

WHAT YOU NEED TO KNOW

Environmental Stewardship



Why is stewardship important to Bruce Power?

The Bruce site has been operating for many decades, long before Bruce Power was created. Throughout that operation, significant data has been accumulated and Bruce Power has used that information to develop an in-depth understanding of the dynamic nature of the local communities and environment.

Bruce County is seen by many as a natural haven and a destination to escape urban sprawl. Many species of wildlife, some of which are endangered or threatened,

call the region home. Additionally, a lot of people, including employees, live, play, farm and raise their families in close proximity to the site. All of these amount to good reasons to proactively engage in the promotion of environmental welfare.

Aside from a moral obligation to care for the nearby environment, Bruce Power has a regulatory responsibility to keep careful track of environmental impacts. Changes to the Fisheries Act, under the jurisdiction of the Department of Fisheries and Oceans, requires Bruce Power to assess and quantify the impact operations have on local commercial, recreational and aboriginal fisheries.

Offsetting Plan

What is an offsetting plan?

An offsetting plan is the planned work to remediate any adverse impacts on fish caused by plant operations. Bruce Power is providing approximately \$1.3M in funding for community partnered offsetting projects between 2017 and 2027, in part to support the Fisheries Act Authorization. These projects are only one facet of Bruce Power's overall environmental stewardship program which encompasses other community based and non-regulatory initiatives and projects.

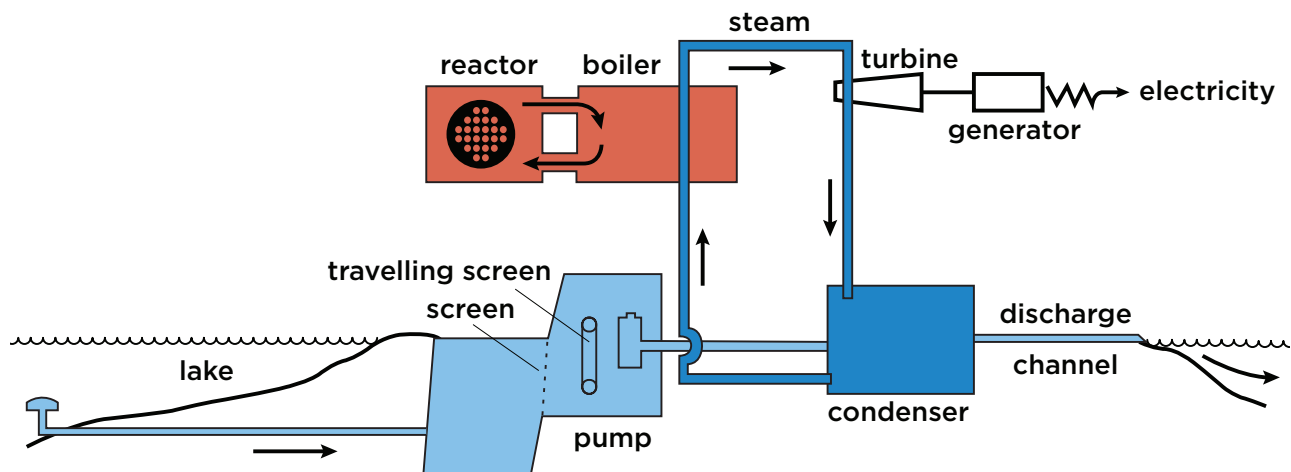
As part of Bruce Power's operation, cold, deep Lake Huron water is drawn into the cooling system on the conventional (non-nuclear) side of the plant, in order to condense steam and supply operational needs. When this water is drawn into the system, some fish

are impinged or entrained. Approximately 2,393 kg of age-one equivalent fish are impinged and entrained each year. This is roughly equal to a typical day's catch for two or three commercial fishing vessels on the Great Lakes.

Impingement: When an adult or larger juvenile fish becomes trapped against water intake screens.

Entrainment: When small organisms, like eggs and small juveniles, fit through water intake screens and enter the cooling system.

Bruce Power carefully tracks these losses and compensates for them through specific stewardship activities to increase the number of fish within the Lake Huron watershed. Bruce Power also monitors all impacts that operations have on the entire environment (e.g. parking lot construction) and compensates for those through various other stewardship programs and projects as well.





The short and long of it

Short Term Strategy

Lake Trout Stocking with the Ministry of Natural Resources and Forestry

Lake trout is a commercially-important cold-water fish. The population in the Great Lakes has been severely reduced due to invasive species, overfishing and pollution. The Ontario Ministry of Natural Resources and Forestry (MNRF) has a management strategy for the restoration of lake trout that includes stocking.

Bruce Power is providing the MNRF with funds to raise and stock yearling lake trout. More than 50,000 1 year-old lake trout will be released each year for the next five years at locations chosen by MNRF experts to boost their existing stocking program. The investment of the stocked trout should grow immensely over time and the MNRF will conduct monitoring to measure the program's success.

Long-Term Strategy

Truax Dam (Lake Huron Fishing Club and Municipality of Brockton)

Located on the Saugeen River in Walkerton, the dam is a barrier to all fish species, though some salmon and trout can swim upstream in the fall and spring using a fish ladder. Removing the dam will remove a major choke point for migration, improve temperatures and restore beneficial riffles and pools. Once removed, fish will be able to access high quality spawning habitat upstream for at least 13 km in the Saugeen River. Additional upstream habitat will be accessible in tributaries including the Otter River, Beatty Saugeen River and South Saugeen River. The project is estimated to produce more than 20,000 kg of fish per year.





Giving Fish a Helping Hand

Black Ash Creek

Bruce Power has provided financial resources to help restore the Black Ash Creek and improve coldwater fish habitat.

Petun Dam: The dam and its pond sit at the headwaters of Black Ash Creek near Collingwood and are managed by the Nottawasaga Valley Conservation Authority (NVCA). Removing the dam will increase wild juvenile rainbow trout and Chinook salmon populations by helping by helping to cool the creek.

Remediation Project: Bruce Power is helping the NVCA to plant and re-grade the riverbank downstream to minimize erosion. This project will help the NVCA to complete the final phase of its urban trout restoration program.

Shebeshekong River (Eastern Georgian Bay Stewardship Council)

Shebeshekong is a 15 km river near Parry Sound. The river previously supported a healthy population of walleye and white sucker, but human-made changes to the river in the 80s made it difficult for fish to bypass two sets of rapids and access spawning habitat. The Eastern Georgian Bay Stewardship Council (EGBSC) monitored the system and developed a restoration plan that Bruce Power helped fund. The restoration occurred in fall 2017 and now walleye should be able to migrate to better spawning grounds. Bruce Power is working with the EGBSC and Biotactic, Inc. to monitor

the success of the restoration and it's estimated to produce 1,300 kg of fish per year.

Beeton Creek

An ice control structure on the Beeton Creek downstream of the Tottenham Dam needs to be removed because it no longer functions properly. It is a complete barrier to fish migration so Bruce Power has provided the NVCA with funds to remove it in 2018 and monitor the recovery of fish populations as they make use of the high-quality nursery habitat upstream.

Local Stream Restoration

Scott Drain Tributary

The Scott Drain Tributary is a small stream near Belgrave that eventually flows into the Maitland River. Over the past 10 years, the Maitland Valley Conservation Authority (MVCA) has restored the stream by constructing wetlands, grassed waterways, erosion control berms, nitrate filters, windbreaks, watercourse buffering, diversion berms and modifications to the channel design.

By the time the final phase of the project is implemented, Bruce Power would have contributed to the improvements in water quality and provide fish with better access to high quality habitat.

Royal Oak Creek

This tributary to the Pine River is south of Kincardine. In 2017, the Pine River Watershed Initiative Network (PRWIN), the Saugeen Valley Conservation Authority (SVCA) and Bruce Power restored 2 ha along the banks by planting 1,500 trees, installing fencing and constructing a new cattle crossing.

Other Local Projects

With the help of the Lake Huron Fishing Club (LHFC), Bruce Power is aiming to restore some other small streams in Bruce County in the coming years. Examples include the Little Sauble River, which flows into Lake Huron at Inverhuron Provincial Park, and Lorne Creek that flows through pasture land south of Tiverton before draining into Lake Huron.

Work will include the elimination of migration barriers to improve fish passage and open new habitats (e.g., mitigate perched culverts, humane removal of beaver dams, pruning dense areas of vegetation that block fish passage). The planting of trees and riparian vegetation along the river banks, and the installation of livestock exclusion fencing, will reduce erosion and improve stream water quality.

Baie du Doré Habitat Creation

The Baie du Doré coastal wetland is located next to the Bruce site. Intense waves and ice scouring limit spawning habitat for yellow perch and other small fish. Bruce Power is developing a pilot project to install artificial habitats made of natural materials in the bay. Log cribs and recycled Christmas trees can provide protection for small fish in the near-shore so they can successfully spawn and rear their young. The pilot program will determine the suitability of this technique locally and if other areas could also benefit.

Lake Whitefish Research

Bruce Power and the Saugeen Ojibway Nation agreed to pursue independent research on whitefish populations in Lake Huron and assess any impacts that site operations may have on whitefish. Researchers from McMaster University, the University of Regina, and the University of Guelph performed a wide array of lab and field-based work to address potential impacts on whitefish due to thermal, conventional, and/or radiological stressors. Bruce Power has provided direct cash contributions of more than \$2.5 million to this research since 2011.

To date, research has shown that there is no genetically or ecologically distinct population of Lake Whitefish or Round Whitefish near Bruce Power. The Lake Whitefish near Bruce Power are part of ecological and genetic populations that cover a large part of the main basin of Lake Huron. Laboratory studies also looked at radiation and morpholine exposure. These studies found no effect on Lake or Round Whitefish exposed to morpholine concentrations or

radiation levels that would be typically present in Bruce Power's discharge waters. Only very high doses of morpholine and radiation produced an effect, and these concentrations would far exceed the discharge limits set by Provincial and Federal regulators.

Lab studies on Lake Whitefish embryos found that survival decreases when they are constantly exposed to 8°C water temperatures. Intermittent short-term increases in temperature of up to 9°C had no impact on Lake Whitefish embryo survival. Field work near Bruce Power showed there was no impact on embryo survival, but there was a potential for embryos to hatch 10% earlier near the discharge channel. The impacts of the earlier hatch times still remain unanswered.

It is still not known whether Lake Whitefish use spawning grounds near Bruce Power. Although there is almost no direct evidence of spawning near the site, the potential for spawning has been inferred from catches of ripe adult Lake Whitefish and the potential suitability of the substrate in some nearby shoals. Nonetheless, the research program results to date support the general understanding that impacts of site operations on Lake and Round Whitefish embryos and juveniles, if they are present near the site, are likely very limited. Bruce Power has committed additional funds to McMaster University and the University of Regina to continue their research program for another 5 years.

Invasive Phragmites

The shoreline of Baie du Doré has 107 hectares of wetland — it's considered provincially significant, with marsh and peatlands. Unfortunately, large beds of *Phragmites australis* (common reed) have infiltrated the shoreline. Phragmites is a highly aggressive, invasive species that is taking over shorelines on all the Great Lakes.

Bruce Power has teamed up with the Invasive Phragmites Control Centre (IPCC) and the Municipality of Kincardine to implement a control program in 2018 at Baie du Doré and nearby shoreline at Scott's Point. The multi-year control program was developed by a wetland ecologist who has pioneered Phragmites research and control programs in Ontario for many years.

Ensuring the Phragmites doesn't return following the control program is important and Bruce Power will work with local hunters, anglers and naturalists who visit the wetland to minimize their impact and prevent further spread and recolonization of Phragmites. Using all-terrain vehicles and boats near the shore of the bay can lead to compaction and destruction of the delicate wetland habitat, which spurs the spread of Phragmites.

Broader Stewardship Efforts

Wetlands

Wetland restoration and protection is part of Bruce Power's environmental stewardship vision.

Working with the Lake Huron Centre for Coastal Conservation and their Coast Watchers citizen science program, over 301 days of data were collected in 2017, resulting in 6,321 data point entries, that have helped shape our joint understanding of local coastal wetlands. Citizens monitored 16 beaches or sections of shoreline totaling 8 km of coastline.

Tree Planting

Bruce Power assists local organizations in tree planting activities. In 2017 alone, over 4,500 trees were planted through our partner groups — the Pine River Watershed Group, SauGREEN and the Penetangore Watershed Group. Some of the types of trees planted included white pine, white spruce, white cedar, linden, blaze and silver maple, sycamore and sugarberry.

Past tree planting projects supported by Bruce Power have also engaged local students in the work. The educational component of planting trees helps students gain knowledge about tree varieties and the important ecological functions that trees perform.

In the Classroom

The Lake Huron Fishing Club has established an innovative project in co-operation with local school classrooms, which is supported by Bruce Power. The partnership provides funds to allow for 45 schools to partake in education about the lifecycle of fish, through managing and observing an in-class salmon hatchery. The program is an important opportunity for students to learn hands-on about ecological conservation and the health of the Great Lakes. The fish that are successfully raised are released into Lake Huron.



What We've Done and Where We're Going

Examples of Historical Projects

Nature Preservation

Bruce Power has recently contributed to the expansion of the Bruce Trail Conservancy Conservation Corridor by preserving 142 acres of irreplaceable Niagara Escarpment UNESCO World Biosphere Reserve landscape in part to compensate for the necessary clearing of 11 acres of land on site to support various on site construction projects particularly for the construction of parking lots.

Butterfly Gardens of Saugeen Shores

Bruce Power has provided resources to assist in the development of garden pods that support the lifecycle of the monarch and other butterflies. This volunteer group is also involved with the Monarch Watch organization and tags local monarch butterflies, as part of scientific research. BGOSS has installed 17 butterfly gardens throughout Saugeen Shores, featuring over 750 types of native plants and 50 native shrubs.

Eco-Restoration at Fairy Lake

Following an infestation of emerald ash borer, Bruce Power contributed funds to the ecological restoration of Fairy Lake in Southampton. The restoration project was spearheaded by SAUgreen and was a collaborative project that involved nearly a dozen



community groups working together to improve the quality of the water and wetlands, rebuild habitat, stabilize the water banks and replace invasive species with native plants.

Composting Pilot Project

The Grey-Bruce Sustainability Network is supported by Bruce Power in its work with local municipalities on sustainability. The group piloted a composting project in the Municipality of Brockton, to explore various ways to divert up to 40 per cent of organic waste from local landfills. Some of the opportunities the GBSusNet researched include backyard composting, energy from waste, neighbourhood composting, curbside green bin pick-up, and working in conjunction with grocery stores and restaurants to reduce food waste.

Greenhouse Gas Inventory

The Grey-Bruce Sustainability Network is working to help local municipalities inventory their greenhouse gas (GHG) emissions and develop action plans to reduce GHGs. With the support of Bruce Power, the GBSusNet was able to launch the first phase of the program by working with Municipality of Brockton on these goals.

Previous Contributions and Experience with Dam Removal

Lockerby Dam Removal

Bruce Power teamed up with the Saugeen Valley Conservation Authority in 2015 to remove the Lockerby Dam in the North Saugeen River. Although the dam stopped supplying power to the town of Paisley in 1923, it remained a barrier to fish migration for another 90+ years before it was removed. Bruce

Power contributed \$45,000 to the removal project, and benefits include cooler stream temperatures and access to new habitat now that migrating salmon, trout, and other fish species can pass upstream.

The Future of Stewardship

Life-extension of the Bruce site is an opportunity for the province to ensure residents and businesses have access to reliable clean energy for the future. It's also an opportunity for Bruce Power to expand and strengthen its stewardship programs, through directed focus on our environment, our people, our community, and the operation of our site.

Sustainability and social responsibility are deeply entwined with stewardship. Bruce Power continually engages with the local and global community to improve operations, and for community betterment. That means focusing on issues such as biodiversity, energy conservation, climate change, waste management, responsible sourcing, and health and wellness, among others.

Working with grassroots and community organizations has always and will continue to be part of Bruce Power's stewardship vision. Each year Bruce Power facilitates the success of many community organizations. Bruce Power has been involved in the implementation of many diverse projects, including nature restoration, tackling hunger and poverty, and empowering youth. Equipping community groups with valuable tools is an effective way to drive positive change now and into the future.



Innovation at work

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