



# SmartCatch: A Modular Filtration System for Hamilton Harbour



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Category:  Clean & Green

## PROBLEM

"How might we reduce contamination in Hamilton Harbour?"

- **Toxic algal blooms** lead to oxygen depletion, fish kills, and ecosystem damage.
- **60% of phosphorus** in Hamilton Harbour comes from **stormwater runoff** and **CSOs**, causing **algal blooms** and **oxygen depletion**.
- **Existing filtration methods** are costly and difficult to scale.



## SOLUTION

SmartCatch is a modular, IoT-enabled filtration system designed for urban catch basins.

- **Customizable Filtration Cartridges:** Uses **FabPhos** for efficient phosphorus capture.
- **IoT Sensors:** Monitors **water flow**, **pollutant levels**, and **filter saturation** in real-time.
- **Smart Data Dashboard:** Provides **real-time monitoring** for maintenance optimization.
- **Low-Cost & Scalable:** Retrofits into existing systems with minimal upkeep.



Figure 1:  
Customizable  
cartridge

Figure 2: IoT-  
enabled  
spectro::lyser  
V3 by S::can

Figure 3: Catchbasin design by FabCo Industries

Phosphorus discharge increased from  
**26.0 kg/day in 1998**  
**to**  
**46.4 kg/day in 2013**



## NEXT STEPS



### Lab Testing & Optimization:

- Refine **filtration efficiency** and **sensor accuracy** under varying conditions.

### Pilot Deployment:

- Install **5-10 units** in **high-risk areas** (i.e **Chedoke Creek** and **Bayfront Park**) for real-time monitoring.

### Funding & Partnerships:

- Secure **grants** and collaborate with **local government** and **environmental groups**.

## REFERENCES

[PDF] Contaminant Loadings Report: 2008 to 2016 Update December 6, 2018 — Hamilton Harbour Remedial Action Plan.  
{PDF} 2018 Fact Sheets - Hamilton Harbour Remedial Action Plan  
Charlton, Murray N. "The Sewage Issue in Hamilton Harbour: Implications of Population Growth for the Remedial Action Plan." *Water Quality Research Journal*, vol. 32, no. 2, May 1997, pp. 407-420.  
Gale, Jessica. "Water Pollution in Lake Ontario and Hamilton Harbour: Causes and Solutions." *Green Venture*, 2 Jan. 2025.  
Hiriart-Baer, Véronique P., et al. "Water Quality Trends in Hamilton Harbour: Two Decades of Change in Nutrients and Chlorophyll A." *Journal of Great Lakes Research*, vol. 35, no. 2, June 2009, pp. 293-301.  
Huang, Sunnie. "Hamilton Harbour Cleanup's Biggest Challenge: Excessive Phosphorus." *CBC*, 27 May 2014.  
International Environmental Technology. "Meet the Intelligent IoT Enabled Spectro::lyser v3 for Smart Water Quality Monitoring." *Envirotech Online*, Environmental, 2025.  
Long, Tanya, et al. "Estimation of Tributary Total Phosphorus Loads to Hamilton Harbour, Ontario, Canada, Using a Series of Regression Equations." *Journal of Great Lakes Research*, vol. 41, no. 3, Sept. 2015, pp. 780-793.  
Mayer, Tatiana, and Philip G. Manning. "Inorganic Contaminants in Suspended Solids from Hamilton Harbour." *Journal of Great Lakes Research*, vol. 16, no. 2, Jan. 1990, pp. 299-318.  
"Phosphorus Stormwater Filter Treatment - Fabco Industries, Inc." *Fabco Industries, Inc.*, 17 Mar. 2022.

## ACKNOWLEDGEMENTS



ENGINEERING



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