Jackfish Bay

Area in Recovery

Status of Beneficial Use Impairments

September 2010

The Jackfish Bay Area of Concern is located on the north shore of Lake Superior, about 250 km northeast of Thunder Bay, Ontario. It consists of Jackfish, Moberly and Tunnel Bays, as well as a 14-km stretch of Blackbird Creek and two small lakes. The Town of Terrace Bay is the closest community. In the past, the bay supported small commercial Lake Trout and Whitefish fisheries. A local pulp mill is the largest industry and major employer in the area.

For many years, mill effluent, spills and sediment contamination impacted the waters and sediment in the Jackfish Bay Area of Concern, affecting fish and the benthic community.[1] Blackbird Creek, which flows into Jackfish Bay, has received wastewater discharge from the pulp mill since 1948. The two small lakes experienced significant infilling with wood fibre and other solids. In addition, overfishing and the presence of Sea Lamprey, an invasive species, have contributed to a decline in the Lake Trout population.

[1] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.

Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

Jackfish Bay was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to address the environmental challenges and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans to protect and restore these Areas of Concern in Canada. Other partners in the cooperative effort in the Jackfish Bay Area of Concern include (in alphabetical order) EcoSuperior Environmental Programs, Lakehead University, the (former) Public Advisory Committee, the Public Area in Recovery Review Committee (which includes residents of the communities of Jackfish, Rossport and Schreiber) and the Town of Terrace Bay.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage 1, the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1991. The report identified seven environmental challenges needing to be addressed and known as *beneficial use impairments* in the Remedial Action Plan process. Their current status is described below in **Progress on Environmental Challenges**.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified recommended remedial actions, was completed in 1998. The report concluded that the Area of Concern should be monitored for incremental improvements but that no further intervention was appropriate at that time. The conclusion followed major improvements to the treatment of effluent undertaken at the pulp mill in the 1990s that led to reductions in contaminant levels in effluent and receiving waters. The improvements included the installation of secondary treatment of effluent, changes in mill processes (to chlorine dioxide bleaching) and the diversion of mill effluent flow away from one of the small lakes.

The *Stage 2 Remedial Action Plan Report* recommended that a natural recovery plan be adopted to address most of the beneficial use impairments in the Area of Concern. The plan does not require the removal of contaminated sediment from the environment. Rather, natural processes will be relied on to cover contaminants in the sediment, effectively isolating them from the water column and food web. A status report for this Area of Concern was completed by Lakehead University in 2010.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The natural recovery recommendation in the *Stage 2 Remedial Action Plan Report* recognized that complete recovery and delisting for the Area of Concern would not occur without further treatment of pulp mill effluent. The ***Stage 3 Remedial Action Plan Report*** and delisting of Jackfish Bay as an Area of Concern will take place when monitoring confirms the natural recovery of the ecosystem. As of September 2010, there is no estimate of when the delisting will occur; however, the status report confirms that all feasible remedial actions have been completed and that the ecosystem has shown signs of recovery. The report recommends that Jackfish Bay be recognized as an Area in Recovery.

PROGRESS ON ENVIRONMENTAL CHALLENGES

Contaminant levels in effluent and receiving waters have decreased since the installation of secondary treatment and changes in mill processes to chlorine dioxide bleaching; however, mill-related effects on water quality are continuing.

The natural recovery plan for the Jackfish Bay Area of Concern recognizes that complete recovery and delisting for the area cannot occur unless the pulp mill continues to meet federal and provincial standards for effluent discharges. The recovery of the Jackfish Bay ecosystem needs to be monitored and evaluated by the Remedial Action Plan partners on a regular basis. Delisting will be considered when monitoring information confirms the restoration of environmental quality.

Status of Beneficial Use Impairments

The tables below summarize, for each of the seven beneficial use impairments in the Jackfish Bay Area of Concern, their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

STATUS – IMPAIRED

Degradation of Benthos

Status: ***Impaired***

Monitoring has confirmed impairment of the benthic community structure at several sites within the Area of Concern including Moberly, Tunnel and Jackfish bays, several sites along Blackbird Creek and in Moberly Lake.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Implemented federal pulp and paper regulations and the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at the area pulp and paper mill ▪ Applied the Canada Ontario Decision Making Framework for the management of contaminated sediment and determined that monitored natural recovery is the appropriate management approach for the Jackfish Bay Area of Concern ▪ Completed a survey of benthic invertebrates and sediment quality in Blackbird Creek and Moberly Lake to assess the health of the benthic community	▪ Develop and implement a long-term monitoring plan for benthic invertebrates and sediment quality

Degradation of Fish and Wildlife Populations

Status: ***Impaired, for fish populations***

Impairment of the overall fish community and Lake Trout populations in particular was identified as a result of the presence of invasive species such as Sea Lamprey, the effects of pulp mill effluent, and the overharvesting of fish. Impairment of Herring Gulls was identified as a result of repeated nesting failure, but not related to pollution from pulp mill effluent.

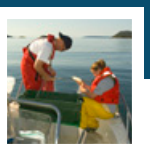
KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Conducted a Lake Trout index netting project that indicated that the relative abundance of Lake Trout in Jackfish Bay was similar to sites outside of the bay (2001)	▪ Continue to monitor fish community to assess the health of fish populations within and adjacent to the Area of Concern

Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Degradation of spawning habitat in Moberly Bay has been identified as one of the causes resulting in the reduction and loss of local fish communities.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Identified Lake Whitefish and Lake Trout spawning and nursery habitat on the eastern shore of Jackfish Bay	▪ Develop and implement a monitoring plan to assess fish habitat in Jackfish Bay



Status – REQUIRES FURTHER ASSESSMENT

Degradation of Aesthetics

Status: ***Requires further assessment***

The aesthetics are degraded as a result of the presence of foam and odour.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ The use of foam barriers and the entombment of part of the creek by the mill have improved aesthetics since the early 1970s; however, the presence of foam and dark-coloured water in Blackbird Creek and Moberly Bay is still a concern at times	▪ Determine, through public input, whether completed remedial actions have adequately addressed aesthetic concerns

Restrictions on Fish and Wildlife Consumption

Status: ***Requires further assessment***

Restricted consumption of Lake Trout and Lake Whitefish is advised due to elevated levels of: dioxins or furans, mercury, PCBs,[2] mirex and pesticides.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Implemented federal pulp and paper regulations and the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at the area pulp and paper mill ▪ Collected samples for the sport fish contaminant monitoring program (2002, 2007 and 2008)	▪ Continue monitoring Jackfish Bay and the Schreiber and Sewell Point reference area as part of the Ministry of the Environment's sport fish contaminant monitoring program

[2] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

Status – NOT IMPAIRED

Bird (or Other Animal) Deformities or Reproduction Problems

Status: ***Not Impaired***

Although reproductive problems in Herring Gulls were initially a concern, the problems were attributed to natural causes (i.e. predation). There are no reported incidences of deformities or reproductive problems in birds or other animals in Jackfish Bay.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Conducted studies of nesting waterbirds in the Area of Concern ▪ Confirmed, through discussion with local wildlife biologists and the Public Area in Recovery Review Committee, that no animal deformities and reproductive problems have been observed	▪ No further action required

Fish Tumours or Other Deformities

Status: ***Not Impaired***

An analysis completed in 2010 confirmed that fish tumours and other deformities do not occur more often in Jackfish Bay than in a reference site on Lake Superior.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Implemented federal pulp and paper regulations and the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills ▪ Conducted analysis of liver tumours in fish in Jackfish Bay and Mountain Bay (reference site)	▪ No further action required

FOR MORE INFORMATION

Environment Canada:
www.ec.gc.ca/raps-pas

North Shore of Lake Superior Remedial Action Plans:
www.northshorerap.ca

ISBN: 978-1-100-18066-3
Cat. No.: En164-22/13-2011E-PDF
PIBS: 8230e

Published by Environment Canada and the Ontario Ministry of the Environment

Aussi disponible en français

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