natural community as they may displace native species and cause habitat disruptions.

Management Objectives

Manage the fisheries in the OAC to consider both the SAR fishes and the broader fish community supported by this unique habitat. As such, a whole ecosystem approach should be adopted for mutual benefits to all native fishes.

Protect the SAR fishes and maintain critical habitat for these fishes. Management for the protection of SAR fishes and maintenance of their critical habitats should be given high priority. Further, all management decisions should be consistent with existing species specific recovery strategies and management plans.

Prevent the release of undesirable fish in the OAC through increased efforts in education and awareness.

Longear Sunfish are a very common OAC species (K. Stammler)

Summary of Recommended Actions

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2013)	Species at Risk and Fish Community	Background Surveys Monitoring	Develop and implement specific sampling protocol to survey the entire OAC fish community to gain knowledge and detect changes over time Complete surveys in the OAC to identify range, abundance and population demographics of SAR fishes with standardized, effective sampling techniques Develop a monitoring program to evaluate trends in distribution and abundance of SAR species over the long term	ABCA DFO
Short Term (2010)	Species at Risk and Fish Community	Fisheries Management	Summarize biological information to identify potential critical habitat for the pugnose shiner and lake chubsucker Ensure protection of critical habitat for the pugnose shiner and lake chubsucker	DFO ABCA Ontario Freshwater Fish Recovery Team Ausable River Recovery Team

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2013)	Education and Awareness	Education	Creation of an OAC angler brochure to educate users on species, regulations, spawning activities and negative effects of dumping baitfish and invasives (goldfish) into the OAC Creation of signage to educate anglers on fish community Creation of good stewardship guidelines for distribution to local landowners to promote Best Management Practices (BMPs) to decrease activities that may impact the fish community Creation of an OAC specific fish poster to provide education and awareness to residents and visitors on OAC fish species	DFO ABCA Pinery Provincial Park
Short Term (2013)	Fisheries Management	Fisheries Management	Assemble an OAC fisheries sub-committee to coordinate project completion (including obtaining required funds) and to regularly consider management decisions based on new research and monitoring data	DFO ABCA Pinery Provincial Park

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Mid Term (2018)	Fisheries Management	Fisheries Management	Evaluate the impacts and feasibility of controlling predators (sunfishes) and nuisance fish (common carp) in the OAC Initiate the process needed for prohibition of baitfish use in the whole OAC (northern portion)	DFO Pinery Provincial Park ABCA
Mid Term (2018)	Habitat Threats	Education	Promote Best Management Practices to residents to reduce the threat of contaminants entering the OAC	ABCA
Long Term (2018)	Habitat Threats	Background Surveys	Investigate assessment of future risks to the health of the OAC (contaminants entering system) Investigate environmental conditions potentially limiting the abundance and distribution of SAR fish species Establish long-term monitoring of the rate of succession to guide future management decisions relating to fish habitat (succession will eventually take over, reducing the available habitat)	ABCA DFO

Recommendations for Management

It is clear that fisheries in the OAC will be an ongoing issue as the fish community and habitat change over time. The fish community depends on the unique habitat conditions provided by the OAC. As succession progresses, the unique SAR fish habitat may be reduced. Over the long term human intervention may become necessary to ensure habitat for the SAR fishes is maintained. Management decisions that support the protection and recovery of sensitive SAR fishes should provide benefit to the health of the native fish community as a whole. Ongoing monitoring, and adoption of an ecosystem management approach is required to ensure protection of habitat for all fishes.

The benefits to the users and residents by implementing these recommendations: a unique ecological system of excellent quality indicated by the presence of species at risk fishes. Also, the use of a high quality ecosystem with a healthy, diverse fish community for recreational angling opportunities.

Pumpkinseed are a very common variety of sunfish found in the OAC (K. Stammler)

Bluegill are a popular species of sunfish found in the OAC

2.2.3 Terrestrial Ecosystems and Forestry

Background

The OAC watershed contains rare oak savanna and pine-oak woodland communities, which provide habitat for provincially and nationally significant flora. Oak savanna and pine-oak woodland ecosystems are a transition zone between prairie grasslands and oak forests that is kept stable by periodic forest fires (www.pinerypark.on.ca 2007). The vegetation community in the OAC watershed is influenced by many factors including soils, climate and past natural and man-made disturbance. Established on former shore dunes, the sandy soils are young, nutrient poor and rapidly drained, making them prone to drought. The oak savanna and pine-oak woodland communities that evolved on these dunes are able to tolerate the poor soils.

Yellow Puccoon, an oak savanna species found in the OAC watershed

Origin & Northern Region

The oak savanna and pine-oak woodland require fire to maintain their characteristic ecosystem. Historically periodic ground fires occurred. The grasses and sedges that grow as part of this ecosystem along with decay resistant oak leaves made excellent tinder for these natural fires. For the oak savanna and oak woodlands, fire was not destructive but rather a regenerative force that favored this unique plant and animal community by preventing the succession to closed canopy forest (Jean 2006). As settlement grew in and around Grand Bend the periodic fire regime was suppressed. However, timber harvesting likely helped maintain the open nature of these savanna and woodland communities with pine and oak seeding aggressively into open areas and oak also sprouting from cut stumps (pers. comm. Jean 2006). Today a range of landscaping practices exists within the residential portion of the OAC. Yards range from fully naturalized (undisturbed) through partially naturalized (wild vegetation trimmed) to intensively managed lawns (lawn grass species, fertilized and manicured) extending to the water's edge (Wilson 2006). In the absence of fire, the vegetation communities of the Origin and Northern Region are transitioning from oak woodland to deciduous forest.

Central, Southern & Mouth Regions

Pinery Provincial Park protects almost fifty per cent of the remaining oak savanna in the world and manages this ecosystem according to their own specific management plan. Oak savanna habitat is globally rare. In contrast from the Origin and Northern Region residential areas, the Pinery conducts prescribed burning regularly to maintain the oak savanna ecosystem. The Park mimics nature by managing controlled burns (www.pinerypark.on.ca 2007).

Pine plantations were established in the Pinery as a result of accepted forestry practices of the early 1960s, and the oak savanna ecosystem was altered by the planting of almost 3 million pines. At this time managers, viewed the open nature of this ecosystem

as degraded, and forest fires within the park were also suppressed. It was not until the 1980s that it was realized how rare and fragile the Pinery's oak savanna ecosystem was. Through prescribed burning and removal of pine plantations, the Pinery is restoring its oak savanna ecosystem. Other Pinery management techniques besides prescribed burns include; removal of non-native or over-populated species, as well as planting or re-introducing native species (www.pinerypark.on.ca 2007).

Oak Woodland, Pinery Provincial Park

The ABCA Watershed Report Card for the Dunes sub-watershed (of which the OAC is a part) states that 69% of the watershed is forested (Veliz *et al.* 2006). Environment Canada recommends at least 30%, making this sub-watershed quite exceptional. Protection and enhancement are required for the forest community in the OAC management plan area, as over ninety nine per cent of the oak savanna in the world has been degraded (www.pinerypark.on.ca 2007). Many agencies and stakeholders recognize the OAC watershed as being exceptional because of its rare oak savanna habitat. Carolinian Canada is one such agency, and has identified a portion of the OAC watershed in their *Big Picture Initiative* as one of their core areas for protection and enhancement. The *Big Picture* Port Franks Wetlands and Forested Dunes Signature Site includes the Pinery Provincial Park down to Kettle Point. Working towards connecting a large corridor of the same habitat within the OAC watershed, to include the residential areas, the Pinery and the Carolinian Canada core area would be highly beneficial to the ecosystem.

Forest cover in the OAC watershed, Pinery Provincial Park (D. Holm)

Management Challenges & Issues

Forest Management

Over the years, the original forest community has undergone changes in the Origin and Northern Regions due to the neighbourhoods being established there. Management exists for the oak savanna in the Pinery. Forest management in the residential areas varies. One specific forest management plan guiding residents on species to plant and beneficial practices for the ecosystem doesn't exist. Similar vegetation between the residential areas and the Pinery to provide a corridor of habitat or a larger section of similar ecosystem would be beneficial.

Some neighbourhoods, such as Southcott Pines and Huron Woods have policies in place known as schedule A. This is a legal document attached to a property deed. When landowners buy property, schedule A states they must maintain a certain portion of their land as natural. But it has been noted by local residents that the influence of schedule A has diminished over the years. Enforcement is difficult and there is little follow-up to ensure compliance. For some other subdivisions and private lands along Highway 21 policies that protect natural heritage values are absent. As an extension of natural communities in Pinery Park, the oak woodland forest in the residential areas would benefit from a whole ecosystem management approach which would guide residents in enhancing the native vegetation and improving this globally rare ecosystem. See Appendix 3 for native plant lists, a non-native plant list, a recommended list of what to plant and an OAC forestry fact sheet.

Tree Removal

Trees come down in the forest and into the channel over time from age and natural causes. The removal or procedure for removal of such downed trees should be considered. These trees are contributing to the natural habitat both on land and in the water.

The Pinery leaves fallen trees for habitat and removes problem trees at their discretion. Fallen trees should be left as part of the ecosystem, where they do not present a hazard to people or property. It is recommended that downed trees be left for habitat in residential areas and in water. Fallen trees not impeding the navigable waterway should be left as habitat. On walking trails the sections of fallen trees on the path may be cut out to allow walking with the ends left on either side of the path for habitat.

Invasive & Non-native Species

Invasive species and non-native species of vegetation are a concern in all regions of the OAC watershed. Invasive and non-native trees, shrubs and plants can move into an area and out-compete native varieties. Displacing native species can permanently alter this fragile ecosystem, directly affecting the native vegetation community and indirectly affecting local wildlife that require certain vegetation for food and habitat. Native plants should be encouraged not only for these reasons, but also because they are more hardy than introduced or horticultural varieties in terms of disease, drought and cold resistance.

There is a lack of native species information and education for residents. Residents and the Pinery should avoid bringing in soil that may have non-natives or invasives within the seed bed. A lack of local greenhouses or businesses which supply native species in the OAC area is also a concern. In addition to these issues we have a knowledge gap in terms of variety, abundance and distribution of non-native and invasive species in the OAC watershed.

Butterfly Weed, a native flower to the OAC watershed

Woodland Sunflower, native to the local OAC forest

Rare Native Species

Rare and at risk native vegetation exists in the OAC watershed. We have a knowledge gap in terms of the abundance and distribution of these species. It is important to know what exists so that populations and habitat can be protected against any degradation.

Green Dragon, native to the OAC watershed, is a species at risk listed as Special Concern

Restoration

There are various terrestrial areas that have potential to be restored and rehabilitated. This would improve the vegetation community and habitat overall. Habitat for local fauna is also an important consideration. Restoration may also provide the opportunity for an educational component in the form of signage.

Deer browsing in all regions is a concern. High deer populations can negatively impact rare plant species and communities. Ontario Ministry of Natural Resources (MNR) managed deer culls in Pinery Park have been used to restore oak savanna communities.

Restoration of native vegetation could be completed in some areas within the OAC watershed. Some riparian areas along the OAC in the Northern Region contain non-native shrubs that should be removed. These riparian areas could be enhanced with native varieties.

<u>Management Objectives</u>

Initiate a whole ecosystem approach toward enhancing and improving the forest in the entire OAC watershed by creating one large corridor of terrestrial habitat with synchronized management practices. This could serve as a model for the broader Carolinian Canada Big Picture process.

Running Strawberry Vine, a native euonymus and woodland ground cover

Inventory existing rare and at risk vegetation to gain knowledge on abundance and distribution of these species.

Inventory and remove invasive or non-native species as well as encourage the planting of native species. This is very important to improving and enhancing the terrestrial community in the OAC watershed.

Restore areas where possibilities exist in the OAC watershed.

New Jersey Tea, a native shrub

Summary of Recommended Actions

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2010)	Forest Management	Local Management	Update existing forestry management report for the OAC Watershed to a more formal management plan	ABCA
Short Term (2010)	Rare Native Species	Background Surveys and Studies	Complete an inventory study to find out what types of rare and at risk native plants species are present and in what abundance in the watershed	ABCA Pinery Provincial Park
Short Term (2010)	Invasive and Non-native Species	Background Surveys and Studies	Complete an inventory study to find out what types of non-native and invasive plants species are present and in what abundance in the watershed	ABCA Pinery Provincial Park
		Monitoring	Investigate the possibility and methods of eradicating some of the problem species Establish a volunteer group to help with removal of some of the problem species Design and establish a monitoring program to observe presence and abundance of problem species	

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2010)	Forest Management	Education Stewardship Promotion	Produce a forest ecosystem guide for OAC residents – "Living with Nature: A Landowner's Guide to Stewardship of the Old Ausable Channel Ecosystem" that recommends what to plant, what not to plant and guides residents in enhancing the native vegetation and improving the globally rare ecosystem through education. Engage residents and encourage use of the guide via the following "program": - getting them to sign up for the guiding document or a plan (it becomes the norm in the neighbourhood to be practicing these guidelines) - create a best management practices checklist as part of the guide and residents that are using the guide and doing what it suggests on their properties get a plaque to signify they are meeting the criteria (e.g., no non-natives, a lot of natural area/no traditional grass/lawn) - establish recognitions program by Horticultural Society - residents building new homes and clearing land will be given the guide as a suggestion for what to plant Distribute guide to local nurseries and Horticultural Societies Provide information as to why the schedule A rules are important to landowners	ABCA Pinery Provincial Park

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2010)	Forest Management	Stewardship Promotion	Encourage the use of native plants in residential regions by obtaining funds to help subsidize costs for distribution of one free incentive native plant or overall reduced costs of native plants in general for landowners Investigate the possibility of entering into a partnership with local or non local nurseries where they are suppliers and we obtain funds to subsidize the growing of native plants and guarantee a certain number will be sold Investigate the possibility of organizing an annual native plant landscaping workshop/native plant sale and information session by inviting native plant suppliers to Grand Bend Produce an easy reference fact sheet that includes a list of what to plant and locations to purchase these plants. Provide contact information for nurseries that sell native plants.	ABCA

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Mid Term (2013)	Tree Removal	Local Management	Provide education and guidelines to local neighbourhoods for tree removal and why it's beneficial to leave some fallen trees Determine local interest in and establish a local trail club to monitor these types of tree issues (municipality member to be on the trail club for liability reasons)	ABCA Pinery Provincial Park Municipality of Lambton Shores
Mid Term (2013)	Restoration	Background Surveys Education	Investigate the feasibility of restoring areas that could be appropriate candidates or demonstration sites (e.g., open area in Wee Lake could be restored with oak savanna species or deer browse sites) Investigate the possibility of educational signage on these sites	ABCA Pinery Provincial Park
Mid Term (2013)	Forest Management	Local Management	Establish partnership with Carolinian Canada to support local efforts to protect and restore an OAC habitat corridor	ABCA Pinery Provincial Park Neighbourhood Associations Carolinian Canada

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Mid Term (2013)	Invasive and Non-native species	Education	Create a fact sheet dedicated to information and pictures of native plants as well as pictures and information regarding invasive and non-native species for distribution Creation of a brochure providing a list of what native species flower in what season and in what color for promotion to landowners Promote use of native plants to property owners by establishing working relationship with real estate agents, arborists and landscapers so that native plant information can be given to their clients Develop model properties in the Northern Region by working with landowners to create examples of native plant use Develop a program with local Horticultural Society to provide special recognition and tours of model gardens	ABCA Pinery Provincial Park

Recommendations for Management

It is highly recommended that a whole ecosystem approach be adopted to work towards enhancing the oak savanna ecosystem. The residents in the Origin, Northern and Central regions need to collaborate and work towards planting appropriate vegetation and creating a certain kind of ecosystem to maintain the integrity of the oak savanna.

The residential regions of our study area can be linked in harmony to the Pinery and Carolinian Canada's *Big Picture* Initiative to provide an invaluable corridor of habitat through ecosystem enhancement. Private landowners could contribute to this by following a guideline for what is best for this forest ecosystem.

It is also recommended that inventory work be conducted to assess the status of native and non-native vegetation in the watershed.

The benefits to the users and residents by implementing these recommendations: users and residents are contributing to the preservation of a globally rare habitat. Residents are enhancing and maintaining the natural ecosystem that makes their property special.

Spotted Joe Pye weed along the OAC – a native flower that prefers the water's edge

2.2.4 Fauna

Background

The OAC's watershed contains a rich variety of fauna, including unique species and common species. Various types of reptiles and amphibians, mammals, birds, fishes, butterflies and other insects are found in the OAC's watershed (See Appendix 4 for more detailed species lists of some of these groups). Among these groups there are many provincially and federally designated species at risk (Refer to Table 2 for examples of some at risk species).

Table 2. Select Faunal Species at Risk found in the OAC Watershed (Natural Heritage Information Centre, ABCA 2006)

Fauna Group	Species at Risk found in the OAC Watershed
Insects	Karner Blue Butterfly, Frosted Elfin
Reptiles	Blue Racer, Eastern Hog-nosed snake, Five-lined Skink, Spotted Turtle
Birds	Cerulean Warbler, Prothonotary Warbler, Red Headed Woodpecker, Northern Bobwhite
Mammals	Southern Flying Squirrel

Ontario's only lizard – the Five-lined Skink is found in the OAC Watershed (OMNR, Pinery Provincial Park)

Southern Flying Squirrel – A unique creature found in the OAC watershed (OMNR, Pinery Provincial Park)

The OAC watershed's extraordinary ecosystem characteristics provide a home for the many provincially and nationally rare, at risk and interesting species. The Origin and Northern Regions are developed with homes and businesses and therefore fauna distribution, abundance, diversity and habitat may be diminished in these areas. The Central, Southern and Mouth Regions are more natural and managed so that fauna species may thrive, although the Pinery Park is a highly used natural area and pockets of human development exist along Highway 21 and in Port Franks. Despite these human impacts, biodiversity of fauna in the OAC watershed is elevated well above most areas of Southern Ontario.

There are many different habitats within the OAC watershed and within the boundaries of Pinery Provincial Park which support the local fauna. In general these include; oak savanna, freshwater coastal dunes and the OAC itself. Pinery Park staff actively

manage the natural resources within the park to improve the ecosystem for the unique and rare species according to the park management plan.

Management actions may include removal of non-native or hyper-abundant species. Management actions aim to restore and maintain the natural ecosystems found there and to improve habitat for a range of fauna species. With a huge portion of the OAC's watershed being part of the Pinery, it provides an invaluable corridor of available habitat for all faunal species native to this area of Southern Ontario. In particular the forest interior (core area within a woodlot) required for breeding in some bird species is quite exceptional within the OAC's watershed, as it is quite densely forested. Environment Canada recommends 10% of a watershed should be in forest cover that is at least 100 m from the forest edge. The Dunes watershed, of which the OAC is a part of, has 32% - which is much higher compared to other watersheds (Veliz *et al*. 2006).

The important bird habitat provided in this area prompted the establishment of the Ausable Bird Observatory (AuBO) in 2006 within the Pinery Provincial Park. Banding sessions completed in previous years at PInery Provincial Park suggested that the Lake Huron coastline served as an important migratory corridor for many bird species. One of the aims of the Ausable Bird Observatory is to continue to assess the theorized importance of Pinery and the rest of the Port Franks Dune Complex Important Bird Area - as identified by Bird Studies Canada (BSC) - as a migratory corridor on the Lake Huron coastline. Bird species are monitored, assessed and banded at the AuBO within the Park (www.ausablebirdobservatory.org 2006).

Baltimore Oriole captured at the AuBO (P. Fearon)

Chestnut Sided Warbler captured at the AuBO (P. Fearon)

Management Challenges and Issues

Habitat

Habitat availability and species presence on the landscape are directly related. Without proper habitat we won't have faunal species occurring in the watershed. Faunal species richness, diversity and health are dependent on providing and maintaining appropriate mosaics of both terrestrial and aquatic habitat. Not only is the provision of appropriate habitat necessary, the quantity and configuration are key to long-term successful management of fauna. Human development is part of OAC watershed. There must be a balance between humans and local fauna to ensure adequate and important habitat is being maintained.

Fauna

Some of the more common mammals found in the OAC watershed are White-tailed deer, beaver, raccoons and Canadian geese. These particular species can sometimes become over-abundant and cause ecosystem impacts that affect overall biodiversity and ecological integrity. Deer are currently over-populated in the OAC watershed. This results in a high amount of deer browsing and impacts on local vegetation. This in turn causes a decline in plant species richness and vegetative community function.

Raccoon at Pinery Visitor's Centre

Raccoons and Canadian geese are also currently elevated in numbers and can be pests to humans and have consequences for ecological communities. Raccoon numbers are high in Pinery Park and consequently they are believed to be impacting reptile and amphibian populations through elevated predation. Beavers in the OAC build dams in culverts and fell trees along the shorelines. In the Northern Region problem beaver dams and beaver removal are dealt with on a case by case basis by the Municipality of Lambton Shores. In the Central and Southern regions beaver dams are dealt with by the Pinery, who's policy is to let the beavers manage themselves unless a dam becomes a serious threat to park ecology or infrastructure.

Fauna that are rare and unique to this watershed need to be protected and aided in any way possible. There are knowledge gaps in terms of habitat quality and availability and also presence and abundance for some of these species.

Another issue is the release of "pets" into the OAC. Non-native turtles, such as the Red-earred Slider species, not native to this area have been noted in the channel. Non-native fauna can out-compete native species for food and habitat.

Residents and Visitors

There are some residents and visitors to the watershed that fail to realize the value or significance of some of these rare species. For example snakes are often harassed or killed simply because people are afraid of them. There also may be people who are simply unaware of the species of fauna inhabiting the OAC watershed. Another concern is the annual intensity of visitors to the Pinery, which may have serious impacts on faunal diversity and abundance as well as habitat quality and availability. Road mortality may be high in the Pinery given the magnitude of human activity and lengths of roads found there. Some residents and visitors could be more informed and engaged regarding local fauna. Local organizations could use more support from the public to assist in monitoring species and providing funding for projects.

Management Objectives

Protect and enhance habitats from a multi-species perspective, thus allowing for greater species richness and abundance. Inventory and study will need to be conducted.

Provide education to the public regarding faunal species and their habitats. Investigate the effects of the intense use of the Pinery on fauna.

Summary of Recommended Actions

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2010)	Fauna	Background Studies	Conduct inventory studies to learn more about rare species populations, identify the significant species and their habitats and gain an understanding of species abundance for future management decisions	Pinery Provincial Park ABCA
Mid Term (2013)	Fauna	Education	Provide education to the public regarding more common fauna (e.g., deer damage to the environment initiating the need for a cull and enclosure projects found in the Pinery) Provide education to the public regarding rare and at risk fauna to increase their awareness of these species and also provide education regarding not releasing exotics such as pet turtles into the wild	Pinery Provincial Park ABCA
Mid Term (2013)	Residents and Visitors	Education	Provide educational resources supplying species information in the form of workshops, lectures and fact sheets which would include photos, species lists and education such as improvements landowners can make to provide habitat in their yards	ABCA Pinery Provincial Park

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Mid Term (2018)	Habitat	Local Management	Partner with other agencies and landowners to create a large corridor of similar habitat within and beyond the OAC watershed through enhancement and protection (e.g., Carolinian Canada)	Pinery Provincial Park ABCA
Mid Term (2013)	Residents and Visitors	Monitoring	Provide education and information to get the public engaged and involved in funding projects and helping to monitor and protect species through volunteer monitoring networks where species type and numbers are noted and counted e.g., Frog Watch, Project Feeder Watch (birds), butterfly counts, Ontario Turtle Tally Work with local organizations such as the Ausable Bird Observatory to get more people involved and engaged through volunteering monitoring	ABCA Pinery Provincial Park
Long Term (2018)	Residents and Visitors	Local Management	Investigate the feasibility of closing roads or restricting access in Pinery Provincial Park to reduce species fatalities and to allow habitat to rejuvenate as part of a revised Pinery management plan Investigate the feasibility of creating eco-passages at Pinery culverts for fauna such as snakes (e.g., Burley Bridge culvert)	Pinery Provincial Park

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Long Term (2018)	Habitat	Habitat Assessment Background Studies	Investigate locations within the OAC watershed for species habitat restoration possibilities for specific fauna usage where appropriate (e.g., turtle species using the Origin wetland) Conduct background studies to determine if certain habitats can be restored or enhanced for certain species	Pinery Provincial Park ABCA
Long Term (2018)	Habitat	Monitoring	Establish a monitoring program to gain knowledge on habitat conditions and species abundance	Pinery Provincial Park ABCA

Recommendations for Management

More study and monitoring is needed and highly recommended to learn more about faunal species and their habitat.

It is also recommended that education regarding species and their habitat be provided to the public to engage local residents and visitors, and involve them in protecting these fauna.

The benefits to the users and residents by implementing these recommendations: users and residents will be able to contribute to the preservation of a faunal community that is unique and rare. The natural heritage of the area will be conserved.

2.3 Economic Management Components for the Old Ausable Channel Watershed

Canoeing on the Old Ausable Channel, Pinery Provincial Park (D. Holm)

2.3.1 Recreation & Tourism

Background

This chapter provides information about recreational and tourism opportunities in the Old Ausable Channel for local residents and visitors. Potential for recreation and tourism exists in all regions of the watershed, both within the Pinery Provincial Park and the residential neighbourhoods.

Origin & Northern Region

The residential areas along the OAC provide various recreational opportunities. Residents enjoy fishing, canoeing, kayaking and walking along the OAC. In the winter skating, cross country skiing and some snowmobiling are also popular. Skating occurs on all sections of the OAC, but in particular the Origin region is flooded and used as a skating rink for hockey.

Hockey on the OAC Origin

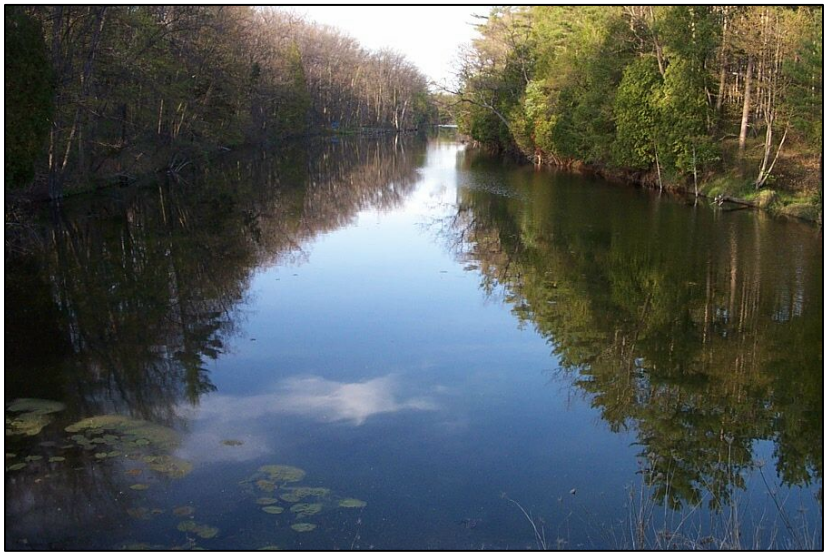
Approximately 3.5 km (250 ha) of the most northerly section of the OAC (and upstream watershed) is used for residential purposes. This area is used for permanent residences as well as seasonal and four-season cottages. Docks, fire pits and lounging chairs/areas are common on most developed properties along the OAC. There are two neighbourhood clubhouses located in the residential sections of the watershed, one in Southcott Pines and the other in Huron Woods, used for community events and gatherings (Refer to Figure 12).

The Origin and Northern Region also feature neighbourhood walking trails and historic landmarks. A tow path exists along the OAC (Refer to Figure 12). The tow path is a historic unopened road allowance that was once used for transportation of goods along the river. The tow path is adjacent to the OAC for 33 feet on either side of the entire length of the channel beginning at the Origin and the Northern Region and extending to the Mouth Region through the Pinery. Current ownership of the tow path was determined through records from the Municipality of Lambton Shores. In the Origin and Northern Region, the Municipality of Lambton Shores owns certain sections of the tow path, and some portions are privately owned (Refer to Figure 12). Within Southcott

Pines neighbourhood on the west side of the channel, the Southcott Pines Park Association owns and maintains a section of the tow path as a walking trail (Refer to Figure 12). There is also a section of tow path walking trail that extends into Huron Woods owned by the municipality. There is a possibility of expanding the local trail system and linking the tow path to an existing walking trail that is adjacent to Highway 21 (Grand Bend Rotary Trail), and also a walking trail yet to be created along Parkhill Creek which will extend to Klondyke Road.

The Pinery is not shown on the mapping (Figure 12) featuring the tow path. Although the tow path did historically border the OAC for 33 feet on either side, north to south – this is no longer the case. The provincial parks act dictates that "*Every unopened road allowance that is within a provincial park and that has not been closed and conveyed shall be deemed to have been vested in the Crown from the day on which the area was set apart as a provincial park or the area in which the unopened road allowance is located was added to the provincial park*" (*Provincial Parks and Conservation Reserves Act*. Section 32.1). Therefore the historic road allowance or tow path is now part of the Pinery, as of enactment of the Provincial Parks and Conservation Reserves Act of 2007. The portion of the tow path within Pinery Provincial Park will be managed accordingly within the Pinery as per the current Pinery Provincial Park Management Plan.

Remnants of an old saw mill can be found in the Northern Region. In the early 1800s a saw mill and a dam were constructed near the present day location of the Southcott Pines Park Association Clubhouse (Refer to Figure 12) by a man with the last name of Brewster (Dixon 1963). The OAC would have been part of the flowing Ausable River at this time in history. Brewster Mill was thought to be the cause of flooding in the area and was destroyed by local settlers (Dixon 1963). It is an historic site of one of the first industries in the Grand Bend area. There is still evidence of its existence today at the site; ruins of the dam and remains of timbers on the shore. Other artifacts from this mill have been collected and saved through the years.



OAC in Huron Woods Neighbourhood

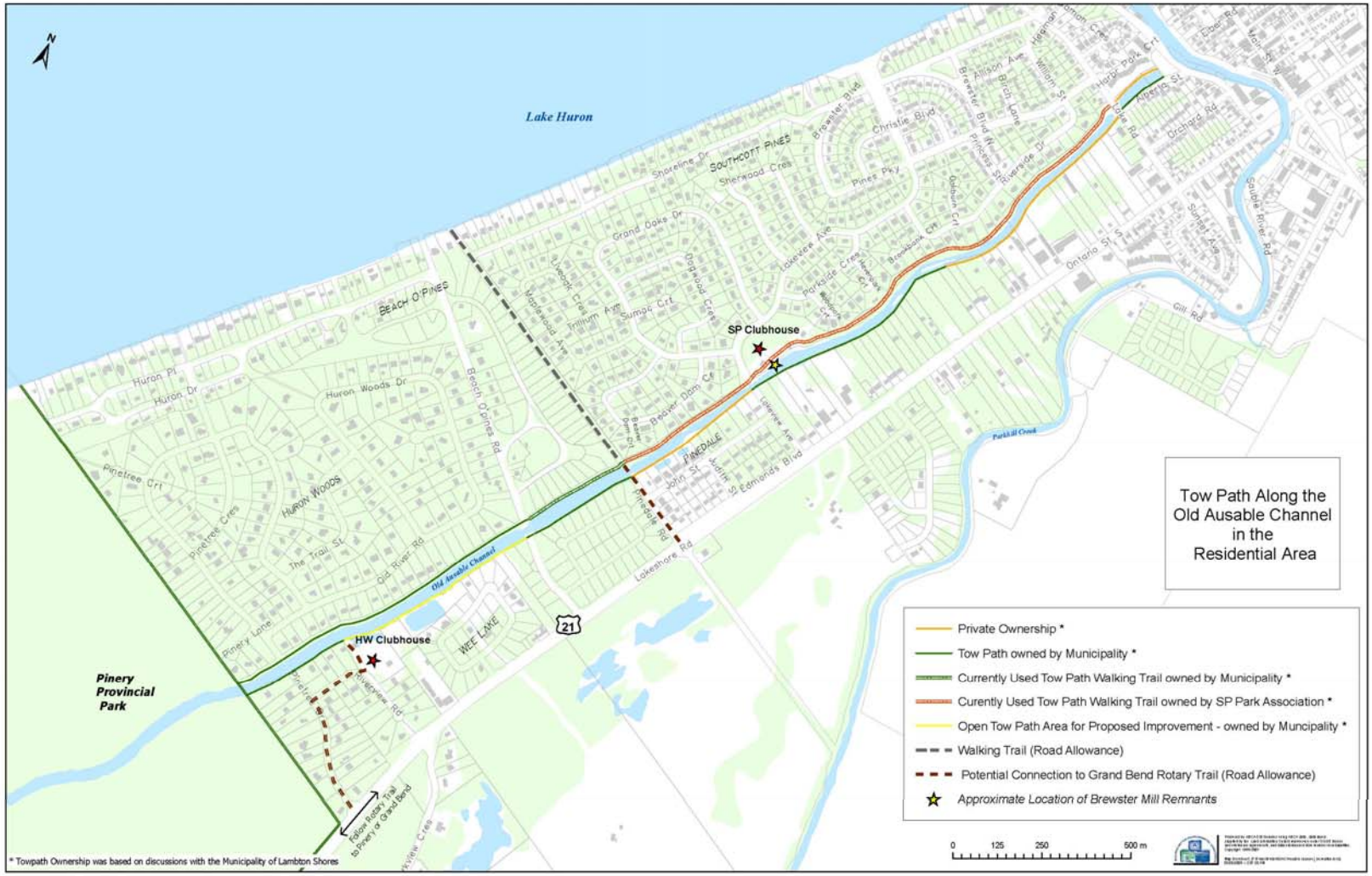


Figure 12: Tow Path along the Old Ausable Channel

Central, Southern and Mouth Regions

The Pinery Provincial Park occupies 10.5 km (2200 ha) of the OAC watershed. The Pinery Provincial Park has been a recreational destination for many decades. The land for the Park was purchased in 1957 and opened to the public in 1959 to provide recreational opportunities (www.pinerypark.on.ca 2007). Recreational pursuits in the Park include; canoeing and fishing, as well as hiking, camping and naturalist activities. Cross country skiing and skating are also popular in the winter. The Pinery hosts 11 walking and biking trails of various lengths which highlight the natural features of the park (www.pinerypark.on.ca 2007). These activities tend to be very low impact and are not believed to create an adverse affect on the watershed or the channel itself. The Pinery also has a very popular visitor's centre, out of which many educational programs are run for the public. The Pinery manages tourism and recreation activities within the park according to its own management plan.

Lake Huron - Pinery Provincial Park Beach showing dunes (D. Holm)

The OAC watershed within the Pinery is renowned for its wide array of interesting and unique ecosystems and the organisms that live within them. Naturalists come from far and wide to enjoy the large and diverse populations of flora and fauna the Pinery has to offer. Many unique species of reptiles and amphibians, mammals, birds, fish, plants, trees, butterflies and insects are found in the Park.

The Pinery also features unique freshwater coastal dunes. Sand is eroded from shores and bluffs north of Grand Bend and transported by long shore drift to the Grand Bend area where it is blown into dunes. Over thousands of years, the dunes have become colonized by vegetation and stabilized from further movement. These dune systems are relatively fragile so access is limited to these areas and conservation measures including dune grass planting are implemented to stabilize and repair earlier damage (www.pinerypark.on.ca 2007). The beautiful and sandy beaches are also a very popular tourist attraction. Due to these attractive attributes, the Pinery Provincial Park is a very popular tourist destination with current estimates of 600 000 visitors to the park each year (pers. comm. Swick 2007).

The small portion of the Mouth Region owned by the Scouts Canada (Refer to Figure 6) provides recreation by housing cabins for scout camping. The adjacent ABCA property is used by the scouts for day use activities. The ABCA land known as the Sherwood Fox Plant Preserve has very little management conducted by the Authority, but is used for hiking and enjoying nature by the public (Refer to Figure 6).

Management Challenges & Issues

Signage & Historical Documentation

Many residents and visitors to the Origin and Northern Region may not realize the significance or the history of the OAC. The OAC has an interesting past, and uncommon natural characteristics that should be documented, promoted and shared. Some signage exists along the channel in the Pinery, and at the extreme north end of the OAC at the Origin. However signs within the local neighbourhoods documenting local history, how the OAC came into existence and unique natural characteristics, such as species at risk would educate the local community within the neighbourhoods and further promote the conservation of the OAC watershed.

Brewster Mill is an historical landmark of interest found within the OAC watershed in the Northern Region. Artifacts from the site where it existed have been noted or collected, and preserved over the years. However there are many residents and visitors that are unaware of this site, and there has been no documentation of the location or coordinated effort to collect the artifacts and pictures in one location for display purposes. The artifacts and the story of Brewster Mill should be documented and preserved as part of the history of Grand Bend.

Recreational Responsibility

Tourism and recreation promotion presents a challenge within the Origin and Northern Region. Tourism and recreation activities exist and could be highlighted, however local neighbourhood residents have concerns regarding liability and responsibility for the general public using this section of OAC for recreational purposes. Residents of the neighbourhoods would like to manage the recreation possibilities for themselves. However, neighbourhoods have their own walking trails, canoe access and educational sites such as Brewster Mill that others may want to access.

All-terrain vehicle (ATV) use is becoming a concern in the vicinity of the Pinery. There is concern that that ATV issues (or snowmobile issues) could arise in the residential areas as well.

Tow Path

Within the Origin and Northern Region the tow path is used as a walking trail in some portions, but in other undeveloped areas people view it as an extension of their lawns (Refer to Figure 12). As a result of this, and also various owners, further trail development seems unlikely. There is one area near Huron Woods Clubhouse that is currently used as a walking trail and could be further enhanced (Refer to Figure 12). However, connection of existing tow path walking trails to other trails, such as the Grand Bend Rotary trail or road allowances that are currently used for walking, are more feasible options (Refer to Figure 12). The existing tow path could be used to loop back to town along Highway 21. Oak savanna flora species can be seen along the Grand Bend Rotary trail (pers. comm. Jean 2007).

Ecosystem Fragility

The Pinery Provincial Park is a very popular and highly used natural area. It is also contains a significant and fragile ecosystem. With upwards of 600 000 visitors every year, it must be ensured that the Park's ecosystem is not degrading. There is a need to find a balance between the natural environment and recreation. This sensitive and unique environment will continue to need low impact activities, such as hiking and canoeing.

Management Objectives

Achieve a balance between the natural environment and recreation activities in the OAC watershed. Recreation and tourism will be promoted in such a way to also provide the lowest impacts on the natural environment. The ecosystem, including species at risk, must be considered with any tourism and recreation development.

Promote and enhance unique recreational and historical attributes of the OAC.

Summary of Recommended Actions

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Mid Term (2013)	Signage & Historical Documentation	Education	Construct signage in Northern Region at neighbourhood clubhouses to educate the public on the history of the OAC and natural features such as the oak savanna ecosystem and species at risk Construct signage in Northern Region at the site of the Brewster Mill to educate the public. Construction of dock viewing platforms along OAC Coordinate effort to gather all artifacts related to the Brewster Mill in one location and create a display (such as the Lambton Museum) Investigate the existence of other historic sites of interest Create brochures with background information and a list of resources on Brewster Mill, History of the OAC, natural attributes or characteristics of the OAC , good stewardship educational material Determine feasibility of self guided walking tour with brochures along the tow path Further development of a “Friends of the Old Ausable Channel” volunteer group to help with promotion and community involvement	ABCA Pinery Provincial Park Municipality of Lambton Shores Neighbourhood Associations

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Mid Term (2013)	Recreational Responsibility	Local Management	Promote existing recreation activities while keeping in mind the fragility of the ecosystem	ABCA Pinery Provincial Park Neighbourhood Associations Municipality of Lambton Shores
		Education	Promotion of activities such as canoeing, cross country skiing or hiking for local residents through such activities as: creation of canoe access, canoe launches and canoe racks for local residents and enhancement of existing trails Development of special event days for areas of interest within the neighbourhoods which can be promoted through controlled access on these special event days – such as guided hikes, family fishing week, OAC specific lectures nights, guided paddles in the OAC, OAC specific kids programs Establish enforcement dictating that no motorized vehicles (ATVs, snowmobiles) will be allowed on the tow path or OAC watershed including the Pinery through signs and fines imposed by the Municipality bylaws	

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Mid Term (2013)	Tow Path	Local Management Education	Explore the feasibility of further trail development along the tow path near the Huron Woods clubhouse (Refer to Figure 12) Explore the feasibility of connecting the tow path walking trail to other local walking trails Investigate the interest in the formation of a local OAC Trail Club to further enhance the tow path walking trails and link them to town walking trails in the Origin and Northern Region – this could be accomplished through partnerships with other local groups Investigate the possibility of interpretive signage along tow path and highway trail to promote the oak savanna ecosystem Explore the feasibility of placing garbage cans and benches along the tow path	Municipality of Lambton Shores Neighbourhood Associations ABCA
Long Term (2018)	Ecosystem Fragility	Monitoring	Assess the level of degradation within the Pinery through observation and studies Investigate revising Pinery's management plan at the next opportunity regarding the impact visitors may be having on the ecosystem	Pinery Provincial Park

Recommendations for Management

It is recommended that the Origin and Northern Region will be managed for local residents living in neighbourhoods to keep impact at a minimum with the exception of some special event days.

It is also recommended that a trail club made up of local residents be established to facilitate the further development of tourism and recreation in the Origin and Northern Region.

It is also recommended that education is provided to allow people to gain an appreciation for the OAC watershed. Education and knowledge will ensure the protection of the OAC's unique features. Agencies and the local community must connect with and involve people to foster this education.

The benefits to the users and residents by implementing these recommendations: users and residents will be able to enjoy a beautiful and natural area in Southern Ontario through numerous opportunities. The economic gain will also be a factor with improvements to recreation and tourism in the area.

2.3.2 Land Use and Development

Background

Land use surrounding the OAC is mainly recreational and protected for conservation, with a small portion being residential with businesses. Some aggregate industry is present within the OAC watershed study area. Refer to Figures 13a and 13b for municipal zoning categories indicating land use.

Origin and Northern Region

This area is used for permanent residences as well as seasonal and four-season cottages. This section also includes some commercial businesses (Refer to Figure 13a). In this region of the OAC watershed, property development is mostly completed. Residential development in this area had been relatively intense over the past 40 years, but has more recently slowed down as property lots have been bought and building has taken place. Presently, property owners are more likely to be making changes to existing development on their properties. There is potential for businesses owning land near the OAC in Grand Bend to develop their properties in different ways, and development may continue in this respect. There are a handful of small properties zoned for future development in this section of the study area, but they are minimal compared to past development (Refer to Figure 13a).

Central, Southern and Mouth Regions

The section of privately owned property along Highway 21 between Huron Woods and the Pinery entrance in the Central Region (Refer to Figure 13b) contains a small number of residences including one subdivision known as Dalton subdivision at the north end. There are also commercial and industrial businesses present. Some aggregate production takes place in this area. There are three active aggregate extraction businesses. This area still has potential for relatively substantial development to take place. Municipal zoning confirms some large areas slated for future development (Refer to Figure 13b). A new subdivision known as Pinery Bluffs is already under way in this area (pers. comm. Turnbull 2007).

The privately owned residential portion of Port Franks known as Armstrong East is included in the management plan study area. It is located at the southern end of the Pinery near Lake Huron and is not experiencing new development (Refer to Figure 13b). This residential area is used for summer cottages. Bylaws have been implemented by the Municipality of Lambton Shores to prevent more development.

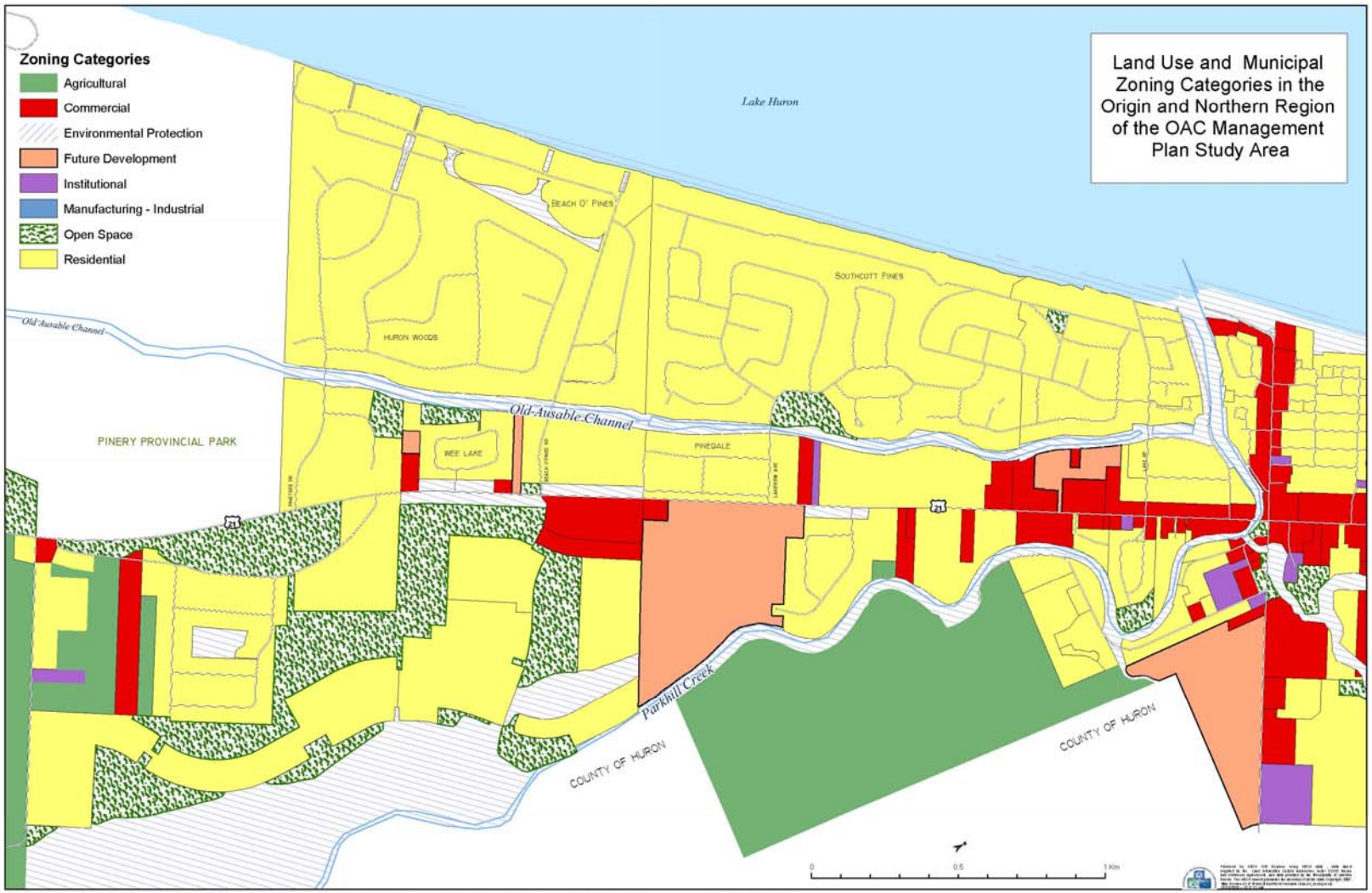


Figure 13a: Land Use and Municipal Zoning Designations in Origin and Northern Region of the OAC Management Plan Study Area

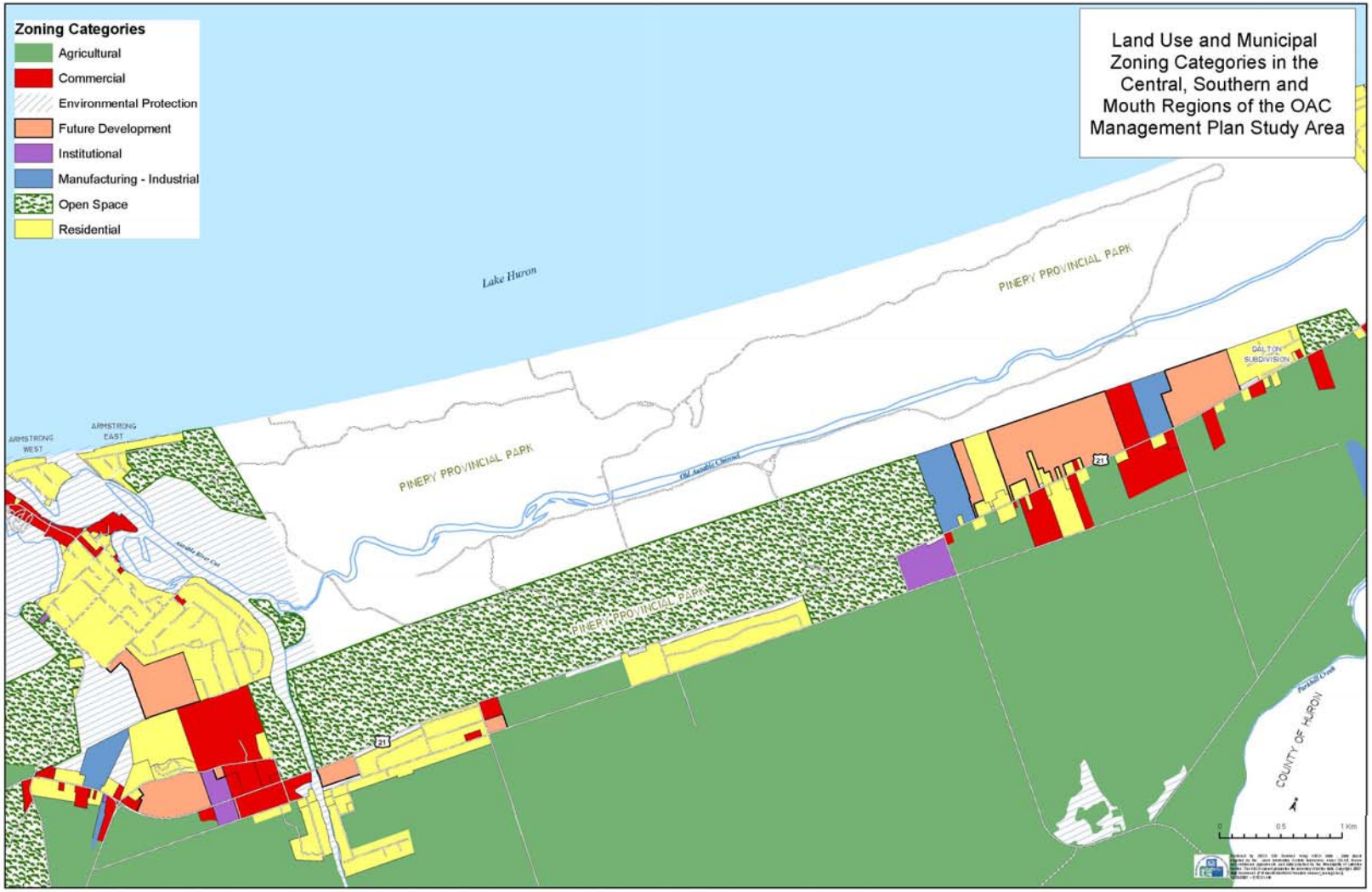


Figure 13b: Land Use and Municipal Zoning Designations in the Central, Southern and Mouth Regions of the OAC Management Plan Study Area

The Pinery Provincial Park is a conservation property used for recreation. The Park experiences intensive campground and beach use, and is one of the largest campgrounds in Ontario. It brings in more revenue than most of the other provincial parks combined (pers. comm. Purdy 2007). The Ausable Bayfield Conservation Authority's property (Refer to Figure 6) is also a conservation property. The Scouts Canada property is privately owned (Refer to Figure 6). Both of these properties are used for low intensity recreation. It should be noted that if the Scouts property were to be sold, development could be a possibility. All of these properties are zoned for either Open Space or Environmental Protection (Refer to Figure 13b). Open Space indicates that things like campgrounds or trails can be developed.

Management Challenges and Issues

Development

Further development of any sort in this sensitive ecosystem could have detrimental effects on the OAC's ecosystem. In the interest of maintaining a large corridor of natural habitat it would not be favorable to condone more development to occur in the Northern and Central Regions.

Intense use in Pinery Provincial Park

The Pinery has up to 600 000 visitors a year. This is very intense use of such an extraordinary natural area. This kind of use may be taking a toll on the natural environment. The revenue generated to the Park and the local community by tourists and visitors is substantial. Managing for the environment as opposed to the economy is a difficult dilemma.

Management Objectives

Arrive at a balance between the environment, the community and development, with the protection of nature as priority. Protection of the integrity of the OAC's ecosystem, while recognizing that development, recreation and tourism are important to the local economy is very important. Options in which the environment and the economy can co-exist with the least amount of impact to the natural environment would be most preferred for the OAC's watershed. The existing development is more than enough for this ecosystem and further development is not recommended.

Summary of Recommended Actions

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Short Term (2010)	Development	Habitat Assessment	Investigate the feasibility of the entire OAC being designated as a provincially significant wetland (PSW) through in-field site evaluation, which will ensure the OAC's protection to the highest degree pending any additional development taking place	ABCA Ministry of Natural Resources
Mid Term (2013)	Development	Background Studies	Conduct ecological significance studies on land zoned as future development before development applications are entertained in order to determine characteristics of the land	Pinery Provincial Park ABCA

Priority Time Frame	Management Challenge or Issue Addressed	Approach	Recommended Actions	Responsible Agency
Mid Term (2013)	Development	Local Management	Investigate the availability, feasibility and procedures involved in purchasing land slated for future development Determine potential buyers of this land Investigate the feasibility of working with the municipality to get some areas re-zoned as natural instead of future development at the next opportunity when Lambton Shores revises/reviews their Official Plan zoning by-laws	ABCA Pinery Provincial Park Municipality of Lambton Shores
Mid Term (2013)	Development	Stewardship Promotion Education	Work with local business owners to promote and educate them on environmentally friendly methods of managing their properties by providing information for eco-friendly alternatives	ABCA
Long Term (2018)	Intense use in the Pinery	Local Management	Implement monitoring programs with appropriate indicators to ensure the long term sustainability of the OAC watershed in future Pinery Park specific management plans	Pinery Provincial Park

Recommendations for Management

Initial protection of the OAC is the preferred option, as opposed to restoration after detrimental actions have already taken place. Protecting the OAC's ecosystem is the top priority. It is recommended that a proactive approach is taken to look into options other than development in the residential area along Highway 21. Options for restricting or reducing development and intense use in the OAC watershed are highly recommended in order to maintain the integrity of the watershed.

The benefits to the users and residents by implementing these recommendations: the natural integrity of the area will be conserved for years to come.

Some development evidence along the Old Ausable Channel, Grand Bend (D. Holm)

3.0 Conclusions and Recommendations

Old Ausable Channel (D. Holm)

3.1 General Conclusions and Recommendations

The OAC is one of the most unique ecological features in southwestern Ontario. Its significance and diversity are exceptional. The most prominent threat facing the OAC is its own natural succession. Succession has been, and continues to be observed in the OAC. The natural succession of the OAC from an aquatic system to a more terrestrial system over many years is one of the most difficult management concerns. This management plan has recognized that more study and time series monitoring are needed regarding this issue. Over the long term, based on succession monitoring results, alternative solutions may be recommended depending on the rate at which succession is happening. Keeping nutrient levels low to decrease plant growth and not throwing plant matter into the OAC are good management techniques to slow succession. Over the long term, as succession advances, human intervention may become necessary to ensure habitat for the SAR fishes is kept intact.

The secondary threat facing the OAC watershed is human development. The quality of the ecosystem is high at this time, and so a proactive approach must be taken to ensure it stays this way. Essentially, the OAC is a natural area where portions of the watershed have been developed. People have chosen to live here because of these natural attributes, and so there is a need to find a balance between the environment and the community. Protecting the ecosystem will not only benefit the natural environment, it will also indirectly provide longer-term economic benefits to the Grand Bend community in ensuring this area remains natural and beautiful.

Burley Bridge in Pinery Provincial Park

The development of the management plan has allowed the local residents and agencies to learn more about the OAC, and work together to conserve and enhance an extraordinary area in Ontario. This management plan has recognized that more study and monitoring on various aspects of the watershed are needed to better manage this system over the long term. The management plan has also recommended agency management actions and individual resident actions to protect the integrity of this area. Broader co-management opportunities include such things as enhancing the recreational and educational opportunities in the area. Many individual actions landowners can do on their own properties to benefit the OAC watershed were also identified as part of the plan, such as using native plants in your landscaping and keeping your septic in good repair to protect the water quality. This project has allowed different groups to come together for the greater good of this ecosystem, and has shown that the community can effectively work together and provide direction for management of local resources. Involving local people to manage a resource that exists in their own backyard is a very important process that led to the success in developing this management plan.

The guiding philosophy of this document is to protect and enhance this natural ecosystem. Initial protection of the OAC and its watershed, as opposed to restoration

after detrimental actions have already taken place is the preferred approach. This management plan has provided a means to unify efforts between the various stakeholders, and develop management direction allowing local agencies and residents to better utilize and protect this ecosystem.

3.2 Stewardship Practices

Individual Action

Different actions were identified for the various stakeholders within the management plan, including recommendations made for community and individual action. Several action items were noted specifically for landowners. Local landowners and land managers can help to alleviate management issues through good stewardship practices on their own properties. A summary of management issues and recommended individual actions from the management plan is provided below in Table 3.

Table 3. Summary of Recommendations for Landowners, Land Managers and Neighbourhood Associations

Management Plan Component	What needs to be Addressed	Individual Action
Hydrology and Succession	Landowner acceleration of succession e.g., leaf disposal in the channel, lack of shoreline vegetation, erosion	Don't throw leaves, other vegetation or soil into OAC (these things are contributing to succession)
		Increase shoreline vegetation to shade aquatic vegetation, decreasing its growth
		Don't mow grass to water's edge to prevent erosion and increase shade
	Water flow through culverts	Keep culverts free of debris and garbage through regular maintenance program
Water Quality	Lack of Best Management Practices on private property that could potentially impact water quality e.g., lawn chemical use, septic systems in disrepair	**Proactive approach to keep water quality good:** Regular septic maintenance – work with Municipality to develop and set up a program for septic inspections and establish homeowner septic maintenance plans for regular maintenance
		Alternative lawn care methods to decrease nutrients entering the OAC (no fertilizers)
		Residents attend education workshops to learn if actions conducted on their properties are impacting the water quality
		Maintain vegetation along the shoreline to help keep turbidity and contamination out of the OAC
Aquatic Vegetation	Decaying excess vegetation contributing to succession Excess vegetation decreasing aesthetic value	Plant more trees/vegetation in open shoreline areas to take up any excess nutrients and shade aquatic vegetation
		Fertilizer decrease to prevent aquatic vegetation increase
Fisheries	Baitfish dumping, non-native/invasive fish being released into the OAC	Responsible baitfish use
	These lead to competition of non-native species with native species and disruption of habitat	Not using goldfish/koi in garden ponds where they may escape from and do not deliberately release pet fish into the OAC
	Turbidity and contamination of fish habitat	Practice best management practices in yards

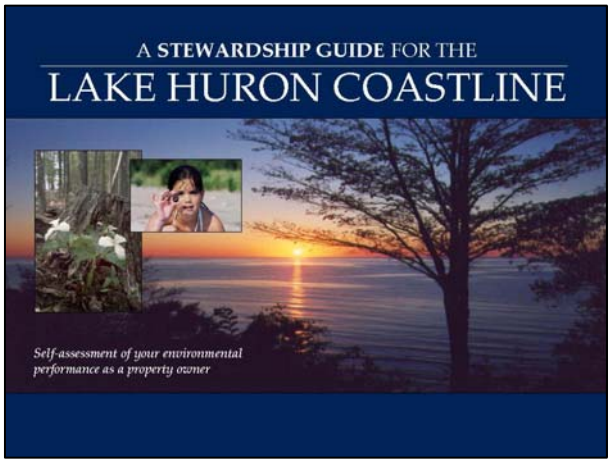
Table 3. Summary of Recommendations for Landowners, Land Managers and Neighbourhood Associations

Management Plan Component	What needs to be Addressed	Individual Action
Terrestrial Ecosystems and Forestry	Natural landscaping that fits with oak savanna ecosystem	Plant vegetation that is native to an oak savanna ecosystem, leave yards natural
	Invasive and non-native vegetation species being brought into neighbourhoods	Encourage and use only native plant varieties
	Lack of native species available to purchase	Volunteer group to help get rid of non-native or invasive species
		Organize a native plant sale or work with local nurseries or groups to make this vegetation available locally
Fauna	Need for awareness of rare and at risk species	Help to monitor species through a volunteer network e.g., Frog Watch, Project Feeder Watch (birds)
	Need for enhancement of habitat for species on private property	Landscape your property with species habitat (e.g., birds) needs in mind or leave property more natural to encourage species
Recreation and Tourism	Protection, enhancement and promotion of natural features, recreation and historical landmarks in OAC watershed	Volunteer groups to help organize special events and public education and recreation opportunities
		Neighbourhood associations to assist with educational signage along the OAC
		Enhance recreation e.g., more canoe access, more trail development along tow path
		Form neighbourhood OAC trail club to maintain and enhance walking trails
Land Use and Development	Future development designations on land within the OAC watershed	Leave land slated for future development along the OAC undeveloped and natural
		Manage the land to enhance the environment

Engagement of Landowners to Implement Individual Action - Community Focus Group

It is important to investigate the best means possible to engage local landowners to implement action items from the management plan on their own properties (Refer to summary of actions listed in Table 3). It is recommended that a community focus group be assembled to help determine the best approach to encourage other local landowners to adopt Best Management Practices (BMPs) recommended by the OAC management plan in the watershed. This focus group will help determine the best approach to educate and facilitate BMPs to residents in the OAC. The use of a focus group will help to clearly define barriers that may be preventing the local landowners from becoming better stewards of the OAC watershed. As part of this focus group exercise it is also recommended that a BMP incentive program be established to encourage local landowners as well as discussion regarding the best ways to provide education on BMPs to residents (e.g., at neighbourhood association meetings).

Stewardship Guide for the Lake Huron Coastline



Another recommended means of encouraging good stewardship practice is a self-assessment of environmental performance as a property owner. Very few OAC watershed residents have been exposed to *the Lake Huron Coastline Stewardship Guide*. This guide provides environmentally friendly education and allows property owners to go step by step through an environmental evaluation of their property and its management.

The stewardship guide has worksheets which will help identify what landowners are doing right and what they can improve in protecting the natural environment on their property. It is recommended that a series of *Lake Huron Coastline Stewardship Guide* workshops are provided to local residents so they can self evaluate actions they are conducting on their properties that may be impacting the quality of the OAC watershed.

3.3 Monitoring and Future Studies

Broad monitoring and future study recommendations which will incorporate many aspects of the OAC ecosystem are detailed below.

Succession

Baseline data collection and ongoing monitoring of the state of the OAC in regard to succession is very important. Long term monitoring of the rate of succession and the aquatic vegetation to assess changes and provide data to guide future management should be implemented. A monitoring plan would include indicator stations for aquatic vegetation and sediment buildup. Monitoring to collect time series data indicating what is happening and how fast is highly recommended. A literature review providing background information on the issue of succession will be an important first step in studying this phenomenon in the OAC.

Provincially Significant Wetland (PSW)

The OAC should be evaluated to determine if it meets the requirements to be designated as a PSW. A PSW designation would identify the OAC as being a very valuable wetland and would protect it for the long term. Development and site alteration surrounding the OAC will go through a more involved process if the OAC were to receive a PSW designation - heightening the conservation and protection of the watershed (Provincial Policy Statement 2005).

Pinery Provincial Park Dam

The implementation of a monitoring program to keep the Pinery Dam in place and in good repair will ensure water levels are kept at a certain depth. The Pinery Dam maintaining water levels in the OAC is important to many other components of this system.

Water Quality

The development of a consecutive long-term monitoring program to evaluate trends or changes in water quality over time is an important recommendation. Water quality is currently quite good in the OAC, but more long term information will need to be collected to inform future management decisions. A monitoring program would include data collection on water quality and water quantity.

Watershed Report Card

A state of the resource report (part of a watershed report card process) for the OAC, using monitoring data to report on its health and quality should be published and distributed every five years so that the community and other stakeholders can monitor any change in the ecosystem.

SAR Fishes

The OAC provides very unique habitat that is scarce and fragmented in the rest of Ontario for the 3 species at risk (SAR) fishes. The designation of critical habitat for the fishes via further studies will be very important to these populations. More monitoring is needed to successfully manage the fishery and to get a firm handle on SAR fish populations and trends.

A summary of all recommended monitoring and future studies categorized by chapter from the management plan is provided in Table 4.

Table 4. Summary of Recommendations for Monitoring and Future Studies

Management Plan Component	Recommended Monitoring and Future Studies
Hydrology and Succession	Feasibility study to determine if the OAC could be classified as a provincially significant wetland (PSW)
	Literature review specific to the issue of succession
	Summary report investigating the course of action that would be necessary if we were to alter the ecosystem in order to slow down succession and infilling
	Long term monitoring of the rate of succession and inventory of the aquatic vegetation
	Monitoring programs to detect changes in elevation of the channel, water levels and sediment depth
	Wetland restoration options report for the OAC Origin
	Monitoring program/protocol to keep the Pinery Dam in place and in good repair
	Monitoring program/protocol for culvert maintenance along the OAC

Table 4. Summary of Recommendations for Monitoring and Future Studies

Management Plan Component	Recommended Monitoring and Future Studies
Water Quality	Maintain existing water sampling of two locations in the OAC and expand water sampling program to other locations by choosing additional water sampling sites
	Develop and implement a more extensive water quality sampling program throughout the entire OAC with specific protocol
	Develop a consecutive long term monitoring program to evaluate trends or changes in water quality over time
	Conduct specific studies to determine road salts, lawn chemicals/nutrients and septic system impacts on water quality in the OAC
	Compile a state of the resource report (part of a watershed report card process) for the OAC, using monitoring data to report on its health and quality on a 5 year basis
Aquatic Vegetation	Literature review specific to the issue of succession and aquatic plants
	Summary report investigating the course of action that would be necessary if we were to alter the ecosystem in order to combat the dense aquatic vegetation and infilling
	Develop and implement monitoring programs to detect changes and make future management decisions for types of vegetation, abundance of vegetation, sediment depth, role of nutrients in excessive growth
	Develop long-term monitoring of the rate of succession and the diversity of aquatic vegetation
Fisheries	Develop sampling protocol to survey the entire OAC fish community to gain knowledge and detect changes over time
	Complete surveys in the OAC to identify range, abundance and population demographics of SAR fishes with standardized, most effective sampling techniques
	Develop a monitoring program to evaluate trends in distribution and abundance of SAR species over the long term
	Summarize biological information to determine Critical Habitat for the pugnose shiner and lake chubsucker
	Assemble an OAC fisheries sub-committee to look at obtaining funds for project completion and to regularly assess the situation and make decisions as the fish community changes and evolves
	Conduct study to evaluate the impacts and feasibility of controlling predators (sunfishes) and nuisance fish (common carp) in the OAC
	Conduct study to evaluate the feasibility of prohibiting the use of baitfish in the whole OAC (northern portion)
	Investigate environmental conditions potentially limiting the abundance and distribution of SAR fish species
Terrestrial Ecosystems and Forestry	Update forestry management report for the OAC Watershed
	Complete an inventory study for rare, non-native and invasive plants species presence and abundance Investigate the possibility and methods of eradicating some of the problem species
	Monitoring program to observe presence and abundance of problem species and rare species, establish a volunteer group to help with removal and monitoring of vegetation
	Investigate restoring areas that could be appropriate candidates for demonstration sites

Table 4. Summary of Recommendations for Monitoring and Future Studies

Management Plan Component	Recommended Monitoring and Future Studies
Fauna	Studies to learn more about rare species populations, identify the significant species and their habitats and gain an understanding of species abundance for future management decisions
	Partner with other agencies and landowners to create a large corridor of habitat within and beyond the OAC watershed
	Volunteer monitoring through volunteer monitoring networks where species type and numbers are noted and counted
	Investigate possibility of closing roads or restricting access in Pinery Provincial Park to reduce species fatalities and to allow habitat to rejuvenate as part of specific management plan for the Pinery
	Investigate possibility of creation of eco-passages at Pinery culverts for fauna
	Investigate the feasibility of restoring and enhancing certain habitats for specific fauna usage
	Monitoring program to gain knowledge on habitat conditions and species abundance
Recreation and Tourism	Study to explore the feasibility of further trail development along the tow path
	Study to explore feasibility of connecting the tow path walking trail to other local walking trails
	Study to assess level of degradation within the Pinery regarding ecosystem impact visitors may be creating
Land Use and Development	Study of the OAC to determine status as a provincially significant wetland (PSW)
	Ecological significance studies on land zoned as future development before development applications are entertained in order to determine characteristics of the land
	Investigate the availability, feasibility and procedures involved in purchasing land slated for future development
	Investigate the feasibility of working with municipality to get some areas re-zoned as natural instead of future development
	Implement monitoring programs with appropriate indicators to ensure the long term sustainability of the OAC watershed in future Pinery Provincial Park specific management plans

3.4 Education and Public Awareness Opportunities

The development of educational material regarding the OAC, and opportunities to make the public aware of this unique area in the form of lectures, workshops, special events, websites, signage and fact sheets is highly recommended. Utilizing the local newspapers to provide education is also advised.

Education will allow people to gain an appreciation for the OAC watershed and in turn protect the ecosystem and its unique features. Agencies and the local community must connect with and involve people to foster this education.

A summary of all recommended education and public awareness opportunities categorized by chapter from the management plan is provided in Table 5.

Table 5. Summary of Education and Public Awareness Opportunities

Management Plan Component	Education and Public Awareness Opportunities
Hydrology and Succession	Develop educational material on succession and the OAC including actions residents can take to slow down the rate of succession or infilling (e.g., not throwing leaves into the channel)
	Provide some education on beaver ecology to the public in the form of a fact sheet and as part of the OAC website
Water Quality	Provide information and education on contamination sources and solutions in the OAC detailing alternatives to lawn chemicals, keeping their septic systems in good repair, Best Management Practices to help decrease excess nutrients entering the OAC
	Work with local municipality to develop and set up a septic education program
	Provide a workshops to local residents so they can self evaluate actions they are conducting on their properties that may be impacting the water quality of the OAC
Aquatic Vegetation	Provide education regarding what Critical Habitat is and why the OAC's aquatic vegetation is important
	Provide education to landowners regarding decreasing the input of nutrients and contaminants into the OAC that could contribute to increased vegetation growth as a proactive approach to combat any future nutrient input problems resulting in more vegetation growth
	Provide education promoting the planting of more trees and riparian vegetation to uptake any nutrients and also to provide shade which will hinder aquatic vegetation growth
	Provide education on why the OAC is prone to aquatic vegetation and why some of the options for removal aren't possible or could be futile
Fisheries	Creation of an OAC angler brochure and signage to educate users on species, regulations, spawning activities and negative effects of dumping baitfish and invasives (goldfish) into the OAC
	Creation of good stewardship guidelines for distribution to local landowners to promote Best Management Practices (BMPs) to decrease activities leading to turbidity and contamination which could impact fish health and well being
	Creation of an OAC specific fish poster to provide education to residents and visitors on OAC fish species
Terrestrial Ecosystems and Forestry	Produce and distribute a forest ecosystem guide for OAC residents recommending what to plant, what not to plant and guides residents in enhancing the native vegetation and engage residents and encourage use of the guide via a best management practices checklist and property assessment program
	Educate horticultural societies, real estate agents, arborists and landscapers regarding native vegetation
	Encourage the use of native plants through subsidized plant purchase programs and establish partnerships with nurseries to supply native plants
	Organize an annual native plant landscaping workshop/native plant sale and information session
	Produce fact sheets regarding suggested native vegetation, non-native vegetation, and locations to purchase native varieties
	Provide education and guidelines to local neighbourhoods for tree removal and why it's beneficial to leave some fallen trees and determine local interest in and establish a local trail club to monitor tree issues
	Develop model properties and a program with local Horticultural Society to provide special recognition and tours of model gardens
	Educational signage on oak savanna restoration demonstration sites

Table 5. Summary of Education and Public Awareness Opportunities

Management Plan Component	Education and Public Awareness Opportunities
Fauna	Provide education to the public regarding nuisance common fauna, rare and at risk fauna and releasing exotic fauna
	Provide educational resources supplying species information and improvements landowners can make to provide habitat in their yards Provide education and information to get the public engaged and involved in helping to monitor and protect species through volunteer monitoring networks
Recreation and Tourism	Construct signage and viewing platforms and create brochures to educate the public on the history of the OAC, natural features, species at risk and other interesting historical facts in the watershed
	Create a Brewster Mill display and investigate the existence of other historic sites of interest
	Determine feasibility of self guided walking tour with brochures along the tow path
	Further development of a “Friends of the Old Ausable Channel” volunteer group to promote and assist with events and education opportunities
	Further promotion of recreation activities through creation of canoe accesses, canoe launches and canoe racks for local residents and enhancement of existing trails
	Development of special event days for areas of interest within the neighbourhoods which can be promoted through controlled access on these special event days - such as guided hikes, family fishing week, OAC specific lectures nights, guided paddles in the OAC, OAC specific kids programs
	Formation of a local OAC Trail Club to further develop new tow path areas and promote, maintain and enhance the existing tow path areas for low impact activities such as hiking and biking
	Establish enforcement dictating that no motorized vehicles (ATVs, snowmobiles) will be allowed on the tow path or in the OAC watershed including the Pinery through signs and fines imposed by the Municipality by-laws and community involvement
Land Use and Development	Educate local business owners on environmentally friendly methods of managing their properties

3.5 Summary Recommendations for the Old Ausable Channel Watershed

In general it is highly recommended that a management plan implementation committee be established to continue to work on action item completion. The development of a five year work plan with prioritization of items is also strongly recommended to ensure timely completion of action items and initiatives that the OAC Management Plan recommends.

This document should be re-visited and re-evaluated in 10 years. This will allow the stakeholders to reassess the status of the OAC, and update the management plan with appropriate recommendations at that time.

Immediate Actions:

- Evaluate the OAC to determine its possible Provincially Significant Wetland status
- Compile a succession and aquatic vegetation literature review, put together a report detailing options of dealing with succession and set up a monitoring program
- Develop a Pinery Dam monitoring program for maintenance and water levels
- Continue with the existing water monitoring program and expand it
- Develop a septic maintenance program
- Conduct fish surveys and implement a monitoring program to detect changes over time
- Compile Critical Habitat information for SAR fishes in the OAC and proceed with designation of the OAC as official Critical Habitat
- Establish an OAC fisheries sub-committee to deal with future concerns
- Update the forestry management plan for the OAC watershed
- Inventory and establish a monitoring program for the OAC vegetation ecosystem
- Create a forestry stewardship guide and program for local landowners to enhance the oak savanna
- Work with partners to make native plants more readily available to local landowners
- Inventory and establish a monitoring program for rare fauna
- Work with partners to establish a large corridor of similar habitat within OAC watershed and beyond (e.g., Carolinian Canada)

Recommendations to be implemented over time:

- Develop educational material; lectures, workshops, special events, websites, signage, fact sheets and use local newspapers to spread education for all aspects for the OAC to raise awareness and foster engagement,
- Identify and proceed with possible restoration and enhancement sites along the OAC
- Develop a culvert maintenance program
- Compile a state of the resource/watershed report card for the OAC on a five year basis
- Conduct OAC impact studies over the long term
- Investigate the possibility of controlling baitfish use, predators and nuisance fish in the OAC
- Establish a volunteer trail club to deal with tow path trail maintenance, possible expansion opportunities and also to investigate the possibility of connecting the tow path trails to other local trails
- Establish volunteer monitoring networks for OAC fauna and flora
- Investigate the possibility of working with the Pinery to decrease visitor use in the park so that flora, fauna and habitat have a chance to recover from extreme use

- Promote recreation and tourism opportunities in the OAC watershed
- Conduct ecological studies on land slated for future development to determine what is there
- Explore the possibility of buying or re-zoning land slated for future development as opportunities arise to work with the municipality

OAC, Pinery Provincial Park

4.0 References, Appendices and Glossary

Outlet of the Old Ausable Channel near Port Franks where it enters the Ausable River Cut

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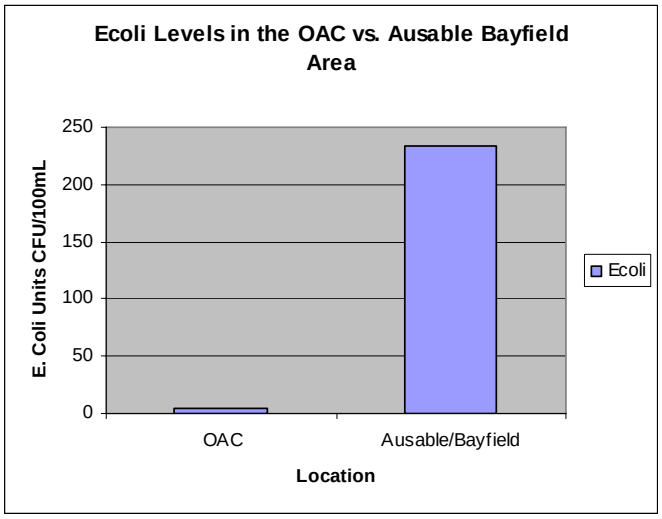
All aerial photography within this document, including the cover photo, was done by Dan Holm of **Daniel Holm Photography** (unless referenced otherwise), courtesy Ausable Bayfield Maitland Valley Drinking Water Source Protection, a project of the Province of Ontario.

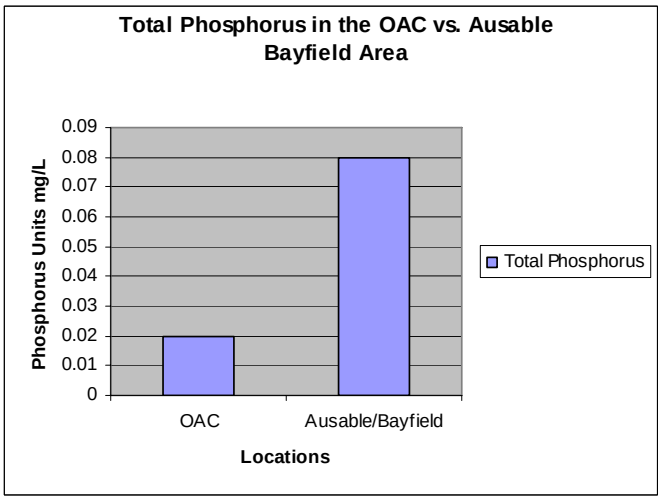
All maps produced as part of this document were done by Tracey Boitson (2006 and 2007), GIS/CAD Information Systems Specialist, Ausable Bayfield Conservation Authority.

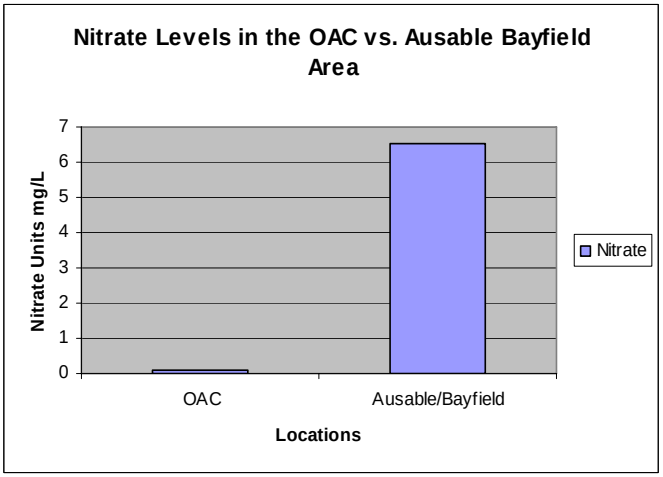
Appendix 1 – Water Quality Data for the Old Ausable Channel in 2006 and 2007 (ND= not detected)

Station Name	Date Sampled	EColi CFU/100mL	Total Phosphorus mg/L	Dissolved Phosphorus mg/L	Ammonia mg/L	Nitrate mg/L	Nitrite mg/L	TKN mg/L	Total Suspended Solids mg/L
OACDAM1	03/21/2006	4	0.006	0.007	ND	ND	ND	0.3	2
OACDAM1	04/25/2006	10	0.020	<0.030	<0.05	<0.1	<0.1	0.6	4
OACDAM1	05/23/2006	3	0.013	<0.003	<0.05	<0.1	<0.1	2.3	2
OACDAM1	06/21/2006	10	0.014	0.0090	0.07	<0.1	<0.1	0.7	2
OACDAM1	07/17/2006	<2	0.016	<0.0030	<0.05	<0.1	<0.1	0.6	2
OACDAM1	08/16/2006	4	0.011	0.0080	<0.05	<0.1	<0.1	0.8	2
OACDAM1	09/25/2006	20	0.019	0.0070	<0.05	<0.1	<0.1	0.6	<1
OACDAM1	10/23/2006	8	0.015	0.013	0.14	<0.1	<0.1	0.7	<1
OACDAM1	11/21/2006	0	0.009	<0.0030	0.10	<0.1	<0.1	0.5	2
OACDAM1	03/27/2007	1	0.018	0.0080	0.35	<0.1	<0.1	0.9	3
OACHW1	03/27/2007	<10	0.034	0.011	<0.05	0.3	<0.1	0.9	10
OACDAM1	04/24/2007	1	0.014	<0.0060	<0.05	<0.5	<0.5	0.8	7
OACHW1	04/23/2007	11	0.039	<0.006	<0.05	<0.5	<0.5	1.4	6
OACDAM1	05/22/2007	2	0.029	<0.006	<0.05	<0.5	<0.5	1.4	4
OACHW1	05/22/2007	7	0.130	0.016	<0.05	<0.5	<0.5	2.8	4
OACDAM1	06/25/2007	3	0.022	0.0070	0.07	0.2	<0.5	0.9	5
OACHW1	06/27/2007	10	0.031	0.010	<0.05	<0.5	<0.3	0.8	2
OACDAM1	07/16/2007	8	0.034	0.009	<0.05	<0.1	<0.1	0.7	2
OACHW1	07/16/2007	1	0.045	0.021	<0.05	<0.1	<0.1	0.8	2
OACDAM1	08/28/2007	4	0.015	0.0080	<0.05	<0.1	<0.1	0.6	4
OACHW1	08/28/2007	10	0.016	0.0050	<0.05	<0.1	<0.1	0.5	16
OACDAM1	09/25/2007	1	0.011	0.0090	0.37	<0.1	<0.1	1.1	2
OACHW1	09/25/2007	6	0.022	0.013	0.08	<0.1	<0.1	0.7	2
OACDAM1	10/23/2007	38	0.022	0.011	0.55	<0.5	<0.5	1.6	2
OACHW1	10/23/2007	16	0.028	0.0090	0.06	<0.5	<0.5	0.7	<1
OACDAM1	11/27/2007	0	0.008	<0.006	0.67	<0.1	<0.1	1.1	3
OACHW1	11/28/2007	5	0.019	<0.006	0.32	0.3	<0.1	1.4	1

Comparison graphs of E. coli, Total Phosphorus and Nitrate Levels between the Old Ausable Channel and the Ausable/Bayfield Watershed





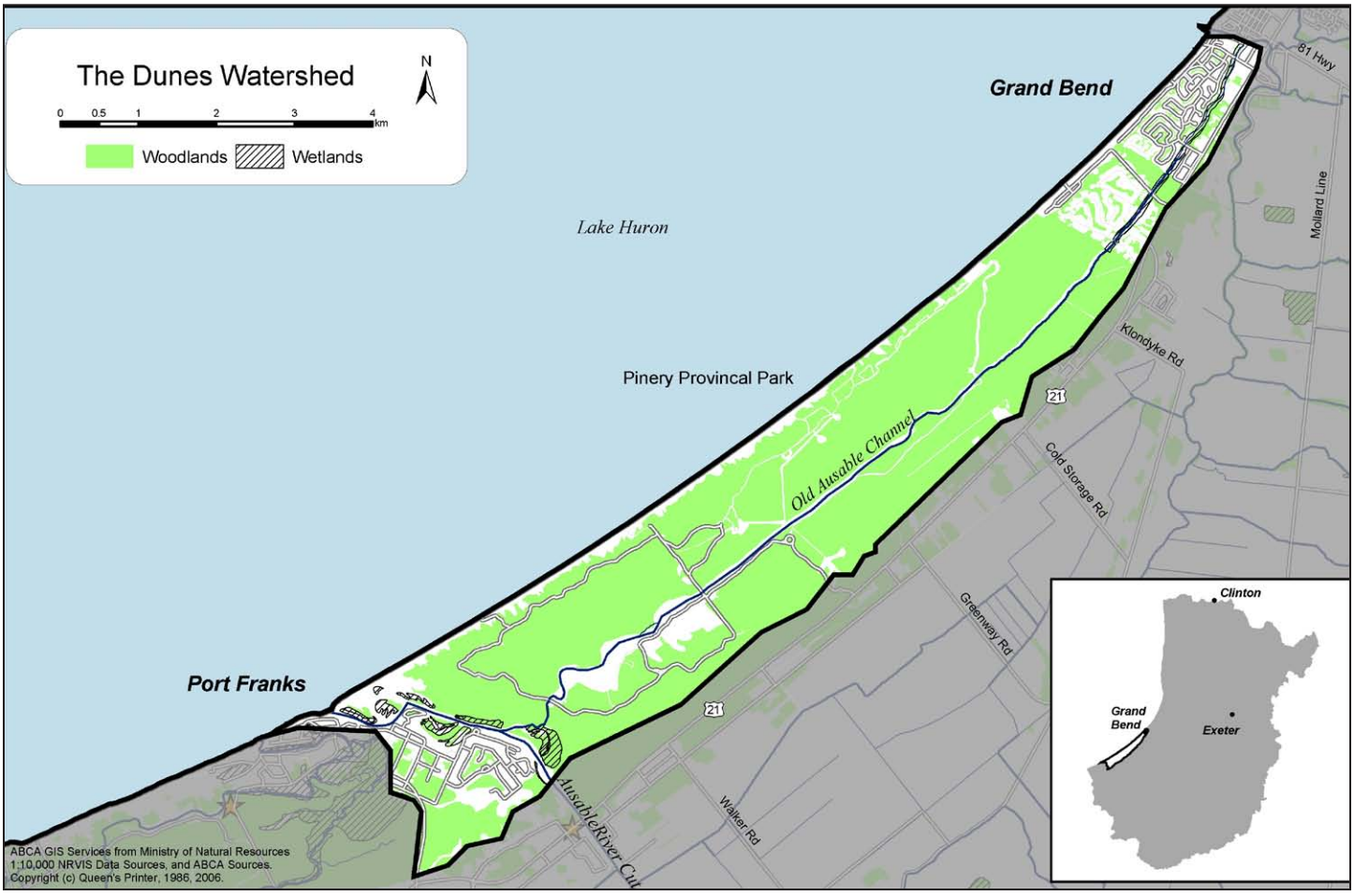


Dunes
Watershed Report Card

Grades:

Forest Conditions	A
Surface Water Quality	N/A

This report card summarizes water quality and forestry information for the Dunes watershed (*the highlighted area on the map below*). This map also shows water quality stations and example environmental improvement locations. For consistency across watersheds, Conservation Ontario has recommended the use of specific water quality and forestry indicators that are described in the following tables. The summary is intended to provide landowners, groups, municipalities and agencies with information to protect, enhance and improve natural features of the watershed. The ongoing monitoring will be reported on a five-year cycle which will help local people manage their natural features. This report card is part of a larger report entitled **The Ausable Bayfield Conservation Authority Watershed Report Card** available at: **www.abca.on.ca**. Further information, including methodology, comparisons to the other 15 Ausable Bayfield watersheds and references are also found in the report.



Priority Strategy for Dunes Watershed

Protect: Develop Management Strategy to ensure long-term protection of unique resources.

Dunes
Watershed Features

Area: 27 km^2 **Municipalities:** Lambton Shores

Geology	73% Sand Plains; 13% Peat and Muck; 5% Bevelled Till Plains; 5% Clay Plains (GIS derived with physiographic maps) (Chapman and Putnam 1984)
Soils	95% Sand; 4% Sandy Loam; 1% Organic (County Soils Maps 1951-1991)
Land Use	**0% agriculture; 69% woodlot; 14% urban; 7% other (OMAFRA 1983)**
Streamside Cover	32% of the 15 metre area on both sides of open streams is vegetated (OMNR 1986, ABCA 1999)
Wetlands	Existing: 2% (OMNR 2003, ABCA 2004); Potential: 3% (ABCA 2005)
Natural Areas	Pinery Provincial Park Earth and Life Science (Area of Natural and Scientific Interest); Port Franks Wetlands (Provincially Significant Wetland); Bosanquet Environmentally Significant Areas 2 and 6
Groundwater	Both shallow (Pinery Aquifer) and bedrock aquifers are found in this watershed. The Pinery aquifer is the most common source of drinking water, and is located within the large deposit of recently deposited sand dunes near the shore of Lake Huron. This important source of drinking water has been sampled and is known to have elevated levels of nitrates, as well as occurrences of E. coli. This aquifer is also an important source of water for the Old Ausable River Channel, as well as the former Lakes Smith and Burwell. The Bedrock aquifer is known to have elevated levels of sulphates and hardness, making it aesthetically unattractive as a potable water source. A thick sequence, underlying the sandy dune deposits, comprised of mostly fine-grained glacial sediment separates the shallow aquifer from the bedrock aquifer in this area.
Fishes	Warm water fishery in pond-like ecosystem; important habitat for fish species at risk

Species at Risk

(As determined by the Committee on the Status of Endangered Wildlife in Canada)

(SOURCES: Natural Heritage Information Centre, 2006; ABCA 2006)

Vegetation:	Bluehearts, Green Dragon, Dense Blazing Star, etc.
Insects:	Karner Blue, Frosted Elfin, etc.
Reptiles:	Blue Racer, Eastern Hog-nosed Snake, Five-lined Skink, Spotted Turtle, etc.
Birds:	Cerulean Warbler, Prothonotary Warbler, Red Headed Woodpecker, Northern Bobwhite, etc.
Fishes:	Lake Chubsucker, Pugnose Shiner, Grass Pickerel
Mussels:	None identified at this time.
Mammals:	Southern Flying Squirrel

Wastewater Treatment Plants None in area.

Dunes
Forest Cover, Surface Water Quality

	Indicator and Description	Dunes		Ausable Bayfield Area	
		Result	Grade	Result	Grade
Forest Conditions	**Forest Cover** is the percentage of the watershed that is forested. Environment Canada recommends **30%** of a watershed should be in forest cover.	69.0%	A	12.6%	C
Forest Conditions	**Forest Interior** is the area inside a woodlot that some bird species need for breeding. Environment Canada recommends **10%** of a watershed should be in forest cover that is at least 100 m from the forest edge.	32.3%	A	2.8%	D
Water Quality	**Total Phosphorus** is an element that enhances plant growth and contributes to excess algae and low oxygen in streams and lakes. The Ministry of the Environment has established an environmental health objective concentration of **0.03 mg/L**.	N/A	N/A	0.08	B
Water Quality	**E. coli** (*Escherichia coli)* are bacteria found in human and animal waste. Their presence in water indicates the potential for the water to have other disease-causing organisms. The Ministry of Health has established a guideline of **100 cfu** (colony forming units)**/100 mL** in recreational waters.	N/A	N/A	233	C
Water Quality	**Benthic Invertebrates** are small animals without backbones that live in stream or lake sediments. The Family Biotic Index **(FBI)** summarizes the information about the numbers and types of these animals in a sediment sample. FBI values provide stream health information and values range from **1 (healthy) to 10 (degraded)**.	N/A	N/A	5.6	C

Grade	Explanation
A	Indicates excellent ecosystem conditions and protection may be required. Some areas may require enhancement.
B	Indicates good ecosystem conditions. Some areas may require enhancement.
C	Indicates ecosystem conditions that need to be enhanced.
D	Indicates poor ecosystem conditions that need to be improved.
F	Indicates degraded ecosystem conditions that need considerable improvement.

Dunes
Next Steps and Local Successes

To improve forest conditions ...

- Subdivision associations need long-term woodlot management strategies. Currently there may be too many older trees per acre. When old trees die, younger medium-sized trees will be needed to maintain the forest health.
- Invasive species such as Phragmites grasses need to the controlled.
- Private landowners should consider Carolinian plant species for landscaping.
- Local agencies should provide native species for landscaping.

To improve water quality ...

- There are no water quality data for this watershed. Environmental agencies should coordinate a solution to this lack of information.
- Fix faulty septic systems and establish a septic maintenance plan.

Other recommendations

- Link the natural areas of the Ausable Gorge with The Pinery Provincial Park and Port Franks.
- Summarize biological information to determine critical habitat for two fish species at risk, Lake Chubsucker and Pugnose Shiner.
- Management of the tow line along the Old Ausable Channel is an issue that needs to be addressed in a strategy being developed for this area.
- Continue to support the province's natural heritage policies through local official plans and zoning by-laws (i.e., storm water management, tree cutting bylaw).
- Complete Environmental Action Plans (Lakeshore residents see Lakeshore Stewardship Manual). A stewardship manual for rural non-farm landowners should be completed by 2007. Contact the ABCA for more information.

Thumbs up!

The Greater Grand Bend Community Foundation has recently contributed to a long term management strategy for the Old Ausable Channel.

This is just one example in the watershed – give us a call and tell us about your project.

Ausable Bayfield Conservation Authority
71108 Morrison Line, RR 3 Exeter, ON N0M 1S5
E-mail: info@abca.on.ca
Web site: www.abca.on.ca
Phone (519) 235-2610, 1-888-286-2610

Appendix 2 - Fish Species found in the Old Ausable Channel

(www.pinerypark.on.ca 2007 & Edwards *et al.* 2005)

Common Name	Scientific Name
Lampreys	**Petromyzontidae**
sea lamprey*	Petromyzon marinus*
Bowfins	**Amiidae**
bowfin	Amia calva
Gars	**Lepisosteidae**
longnose gar	Lepisosteus osseus
Salmons, Trouts	**Salmonidae**
rainbow trout*	Oncorhynchus mykiss*
chinook salmon*	Oncorhynchus tshawytscha*
Pikes	**Esocidae**
northern pike	Esox lucius
*grass pickerel***	*Esox americanus vermiculatus***
Mudminnows	**Umbridae**
central mudminnow	Umbra limi
Carps, Minnows	**Cyprinidae**
blackchin shiner	Notropis heterodon
blacknose dace	Rhinichthys atratulus
blacknose shiner	Notropis heterolepis
bluntnose minnow	Pimephales notatus
common carp*	Cyprinus carpio*
common shiner	Luxilus cornutus
creek chub	Semotilus atromaculatus
emerald shiner	Notropis atherinoides
golden shiner	Notemigonus crysoleucas
goldfish*	Carassius auratus*
koi*	Cyprinus carpio*
*pugnose shiner***	*Notropis anogenus***
striped shiner	Luxilus chrysocephalus
Suckers	**Catostomidae**
northern hog sucker	Hypentelium nigricans
*lake chubsucker***	*Erimyzon sucetta***
Bullhead Catfishes	**Ictaluridae**
black bullhead	Ameiurus melas
brown bullhead	Ameiurus nebulosus
stonecat	Noturus flavus
tadpole madtom	Noturus gyrinus
yellow bullhead	Ameiurus natalis
Killifishes	**Fundulidae**
banded killifish	Fundulus diaphanus
Silversides	**Atherinidae**
brook silverside	Labidesthes sicculus
Sticklebacks	**Gasterosteidae**
brook stickleback	Culaea inconstans
Sculpins	**Cottidae**
mottled sculpin	Cottus bairdii

Sunfishes	**Centrarchidae**
black crappie	Pomoxis nigromaculatus
bluegill	Lepomis macrochirus
green sunfish	Lepomis cyanellus
largemouth bass	Micropterus salmoides
longear sunfish	Lepomis megalotis
pumpkinseed	Lepomis gibbosus
rock bass	Ambloplites rupestris
smallmouth bass	Micropterus dolomieu
pumpkinseed x bluegill hybrid	Lepomis gibbosus x Lepomis macrochirus
pumpkinseed x longear sunfish hybrid	Lepomis gibbosus x Lepomis megalotis
Perches	**Percidae**
Iowa darter	Etheostoma exile
johnny darter	Etheostoma nigrum
logperch	Percina caprodes
rainbow darter	Etheostoma caeruleum
yellow perch	Perca flavescens

* fish are not native to Ontario

*** Species at Risk (SAR)*

Old Ausable Channel

Fish Community



The Old Ausable Channel is home to several Species at Risk, such as the Lake Chubsucker, Pugnose Shiner and the Grass Pickerel.
(Photos courtesy Fisheries and Oceans Canada)

Habitat and Fish Community

The Old Ausable Channel (OAC) is a warm water, pond–like ecosystem that is fed by surface runoff, precipitation and groundwater inputs. It is characterized by still, clear water and dense aquatic vegetation. Its substrate is made up of fine sand, silt and organics.

The diverse fish community is made up of nearly 50 species in total, and mainly consists of minnows and sunfishes. It contains a warm water fishery with top predators such as northern pike, largemouth bass, black crappie, smallmouth bass, yellow perch and various sunfish species.

Species at Risk Fishes

Three fish species found in the OAC have been listed as 'Species at Risk' (SAR) by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). These include the Pugnose Shiner (endangered), the Lake Chubsucker (threatened), and the Grass Pickerel (special concern).

These three SAR fishes are not known to occur elsewhere in the Ausable River watershed. The Old Ausable River Channel provides the only suitable habitat remaining for these species, consisting of heavily, vegetated, still clear waters. Therefore, the OAC has been identified as an important ecosystem in the Recovery Strategy for Species at Risk for the Ausable River.

Critical Habitat

Critical habitat is defined by Canada's Species at Risk Act (SARA) as: "… the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in a recovery strategy or in an action plan for the species."

The habitat may be an identified breeding site, nursery area or feeding ground. For Species at Risk, these habitats are of crucial importance, and must be identified for their protection. Fisheries and Oceans Canada and the Ausable Bayfield Conservation Authority are currently working together with the Ausable River Recovery Team to identify critical habitat for the Lake Chubsucker and Pugnose Shiner within the OAC to ensure these unique habitats receive protection under SARA.

Efforts to protect and enhance the habitat for these species in the OAC are being pursued to ensure the continued survival of these important populations.

The common Creek Chub minnow is present in the Old Ausable River Channel ecosystem.

BUILDING BETTER ENVIRONMENTAL CONSCIENCE

Old Ausable Channel

Fish Community

One of the most common species in the Old Ausable Channel is the Longear Sunfish.

Another common species in the Old Ausable River Channel is the Pumpkinseed Sunfish.

What is affecting the fish community?

Sedimentation and Contamination

Sediment input sources (due to lack of riparian vegetation, construction) and potential contamination (septic, lawn fertilizers, road salt) may impact the aquatic community and be especially detrimental to sensitive Species at Risk (SAR) fishes and common species as well.

What can you do to help?

1. Don't mow your lawn right down to the bank. Leaving a naturally-vegetated border along the waterway can help prevent harmful contamination getting into the Old Ausable River Channel by acting as a buffer. This can also prevent erosion, as the vegetation helps to keep the bank intact, which in turn will keep the water clearer. A minimum of a five-metre buffer is suggested – however keeping your entire lot in a natural state is very beneficial to the ecosystem as a whole, in terms of providing good habitat for lots of living things including birds, butterflies and the forest community.

2. Cut down on winter use of road salt on your neighborhood roads and driveways.

3. Make sure your septic system is the appropriate size for your needs and is in good repair.

4. Find alternatives to lawn fertilizers and other chemicals. For example, clippings left on your lawn act as nutrients reducing the need for chemical fertilizers by one third (Friends of the Bayfield River). For more information on this subject visit **http://fobr.huronstewardship.on.ca**.

5. Don't throw your leaf litter or any other garbage into the Old Ausable Channel (OAC). Decomposing leaf litter deprives the waters of the OAC of oxygen, which is required by fish and other organisms to breathe. The litter accumulates over time, filling the river channel up with organic matter – and also covering up the river bed surface which fishes may be using for spawning purposes.

The Bluntnose minnow is a common native fish species in the OAC.

Old Ausable Channel

NON-NATIVE FISH

Non-native fish species threaten to displace native aquatic species in the Old Ausable Channel. These species include Goldfish and Koi. Residents can prevent the proliferation of these species by not releasing them into the OAC.

(Photo of Goldfish courtesy Fisheries and Oceans Canada)

Non-native Fish Species

Baitfish

There is potential for non-native species to be released into the OAC. The use of baitfish is currently banned in Pinery Provinical Park, however this ban should be extended into the northern portion of the channel outside of the park.

Anglers using the OAC that dump their baitfish could be releasing undesirable species. This could be detrimental to the existing fish community, specifically the pugnose shiner and lake chubsucker. Released baitfish which are not native to the OAC could out-compete the native minnows for food and habitat, if they became established. Anglers should be familiar with, and observe all fishing regulations.

Please check the "Recreational Fishing Regulations Summary" for fishing regulations in the OAC at http://www.mnr.gov.on.ca/MNR/fishing/ or pick up this booklet most anywhere a fishing license can be purchased.

Release of Pet Fish

Studies and personal sightings indicate evidence of people releasing exotics, like goldfish and koi into the OAC's unique ecosystem. The release of such pet fish is harmful to the existing natural community as they may displace native species and cause habitat disruptions.

Koi

These ornamental fish are directly related to the common carp. Koi are selectively-bred carp from a natural anomaly first discovered and developed in Japan. Koi typically eat nearly anything, and they like to eat a lot of it – they can consume up to two per cent of their body weight per day. Koi can live to be 30 years old and they can reach lengths in excess of one metre and weigh up to 12 kg.

Goldfish

Releasing your goldfish into nature is not a good idea, as they are not a native species and they upset the natural balance. Goldfish are bottom feeders, so they stir up bottom sediments and can turn clear waters cloudy. Goldfish, much like Koi, can cause habitat disruptions that impact native species, and can introduce new diseases.

We would like to thank our funding partners:

Grand Bend Community Foundation
Government of Canada Habitat Stewardship Program
Ausable Bayfield Conservation Foundation
Ausable Bayfield Conservation Authority

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BUILDING BETTER ENVIRONMENTAL CONSCIENCE

Old Ausable Channel

INVASIVE SPECIES

Several invasive species such as the Round Goby and the Common Carp threaten the Old Ausable River Channel.
(Courtesy Fisheries and Oceans Canada)

Non-Native Invaders

Round Goby

This invasive, non-native fish is illegal to use as bait. It has not yet been captured in the Old Ausable Channel (OAC) during recent surveys. However, this species could enter the OAC from Lake Huron or the Ausable River (where it is now present) to the areas downstream of the Pinery Dam.

Care must be taken to ensure that the Round Goby is not introduced into the OAC upstream of the dam, as bait or by any other means.

The Round Goby is an aggressive fish that can spawn several times each season. These characteristics, combined with its abundance and relatively large size, mean that the Round Goby has impacted native fish species in some waters by causing their decline through competition for food and habitat. Round Gobies have also been observed feeding on the eggs and fry of sportfish, and may impact on these populations.

Common Carp

Common carp, which currently occur in the Old Ausable River Channel in relatively low numbers, are known to uproot aquatic vegetation, stir up bottom sediments and destroy habitat. This could be a problem for OAC fish habitat and specifically Species at Risk (SAR) fishes that are quite sensitive to turbidity and also require dense aquatic vegetation.

The feasibility of controlling carp numbers in the OAC is being investigated.

What can you do?

1. Don't move or release exotic or non-native fishes of any kind into natural water bodies where they don't belong. This is detrimental to the natural ecosystem.
2. Donate exotic fishes to a school or pet store, or contact the Invading Species Hotline at 1-800-563-7711 to find a home for unwanted exotic fishes.
3. Don't release baitfish into the OAC or anywhere else – buy only what you need and return unwanted baitfish to the place of purchase.

Sources of More Information

– Canadian Association of Aquarium Clubs - Fish Rescue, Being a Responsible Pet Owner – Information & Alternatives to not releasing your pet fish into natural spaces
http://www.caoac.on.ca

– Invasive Species – Information & Identification
http://www.invadingspecies.ca

– Species at Risk – Information & Identification
http://www.cosewic.gc.ca

– Department of Fisheries and Oceans Canada Fact Sheet 'The Species at Risk Act and Critical Habitat for Aquatic Species'

– ABCA & Partners – 'Fish Species found in the OAC'

– Contact the ABCA – Kari Killins, Aquatic Biologist (kkillins@abca.on.ca) or call 519-235-2610 or toll-free 1-888-286-2610

For more information please contact:
Ausable Bayfield Conservation Authority
71108 Morrison Line, RR 3 Exeter, ON N0M 1S5 519-235-2610, 1-888-286-2610
www.abca.on.ca info@abca.on.ca **www.oldausablechannel.ca**
Plan coordinator: Kari Killins, kkillins@abca.on.ca

Appendix 3 – Flora of the Old Ausable Channel Watershed

List of Recommended Native Trees for Restoration Planting along Old Ausable Channel Corridor - includes each tree's preferred habitat

Tree species - common name	Floodplain	Dune Ridges	Full sun	Light Shade	Full Shade
red oak	X	X	X		
white oak	X	X	X		
black oak		X	X		
bur oak	X		X		
red maple		X	X	X	
sugar maple		X		X	X
silver maple	X		X		
basswood	X		X	X	
shagbark hickory	X		X	X	
bitternut hickory	X		X	X	
black cherry	X	X	X		
sassafras		X	X		
black walnut	X		X		
tulip-tree	X		X		
sycamore	X		X		
beech	X	X		X	X
ironwood	X	X	X	X	X
blue beech	X		X	X	X
peachleaf willow	X		X		
white pine		X	X	X	
red pine		X	X		
hemlock		X		X	X
white cedar	X		X	X	
red cedar	X	X	X		

List of Recommended Native Shrubs for Restoration Planting along Old Ausable Channel Corridor - includes each shrub's preferred habitat

Shrubs/ Small trees – common name	Floodplain	Dune Ridges	Full sun	Light Shade	Full Shade
witch hazel	X	X	X	X	
spicebush	X			X	X
nannyberry	X		X	X	
maple-leaved viburnum	X	X		X	X
downy arrowwood		X	X	X	
fragrant sumac	X	X	X		
staghorn sumac	X	X	X		
bladdernut	X			X	X
choke cherry	X	X	X	X	
ninebark	X		X		
buttonbush	X		X		
red osier dogwood	X		X		
silky dogwood	X		X		
alternate-leaved dogwood	X		X	X	X
Canada plum	X		X		
serviceberry	X	X	X	X	
native crab-apple	X		X		
native willow shrubs	X		X		
new jersey tea		X	X		
dwarf chinquapin oak		X	X		
common juniper		X		X	

What kind of herbaceous plants are best for your gardens?

Please refer to "***The Native Plant Resource Guide for Ontario***" put out by the Society for Ecological Restoration (SER) – Ontario Chapter. Visit their website www.serontario.org or contact ABCA for more information.

Invasive Vegetation – Prevention & Removal

Invasive plants, shrubs and trees can out-compete and displace native species and their associated wildlife.

List of Current and Potentially Invasive Plant Species along Old Ausable Channel Corridor

These could be the target of future monitoring-management/removal strategy

Species – common name	Floodplain	Dune Ridges	Full sun	Light Shade	Full Shade
common reed	X		X		
garlic mustard	X	X		X	X
dame's rocket	X		X	X	
Norway maple	X	X	X	X	X
multiflora rose	X		X		
autumn olive	X	X	X	X	
European buckthorn	X		X	X	
Eurasian honeysuckle	X		X	X	
oriental bittersweet	X	X	X	X	
dog-strangling vine	X	X	X	X	X
periwinkle	X	X		X	X
English ivy	X	X		X	X
Japanese barberry	X	X	X	X	
Oregon grape		X		X	X
spotted knapweed		X	X		
brown knapweed		X	X		
purple loosestrife	X		X		

Trees of Pinery (www.pinerypark.on.ca 2007)

Pine Family
Eastern Hemlock *Tsuga canadiensis* (L.) Carr.
Tamarack *Larix laricina* (DuRoi) K. Koch
White Pine *Pinus strobus* L.
Red Pine *Pinus resinosa* Ait.
Scotch Pine *Pinus sylvestris* L.
Jack-Pine *Pinus banksiana* Lamb.
White Cedar *Thuja occidentalis* L.
Common Juniper *Juniperus communis* L.
Red Cedar *Juniperus virginiana* L.

Willow Family
Peach-Leaved Willow *Salix amygdaloides* Anderss.
White Willow *Salix alba* L.
Trembling Aspen *Populus tremuloides* Michx.
Large-toothed Aspen *Populus grandidentata* Michx.
White Poplar *Populus alba* L.
Cottonwood *Populus deltiodes* Marsh.
Black Poplar *Populus nigra* L. var. italica Muenchh.
Balsam-Poplar *Populus balsamifera* L.
Carolina Poplar *Populus x canadiensis* Moench.

Walnut Family
Butternut *Juglans cinerea* L.
Black Walnut *Juglans nigra* L.
Shagbark-Hickory *Carya ovata* (Mill) K. Koch

Hazel Family
Ironwood *Ostrya virginiana* (Mill) K. Koch
Blue Beach *Carpinus caroliniana* Walt.
Yellow Birch *Betula lutea* Michx. f.
White Birch *Betula papyrifera* Marsh.

Beech Family
Beech *Fagus grandifolia* Ehrh.
White Oak *Quercus alba* L.
Bur-Oak *Quercus macrocarpa* Michx.
Swamp-White Oak *Quercus bicolor* Willd.
Chestnut-Yellow Oak *Quercus muehlenbergii* Engelm.
Dwarf Chestnut Oak *Quercus prinoides* Willd.
Red Oak *Quercus rubra* L.
Black Oak *Quercus velutina* Lam.

Elm Family
Slippery Elm *Ulmus rubra* Muhl.
American Elm *Ulmus americana* L.
Dwarf Hackberry *Celtis tenufolia* Nutt.

Mulberry Family
White Mulberry *Morus alba* L.

Barberry Family
Japanese Barberry *Berberis thunbergii* DC.

Magnolia Family
Tulip-tree *Liriodendron tulipifera* L.

Laurel Family
Sassafras *Sassafras albidum* (Nutt.) Nees.

Witch-Hazel Family
Witch-hazel *Hamamelis virginiana* L.

Plane-Tree Family
Sycamore *Platanus occidentalis* L.

Rose Family
Apple *Pyrus Malus* L.
Wild Crab *Pyrus coronaria* L.
Mountain-Ash *Pyrus acuparia* L. Gaertn.
Hawthorn *Crataegus* L.
Sand Cherry *Prunus pumila* L.
Eastern Dwarf Cherry *Prunus susquehanae* Willd.
Pin Cherry *Prunus pensylvanica* L.f.
Black Cherry *Prunus serotina* Ehrh.
Choke Cherry *Prunus virginiana* L.

Rue Family
Prickly Ash *Xanthoxylem americanum* Mill.

Cashew Family
Staghorn Sumac *Rhus typhina* L.
Fragrant Sumac *Rhus aromatica* Ait.
Poison Ivy *Rhus radicans* L.

Bladdernut Family
Bladdernut *Staphylea trifolia* L.

Maple Family
Sugar Maple *Acer saccharum* Marsh.
Black Maple *Acer nigrum* Michx f.
Red Maple *Acer rubrum* L.
Silver Maple *Acer saccharinum* L.

Buckthorn Family
Common Buckthorn *Rhamnus cathartica* L.

Linden Family
Basswood *Tilia americana* L.

Dogwood Family
Red Osier Dogwood *Cornus stolonifera* Michx.
Bailey's Dogwood *Cornus stolonifera* Michx. Var. *baileyi*
Round-leaved Dogwood *Cornus rugosa* Lam.
Silky Dogwood *Conus obliqua* Raf.
Gray Dogwood *Cornus racemosa* Lam.
Alternate-leaved Dogwood *Cornus alternifolia* L.f.

Olive Family
White Ash *Fraxinus americana* L.
Red Ash *Fraxinus pennsylvanica* Marsh.
Green Ash *Fraxinus pennsylvanicus* Marsh. Var. *subintergerrima*
Black Ash *Fraxinus nigra* Marsh.

Honeysuckle Family
Common Elder *Sambucus canadensis* L.

For species lists and more information on plants found in the Pinery Provincial Park visit www.pinerypark.on.ca or the Pinery Provincial Park's Visitor's Centre.

Old Ausable Channel Fact Sheet

FORESTRY

Forest Community Background

Two distinct forest communities are found adjacent to the Old Ausable Channel, due to very different soils, topography and moisture regimes on which each has developed.

The Old Ausable river flats support lowland or floodplain forests on the silt loam soils deposited by floodwaters in centuries past. Green and red ash, bur and swamp white oak, shagbark hickory and elm are typical of this community.

On the more sterile, excessively-drained sand dune ridges pine-oak and oak woodland has developed. The oak and pine species that grow here – including black, white and red oak and white and red pine – are able to tolerate the dry, infertile soils of the dunes. In more open areas, mainly southern sections within the Pinery Provincial Park, globally rare oak savannah is found.

Tips for Maintaining a Healthy Forest Community

1. Diversity

Diversity in native species, structure and wildlife contribute to a healthy forest. It is often difficult to see the forest for the trees. All parts, seen and unseen, play important roles. A diverse system is best able to adapt to changing environmental conditions and withstand new threats faced by the forests of today.

2. Moving Soil and Planting Grass

Tread lightly in the natural areas surrounding your home. Mowing, addition of topsoil and grade changes affect soil water and oxygen levels and can negatively impact forest health. Try to keep manicured lawn and gardens to areas immediately adjacent your home. Invasive plants such as garlic mustard are spreading rapidly due to soil being brought in.

3. Thinning or Cutting Brush

In general, the cutting of shrubs, saplings and other brush is not necessary to maintain a healthy forest. However, light thinning of sapling and shrubs can have a positive impact on oak woodland grasses and wildflowers providing you do not introduce turf grass or other landscape plants to the area. If you must thin, proceed with caution, taking care not to disturb the native ground flora or soil.

4. Raking/Blowing Leaves

As with brush, leaf litter is a natural component of a healthy forest and need not be removed from natural areas. At the same time, avoid raking excess leaves from the manicured portion of your property directly into natural areas as they can smother the native flora. If possible, compost leaves from lawn and garden areas in a designated spot on your property. Do not dump leaf litter into the Old Ausable Channel. Decomposing leaf litter deprives the waters of the OAC of oxygen, which is required by fish and other organisms to breathe. The litter accumulates over time, filling the river channel up with organic matter.

5. Grape vines

Two species of grape are native to Old Ausable Channel neighborhoods. Summer grape (leaves with whitish underside) is an upland species found in the dry oak-pine forest while its lowland cousin riverbank grape (leaves with green underside) is common along the old channel. Both species of grape vine provide food and habitat for birds and other wildlife and are an important part of a healthy and diverse forest. Remember to leave a few when considering their removal. For more information phone the ABCA's Forestry Specialist.

Old Ausable Channel Fact Sheet

FORESTRY



Invasive species, such as Eurasian Honeysuckle, Garlic Mustard, or Knapweed, can pose a threat to the unique Old Ausable Channel ecosystem.

6. Hazard Trees

Individual trees of concern, within a full length of people or property, should be assessed by a certified arborist or qualified forestry professional. Standing dead trees and downed woody debris are part of a healthy forest, providing habitat for a host of invertebrates, salamanders and feeding sites for birds and other wildlife. Where they do not pose risk to people or property, standing dead trees can be left to provide habitat and will slowly release their stored nutrients back to the living forest. Downed trees and branches need not be removed. If aesthetics are compromised, consider removing those branches that are detracting, or relocating fallen trunks to less visible areas of your property.

7. Forest Pests

Emerald Ash Borer and Hickory Bark Beetle are currently devastating hardwood stands in parts of Lambton County. Do not import firewood of any type, including pallets or slabs from outside the community. It is illegal to move firewood of any kind out of Lambton County under the County of Lambton Emerald Ash Borer Infested Places Declaration and Order (2006) – see **www.inspection.gc.ca** or **www.invadingspecies.com** for more detailed information.

8. Tree Planting, Groundcovers and Landscaping

When planting or landscaping try to do so in harmony with the natural environment in which you live. Use only native trees, shrubs and perennials. Do not plant Norway maple, ornamental honeysuckles, or oriental bittersweet. Avoid plants such as English ivy and periwinkle, as they will slowly creep into the forest and take over native ground flora.

We would like to thank our funding partners

Grand Bend Community Foundation
Government of Canada Habitat Stewardship Program
Ausable Bayfield Conservation Foundation
Ausable Bayfield Conservation Authority

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9. Exotic Species

Most introduced species are benign and do not stray far from where they are planted. A few, however, have escaped to natural areas, displacing native plant species and the wildlife dependant on them for food and home. Autumn olive and multiflora rose were planted across the province for erosion, including along the Old Ausable Channel, where they are increasingly invading native vegetation along the bank. Keep an eye out for Norway maple, European buckthorn, Eurasian honeysuckle and other invaders listed on the accompanying species list.

What should you plant? Where can you find appropriate species and get some more information?

- Local Nurseries

- ***Native Plant Resource Guide for Ontario.*** Currently there is a listing out for 2004-2005. The 2007-2008 listing is currently being developed according to their website (**www.serontario.org**)

- ABCA – Forestry Services, contact Ian Jean, Forestry Specialist, at **ijean@abca.on.ca** or **519-235-2610** or toll-free **1-888-286-2610**

- ABCA and Partners' 'List of Recommended Native Trees and Shrubs for Restoration Planting along Old Ausable Channel Corridor' available as a factsheet or at **www.abca.on.ca**

For more information please contact:
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519-235-2610, 1-888-286-2610
www.abca.on.ca info@abca.on.ca **www.oldausablechannel.ca**
Forestry contact: Ian Jean, ijean@abca.on.ca
Plan coordinator: Kari Killins, kkillins@abca.on.ca

No. 1/2007

Appendix 4 – Mammals, Reptiles and Amphibians found in the Old Ausable Channel Watershed

For species lists and information on birds, butterflies, other insects please visit www.pinerypark.on.ca or the Pinery Provincial Park's Visitor's Centre.

Checklist of the Mammals of Pinery Provincial Park (www.pinerypark.on.ca 2007)

Opossums Didelphimorphia
Virginia Opossum *Didelphis virginiana*

Shrews and Moles Insectivora
Common Shrew *Sorex cinereus*
Short-tailed Shrew *Blarina brevicauda*
Hairy-tailed Mole *Parascalops breweri*
Star-nosed Mole *Condylura cristata*

Bats Chiroptera
Little Brown Bat *Myotis lucifuga*
Big Brown Bat *Eptesicus fuscus*
Eastern Red Bat *Lasurius borealis*
Hoary Bat *Lasurius cinereus*

Rabbits and Hares Lagomorpha
Eastern Cottontail *Sylvilagus floridanus*
European Hare *Lepus europaeus*

Rodents Rodentia
Eastern Chipmunk *Tamias striatus*
Woodchuck *Marmota monax*
Gray Squirrel *Scurius carolinensis*
Gray Squirrel black phase *Scurius carolinensis*
Red Squirrel *Tamiascurius hudsonicus*
Southern Flying Squirrel *Glaucomys volans*
Beaver *Castor canadensis*
Deer mouse *Peromyces maniculatus gracilis*
Prairie Deer Mouse *Peromyces maniculatis bairdii*
Meadow Vole *Microtus pennsylvanicus*
Woodland Vole *Pitymys pinetorum*
Muskrat *Ondatra zibethicus*
Meadow Jumping Mouse *Zapus hudsonius*

Carnivores Carnivora
Coyote *Canis latrans*
Red Fox *Vulpes vulpes*
Raccoon *Procyon lotor*
Ermine *Mustela erminea*
Long-tailed Weasel *Mustela frenata*
Mink *Mustela vison*
Striped skunk *Mephitis mephitis*
River Otter *Lontra canadensis*

Even Toed Hoofed Mammals Artiodactyla
White-tailed Deer *Odocoileus virginianus*

Reptiles and Amphibians Checklist
Pinery Provincial Park and Surrounding Area (www.pinerypark.on.ca 2007)

Amphibians

Salamanders and Newts
Mudpuppy *Necturus maculosus*
Eastern Newt *Notopthalamus viridescens*
Eastern Redback salamander *Plethodon cinereus*
Jefferson Salamander *Ambystoma laterale*, *Ambystoma jeffersonianum*,
Complex *Ambystoma laterale* x *Ambystoma jeffersonianum*

Toads and Frogs
American Toad *Bufo americanus*
Spring Peeper *Hyla crucifer*
Gray treefrog *Hyla versicolor*
Striped Chorus Frog *Acris crepitans*
Wood Frog *Rana sylvatica*
Northern Leopard frog *Rana pipiens*
Green frog *Rana clamitans*
Bullfrog* *Rana catesbeiana*

Reptiles

Turtles
Common Snapping turtle *Chelydra serpentina*
Musk turtle *Sternotherus odoratus*
Painted turtle *Chrysemys picta*
Blanding's turtle *Emydoidea blandingi*
Spotted turtle *Clemmys gutatta*
Wood turtle** *Clemmys insculpta*
Soft-shelled turtle *Trionyx spiniferus*

Lizards
Five Lined skink *Eumeces fasciatus*

Snakes
Common Garter snake *Thamnophis sirtalis*
Eastern Ribbon snake *Thamnophis sauritus*
Northern Water snake *Nerodia sipedon*
Brown snake Storeria dekayi
Smooth Green snake *Opheodrys vernalis*
Eastern Hognose snake *Heterodon platyrhinos*
Milk snake *Lampropeltis triangulum*
Blue Racer* *Coluber constrictor*

* historically present, no recent sightings
** one recorded sighting

Glossary

Aquatic macrophyte - plants of lakes, streams and wetlands that are visible with the naked eye. This term literally means "large plant." Usually refers to rooted, seed-producing aquatic plants.

Aquifer - an underground formation of permeable rock or loose material which can produce useful quantities of water when tapped by a well. Aquifers come in all sizes. They may be small, only a few hectares in area, or very large, underlying thousands of square kilometres of the earth's surface. They may be only a few metres thick, or they may measure hundreds of metres from top to bottom.

Area of Natural and Scientific Interest (ANSI) – area of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education.

Best Management Practices (BMPs) – a proven, practical and affordable approach to conserving soil, water and other natural resources.

Big Picture – a Carolinian Canada initiative which is an analysis which identifies a natural heritage system of large core natural areas, other significant natural areas and corridors and linkages connecting the system together. It is meant to complement other analyses of natural heritage conducted by municipalities, conservation authorities, provincial and federal departments.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC) - is a committee of experts that assesses and designates which wild species are in some danger of disappearing from Canada.

Carolinian Canada - a non-profit coalition of over 40 government and non-government conservation groups and many individuals working to conserve the ecological diversity of Canada's most threatened natural region.

Critical habitat - is defined by Canada's Species at Risk Act (SARA) as: the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in a recovery strategy or in an action plan for the species. The habitat may be an identified breeding site, nursery area or feeding ground. For species at risk, these habitats are of crucial importance, and must be identified and included in recovery strategies or action plans

Ecosystem – and interacting system of living organisms and their environment

Ecosystem approach – a holistic way of planning and managing natural resources. It means that the consequences of an action on all other parts of the ecosystem will be considered and evaluated before the action is undertaken

E. coli *(Escherichia coli)* – bacteria found in human and animal waste. Its presence in water indicates a potential for the water to have other disease-causing organisms

Environmentally Significant Area (ESA) – ABCA defines environmentally significant areas as areas of woodlots that contain some wetland features that play an important role in supporting significant plant or animal species and/or serving hydrological functions. A site may also be significant if it supports a remnant or threatened species of flora or fauna

Eutrophication - the process whereby a body of water becomes rich in dissolved nutrients through natural or man-made processes. This often results in a deficiency of dissolved oxygen, producing an environment that favors plant over animal life.

Fauna - the animal life of a particular region or period, considered as a whole.

Flora - plant life, especially all the plants found in a particular country, region, or time regarded as a group.

Habitat – food, water, shelter, cover and other elements of the environment that living organisms need to survive

Hyper-abundant species – species which expand their range and dominance from existing or nearby locations

Invasive species – a species (native or non-native) which typically spreads quickly and may be difficult to control or eradicate. These species are of concern because they can be detrimental to other species and threaten ecosystems.

Native species – a species that occurs naturally in an area, and has not been introduced by humans either intentionally or unintentionally

Non-native species - term to describe a plant or animal species that is not originally from the area in which it occurs.

Oak savanna – this globally rare habitat is a transition zone between prairie grasslands and oak forests that is kept stable by periodic forest fires.

Provincially Significant Wetland (PSW) – has been identified and classified as provincially significant by the Ontario Ministry of Natural Resources in accordance with the Wetland Evaluation System. These wetlands may contain critical fish and wildlife habitat; provide a hydrologic role in the watershed; or have unique or provincially-significant features

Regulated water body - permits may be required for works within or in proximity to the waters edge

Riparian zone – an area of ecological transition between the aquatic zone and the upland zone

Species At Risk – species that are at risk of extinction, extirpation or endangerment globally or within a jurisdiction or region.

Stewardship - the concept of responsible caretaking; based on the premise that we do not own resources, but are managers and are responsible to future generations for their condition

Succession - gradual replacement of one type of ecological community by another in the same area, involving a series of orderly changes, especially in the dominant vegetation. In the OAC it is the transformation of an aquatic ecosystem to a more terrestrial one over many years, in this case from a slow flowing channel to a pond, to a marsh and finally to a forest.

The Ausable River Cut – a “cut” was excavated from a point east of Port Franks where the Ausable River was flowing northward, to the river mouth at Port Franks resulting in the present outlet of the Ausable River emptying directly into Lake Huron at Port Franks

Total Phosphorus – refers to the total amount of phosphorus in a water sample. Phosphorus is an element that enhances plant growth and contributes to excess algae and low oxygen in water bodies.

Watershed – an area of land that is drained by a river or a stream, and its tributaries, to a body of water such as a lake or ocean. It is often referred to as a drainage area, basin or catchment area for a watercourse.

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