



Natural Sciences and Engineering  
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Conseil de recherches en sciences  
naturelles et en génie du Canada



## **NSERC NEWSBULLETIN – No. 173**

**December 8, 2008**

### **We're back...**

This issue marks the return of the NSERC Newsbulletin after an extended absence. Over the coming weeks we'll be reaching out to reporters and others to let them know that we are back in the business of providing leads on Canadian research.

We also welcome comments. Let us know what you think of the bulletin and what you'd like to see in it.

If you no longer wish to receive copies, follow the unsubscribe instructions at the end of the message. And, of course, if you know anyone who might be interested in joining our listserve, please feel free to forward your copy.

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## Canada hosts a major Arctic conference this week

From December 9 to 12, Quebec City will host one of the largest international research conferences on the Arctic. For scientists, northern residents, reporters and everyone who has a concern for the Arctic, this conference will provide an unprecedented sharing of the latest information on the profound changes underway in this region. Sea ice melting, river flows, ecosystem vulnerabilities, Inuit health challenges, undersea mapping, community knowledge...these are just a small selection of the topics that will come up in the more than 570 scientific presentations and posters.

Come and meet the NSERC Newsbulletin at the NSERC exhibit booth. We'll be there looking for new story ideas and to welcome the 800 participants from 16 countries.

On December 9, NSERC program staff will host an all-day workshop for the leaders of Canada's International Polar Year projects. NSERC President Suzanne Fortier will speak on December 11.

You can find the full Arctic Change program at [www.arctic-change2008.com](http://www.arctic-change2008.com).

Click here for the Conference media advisory [www.arctic-change2008.com/index.php?url=11040](http://www.arctic-change2008.com/index.php?url=11040).

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## Snowy owl – a marine species?

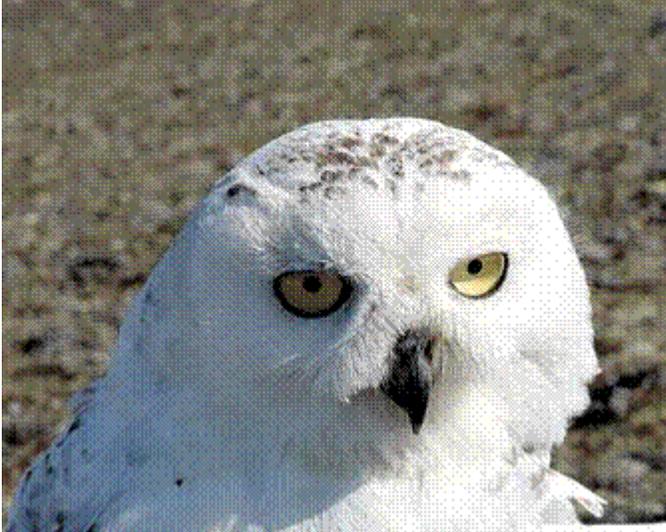


Photo: Gilles Gauthier

Wildlife satellite studies could lead to a radical re-thinking about how the snowy owl fits into the Northern ecosystem.

“Six of the adult females that we followed in a satellite study spent most of last winter far out on the Arctic sea ice,” said Université Laval doctoral student Jean-Francois Therrien, who is working with Professor Gilles Gauthier as part of an International Polar Year (IPY) research project to better understand key indicator species of Canadian northern ecosystems.

The finding flabbergasted the biologists who are now curious to find out if Inuit seal hunters ever encounter the large white birds on the ice in winter darkness.

"As for what the birds were doing there, they were possibly preying on seabirds," said Gauthier. "Bird researchers at coastal field sites have observed snowy owls attacking eiders in winter. This hypothesis will be strengthened if we can match up the locations of our birds with the position of open water leads in the ice as recorded by other satellite data."

The researchers find it intriguing that the top Arctic bird predator, like the top mammal – the polar bear, is also part of the marine ecosystem. The possible implications for the species will be discussed by Therrien this Wednesday in Quebec City at the Arctic Change Conference, one of the largest international research conferences ever held on the challenges facing the north.

It was very surprising, said Therrien, how far the individual birds migrated from where they were banded on their nesting grounds on Bylot Island, north of Baffin Island.

"The satellite data showed just how dramatic the owl movements are. They flew huge distances. One owl went to Ellesmere Island, another flew straight to North Dakota and a third ended up on the eastern point of Newfoundland," he said.

The researchers say that this winter should provide many southern Canadians with a better than normal opportunity to see the magnificent birds.

"We had the largest abundance of lemmings in many years in our study area this past summer," said Gauthier. "The owls had no problems raising young, so we were informally predicting a strong outward movement of young owls this winter."

And indeed, judging by numerous newspaper reports and naturalist sightings, that prediction has already come true.

In fact, if anyone has a really ingenious idea to keep them away from airports, there is at least one airport authority that would like to hear from you. One owl-plane collision has already been reported this year at Montreal-Trudeau International Airport in Dorval.

“The support from IPY and NSERC and the advances in satellite technology have given a huge impetus to what promises to be a revolution in our understanding of this key northern species,” said Gauthier. That knowledge can’t come soon enough, the two researchers said.

Jean-Francois Therrien’s presentation “Reproductive success and long-distance movements of snowy owls: Is this top predator vulnerable to climate change” will take place at the Arctic Change Conference in Quebec City on Wednesday, December 10 at 11:30 a.m.

Therrien received an NSERC Northern Internship for his work, which was also conducted as part of the NSERC IPY ArcticWOLVES project based out of Université Laval. Arctic WOLVES stands for Arctic Wildlife Observatories Linking Vulnerable Ecosystems ([www.cen.ulaval.ca/arcticwolves/en\\_intro.htm](http://www.cen.ulaval.ca/arcticwolves/en_intro.htm)).

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## Zapping odours in the pig barn



A low voltage current might just be what is needed to sweeten the air in and around large hog operations. That's the finding of an NSERC-funded study that shows that the electrolysis of pig manure can deliver more than a one hundred-fold reduction in the intensity of gag-inducing smells.

Electrolysis acts in several ways according to Professor Nigel Bunce and Dr. Dorin Bejan, two University of Guelph chemists who have been working on the project for six years.

The compounds of sulphur and nitrogen that cause the smells are generated by anaerobic bacteria, which thrive in oxygen-starved environments.

"While electrolysis alters the chemistry of these compounds directly," said Bunce, "the main effect is to create a hostile environment for the bacteria."

"The bacterial population is reduced because electrolysis introduces oxygen into the manure and at the same time the current oxidizes chloride ions in the manure to hypochlorite, a well known disinfectant."

"The nice thing is that 10 volts is all it takes," said Bunce. "Low voltage current is safe to use and electricity is much cheaper than the cost of chemicals proposed for alternative treatments."

He added that the nutrient value of the manure is unaffected by the treatment and that deodorized manure stays "sweet" for an extended period of time.

Bunce said with odour identified as a major environmental problem, the agricultural community has a considerable incentive to find solutions.

"Large hog operations in many parts of the country have gained the reputation as bad neighbours," he said.

"In Southern Ontario, the heart of the pork industry in that province, fewer and fewer people are willing to accept smelly neighbours. As a result it is almost impossible to obtain planning permission to erect new hog barns."

His colleague Bejan said that cleaning up the air in the barns may also have health benefits for farm workers and pigs. "If we can show that our odour control technology results in better hog appetite and feed conversion, it will more than pay for itself," he said.

But before farmers rush out to plug in the barn, Bejan added a few caveats.

“This was a small-scale pilot. We now want to test it at full scale on a working farm,” he said. “That will require support for a demonstration project.”

“Unless there are incentives for widespread adoption of the idea, it is difficult to see how an individual hog producer would step up to take it on,” he said. “But at least we can see the potential for an innovative new solution for the industry.”

The project was conducted under an NSERC program that supports projects that tackle problems of interest to industry. The industry co-funder of the study was Ontario Pork (The Ontario Pork Producers’ Marketing Board) which represents pork producers and regulates the industry in the Province.

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**Painting the town red, white, teal, blue, mulberry burst, and barley white**

As handymen know, acrylic additives can improve the bonding and durability of concrete and mortar mixes. But it’s a huge leap from there to the idea that the concrete trucks of the nation might become

a destination for the many thousands of litres of unused acrylic latex paint that end up at municipal recycling sites across Canada.

The idea, however, is very familiar to Dr. Moncef Nehdi, a professor of civil and environmental engineering at the University of Western Ontario. He was turned on to the potential of paint-concrete mixes when a number of years ago he was asked to take a preliminary look into the topic by the City of London. Promising news from this early work reached the Vancouver-based Product Care Association. They contacted Nehdi, who based on their interest and that of the Ontario Centre for Materials and Manufacturing, proposed an in-depth investigation.

With matching funding from NSERC under a program that funds universities to work collaboratively with private sector partners on ideas of interest to industry, Nehdi, a colleague and students set out to perform the first-ever comprehensive study of paint-concrete mixes.

"The results from the two-year project were amazing," said Nehdi. "Essentially all our objectives were achieved."

"The paint improved the durability of the concrete, and in virtually every aspect, from the mechanical properties of the concrete mixture to its workability and handling, to worker and environmental safety (the potential harmful components were stabilized and did not leach out over the long term), the process and product met or exceeded standards."

There was only one exception according to the researcher. "The compressive strength of the concrete decreased, but we solved this by lowering the water to cement ratio or using high-shear mixing."

Nehdi said that the project lays the groundwork for large-scale municipal use of latex paint in sidewalks and other concrete structures, an idea he and others are eager to advance to the next stage.

“Currently waste latex paint forms the largest volume of liquid waste collected at household hazardous waste collection sites in Canada,” he said. “If implemented, our technology can recycle most of this waste, with the added value of enhancing the durability of municipal concrete infrastructure and eliminating the cost of alternative disposal of the paint.”

And will the paint actually colour the town? Well, not really. When all the tints are mixed up together, the concrete still looks very much like...concrete.

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**We can't wait for 2009!**

After almost a decade, the NSERC Web site is finally getting a long-overdue makeover. But the sleek new look that will appear in the New Year will be more than just skin deep. The whole site is being rebuilt from the bottom up in a way that will make it much easier for us to expand our services and add new features to engage the public in the significant research carried out across Canada. Visit us at [www.nserc.gc.ca](http://www.nserc.gc.ca) as of January 5, 2009, to see the new look.

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