WATER & ECOLOGY CASE STUDY

Minnow Environmental Helps Arctic Mine Balance EEM Compliance with Environmental Stewardship

CHALLENGE

A Canadian mine needed to conduct EEM fish health studies in an Arctic environment, but lethal sampling methods were causing a decline in the fish population.

SOLUTION

Minnow Environmental transitioned the program to a non-lethal sampling design which included using biopsy punches and genetic testing, to gather critical data while preserving the fish population.

RESULT

The fish population has recovered while annual monitoring continues, demonstrating improved conditions, enhanced data collection methods, and continued compliance with EEM requirements.

A Canadian mining operation in the Arctic was required to conduct lethal fish sampling to evaluate metal concentrations in fish tissue under the company's environmental monitoring permit. When the Metal and Diamond Mining Effluent Regulations (MDMER) came into force in 2002, the mine hired Minnow Environmental, a Trinity Consultants Canada team, to conduct their Environmental Effects Monitoring program.

Minnow's initial study revealed a troubling reality: The fish population, located within an environment with low productivity, was declining and could not sustain the continual removal of fish for the lethal, tissue monitoring program. Recognizing the need to protect this sensitive population, Minnow proposed to change the program design in a way that would ensure compliance with the tissue monitoring requirements while also safeguarding the health and sustainability of the local fish population.

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CHALLENGE

Before Minnow's involvement, the Arctic mine conducted its own lethal sampling program to monitor tissue metal concentrations in fish, as a requirement under its environmental permit. This method involved using gill nets to capture and kill fish to gather the necessary data. When the MDMER were enacted, the mine turned to Minnow to conduct the EEM study as part of its new regulatory obligations.

Minnow's study revealed that the fish population was declining and would continue to sustain sampling-related impacts if the lethal sampling approach continued. Analysis of long-term annual monitoring data highlighted declines in fish length and weight as the larger, older fish continued to be removed from the system, while the population's growth rate could not keep pace with this removal for sampling.

With EEM requirements demanding scientifically defensible, ongoing monitoring, the mine faced the dual challenge of fulfilling its regulatory obligations while protecting the health of a vulnerable fish population.

SOLUTION

In 2007, the Minnow team worked with the mine to transition to a non-lethal sampling program, replacing gill nets with hoop nets for capturing the fish. Tissue sampling was conducted using biopsy punches, which allowed for representative samples to be collected without harming the fish. These samples, combined with measurements of fish weight and length, provided the required data for monitoring potential effluent-related effects without sacrificing individual fish.

The transition to a non-lethal approach also required regulatory approval, and Minnow worked closely with the mine to demonstrate the need for this change to the provincial government. By leveraging the Minnow team's strong relationships with regulators and showcasing the ecological benefits of the revised program, Minnow successfully helped the mine secure approval, enabling the company to move forward with a more sustainable monitoring strategy.

RESULT

The change to a non-lethal sampling program marked a turning point for the local fish population, while continuing to meet regulatory monitoring requirements. From 2007 to 2019, the population showed clear signs of recovery. Mean fish size has increased and has nearly recovered to conditions present at the on-set of lethal sampling.

Annual monitoring continues to this day, providing reliable data to assess the potential for effluent-related effects while protecting the sensitive fish population in this low-productivity environment. Minnow's innovative approach has demonstrated that compliance and environmental stewardship can go hand in hand, setting a standard for EEM programs in sensitive ecosystems.

ABOUT TRINITY CONSULTANTS

Trinity Consultants, a leading global environmental consulting firm, provides services and solutions in the EHS Regulatory Compliance, Built Environment, Life Sciences, and Water & Ecology markets. Founded in 1974, Trinity has the technical expertise, industry depth, and capabilities to help clients achieve their goals across the natural and built environments.