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The Centre for Alternative Wastewater Treatment

- The Centre for Alternative Wastewater Treatment (CAWT) is located at Fleming College in the town of Lindsay in eastern Ontario.
- CAWT's Mandate:
 - Research on appropriate and environmentally sound wastewater treatment technologies, with an emphasis on cold-climates
 - Knowledge and technology transfer
 - Education and training
 - Community development



The International Polar Year

- The International Polar Year (IPY) is a science, research and education campaign focused on the Arctic and the Antarctic.
- It is taking place from March 2007 to March 2009.
- Over 60 nations are participating with over 200 projects on a range of science and social science topics.
- CAWT received \$700,000 of funding from the Government of Canada through the International Polar Year to research the use of wetlands to treat wastewater in Nunavut.



Motivation for the Research Project

While wetlands have been used to treat wastewater in Northern Canada for many years, there is still a lack of knowledge on how to best design treatment wetlands to:

- (a) suit Arctic climate and geography, and
- (b) meet changing community needs, especially as communities grow.



Wetland in Whale Cove, 2007

Understanding the limits and treatment potential of wetlands is important for protecting public health and preventing ecosystem contamination, as well as designing and meeting regulations.

This issue has become more urgent because Environment Canada is creating new federal wastewater regulations under the Fisheries Act. New effluent standards for the Arctic will be proposed by 2013.

Our Goals

- To understand how natural and engineered wetlands function in cold climates, and to develop design models and recommendations for use in Nunavut and other Inuit regions.
- To contribute to appropriate, practical and low-cost wastewater treatment technology for Northern communities.
- To help Northern communities maintain and improve their health and the health of aquatic ecosystems.



Wetland in Arviat, 2007

The Research Team

- Dr. Brent Wootton (principal researcher)
- Agata Durkalec (project coordinator)
- Dibyashree Shrestha (graduate student)
- Stephanie Collins (technologist)
- Marjorie Kavis Kaluraq (research assistant for Baker Lake)
- Lab assistant, field assistant, and community research assistants



Dibyashree Shrestha and Brent Wootton



Agata Durkalec

Summary of Research Activities

- (1) Describe the existing treatment wetlands in six hamlets in Kivalliq according to their biological, chemical and hydrological components.
 - *Baseline sampling*: collect weekly samples from 2 locations in each wetland from June 1 to August 31, 2008, with the help of community research assistants.
 - *Intensive sampling*: collect samples from 50 locations in each wetland for one week during July or August 2008.

Intensive surveying	
Number of wetlands	6
Number of sampling locations	50
Total intensive survey samples	300
Number of Parameters	12
Locations X parameters	3600
Additional parameters	50
Total intensive survey samples	3650

Baseline surveying	
Total sampling locations	6
Number of parameters	12
Locations X parameters	156
Number of weeks	12
Sub-total baseline survey samples	1872
Additional parameters	72
Total baseline survey samples	1944

Summary of Research Activities

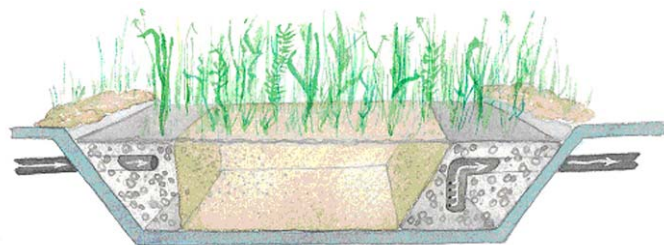
- (2) Construct small, pilot-scale wetlands on the site of existing wetlands in 1 to 2 communities, pending approval by the Hamlets and the Nunavut Water Board.
 - Baker Lake and Coral Harbour are the proposed communities for hosting the pilot sites.
- (3) Establish an analytical laboratory in Rankin Inlet in partnership with local organizations.
 - Currently developing a partnership with Sakku Investments.
 - Intention is for this to become a permanent lab for analyzing wastewater samples with local ownership and oversight.
- (4) Provide training and employment opportunities for local residents and raise public awareness of wastewater issues.



















Lab in Iqaluit, 2007

Proposed Pilot Scale Wetlands

- Pilot-scale constructed wetlands are proposed on the site of existing wetlands in 1 to 2 communities, pending approval by the Hamlets and the Nunavut Water Board.
 - Baker Lake and Coral Harbour are the proposed communities for hosting the pilot sites.
 - The constructed wetlands would be approximately 6mx4mx1m. They would be built in the existing wetlands but would be lined with rubber lining and planted with the existing natural vegetation from the surrounding treatment wetland.
 - By knowing the exact amount and strength of sewage passing through the pilot system, and how well the pilot wetland treats the sewage we can better understand the large scale wetlands in use in communities throughout Nunavut.



Overview of Project Timeline

	2007	2008	2009	2010
	JFMAMJJASONDJ	FMA MJ JASONDJ	FMA MJ JASONDJ	FMA MJ JASONDJ
Preliminary consultation				
Community forums & community research assistant training				
Baseline survey of existing wetlands				
Intensive survey of existing wetlands				
Construction of pilot scale wetlands				
Monitoring of pilot scale wetlands				
Sharing research results with communities				
Extension opportunities and workshops				
Decommissioning of pilot scale wetlands				
Publication of research results				

Research Activities To Date

JULY 2007

- Visited Baker Lake, Arviat, Whale Cove, Chesterfield Inlet, Rankin Inlet and Iqaluit.
- Consulted with Hamlets, GN, INAC, and Inuit organizations on the research project plan.
- Gathered preliminary information on the lagoons and wetlands by observation and discussions with Hamlet and GN staff.



Paul K. Irksok in Arviat, 2007

NOVEMBER 2007

- Presented the research plans to operators and representatives from INAC, the Nunavut Water Board, and GN at the Northern Territories Water and Waste Association conference in Iqaluit.



NTWWA in Iqaluit, 2007

Research Activities To Date

JANUARY 2008

- Wrote a report on behalf of Inuit Tapiriit Kanatami and Nunavut Tunngavik on the impacts that the new Environment Canada wastewater regulations will have on Nunavut.

APRIL 2008

- Visiting all of the hamlets in Kivalliq to consult on the project and sample the lagoons.

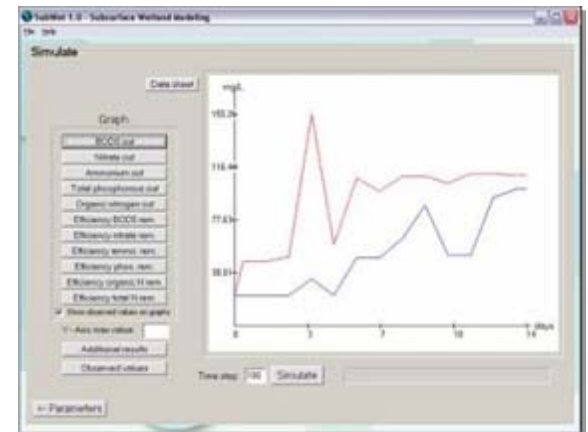
The summer field sampling will begin in June 2008.



Sewage truck in Baker Lake, 2007

Collaboration with United Nations

- The United Nations Environment Program (UNEP) has developed software to design treatment wetlands for tropical climates called SubWet.
- CAWT is collaborating with UNEP to develop SubWet 2.0 for cold climates, using data collected from the existing and pilot scale wetlands in Nunavut.
- SubWet 2.0 will be made available to the GN and Hamlets to help design treatment wetlands, and can be used as a training tool for technicians and students.
- A training workshop will be held in Nunavut in late 2008 or early 2009 on using the new software.



Images from SubWet program

Communications Process

- Local input and direction, particularly from CGS, has been an important part of developing the project plan.
- Communities will be asked for input on a continuous basis as the project progresses.
- All research results will be communicated to communities first, on an ongoing basis, and in a variety of ways (posters, radio, community forums, etc.)

- Please contact us anytime with any questions or suggestions:

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