

Chapter 1: Introduction

1.0 The Report Card

1.0.1 Background

People are becoming more aware of environmental issues locally and globally and want to know what they can do to improve their local watersheds. A report on the condition, or state, of the watershed is important for the public and environmental managers for a number of reasons. The report card primarily provides an opportunity to summarize data from existing monitoring programs. Watershed residents learn about their local creeks, streams, and forests. This report card also identifies activities to improve watershed conditions. Finally, the report card provides baseline information for comparison with future conditions.

Reporting follows a five-year cycle. This frequency provides sufficient data for statistical analyses of water quality data, but it also helps minimize seasonal variations. This is the second watershed report card for the Ausable Bayfield area so we compared data collected between 2007 and 2011 to the data in the 2007 watershed report card (which used data from 2000 to 2005) (Veliz *et al.* 2006). The watersheds will be reassessed again in five years, to determine if conditions are improving or deteriorating.

We acknowledge that many people and agencies are currently working in partnership to protect, improve, conserve, and restore our local watersheds.

1.0.2 Objectives

The objectives of this report are to:

1. Provide background environmental information about the area draining into the southeast shore of Lake Huron (Map 1);
2. Use indicators of environmental health to define the current conditions of the 16 watersheds of the Ausable Bayfield area (Map 2), and to compare to previous conditions; and
3. Provide information about opportunities to improve local water, wetland, and forestry conditions.

1.0.3 Components of the Report

The Ausable Bayfield Watershed Report Card 2013 has three main components:

1. A section that describes the watershed report card and the main watersheds in the Ausable Bayfield Conservation Authority (ABCA) jurisdiction;
2. A section that describes the ecosystem indicators and results; and
3. The watershed report cards.

1.1 Background

1.1.1 Ausable Bayfield Conservation

The municipalities drained by the Ausable River created the Ausable River Conservation Authority (ARCA) in 1946 in order to deal with problems

such as serious local flooding, soil erosion, and water quality and supply.

The Bayfield watershed and lakeshore gullies were added to the ARCA's area of jurisdiction in 1972, and the organization then became the Ausable Bayfield Conservation Authority (ABCA).



Map 1: Municipal boundaries across the Ausable Bayfield watershed

Ausable Bayfield Conservation Authority's area of jurisdiction not only includes the areas drained by the Ausable and Bayfield rivers, but also the area drained by Parkhill Creek, and a series of gullies and streams that drain directly into Lake Huron. The Ausable Bayfield Conservation Authority is responsible for a 2428-km² area that lies within

Perth, Huron, Middlesex, and Lambton counties (Map 1). This area is bounded by the Maitland River watershed to the north, the Upper Thames River watershed to the east, and Lake Huron to the west. Streams that drain into Lake Huron to the south are under the jurisdiction of the St. Clair Region Conservation Authority.

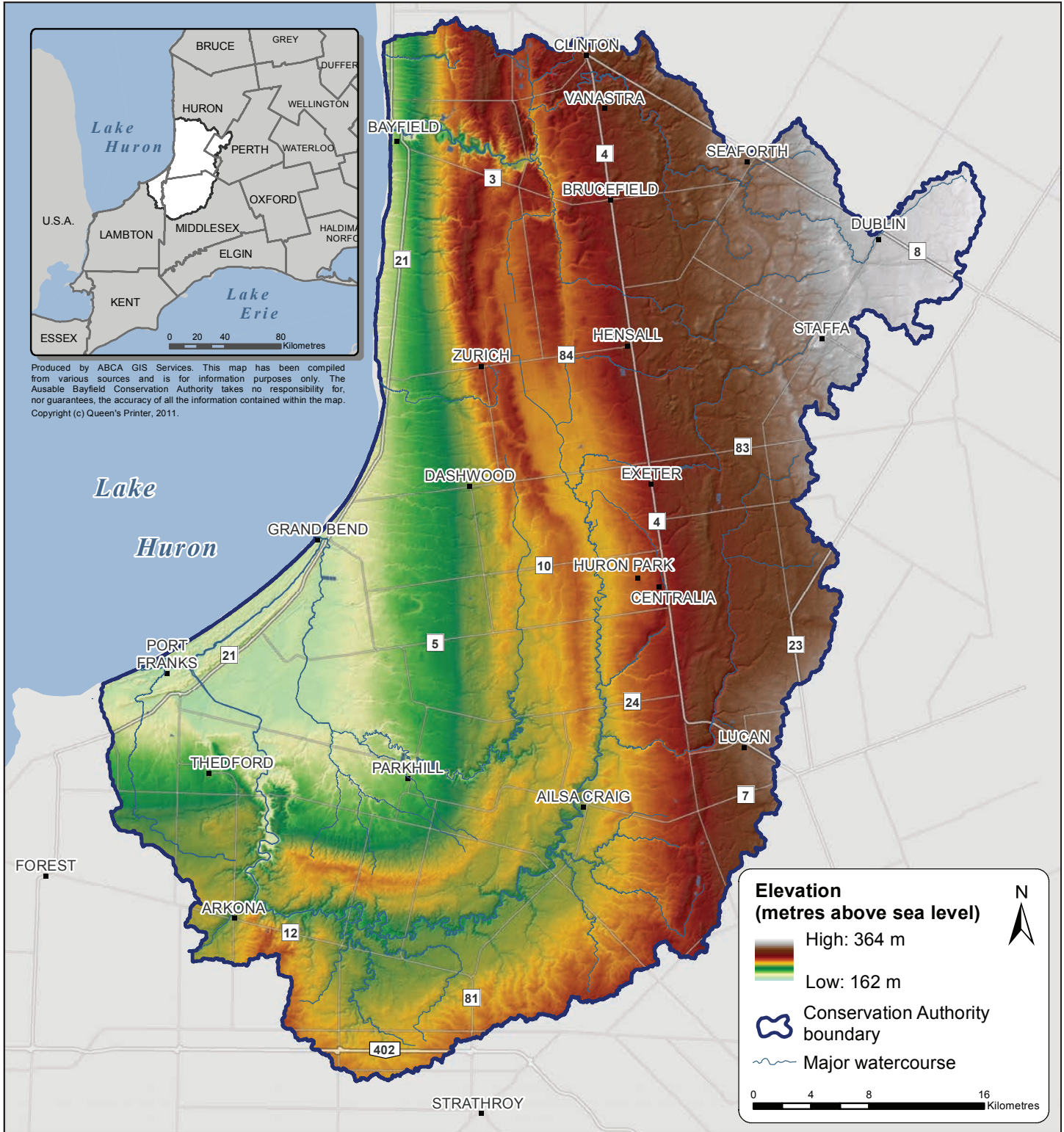


Map 2: Watersheds of the Ausable Bayfield area

1.1.2 Watershed Features

Natural features and land use determine the quality of freshwater. Key natural features include topography, geology, soils, and the location and quantity of woodlots and wetlands.

The Ausable Bayfield watershed is generally level, with gently sloping moraines such as the Wyoming moraine (dark red on Map 3). For further details, see Ausable Bayfield Maitland Valley Source Protection Region – Watershed Characterization (Luinstra *et al.* 2007).



Map 3: Topography of the Ausable Bayfield watershed

The steepest slopes occur at the Ausable Gorge (near Arkona), where the Ausable River cuts into the Wyoming moraine, as well as along the lakeshore, where sand dunes and bluffs can be up to 20 metres in height.

Most of the Ausable Bayfield watershed consists of clay to silt-clay till plains with poor to very poor infiltration. Watercourses draining areas with poor infiltration typically have little groundwater input, and as a result, have low to intermittent base flows, flashy runoff, turbid waters, and warm temperatures. However, there are areas with coarse moraine deposits, most notably in the northwest area of the ABCA jurisdiction, that provide cool or cold groundwater to the river system.

Wetlands and streamside woodlots are recognized as having an important role in maintaining good surface water quality. Wetlands help to clear sediment-laden waters and reduce

concentrations of nitrogen and phosphorus. These areas retain and slowly discharge water, which helps maintain base-flow conditions downstream during dry periods. As well, wetlands provide feeding, spawning, and nursery areas for fish and other aquatic animals. Wetland area is limited in the Ausable Bayfield watershed (Map 4).

Streamside woodlots moderate temperatures and prevent excessive aquatic plant growth by shading streams. Leaves, twigs, and other woody debris provide food for the aquatic food chain and structure to streams. Depending on soil conditions, these woodlots may also reduce the movement of fine soils and the concentrations of nitrogen and phosphorus. Generally, the lower reaches of the larger Ausable and Bayfield rivers, as well as Parkhill Creek, have riparian forests, but the headwater tributaries lack forest cover (Map 4).

What do rocks tell us?

Geology is an important determinant of groundwater and surface water conditions.



Rock Glen Conservation Area near Arkona is a destination for fossil enthusiasts of all ages. Water can contain more suspended material when sedimentary rock, common in this part of Ontario, is eroded.

The primary bedrock features in southern Ontario are of a sedimentary nature (compared with the more durable igneous formation of the Canadian Shield). Sedimentary rocks are formed through the process of deposition and compression of sediment over millions of years. Erosion of sedimentary rocks results in more sediment-laden waters.

Active erosion of sedimentary rock is evident at Rock Glen Conservation Area, near Arkona, which features fossils from 350 million years ago. The most commonly found fossils are brachiopods, horn corals (*Heliophyllum halli*), and crinoid stem sections.



Horn coral



Brachiopod



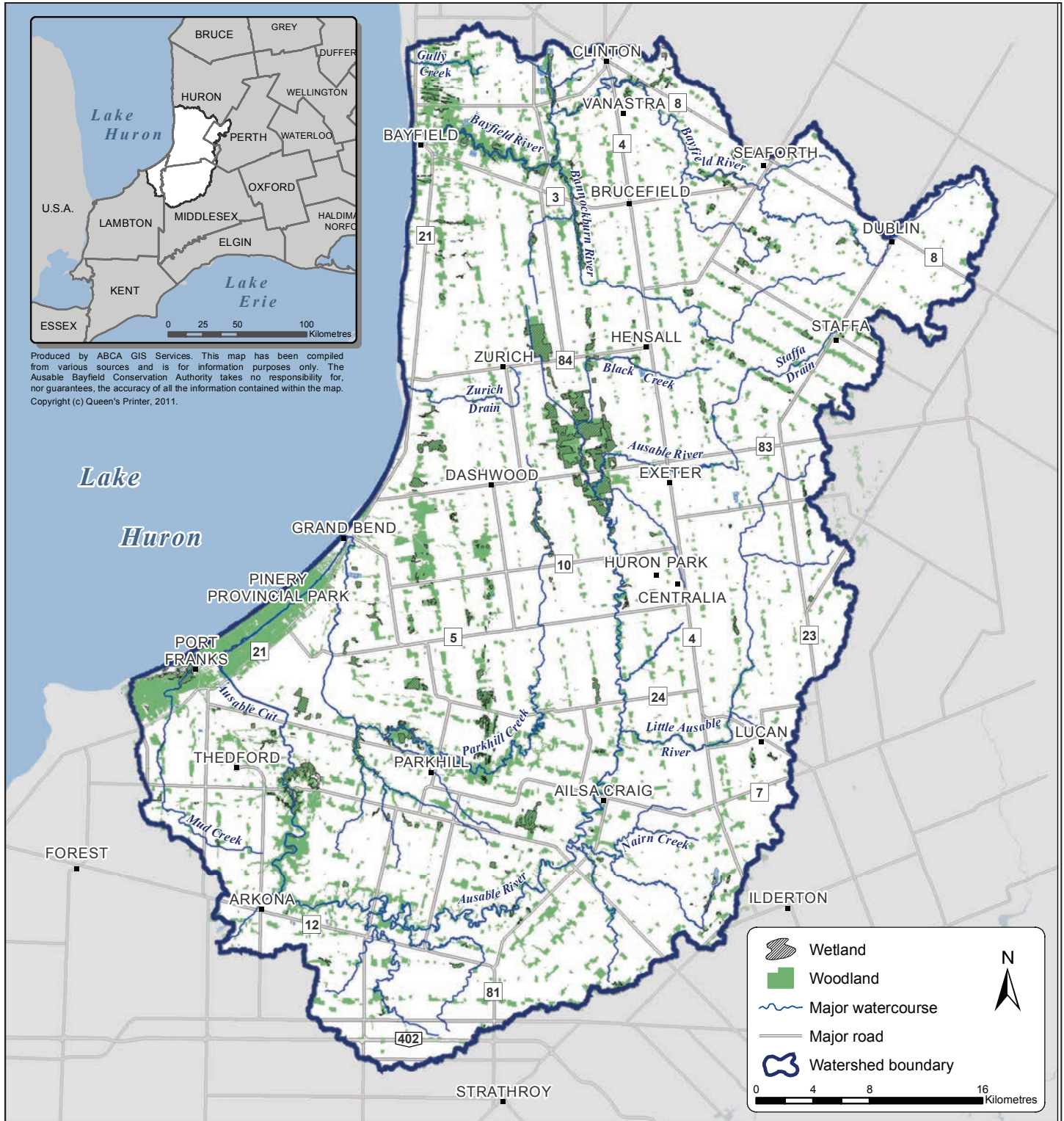
Crinoid stem sections

Human settlement has left a striking pattern for non-streamside forests. Woodlots were often left at the backs of farms, which has resulted in forest cover mainly occurring as broken strips across the landscape (Map 4).

within the Ausable Bayfield watershed. These include Areas of Natural and Scientific Interest (ANSI) and Environmentally Significant Areas (ESA).

Contact Ausable Bayfield Conservation for more information on these areas.

There are significant natural heritage features



Map 4: Natural heritage features of the Ausable Bayfield watershed

1.1.3 Introduction to the Watersheds

Ausable River

The Ausable River basin is 1189 km² in area. This river arises near Staffa and flows south to Ailsa Craig, where it makes a wide arc to the west (Map 5). Prior to 1873, the river traveled north to Grand Bend. Here the river made a sharp turn (approximately 180 degrees) and flowed southwest to its outlet near Port Franks. Between 1873 and 1875, the course of the river was altered by excavating a channel from the boundary between the wards of McGillivray and West Williams to Port Franks. 'The Cut' now diverts flow from Grand Bend towards the current river mouth at Port Franks. The main tributaries of the Ausable River include Black Creek, the Little Ausable River, and Nairn Creek (Map 2, Map 5).

Agriculture is the predominant land use, and forest covers about 14 per cent of the Ausable River watershed. Hay Swamp, the Ausable Gorge, and the valley immediately upstream of the gorge are large areas with extensive forest cover. Woodlots are scattered at the back of farms, in small areas of floodplain, and in wetlands. The woodlots at the backs of farms tend to create strips of forest, a pattern common in southwestern Ontario.

The Ausable River, located at the northern edge of the Carolinian Zone in southwestern Ontario, supports unique aquatic fauna that are not found in many rivers elsewhere in Canada. At least 26 species of mussels, 94 species of fish, and 18 reptile species have been found here (Ausable Bayfield Conservation Authority 2012, Ontario Ministry of Natural Resources 2011). Many of these species are rare, and at least 23 species in the Ausable River have been listed as species at risk (SAR) (Appendix A). As such, the Ausable River watershed is of national significance to the survival of these and other species within Canada. Since 2002, Ausable Bayfield Conservation and Fisheries and Oceans Canada have been working with local landowners

and agencies to implement a recovery strategy for the Ausable River. Visit the link abca.on.ca/page.php?page=ausable-river-recovery-strategy for more information.

Due to channel diversions in the latter part of the 19th century, the Old Ausable Channel (OAC) is now a tributary of the Ausable River, instead of being part of its main channel (Map 5). This 24-km² watershed is void of agriculture, and nearly 80 per cent of the watershed is within Pinery Provincial Park – one of the most visited campgrounds in Ontario.

The OAC is closer to a wetland than a true river channel, and supports three SAR fishes (Pugnose Shiner, Lake Chubsucker, and Grass Pickerel). Threats to these SAR fishes and their habitat include nutrient inputs, low oxygen concentrations, and fluctuating water levels. The OAC watershed also contains rare oak savanna communities and is an important area for rare plants and populations of breeding birds. The OAC watershed community and local, provincial, and federal agencies, are monitoring management actions in this unique ecosystem. See abca.on.ca/page.php?page=old-ausable-channel for more information.

Bayfield River

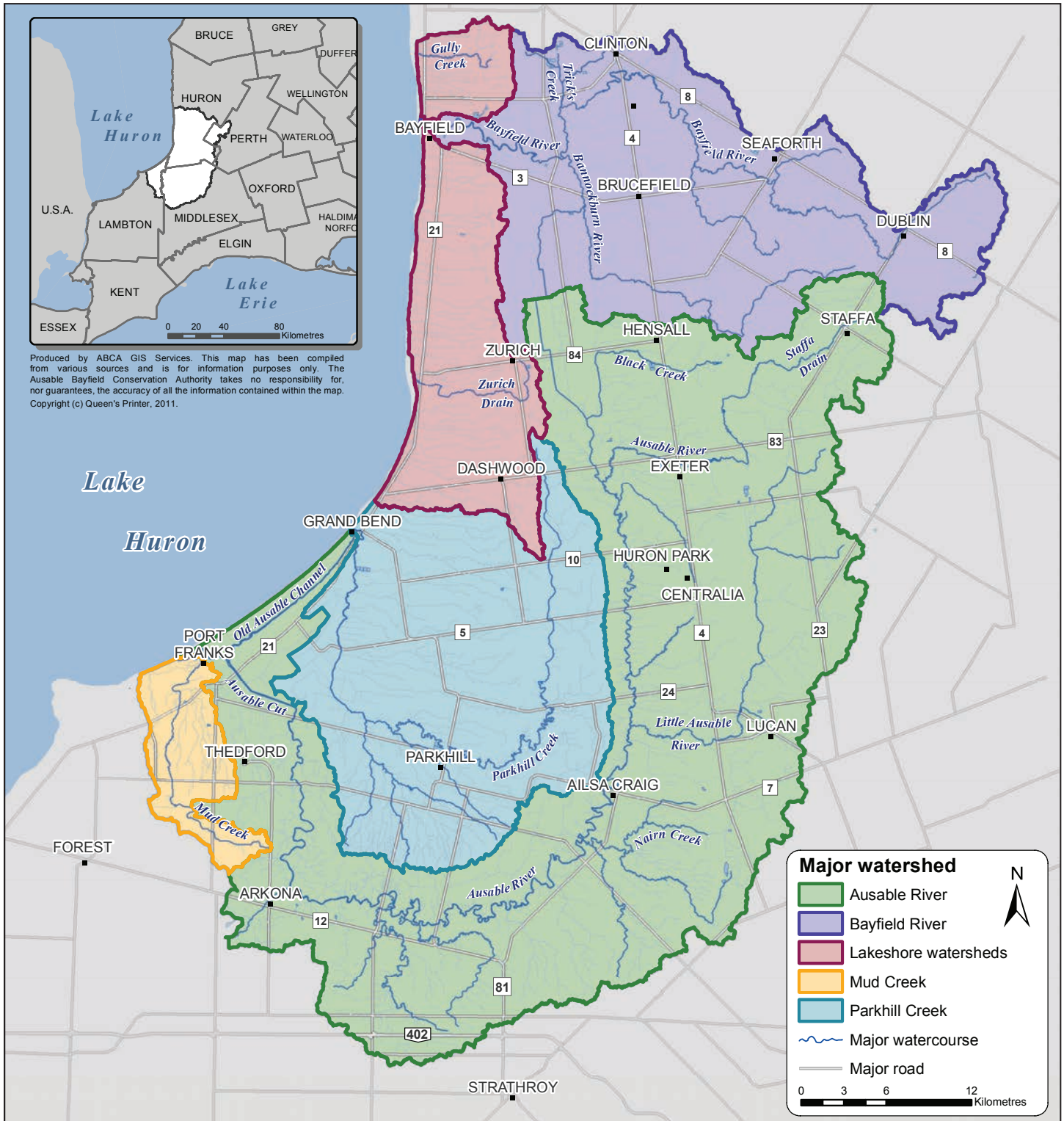
The Bayfield River basin is 499 km², beginning north of Dublin and outletting at Bayfield (Map 5). The Bayfield's main tributary is the Bannockburn River. Trick's Creek is also a significant tributary as it contributes baseflow to the Bayfield River, which is important during periods of low rainfall and to the local recreational fishery.

Land use is dominated by agriculture, and total forest cover in this watershed is approximately 11 per cent. Most of the wooded areas generally occur in the river valleys, but are most common in the Bayfield River valley downstream of Clinton, and the lower reaches of Trick's Creek

and Bannockburn River. Elsewhere, the remaining woodlots tend to be broken mid-concession corridors running perpendicular to the stream systems.

Since 2011, local citizens have been preparing and implementing a watershed plan to protect

and enhance the Main Bayfield watershed (Map 2). The Main Bayfield watershed is one of five priority areas identified along the southeast shore of Lake Huron as part of the *Healthy Lake Huron – Clean Water, Clean Beaches* initiative. See healthylakehuron.ca for more information.



Map 5: Major watersheds of the Ausable Bayfield area

Parkhill Creek

The Parkhill basin covers 461 km² (Map 5). Parkhill Creek arises near Dashwood and flows southward, then westward towards Parkhill. The creek was a former tributary of the Ausable River, but it now empties into Lake Huron at Grand Bend through a short channel constructed in 1892.

Land use is predominantly agricultural, and forest covers approximately 14 per cent of the Parkhill Creek watershed. Wooded areas are concentrated in the Parkhill Creek valley (particularly where it deepens below West McGillivray), several kilometres on either side of the Parkhill Dam and Reservoir. The remaining woodlots are scattered at the backs of farms.

Mud Creek

This watershed refers to the Mud Creek flowing through Port Franks, not to the tributaries of the Ausable River and Parkhill Creek, which have the same name.

The Mud Creek basin is a 69-km² area at the southwestern edge of the Ausable Bayfield jurisdiction (Map 5). Mud Creek itself flows northwards through the basin and empties into Lake Huron at Port Franks. Agriculture is the predominant land use in this upstream basin.

Approximately 24 per cent of the Mud Creek watershed is forested, most of which occurs in the dunes between Highway 21 and Lake Huron. The scattered upstream woodlots are generally oriented north-south, paralleling the stream system in the middle reaches and running perpendicular to it in the upper reaches. Few streambanks are wooded.

Lakeshore Watersheds

Within the ABCA jurisdiction, there are nearly 70 smaller watersheds that outlet directly into Lake Huron (Map 5). These smaller watersheds are found from Grand Bend north to the boundary between the ABCA and the Maitland Valley Conservation Authority. The average catchment area for these small watersheds is three square kilometres.

The watersheds north of Bayfield (Bayfield North) cover a 40-km² area that has a higher percentage of forest cover (30 per cent), compared to the watersheds south of Bayfield (South Gullies) (199-km² area with forest covering 12 per cent). The community north of Bayfield has been working with the ABCA and provincial and federal agencies to develop and implement a Watershed Management Plan for 20 of the lakeshore watersheds. See abca.on.ca/page.php?page=bayfield-north for more information.



L Lake is shown in the foreground and the Mud Creek outlet to Lake Huron is shown in the background.