

# IISD Experimental Lakes Area

The World's Freshwater Laboratory

“IISD Experimental Lakes Area is basically the International Space Station of lake science.

It is the only place in the universe where researchers can carry out a certain type of science, and so scientists from across the globe flock there to carry out one-of-a-kind research.”

—David J. Ruck, President/Producer, Great Lakes Outreach Media

## Climate Change. Drugs. Agricultural Runoff. Pollutants. Plastics. Oil Spills.

In a time of growing populations and a rapidly changing climate, the world is struggling to respond to challenges to its fresh water.

ENTER IISD-ELA: an exceptional natural laboratory comprised of 58 small lakes and their watersheds set aside for scientific research. Located in a remote region of northwestern Ontario, Canada, it is one of the only places in the world where it is possible to conduct experiments on whole ecosystems. By manipulating these small lakes, scientists are able to examine how all aspects of the ecosystem—from the atmosphere to fish populations—respond. Findings of real-world experiments are often much more accurate than those from research conducted at smaller scales, such as in laboratories.

For over 50 years our unique research approach has influenced billion-dollar decisions of governments and industries. It has generated more cost-effective environmental policies, regulations and management—all in the name of keeping our water clean.



### Algal Blooms Blanketing our Lakes

Harmful algal blooms occur when too many nutrients enter a body of water, and algae feed on them. Groundbreaking discoveries at IISD-ELA revealing phosphorus to be the key ingredient in algal blooms led to policy changes around the world that restrict phosphorus entering lakes and rivers. Now that algal blooms plague many water bodies across the world, including the Great Lakes, we are working to determine the necessary preconditions for harmful algal blooms, impacts on greenhouse gas emissions, and a possible role of iron.

### Changing Climate, Changing Lakes

Our exploration of the impact of climate change on fresh water ranges from our data collected over the last fifty years on the health our lakes to actively manipulating and mimicking conditions in a lake that could be seen due to climate change and exploring the impact on the lake ecosystem.

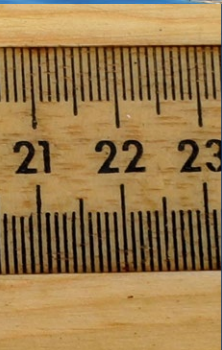
We then take that data and apply the power of artificial intelligence to build models of what the impacts of climate change will be—invaluable when building plans and policies for the future.



## Exploring the Impacts of Oil Spills

With approximately 840,000 km of oil and gas pipelines in Canada and 3.9 million km in the United States, we can always learn more about what occurs should one of those pipelines or rail cars leak into nearby fresh water.

In a landmark study, we are recreating oil spills in our lakes and exploring the behaviour of diluted bitumen (the form in which bitumen is transported in pipelines) in fresh water—all while determining the most effective methods of cleaning it up.



## Pharmaceuticals in our Water

Hundreds of pharmaceuticals and personal care products enter bodies of water and the environment every day. For many of those, we know very little about their impacts on wildlife or human health. IISD-ELA uncovered some striking results when researching the effect of synthetic estrogen on fish populations—including male fish producing eggs in their testes.

Next step? We are now gearing up to explore the impact of cannabis and anti-psychotic drugs on lakes.



## Is it Raining Plastics?

Plastics are everywhere. Microplastics have been found on top of mountains; at the bottom of oceans; in rivers and lakes; and in whales, birds, and fish.

That's why we have proposed a whole-lake experiment, where we carefully and safely add microplastics and closely monitor the ecosystem—all to better understand the impacts of plastics on the whole lake and food web it supports.

## Opening Our Doors

IISD-ELA is dedicated to engaging young people and the general public in the importance of freshwater science for sustainable development in Canada and around the world. We are happy to welcome the freshwater scientists of tomorrow for one-of-a-kind educational experiences, as well as build relationships with local communities and First Nations.

## Our Legacy

Throughout its history, researchers at the Experimental Lakes Area (ELA) have addressed a range of environmental issues, including the impacts of nutrients, acid rain, mercury and other contaminants. The facility has been used to examine the effects of freshwater aquaculture and to assist hydroelectric companies in improving the design of reservoirs. It has also enabled the study of emerging chemicals including synthetic hormone disruptors, flame retardants and household antibacterial products containing nanosilver.

Since ELA's creation in 1968, our scientists have also amassed one of the longest and most comprehensive data sets on freshwater lakes in the world. These long-term records have provided invaluable information for regional and global climate modelling and helped us understand climate change and its effects on freshwater lakes and the plants and animals that depend on them.

## Bridging Science and Policy

The facility is operated by the International Institute for Sustainable Development—an independent think tank. This means that we are in the unique position of being able to take the groundbreaking freshwater research conducted at IISD-ELA and apply it directly to policy decisions that really address global water issues.

IISD-ELA's status as a registered charity rather than a federal facility means that its core operations and scientific goals will require funding and public support to maintain and continue its long history of influential and unique whole-ecosystem research. IISD-ELA is looking for partners and collaborators to continue to grow and expand this unique body of work.

“The ongoing experiments and long-term data sets at the Experimental Lakes Area are an unparalleled resource for critical evaluations of the ongoing changes to our planet.”

—Dr. William Schlesinger, President of the Cary Institute of Ecosystem Studies, New York

We continue to do this work because of our amazing partners and donors. If you believe in a future where freshwater is for everyone and if you are in a position to give, please join us today at: [iisd.org/ela/donate](http://iisd.org/ela/donate)

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