ELA 50

IISD Experimental Lakes Area

From Canada's Lakes to the World

ISD-ELA
Annual Report
2017-2018

#ELA50

Proudly supported by:

Ontario

Fisheries and Oceans Canada

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Message From the Chair of the Board

2018 is certainly shaping up to be a red-letter year for the world's freshwater laboratory.

For 50 years now, IISD Experimental Lakes Area has revolutionized how freshwater scientists research lakes and explore the impact of human behaviour. But in typical Canadian style, they have been rather modest about it from day one. Even so, the impact of the last 50 years is a cause for celebration by any standards.

In 1968, scientific research was conducted, communicated and implemented in a very different way.

Over the years, the unique essence of our research (experimenting on real lakes to discover what humans are doing to whole ecosystems) has always remained at the heart of our work—that's what makes us who we are. But we are embracing innovation and leading the pack when it comes to how we conduct and implement the findings of that research.

Scott Vaughan

In 2018 we now, rightly, live in a world of open data. Our 50-year dataset on the changing health and vicissitudes of freshwater lakes is singular and unmatched in the world. It is therefore critical that scientists, governments and the public have unfettered access to that critical data to learn the true impacts of climate change and contaminants in bodies of fresh water, and to plan better for the future.

We are dedicated to making our long-term dataset free and accessible, and will soon be rolling out that portal online.

When it comes to conducting that research and painting an accurate picture of the state of our lakes, new technologies such as the Internet of Things and Artificial Intelligence are furnishing us with exciting new ways of collecting and processing massive waves of data. Imagine taking an image of an algal bloom in a remote lake and posting it on Twitter, knowing it will then become part of a dataset to enhance human knowledge about where and how algal blooms occur.

This work is still emerging in Canada, so we have teamed up with RBC to advance the application of these new technologies to freshwater research and stewardship.

And there is so much more to mention! What about our work exploring whether or not we can use environmental DNA in tracking fish, even when they're not there? Or our ongoing work coming up with new and exciting ways to research fish without having to kill them? Not to mention the incredible team of scientists and researchers who work tirelessly to continually advance our work.

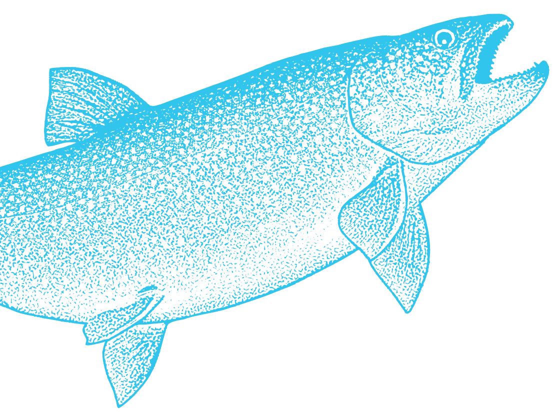
It looks as though the next 50 years will prove rather busy.

For now, let's take a moment over these next few pages to celebrate all that the world's freshwater laboratory has done for the world, and look ahead to all that is to come…

Message From the Executive Director

Matthew McCandless

Yes, yes, we've heard all the jokes—we know our lakes don't look a day over 35.



Despite their perennial youthful glow, it may come as a surprise to you that the world's most influential 58 lakes (and their watersheds)—IISD Experimental Lakes Area—turn 50 this year. Or rather, for 50 years, these ordinary yet highly impactful lakes in a remote corner of northwestern Ontario, Canada have been the only ones in the world dedicated to long-term whole-ecosystem experimentation.

Anniversaries always provide opportune moments for reflection and new direction, and the 50th year of the world's freshwater laboratory are proving to be no exception.

It is heartwarming to hear how many people are still inspired by the legendary tale of our naissance; how, back in the late 60's a cohort of innovative and plucky scientists worked with the Canadian government to set aside some remote lakes to determine what was causing algae to spread across North America. (The answer was phosphorus).

The rest, as they say, is history.

The number of lakes being studied grew to 58 and the researchers then went on to tackle all manner of threats to freshwater—from acid rain and mercury, to dams, reservoirs, birth-control pills and oil spills—all while making sure to reach decision makers and truly impact critical policy-making. The next few pages of this annual report relive many of those glorious moments of reflection.

But what of the new direction? In true IISD-ELA style, we are spending 2018 planning for the next 50 years.

Against a continual stream of emerging threats to freshwater health, IISD-ELA is always evolving its research portfolio. Oil spills, selenium, climate change—our current and upcoming research is focused firmly on those pressing issues, and over the next 50 years (and the 50 years beyond that), we'll be staying ahead of the curve to protect fresh water for generations to come.

But over the next few pages, there will be plenty of time for reflection, new direction, nostalgia, friends, family, fun and future—all the things that make IISD-ELA great.

We hope you enjoy, and we look forward to celebrating our 100-year anniversary with you.

1967

Lakes across northwestern Ontario and northern Manitoba are scouted as potential sites for the new Experimental Lakes Area. Concurrently, a competition for an acronym to name the project (with a bottle of fine scotch as the prize) is held.

1968

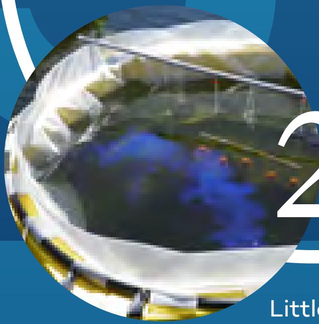
The Experimental Lakes Area—a truly original concept in science—is officially opened in a remote corner of northwestern Ontario. First threat to fresh water on the research agenda? Algal blooms.

2001

Three stable isotopes of mercury are added to an experimental lake. The reason? To see whether reductions in mercury emissions to the atmosphere will reduce methylmercury in fish.

2009

As climate change becomes a more pressing issue globally, researchers intentionally divert the inflow of a lake to simulate a drought caused by the phenomenon.



2012

Little is known about what happens when nanosilver—found in clothing, washing machines and baby products—enters a lake. Researchers begin to add nanosilver to a lake to monitor its impact on the ecosystem.

2014

The International Institute for Sustainable Development—a think tank headquartered in Winnipeg—takes over operation of the site, signalling a new and exciting era for the world's freshwater laboratory, focusing on more education, outreach, communication and a broader research portfolio.

1976

Researchers start to acidify a lake intentionally to mimic the growing impacts of acid rain. We ultimately discover that acid rain can wipe out whole species in a lake.

1980

On Friday, June 20, the “Great” Fire of 1980 burns through an area close to the camp. Despite the devastation, this natural disaster does, however, open up some research into the impact of fire on streams.

1991

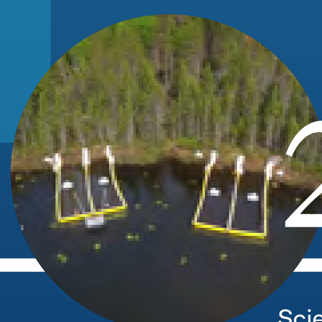
A small reservoir is created in a wetland pond to mimic the process of reservoir development to see what impact that process has on the environment.

2001

Synthetic estrogen is added to a lake to learn about the impact that birth control pills can have on fish populations. We ultimately learn that it can turn male fish into females.

2017

The Minamata Convention on Mercury, an international accord influenced by IISD-ELA research and intended to make mercury history, comes into effect.



2018

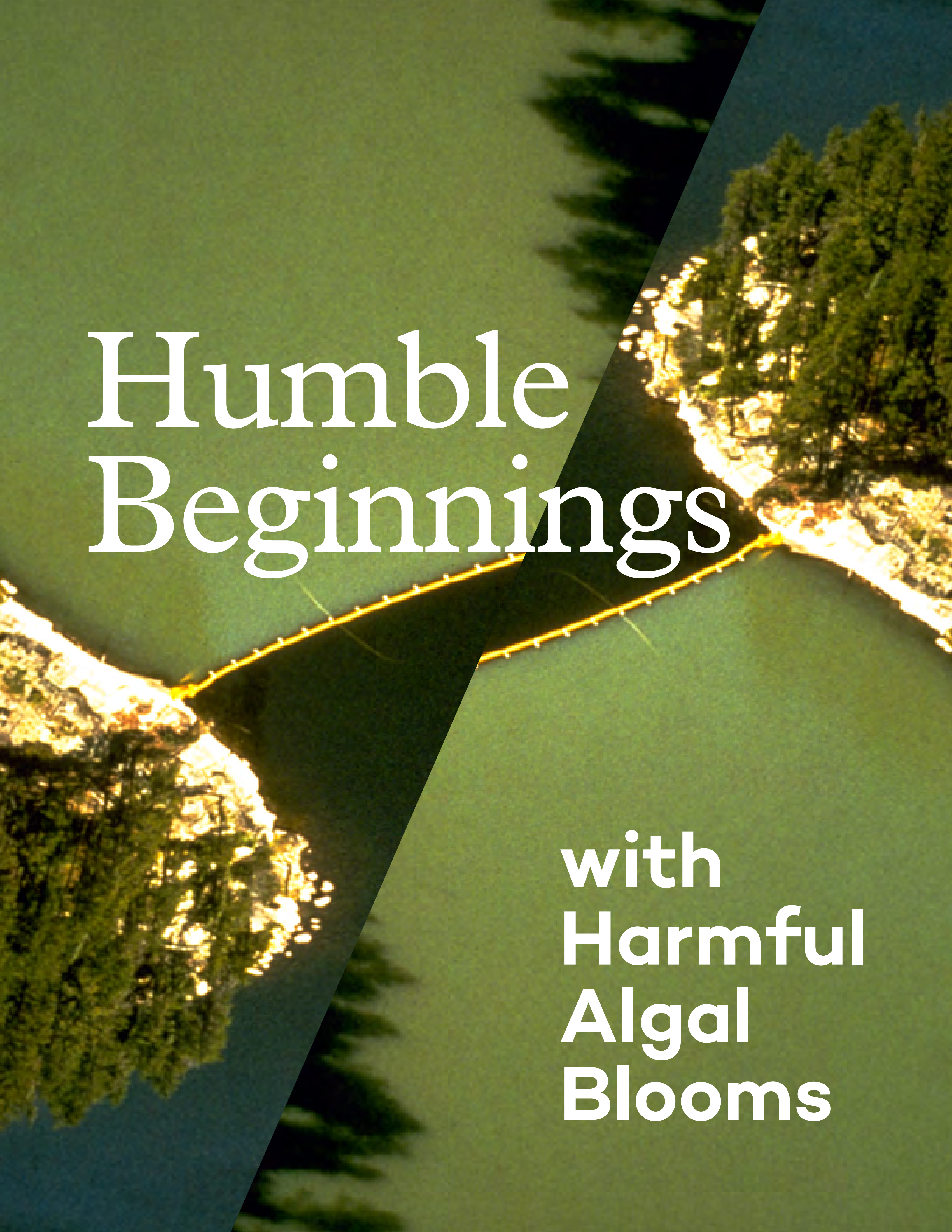
Scientists begin two new projects that simulate oil spills to explore the impacts of crude oil and diluted bitumen on lakes and freshwater systems.

Five

Greatest Research Hits

Humble Beginnings

with Harmful Algal Blooms



Flip through any textbook on freshwater ecology or limnology, and chances are you will stumble across this classic image of a lake divided, with one side evidently invaded by algal blooms—often referred to as the most famous image in the history of limnology.

Why is this image so captivating? Is it because it is one of the greatest depictions of conclusive scientific findings ever captured? Perhaps it's because it demonstrates so very clearly the effectiveness of researching on real ecosystems? For us, it's all of the above, but also because it signals the start of the Experimental Lakes Area story.

Back in 1968, many lakes in North America were suffering from toxic and unsightly algal blooms. You will recognize them as those smelly, often unsightly layers of green sludge that sit atop of lakes during the summer.

Researchers at the Freshwater Institute in Winnipeg prioritized the issue, and, throughout 1966 and 1967, set about scouring northern Manitoba and northern Ontario for a cluster of isolated lakes on which the issue could be explored. 463 lakes were surveyed in total.

In 1968, the Government of Canada ultimately selected 46 remote lakes in northwestern Ontario and the Experimental Lakes Area was born. Ultimately many long-term experiments were conducted on harmful algal blooms, or "eutrophication" on real lakes at the site, both of which determined that phosphorus (as opposed to nitrogen or carbon) was the key factor in the development of those unwanted algal blooms.

But the impact didn't stop there. These findings went on to inform and rewrite policy around the world, ultimately resulting in the banning of phosphates in detergents in many jurisdictions internationally—all in order to mitigate the impacts of eutrophication.

The research didn't end in the 1960s. Since 1990, no nitrogen has been added to Lake 227 and we have continued to add only phosphorus. Despite the absence of artificial nitrogen inputs, algal blooms have not diminished. This and other studies have continually demonstrated that phosphorus control—for which we continue to advocate—is highly important to limit algal blooms.

Algal blooms may have proven our raison d'être, but since 1968, the site has grown in size and scope, and has intentionally evolved its research portfolio to respond to the pressing freshwater issues of the time.

> "ELA's whole-lake nutrient experiments were the basis for timely legislation in North America and Europe to control algal blooms by reducing inputs of phosphorus. Fortunately, phosphorus control is also the least expensive option, because controlling other nutrients, as suggested by many studies at smaller scales, is much more costly."
>
> *David Schindler*

Have You Ever Seen the

As we moved into the 1970s, the public's imagination was captured by the concept of acid rain—rain that was slightly acidified when sulfur dioxide or nitrogen oxide gases are released into the atmosphere, primarily from the burning of fossil fuels. Once this acid rain lands on earth, it can do anything from acidify lakes and rivers to dissolve infrastructure and buildings.

> "The acid rain work at ELA in the 1970s provided deep and practical scientific understanding that was crucial to developing the political confidence that regulations would actually work."
>
> ~ *Carol Kelly*

Acid rain was a particularly pressing issue for freshwater researchers as it had the potential to lower the pH (a measure of acidity) of lakes and streams—the impact of which on freshwater populations and species diversity had yet to be determined.

Luckily, however, there were lakes in northwestern Ontario set aside specifically for this purpose.

In order to mimic the acidity of the rain that was falling on freshwater ecosystems at the time, researchers at the site introduced minute amounts of sulfuric acid into an experimental lake (Lake 223) to reduce the pH (i.e., acidify the lake) from about 6.8 to about 5.0 over the course of seven years, from 1976 to 1983.

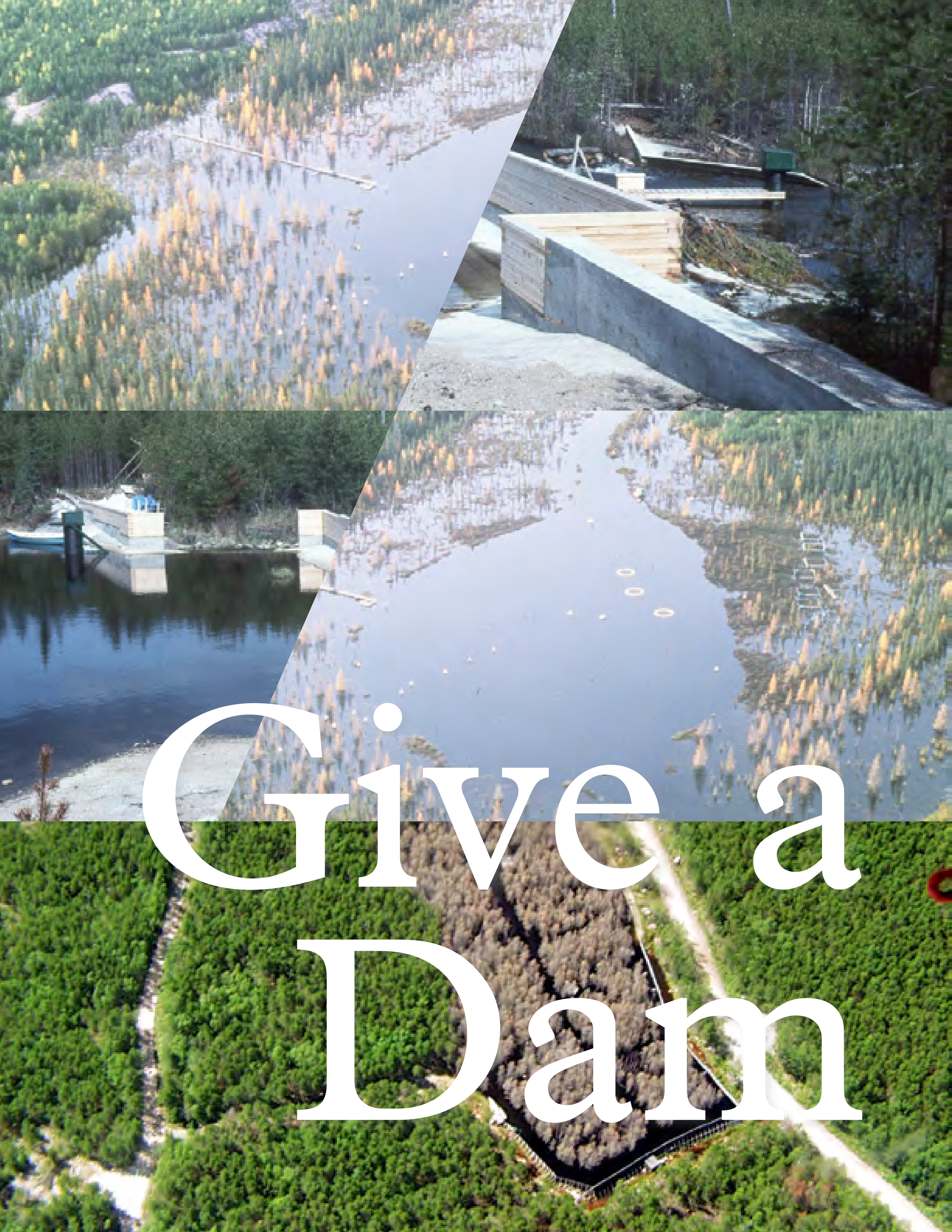
Acid Rain?

Among the many effects found from the acidification of the lake were reduced body condition (how "fat" a fish is) and low breeding success in white suckers and lake trout, and the near extinction of fathead minnows.

Additionally, they found that crayfish populations crashed and that Opossum Shrimp (or Mysis)—a small but important freshwater shrimp—disappeared completely from the lake. This last finding was especially concerning given that the shrimp is a keystone species in the ecosystem and that this local extinction occurred at a much higher pH than had previously been thought to cause such effects. Mysis are also a main food item for growing fish in the lake.

Based on evidence provided by that study at the Experimental Lakes Area, as well as other studies conducted throughout the 1970s and 1980s, legislation was put in place to curtail industrial emissions of sulfate in Canada and the United States (through amendments to the Clean Air Act). These measures led to significant decreases in emissions of NO_x and SO_2 from industrial point sources, such as factories, in the decades that followed.

Now in our 50th year, we have just reintroduced Mysis right back into that very lake to see if recolonizing the lake with Mysis will restore the lake trout population that feed on it.



Give a Dam

About the Impact of Reservoirs and Dams on Fresh Water

In the early 1990s, sources of renewable energy were becoming more popular, and questions were starting to be asked about the relationship between hydroelectric reservoir creation and the production of greenhouse gases (GHGs).

We understood that one of the major benefits of hydroelectric power was that it reduces emissions of GHG gases such as carbon dioxide and methane, which contribute to climate change; however, we set out to see if this was true.

Moreover, we wanted to explore the broader environmental impacts of reservoirs and dams, which bring us so many benefits, including hydroelectric power to heat our homes and power our industries, stable water supplies for irrigation and agriculture, reliable sources of drinking water, protection from floods and greater recreational opportunities.

Researchers conducted two projects at Experimental Lakes Area involving intentional flooding to mimic the development of reservoirs and dams.

Beginning in 1991, researchers undertook a whole-ecosystem experiment whereby they created a small reservoir in a wetland pond by building a small dam at the outflow. In a second experiment, three small reservoirs were created in areas with different amounts of soil and vegetation.

These experiments revealed that both carbon dioxide and methane, an especially potent greenhouse gas, were produced in higher levels after flooding, suggesting that reservoirs can be sources of GHGs. It was also discovered that flooding creates conditions that favour and increase the conversion by bacteria of mercury existing in flooded soils and vegetation to methyl mercury—its much more toxic form.

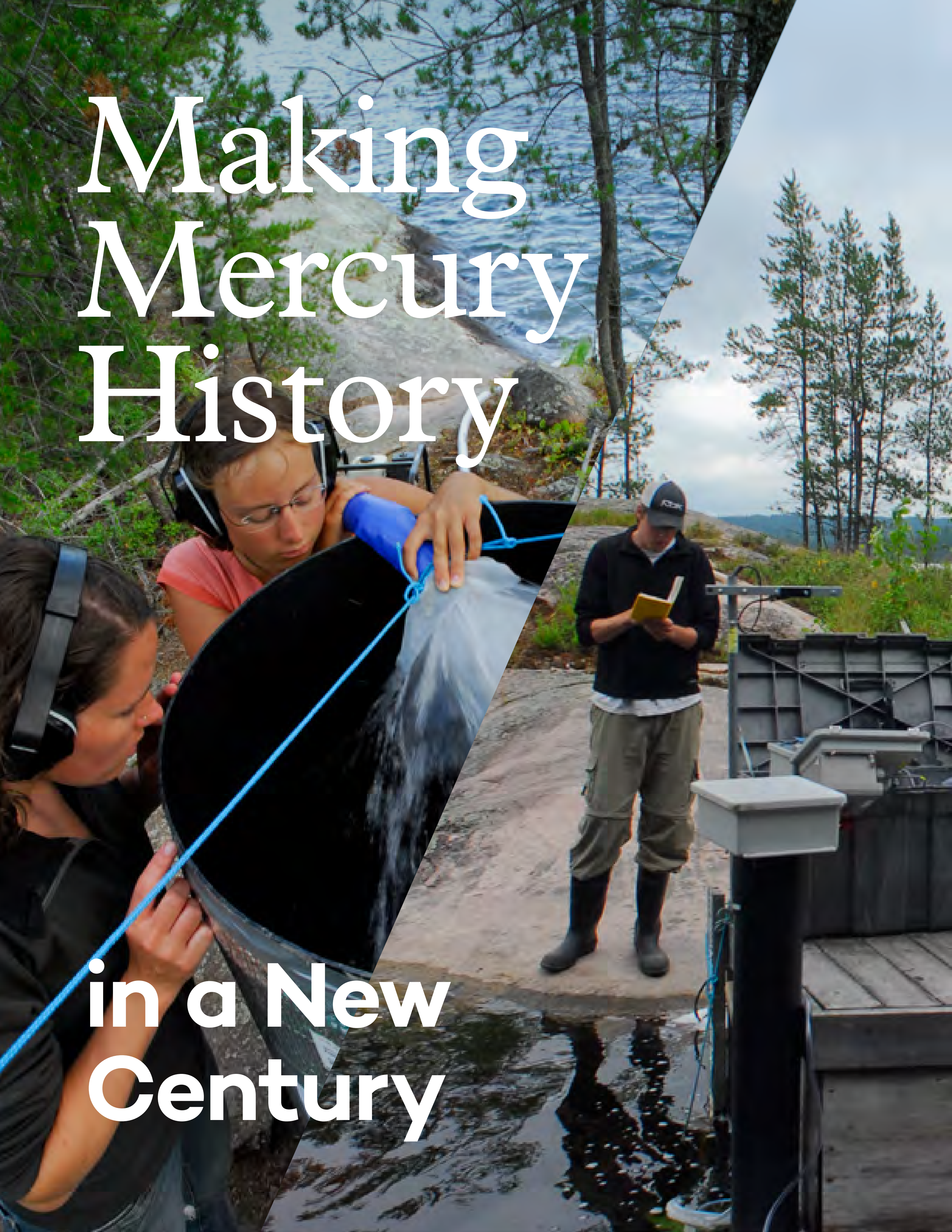
In the coming years, large numbers of dams are scheduled to be built in northern Canada and around the world. We will continue to work closely with hydroelectric companies, governments and other groups to provide key advice to help design and manage these dams so we can balance the many benefits they bring us with their potential environmental impacts.

"The research on dams and reservoirs at the IISD-ELA provided critical information on their effects on greenhouse gas emissions and mercury cycling. This has helped improve the design and management of reservoirs to minimize their impacts on the environment around the world."

Michael Paterson

Making Mercury History

in a New Century



As we entered the 21st century, we turned our focus on to how mercury can build up in fish populations.

Mercury enters into the environment from many natural and human-made sources, including industrial processes. One of the largest human sources of mercury is the burning of coal, and this mercury enters natural ecosystems from rain. Legislation has been proposed in both the United States and Canada that would force power companies to reduce mercury emissions from their smokestacks, with a potential total cost of billions of dollars.

> "METAALICUS is like an old friend. I've worked on the project for my entire career at the site, from research assistant to graduate student to permanent staff! Our project is a perfect example of what IISD-ELA does best: a unique experimental design coupled with a long-term sampling plan aimed at answering pressing questions about a global environmental problem."
>
> ~ *Lee Hrenchuk*

As we had learned from those previous experiments into dam and reservoir creation, mercury is also released into freshwater bodies when land is flooded for an extended period of time, and can then be converted to its most toxic form, methylmercury, by bacteria, and accumulated in fish.

When contaminated fish are consumed by humans, it can lead to mercury poisoning, or Minamata disease, which comprises a wide range of physical and mental symptoms including hair loss, muscle weakness/paralysis, organ damage, loss of senses, depression and even death.

To test whether reductions in mercury emissions to the atmosphere will reduce methylmercury in fish, from 2001-2007, in a highly controlled experiment, researchers intentionally added small amounts of traceable mercury to a lake. Predictably, the amount of mercury found in the fishes increased over the years.

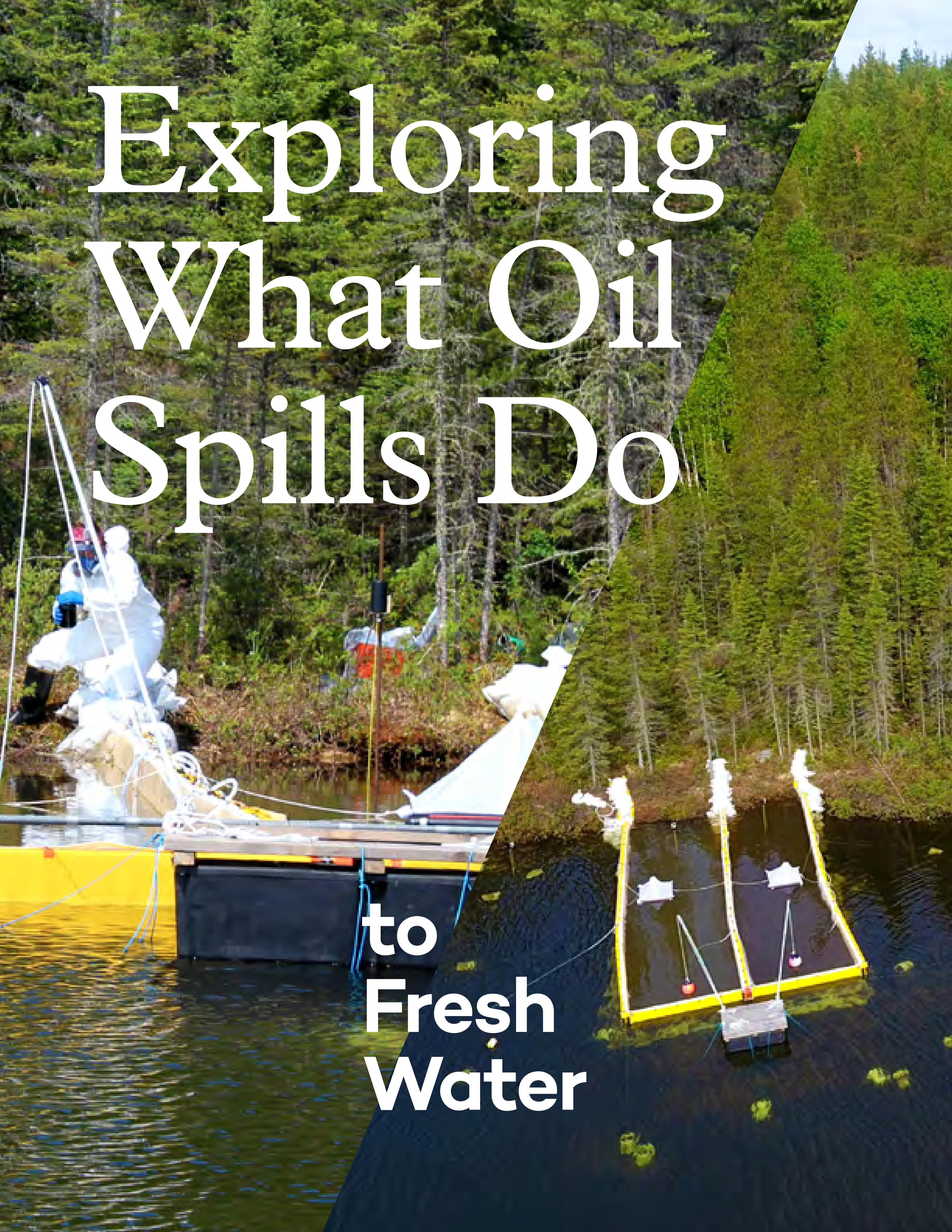
When they stopped adding mercury, the amount found in fishes decreased, suggesting that reducing the amount of mercury that enters the atmosphere may have a significant impact on the amount of methylmercury that ends up in fish (and therefore humans). It should be noted, however, that the response time will vary considerably between lakes.

This is good news, and bodes well for the impact of the Minamata Convention on Mercury, on which research at IISD Experimental Lakes Area was influential.

Minamata is an international treaty designed to protect humans from mercury poisoning by reducing the amount released into the environment. Now ratified by 75 countries, it bans new mercury mines, limits products containing mercury, and controls releases into air, land and water.

Now the work continues to encourage countries to work together to make mercury history.

Exploring What Oil Spills Do to Fresh Water



Keystone Pipeline. The Dakota Access Pipeline. The Trans-Alaska Pipeline System. North America has the largest network of energy pipelines in the world, with approximately 840,000 km of oil and gas pipelines in Canada and 3.9 million km in the United States.

Unfortunately periodic oil spills from pipelines do occur.

That is why, as we enter our 50th year, researchers are conducting two major experiments at IISD Experimental Lakes Area to learn even more about the potential impacts of oil spills on fresh water, and to discover what the most effective remediation, or clean-up, methods are.

Oil spills occur when oil being transported by truck, rail or pipeline unintentionally spills into the surrounding environment. In some cases, oil may end up in freshwater systems.

There are many types of oil. Bitumen (the primary product of Alberta's oil sands region) is too thick to be transported in pipelines, so it is diluted with other, lighter oils to allow it to flow more easily. The diluted bitumen is called 'dilbit' and is pumped through many pipelines in North America.

In 2018, researchers are launching the FOReSt (Freshwater Oil Spill Remediation Study) and BOREAL (Boreal Lake Oil Release Experiment by Additions to Limnocorrals) studies at the world's freshwater laboratory.

FOReSt is conducting a controlled release of oil into floating enclosures to discover the potential impacts of oil spills on freshwater shorelines, as well as the efficacy of a range of clean-up techniques. The research will continue over the next couple of years over different terrains to broaden the scope of the experiments and results.

BOREAL is using large limnocorrals in the middle of a lake to study the physical, chemical, biological and toxicological impacts of dilbit on freshwater organisms—from plankton to fish, frogs and more.

> "Being a part of research like the BOREAL and FOReSt projects is an incredible experience for a graduate student. I am grateful and humbled to work alongside the best and brightest researchers in the field of ecotoxicology towards a better understanding of the effects of diluted bitumen on freshwater ecosystems."
>
> ~ *Lauren Timlick*

The research will take a few years, but as always, this work at IISD-ELA is being conducted to support the development of better government policies and industry practices around emergency management and environmental protection. This is of particular importance in parts of North America at a time where a significant part of the economy rely on safe transportation of petroleum products.

Building

the Next 50 Years

You may remember that the title of our Annual Report from a couple of years ago was “Opening Our Doors.”

Far from being a flippant tagline, that statement concisely reflects an approach to the new era of IISD Experimental Lakes Area, and is more relevant than ever in 2018 as we look towards the next 50 years.

Of course there are no real doors to the world’s freshwater laboratory. Some may argue, however, that the 45-minute long journey down a rambling gravel path to reach the site constitutes more than a door.

Since 2014, when the International Institute for Sustainable Development assumed operation of the site, thousands of students, guest researchers, First Nations and members of the public have made that intrepid journey up that winding road to see for themselves what makes IISD Experimental Lakes Area so unique.

This is no coincidence.

IISD Experimental Lakes Area is a critical resource in northwestern Ontario that can inform, educate, and inspire everyone from members of the local community to researchers from across the globe.

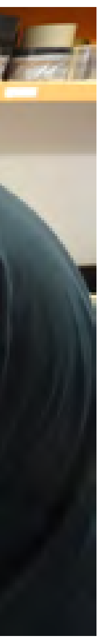
The next 50 years will be dedicated to expanding that role. With our ramped up outreach team, we will now be not only inviting more students from across the country to come and gain the skills to become the limnologists of tomorrow, but also plan to develop more educational resources on freshwater issues that can benefit teachers and students alike.

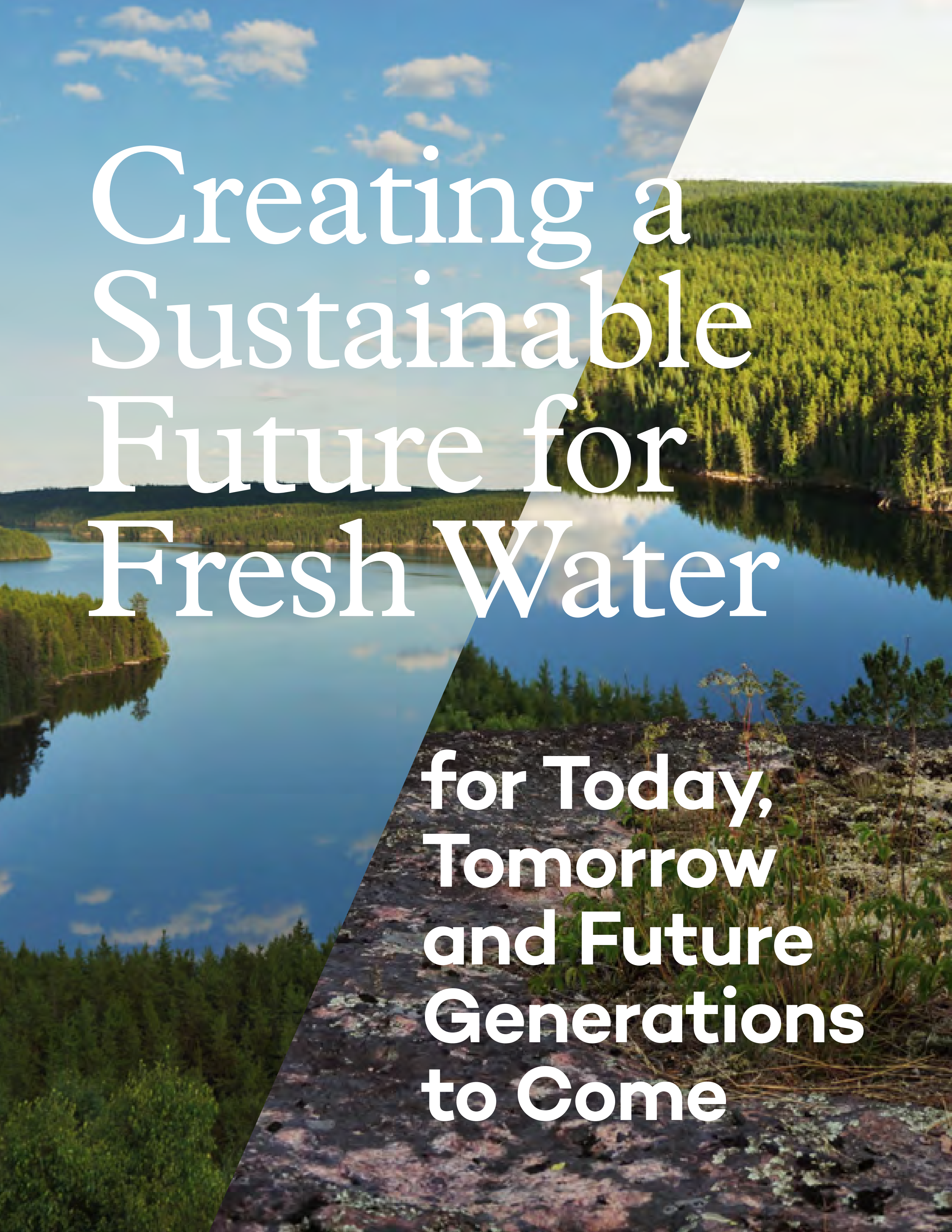
We’ve always been proud to be located on Treaty 3 territory, and we collaborate with local First Nations to pass on critical skills that help communities monitor the health of their own water supplies, and to learn invaluable Indigenous knowledge on the history and state of our lakes—so much of which we will be incorporating into our future research projects.

Speaking of our raison d’être, we will always continue to stay ahead of the curve when it comes to researching emerging threats to fresh water. Just take our current work on the impact of oil spills on fresh water, which we will roll out further in the coming years. As more North Americans continue to consume more pharmaceuticals, we need to understand what that is doing to our lakes and fish, so watch out for future research into the impacts of drugs.

And let’s not forget IISD-ELA also exists on land. Those forests and watersheds that surround us can reveal much about how water is impacted by human and natural activity, and so expect to see more work on terrestrial ecosystems.

In fact, we hope you get to see this work for yourself. If you haven’t already, be sure to take some time in the next 50 years to brave that gravel path and come see for yourself what makes the world’s freshwater laboratory so very special.





Creating a Sustainable Future for Fresh Water

for Today, Tomorrow and Future Generations to Come

A sustainable Earth means we all need to work together—individuals, communities, government and business.

Your continued generosity helps ensure that the cutting-edge research at IISD-ELA continues in perpetuity, and that fresh water can be preserved for future generations to come.

If you would like to make a secure online donation to IISD-ELA please visit: iisd.org/IISD-ELA, or you can pay by cheque payable to IISD Experimental Lakes Area.

To make a donation by a gift of securities, electronic fund transfer, or to learn more about how you can support IISD-ELA, please contact:

Tammy Hildebrand
IISD-ELA Director of Development
Email: thildebrand@iisd-ela.org
Direct: (204) 958-7700 ext. 719

Thank You for Helping Preserve and Protect Our Most Valuable Resource – Water

IISD Experimental Lakes Area (IISD-ELA) is so very grateful for all the amazing partnerships, advocacy and support we received from our funders, donors and friends in 2017-2018.

This generous support has allowed our organization to continue the incredible work that started over 50 years ago, and you are the key to our success! Your ongoing dedication towards our cause creates sustainability for IISD-ELA's mission and allows our organization to continue to orchestrate the research that is crucial to uncovering evidence-based methods to combat threats against our fresh water.

We regard IISD Experimental Lakes Area as a precious scientific asset to be protected for future generations, and our organization is so very fortunate to have you as a part of our IISD-ELA family. We look forward to continuing this journey together in protecting our most valuable resource—water.

IISD-ELA Water Guardians

FUNDERS

Government of Ontario
Government of Canada

MAJOR SUPPORTERS

Canadian Energy Pipeline Association
Richardson Foundation Inc.
Royal Bank of Canada (RBC Foundation)
Johnston Group Inc.

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Polaris Canada (In-Kind)
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CONTRIBUTORS $10,000-$49,999

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Alison Gilbert and Brian Wall In Memory of Amy Gilbert
Diane Guenther
Grant Linney

IISD Experimental Lakes Area is so very grateful for our long-standing partnership with Polaris Industries Ltd., providing us with new snowmobiles in 2017.

CONTRIBUTORS $100-$499

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**In-Kind Donations Total: $68,419.65

IISD Experimental Lakes Area is so very grateful for our new partnership with Mercedes-Benz Winnipeg, providing us with in-kind support towards a new van for our research site in 2017.

IISD-ELA Experimental Lakes Area is so very grateful to all the individuals who donated towards our online 2017 Giving Tuesday Campaign which raised $4,500. Proceeds raised from this campaign went to support our IISD-ELA field programs which ensured the research teams had the equipment they needed for the 2018 research season.

Financials

Statement of Financial Position

As at March 31

	2018	2017
	$	$
ASSETS		
Current		
Cash	**825,192**	341,920
Restricted cash	**504,437**	442,650
Current portion of grants receivable	**322,657**	109,000
Accounts receivable	**30,563**	21,243
Prepaid expenses	**67,024**	91,734
Total current assets	**1,749,873**	1,006,547
Grants receivable	**230,742**	15,000
Investments	**907,613**	784,524
Capital assets, net	**1,096,576**	1,023,052
Intangible assets	**25,985**	25,985
	4,010,789	2,855,108
LIABILITIES AND NET ASSETS		
Current		
Accounts payable and accrued liabilities	**338,114**	189,849
Due to International Institute for Sustainable Development	**60,074**	70,990
Current portion of deferred contributions	**809,304**	182,498
Current portion of deferred capital contributions	**107,375**	79,401
Total current liabilities	**1,314,867**	522,738
Deferred contributions	**393,067**	209,981
Deferred capital contributions	**783,394**	791,994
Total liabilities	**2,491,328**	1,524,713
Commitments		
NET ASSETS		
Net assets invested in capital assets	**183,704**	151,657
Sustainable Future Fund	**800,000**	750,000
Remediation fund	**504,437**	442,650
Unrestricted net operating surplus (deficit)	**31,320**	(13,912)
Total net assets	**1,519,461**	1,330,395
	4,010,789	2,855,108

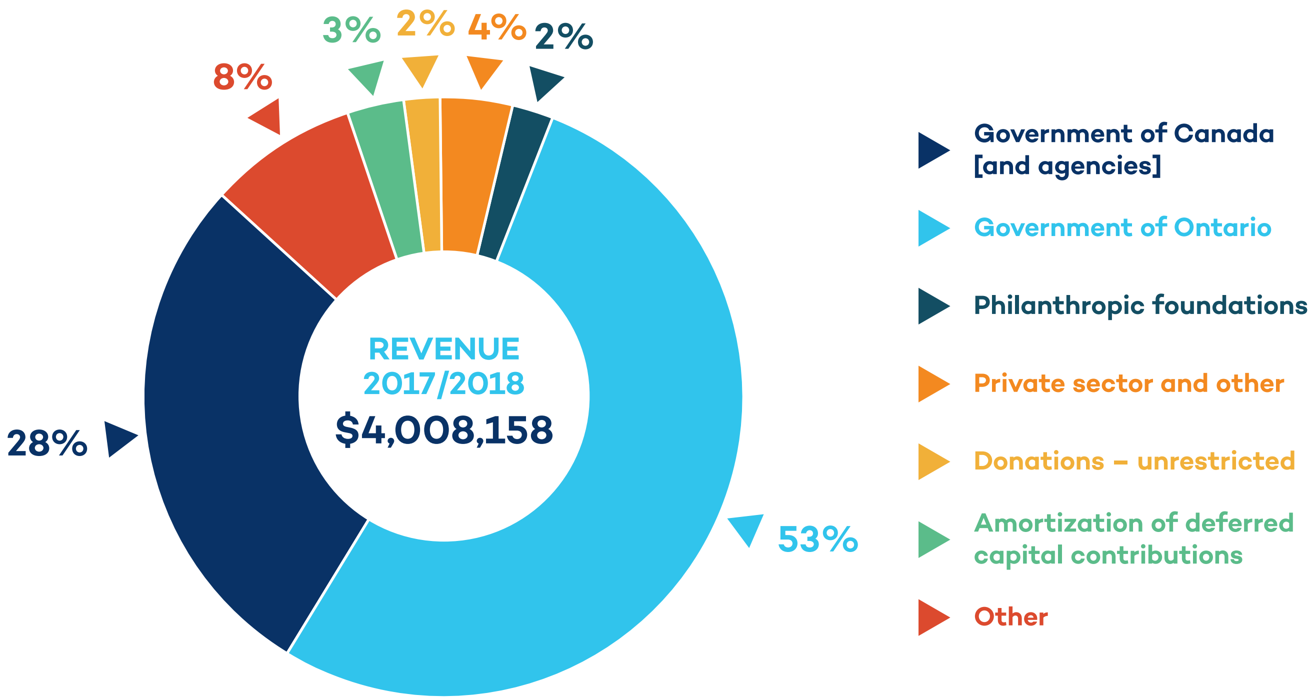
Statement of operations and changes in unrestricted net operating surplus (deficit)

Year ended March 31

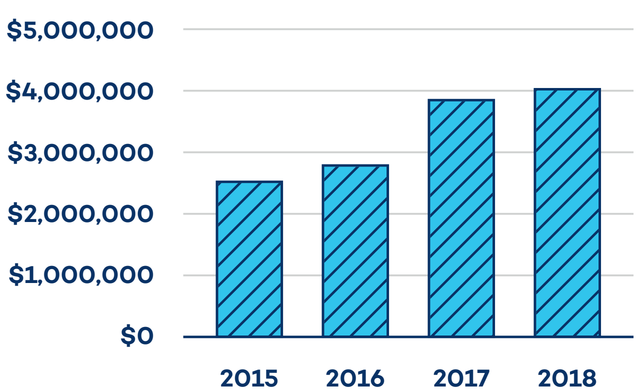
	2018 $	2017 $
REVENUE		
Designated grants	**3,475,133**	3,289,902
Sustainable Future Fund	**5,820**	197,360
Donations – unrestricted	**87,514**	159,316
Amortization of deferred capital contributions	**107,375**	105,367
Other	**319,359**	93,494
Investment income	**12,957**	14,139
	4,008,158	3,859,578
EXPENSES		
Field station operations	**936,917**	994,714
Field research	**1,396,977**	934,199
Administration	**822,904**	675,248
Marketing and fundraising	**191,333**	258,365
Outreach and education	**276,961**	256,328
Laboratory research	**218,204**	187,119
Offsite research and technical review	**25,796**	49,830
	3,869,092	3,355,803
Excess of revenue over expenses for the year	**139,066**	503,775
Appropriation from to unrestricted net operating deficit		
Change in net assets invested in remediation fund	**(61,787)**	(127,632)
Change in net assets invested in capital assets	**(32,047)**	(50,024)
Increase in unrestricted net operating surplus (deficit)	**45,232**	326,119
Unrestricted net operating deficit, beginning of year	**(13,912)**	(340,031)
Unrestricted net operating surplus (deficit), end of year	**31,320**	(13,912)

NOTE:

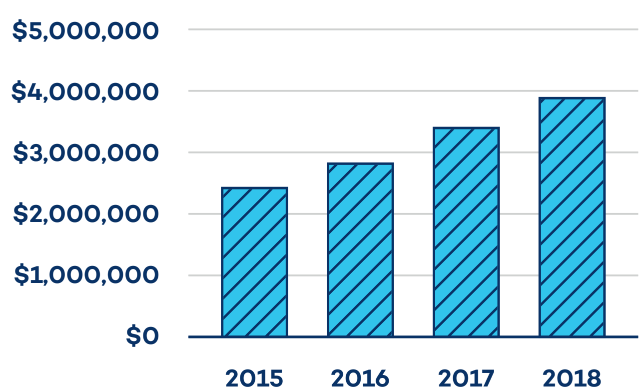
The full 2017-2018 IISD-ELA financial statements are available on our website at: www.iisd.org/ela/about/annual-report



Total Revenue (CAD)



Total Expenses (CAD)



Our Team

Ken Beaty
Sumeep Bath
Scott Bergson
Justin Budyk
Jesse Coelho
Jamie Dearnley
Cyndy Desjardins
Danielle Desrochers
Paul Fafard
Susan Fraser
Pauline Gerrard
Benoit Girouard
Lauren Hayhurst
Sonya Higgins
Scott Higgins
Lee Hrenchuk
Justin Hubbard
Cody Jackson
Donna Laroque
Clayton Lund
Mark Lyng
Cassidy Mazur
Matt McCandless
Frank McCann
Andrew McLeod
Roger Mollot
Grace Mota
John Neall
Vince Palace
Michael Paterson
Stephen Paterson
Hannah Polaczek
Chandra Rodgers
Ken Sandilands
Bryanna Sherbo
Stefano Strapazzon
Catelyn Van Veen
Kayla Wabonge
Dilibai Yunusi

BOARD OF DIRECTORS

Andrea Moffat
Keith Somers
Stephanie Cairns
Sheila Fraser
Glenn Crook
Scott Vaughan (Chair)
Jeffrey Ross
Jane McDonald
Matthew McCandless (Executive Director)

IISD-ELA RESEARCH ADVISORY BOARD

Vince Palace (Chair)
Martin Blake
Robert Hecky
Raymond Hesslein
Karen Kidd
Matthew McCandless
Kathy McKague
Stephen Murphy

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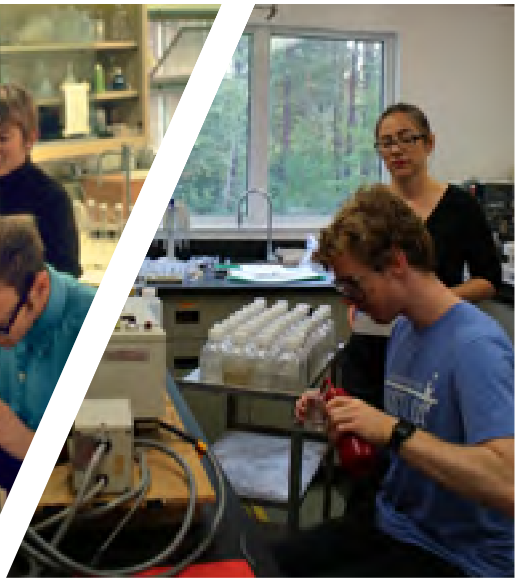
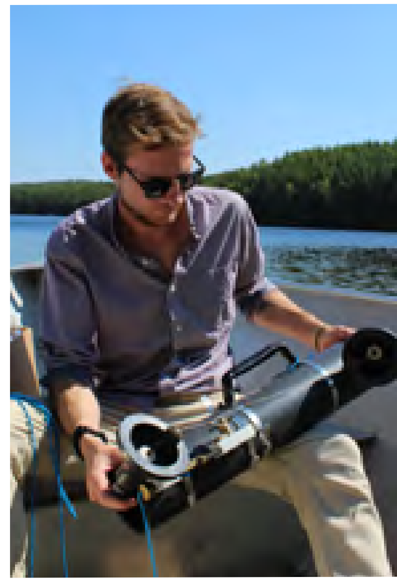
Then and Now





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