IISD Experimental Lakes Area

A Year in the Life of the World's Freshwater Laboratory

2018-2019 Annual Report

Proudly supported by:

Ontario

Fisheries and Oceans Canada

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Head Office

111 Lombard Avenue, Suite 325
Winnipeg, Manitoba
Canada R3B 0T4

Artificial Intelligence. Big Data. The Internet of Things.

Those are probably not the words you were expecting to open a celebration of the world's freshwater laboratory's 51st year.

Well, we are working to change that expectation. The world of environmental protection is evolving and borrowing from different sectors to find smart and efficient ways to monitor, understand and protect our ecosystems.

That's where IISD Experimental Lakes Area comes in.

Our unparalleled 50+ year dataset on the health of five of our lakes—that tracks everything from the temperature and chemistry of the water to how many zooplankton and fish live in a lake—is being overhauled using artificial intelligence so it can open up a whole new understanding of our boreal lakes and where they are headed.

Imagine being able to model what climate change will do to your favourite lake in 50 years at the click of a button. Or immediately know how bad the algal bloom problem at your local beach is by simply opening an app. And then using that information to create informed and effective policies to prevent these phenomena from happening again.

That's the future we are working toward.

Changing how the world looks at science is in our DNA—it was that very innovative sprit that spurred our creation over 50 years ago.

When it comes to the ground-breaking science itself, we still adhere to our original core principle: researching on real lakes to find out what impact current and emerging threats to fresh water are having. That's why we have launched exciting new research to discover

exactly what happens when an oil spill occurs and how we can most effectively clean it up.

We are also responding directly to changing societal landscapes and concerns, with new research tackling the presence and impact of microplastics in our lakes, and what happens when the remnants of cannabis consumption, recently legalized for recreational use in Canada, end up getting flushed into our freshwater systems.

Our work doesn't stop when we pack up our scientific equipment for the day.

We understand that the real change—whether through reimagining our scientific data with the help of artificial intelligence or working directly with decision-makers to improve policies to protect the environment—is only guaranteed by ensuring our ground-breaking research lives on beyond the lakes themselves.

And as we enter the second half of our first century, we are hard at work to ensure our research continues to improve people's lives around the world for many centuries to come.

Right now, however, we hope you enjoy the next few pages—reading the stories, meeting the people and taking in the images that make us the world's freshwater laboratory.

Matt McCandless

Director,
IISD Experimental Lakes Area

Jane McDonald

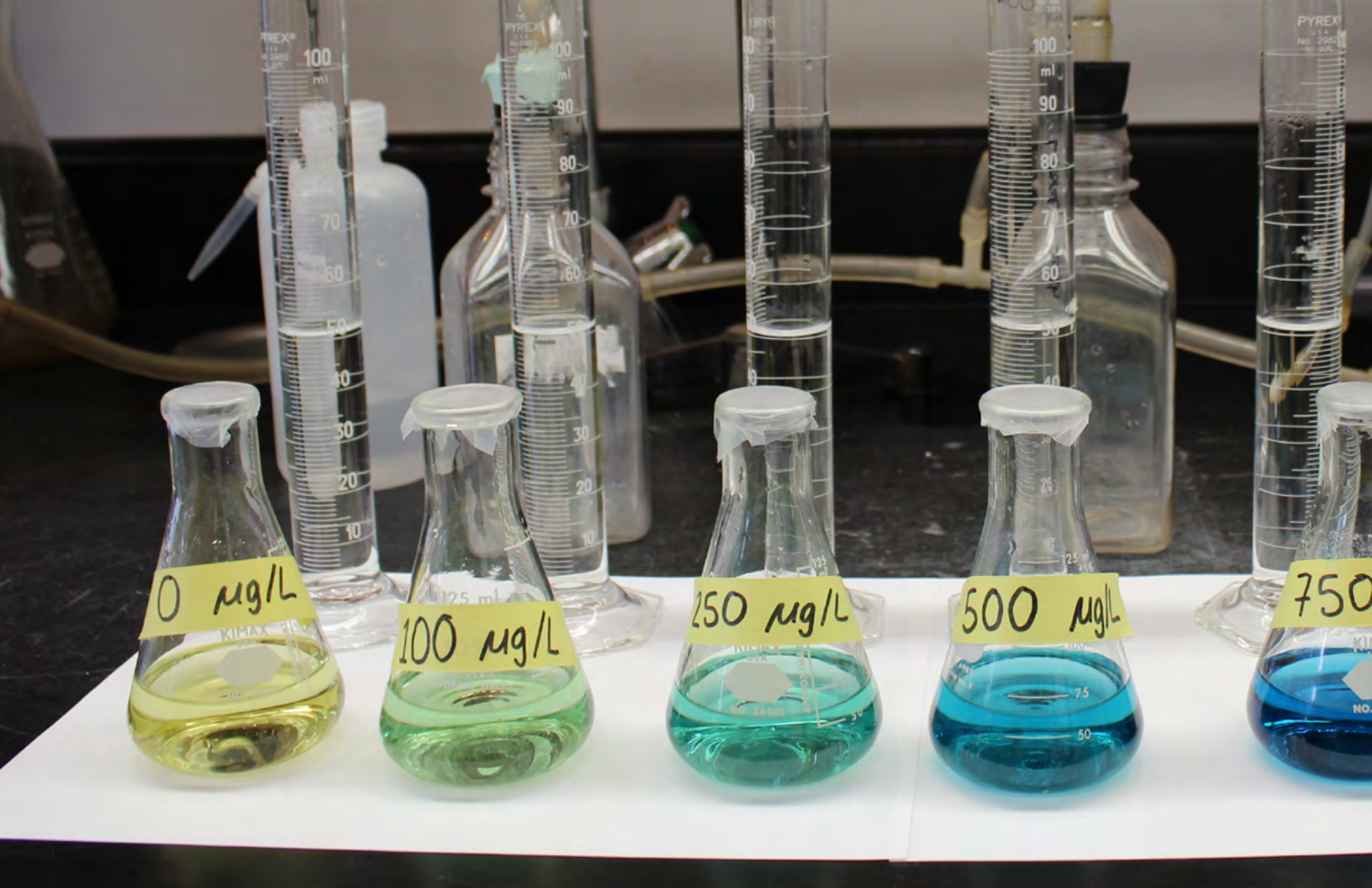
Interim President and CEO,
IISD Vice-Chair, IISD
Experimental Lakes Area Board

The photos of IISD-ELA in the winter are breathtaking. But so are the temperatures. Even so, there is so much that frozen lakes can teach us about the health of our freshwater systems that we make sure to go out periodically during every winter to drill down into the ice to take samples, check the weather and snowfall (spoiler alert: it's a lot) at our meteorological site, and monitor the flows of water between lakes. And when we aren't out on the lakes, we are back in the warmth of our headquarters in Winnipeg, analyzing results collected during the summer, writing up research and, of course, catching up on emails.

Tracking the Health of our Lakes all Year Round ... Even in Winter!

Unleashing Artificial Intelligence on Our Lakes

Our world is changing rapidly. A changing climate turns everything we know on its head. How our lakes behaved in the past is not necessarily an indicator of how they will behave in the future. To protect our water, we need to advance how we conduct and understand our science so we can act faster. And this is why we are taking inspiration from new technologies from outside our sector and spearheading their use in the world of environmental protection. This ranges from applying artificial intelligence to our 50+ year dataset to build a full picture of where our lakes are headed to encouraging budding innovators to come up with new, practical solutions to Lake Winnipeg's woes with our 2020 "AquaHacking" campaign.

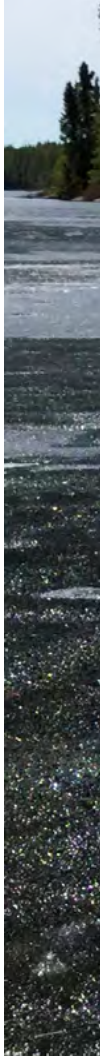

0 µg/L
100 µg/L
250 µg/L
500 µg/L
750

When you think of IISD-ELA, what comes to mind? Beautiful forest-edged lakes in Canada's boreal forest? While that is true, let's not forget that once the water has been collected, it needs to be chemically analyzed—often within a short time period—to understand changes to the lake water occurring as a result of our manipulations. Is the pH changing? Is there less oxygen in the water? What is happening to the phosphorus and nitrogen? All of this happens behind the scenes in our on-site chemistry laboratory!

A Place for Some Serious Chemical Attraction

You may be surprised to learn that we never know for sure when we are planning to kick off another summer season of research at IISD Experimental Lakes Area. This is because it all depends on two little words: ice-off. "Ice-off" is the time at which approximately 80 per cent of the lake is ice-free, which means we can get back to doing what we do best—research on real lakes. (The earliest the ice has ever melted on Lake 239 is April 5 in 2012, and the latest is May 18 in 2014.) And climate change is clearly having an impact. Since we began conducting research in 1969, we have seen the winters getting shorter and have observed a reduction in the duration of ice cover at a rate of about 4.24 days per decade, which can have an impact on everything in the lake from its chemistry and temperature to when fish can spawn.

Kicking off Another Year of Intelligence on Our Lakes



Every year, hundreds of students take the long trip up a private road to the world's freshwater laboratory. Some of them stay for only a day and head out onto the lakes to learn about why fresh water matters and get their hands dirty trying the science. Some of them stay for the whole summer (and some students even brave the bracing Canadian winter) and become critical parts of our research while learning a host of new skills and making a bunch of new friends along the way. Either way, we take our role of educating the next generation of freshwater guardians very seriously and are thrilled to welcome more and more students through our doors each year.

Nurturing the Next Generation of Freshwater Scientists

Happy Great Canadian Giving Challenge

June is an exciting time for many reasons, not least because it's the month we celebrate our culture of giving through the Great Canadian Giving Challenge. We cannot keep defending the world's freshwater supplies without your support. Everything we do—from nurturing new generations of freshwater scientists to monitoring our lakes throughout the year—depends on donations from our generous supporters, and for that we thank you greatly. Now we are looking toward the future and building an endowment fund to ensure long-term stability for the world's freshwater laboratory. You can learn more and donate at iisd.org/ela/support.

Building Our Future

Back: Gail Asper, Dr. Michael Paterson, Dr. Vince Palace and Dr. Matthew McCandless
Front: Stephen Paterson, Dr. David Schindler, Pauline Gerrard and Jane McDonald.

We work tirelessly to protect the future of the world's freshwater supplies.

That's why we need to protect the future of IISD Experimental Lakes Area.

Please consider donating today by visiting iisd.org/ela/support/endowment

To celebrate our 50th anniversary, we launched an Endowment Fund that will nurture students, support freshwater scientists, and fund research into emerging freshwater threats for the next 50 years and generations beyond.

And thanks to the generosity of Dr. Michael Paterson, Gail Asper and family, every dollar you donate to our Endowment Fund will be matched up to $1,000,000 over the next five years.

That means that every dollar you donate—and its impact—is immediately doubled.

IISD-ELA Supporters

Thank you to everyone who contributed so generously to IISD Experimental Lakes Area in our 2018-2019 fiscal year. Your support is greatly appreciated.

Funders ($1,000,000 and over)

Government of Ontario ($2,000,000)

Fisheries and Oceans Canada ($1,000,000)

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The Winnipeg Foundation

For more information visit our website at iisd.org/ela/support or contact Louis St. Cyr, Director of Philanthropy

Phone: 1 (204) 958-7700 ext. 721
Email: lst-cyr@iisd.ca

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Anonymous Donations from Individuals: $7,465.35

IISD-ELA Endowment Fund Total: $180,695.56 (134 donations), including alumni contribution of $25,430.64

“

We support the work of IISD-ELA because its research is essential in understanding the effects of climate change and the human impact on water quality. Their leadership and ability to conduct the scope of work they do in a unique freshwater environment inspires critical action.

Liz Wilson
President & CEO, FortWhyte Alive

“

My grandson and I visited IISD-ELA in 2017 and were impressed with what we saw. This donation is $100 from me and $10 from my 11-year-old grandson (12 days of his allowance he tells me). I promised him that when I get my tax receipt for the donation, I will share it with him. Thank you for all the good work that is being done in the IISD-ELA lakes; we are most grateful. Regards, Nancy Gordon and her grandson, Charley Rands.

Nancy Gordon
IISD-ELA Supporter

Hopefully you know by now that natural wetlands can improve water quality by reducing excess nutrients, treating waste water and removing other industrial contaminants. Here at IISD-ELA, we are now exploring how floating treatment wetlands (FTWs)—small artificial platforms that allow aquatic emergent plants to grow in water that is typically too deep for them—could be placed into lakes to perform the role of traditional wetlands. In fact, one of the most exciting angles we want to explore is how effective they are at cleaning up oil after a spill, as part of our much larger research into how oil spills impact freshwater systems and how we can best clean up after them.

Photo by Sean Landsman, 2019 IISD-ELA Artist-in-Residence

Floating Treatment Wetlands: Keeping our fresh water clean and healthy

North America has the largest network of energy pipelines in the world, and unfortunately, periodic oil spills from pipelines do occur. That's why we are exploring the impact of oil spilling into lakes by simulating oil spills in secure enclosures in real lakes. You can't miss the bright yellow enclosures that dot the shoreline where we have been dropping small amounts of oil to explore what happens when oil spills occur and test what the most effective cleanup methods are. And everyone is on board! From governments and industry to First Nations and local communities, we have been collaborating with everyone who will be affected by this research to make sure it has the maximum positive impact on people's lives.

Exploring What Oil Spills Do to Fresh Water

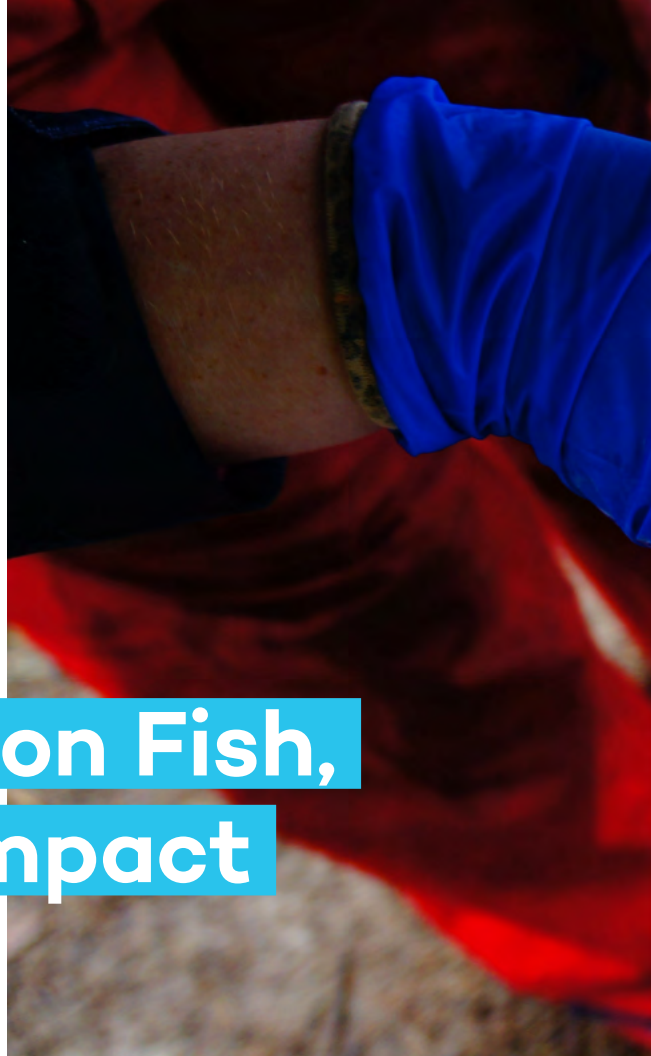
Mega Research on Microplastics in Fresh Water

You will likely have noticed the impacts of plastics in aquatic systems grabbing major headlines in recent years. While most public attention has been directed at plastics in oceans, studies demonstrating the presence of microplastics in freshwater rivers, lakes and in atmospheric deposition have shown that microplastics need to be researched in freshwater environments. That's why we have launched exciting new research to explore how much is already present in our lakes, and what impact intentionally introducing microplastics will have on every aspect of the lake and its food webs.

Photo by Sean Landsman, 2019 IISD-ELA Artist-in-Residence

When researching fish populations, we have to track the health of many fish. Many traditional fish sampling techniques require scientists to kill the fish in order to obtain the necessary data, which can skew results when we are researching populations, but is also inhuman and can be avoided. We are now spearheading some exciting and innovative ways to get the same critical information, but without killing those fish. These tactics range from only clipping a fish's fin for analysis, instead of using the whole thing, to scraping off and analyzing the fish's mucus (yes, we said mucus!), which holds much of the health information we need.

Measuring Impacts on Fish, Without Being an Impact



Our research affects the whole world, so we need to communicate directly with the world. Whether it's on the front page of the BBC website, in the folds of Science magazine or in your Instagram feed on your cellphone, every year we reach more and more people across the globe. And we are getting pretty fancy in how we do it—from new ways to visualize our data and three-minute animated videos to an exciting new artist-in-residence program (see photo)—we want to make sure everyone can understand the research that we do and why it should matter to them.

ELA Fire of 74, 2018 by James Culleton

The World's Freshwater Laboratory Speaking to the World

Happy Holidays From the World's Freshwater Laboratory

The holidays are a time for family, and anyone who has ever spent time here—as a student, researcher, visitor or supporter—will always feel like part of the IISD-ELA family. We celebrate our very special community with a team triathlon in the middle of the year, a student-scientist volleyball tournament to showcase that healthy familial competitiveness, a variety night where everyone gets to show off their talents to cap the summer off, and endless nights around campfires, canoe trips and weeknight jam sessions!

Financials

Statement of Financial Position

	2019	2018
	$	$
ASSETS		
Current		
Cash	502,251	825,192
Restricted cash	513,057	504,437
Current portion of grants receivable	1,194,700	322,657
Accounts receivable	95,682	30,563
Prepaid expenses	44,384	67,024
Total current assets	2,350,074	1,749,873
Grants receivable	260,000	230,742
Investments	990,019	907,613
Capital assets, net	968,640	1,096,576
Intangible assets	25,985	25,985
	4,594,718	4,010,789

	2019	2018
	$	$
LIABILITIES AND NET ASSETS		
Current		
Accounts payable and accrued liabilities	294,569	338,114
Due to International Institute for Sustainable Development	22,435	60,074
Current portion of deferred contributions	1,034,174	809,304
Total current liabilities	1,351,178	1,207,492
Deferred contributions	584,066	393,067
Deferred capital contributions	818,422	890,769
Total liabilities	2,753,666	2,491,328
Commitments		

	2019	2018
	$	$
NET ASSETS		
Net assets invested in capital assets	122,991	183,704
Sustainable Future Fund	800,000	800,000
Remediation fund	513,057	504,437
Unrestricted net operating surplus (deficit)	405,004	31,320
Total net assets	1,841,052	1,519,461
	4,594,718	4,010,789

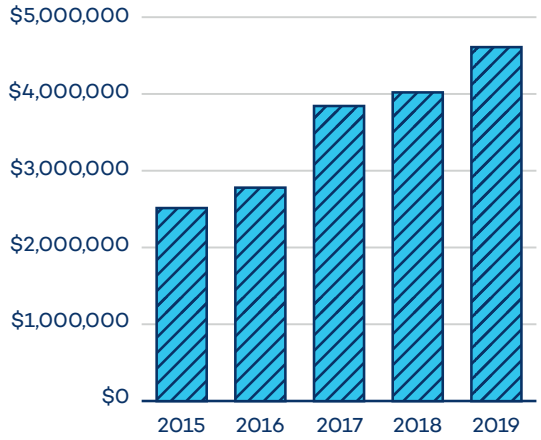
Statement of operations and changes in unrestricted net operating surplus (deficit)

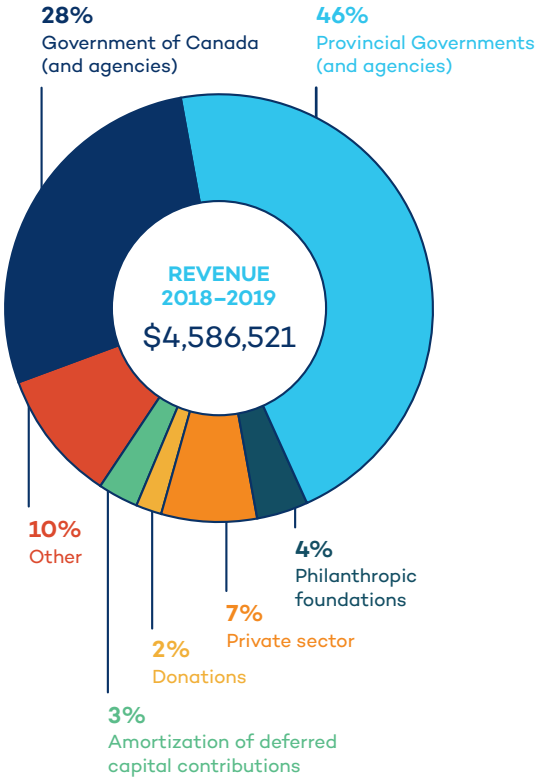
	2019	2018
	$	$
REVENUE		
Designated grants	3,913,578	3,475,133
Sustainable Future Fund	5,769	5,820
Donations – unrestricted	70,430	87,514
Amortization of deferred capital contributions	119,706	107,375
Other	463,139	319,359
Investment income	13,899	12,957
	4,586,521	4,008,158

	2019 $	2018 $
EXPENSES		
Field station operations	**1,002,700**	**936,917**
Field research	**1,685,969**	**1,396,977**
Administration	**851,682**	**822,904**
Marketing and fundraising	**198,884**	**191,333**
Outreach and education	**338,993**	**276,961**
Laboratory research	**89,492**	**218,204**
Offsite research and technical review	**97,210**	**25,796**
	4,264,930	**3,869,092**
Excess of revenue over expenses for the year	**321,591**	**139,066**

	2019 $	2018 $
Appropriation from and to unrestricted net operating surplus		
Change in net assets invested in remediation fund	**(8,620)**	**(61,787)**
Change in net assets invested in capital assets	**60,713**	**(32,047)**
Increase in unrestricted net operating surplus (deficit)	**373,684**	**45,232**
Unrestricted net operating deficit, beginning of year	**31,320**	**(13,912)**
Unrestricted net operating surplus (deficit), end of year	**405,004**	**31,320**

IISD-ELA Total Revenue (CAD)





Note: To see the full IISD-ELA financial statements visit our website at: www.iisd.org/ela/about/annual-report


19 June 2019

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