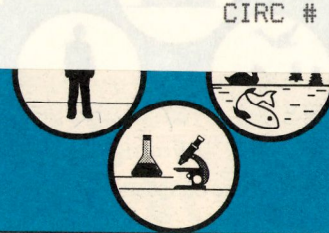




# The Effects Monitor

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## EEM Studies at Atlantic Region Pulp and Paper Mills - Update

**U**nder the Pulp and Paper Effluent Regulations (1992), all pulp and paper mills in Canada are required to conduct environmental effects monitoring (EEM) studies and to submit interpretative reports on the results of those studies to Environment Canada by April 1, 1996. All mills in Atlantic Canada have completed their field studies and the mills and their consultants are in the final stages of drafting the required reports. The Fraser's Inc. mill in Edmunston, NB submitted their final report on March 5, 1996. On March 8th, mill representatives and their consultants met with the New Brunswick Technical Advisory Panel to present the details of the report to the regulatory agencies and to discuss the findings of the study. Reports from the remaining 19 mills in the Atlantic Region are expected to be submitted by the required deadline. The provincial Technical Advisory Panels will conduct detailed reviews of these first cycle EEM reports and make recommendations to Environment Canada regarding the study requirements for the next three year EEM cycle which ends on April 1, 1999.

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## Monitoring mercury levels in Maritime Common Loons

Researchers across North America are investigating the exposure of Common Loons to mercury contamination in their breeding lakes, and the adverse effects mercury may have on loon health, reproduction and behavior. The Canadian Wildlife Service (CWS) of Environment Canada worked with the University of New Brunswick, Kejimikujik National Park and American loon biologists last summer to determine mercury levels in Common Loons breeding in the

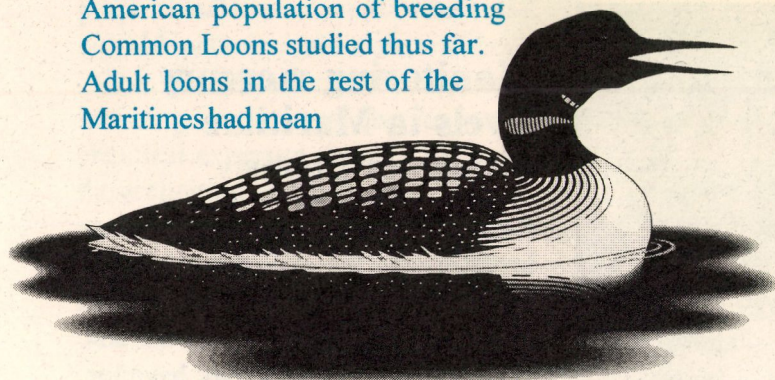
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### inside...

Mercury in Loons (cont'd).....	2
Tracers in Pulp Mill Effluents.....	2
River Guardians.....	3
Update on AQUAMIN.....	3
Bioassay on a Film Strip.....	4

Maritimes. Blood samples were collected from 24 loons on 12 lakes across Nova Scotia and New Brunswick in August, 1995 to assess their exposure to mercury. Kejimikujik National Park, Nova Scotia was included in the study because previous monitoring by CWS had revealed that production of young loons in the Park (0.28 young/territorial pair) was about half the average for eastern Canada.

Mercury levels were highest in adult loons breeding in Kejimikujik National Park. Mean blood mercury levels in Kejimikujik adults (5.7 ppm, wet wt.) were more than twice those observed in any other North American population of breeding Common Loons studied thus far. Adult loons in the rest of the Maritimes had mean



blood mercury levels as high (2.3 ppm) as those seen in New England and the Great Lakes area. Because adult loons migrate to sea coasts in the winter, the birds may be accumulating mercury in their freshwater breeding areas, in their marine wintering areas, or both. Loons accumulate mercury from the fish they eat. Blood mercury levels were strongly correlated between adult and young loons from the same family groups. Since the young feed only on their nest lake after hatching, it appears that any mercury in them is from local fish. As the adults showed the same mercury patterns as the young, it was concluded that mercury levels in adult loons reflect local exposure to mercury in their breeding lakes, as well.

Based on these findings of high mercury exposure, the study will be expanded in 1996 & 97, and will include more detailed investigation of mercury's potential effects on loon health, reproduction and behavior.

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## **Pulp & Paper Mill Effluent Tracer Working Group Formed**

During the first cycle of the national pulp and paper mill environmental effects monitoring program, one technical issue that created numerous problems was the use of effluent tracers in fish. The measurement of effluent tracers in fish tissue was intended to determine whether fish captured in the vicinity of a mill discharge were in fact exposed to the mill effluent. Identification of suitable tracers that were present in the mill effluents and that would accumulate in fish tissue proved to be problematic at many mills. With the installation of secondary effluent treatment at most mills in the country, the presence of potential effluent tracers will likely be even further reduced. Although the final results from the first EEM cycle are not yet in, in order to address the issue of effluent tracers for the next EEM cycle, a Tracers Working Group has been formed.

The eight member group consists of interested representatives from the pulp and paper industry, Environment Canada and the Department of Fisheries and Oceans. The group has finalized their Terms of Reference and have defined the purpose of using effluent tracers as: "The purpose for requiring Canadian pulp and paper mills to analyze for tracers during the adult fish survey, at mill sites where fish can move freely between sampling locations, is to verify that the fish collected in the receiving area have been exposed to the effluent, and that fish collected in the reference area have not".

The Tracer Working Group has developed an action plan to review the pulp and paper mill effluent tracer issue and will prepare a report summarizing their findings and recommendations by October, 1996.

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## Annapolis River Volunteer Guardians

A dedicated group of volunteers is on guard in Nova Scotia's Annapolis Valley. This hardy band of River Guardians actively monitor the water quality at 22 sites scattered along a 75 kilometer stretch of the Annapolis River.

The guardians collect water samples for analysis in scientific laboratories and in simple labs that they have set up in their kitchens, basements and garden sheds. The data collected by the Guardians - the first group of its kind in Atlantic Canada - provides a long-term record of the health of the Annapolis River. This important information has been shared with area residents via the pages of their local newspapers throughout the duration of the project.

This ever-growing group of on guard residents, which includes teachers, homemakers, trades people, business people and retirees, is raising the public awareness

about enhancing, preserving and using the river in wise and environmentally sound ways.

Thanks to the River Guardians program, which was originally funded by the Environmental Partners Fund of Environment Canada and established by the Clean Annapolis River Project, the Annapolis Valley now has a highly effective early warning system for environmental problems.



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## Update on AQUAMIN

The Assessment of the Aquatic Effects of Mining in Canada (AQUAMIN) program is rapidly approaching completion. Established in 1993, the multi-stakeholder process had an objective of making recommendations about:

- amendments to the Metal Mining Liquid Effluent Regulations (1977) and the federal regulatory framework for mining;
- the design of a national environmental effects monitoring program for metal mining;
- data gaps requiring further research.

During the last week of February, 1996, Working Group # 7 (environmental effects monitoring) and Working Group # 8 (amendments to the regulations) met for five days in Ottawa to reach consensus on unresolved issues, to complete draft # 3 of the final AQUAMIN report and to prepare the Executive Summary of the report. Draft # 3 has been circulated for final review to everyone involved in the AQUAMIN process from 1993 to the present including the members of Working Groups 1 through 6 and all attendees of the AQUAMIN Workshop held in May, 1995. The deadline for having comments back to the AQUAMIN Secretariat is March 29, 1996. A technical editor will make revisions to the draft according to the comments received. The final report will be translated to French, printed in both official languages and submitted to Environment Canada by the end of April, 1996. The final report will be available to interested parties.

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## Bioassay On A Film Strip

Resource Technologies Group, Inc. of Staten Island, NY have developed a toxicity-activated biosensor which detects exposure hazards to known or unknown chemical agents in both occupational and environmental settings. Prototypes of this biosensor have been produced as colorimetric film badges for passive dosimetry, as test strips and as plates for liquid and solids sampling and analysis as well as airborne contaminant detection. The rate and intensity of color response are proportional to concentration and toxic severity of the culpable chemical materials, and to exposure duration.

This biosensor works by simulating toxic effects initiating reactions which occur as a consequence of chemical exposure events. Chronic toxins (such as those eliciting carcinogenic or related effects) trigger metabolic activation reactions of enzyme complexes in the biosensor upon exposure. The products of this enzyme reaction are trapped by a dye precursor to develop the color response. The intermediate products in the biosensor detection reactions appear to be the same as those associated in the literature with chronic toxic effects initiation processes such as chemical

carcinogenesis. Higher concentrations of toxins have triggered color development at shorter times than do lower concentrations.

Biosensor response has been evaluated in exposure tests to more than 160 substances representative of the chemical universe, including those which have published occupational threshold limit values or other environmental standards. Laboratory and field studies have demonstrated generally appropriate sensitivity and response rate. These included cleaning tests of firefighters' protective gear, renovation of an academic chemistry laboratory building, and a cadmium contaminated site cleanup. Biosensor test strips have also been successfully tested in industrial medicine and hospital pathology laboratories, pesticide applications, and in water analysis studies. Sealed field deployable prototype units have remained useful for up to three months when stored at room temperature and indefinitely when frozen.

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**The Effects Monitor will be published quarterly by Environment Canada, Atlantic Region. Anyone interested in receiving a copy of the newsletter, submitting an article for the newsletter or making any comments or suggestions, should contact:**

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