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RIVERKEEPER[®]

10 Worst Pollution Sources of the Petitcodiac River System in 2007

**7th Annual Edition
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Executive Summary

Since 2001, Petitcodiac Riverkeeper has released an annual report detailing the 10 worst pollution sources of the Petitcodiac River system, an area which includes the Petitcodiac and Memramcook Rivers, Shepody Bay, and all their tributaries. The purposes of the report are to:

- Document the ten most immediate pollution threats to the health of the river ecosystem and quality of life in the region;
- Recommend effective solutions to pollution problems; and
- Increase public awareness of pollution issues in our watershed.

In 2007, pollution sources in the Petitcodiac River system continued to threaten ecosystem and public health. While some progress was made on certain issues, evidence suggests pollution sources in the watershed continue to affect the quality of life of residents. In summary, the Top Ten Pollution Sources of 2007 in the watershed remained unchanged from 2006:

1. Petitcodiac Causeway
2. Greater Moncton Wastewater Treatment Facility
3. Former Moncton Landfill
4. Memramcook and Shepody Causeways
5. Urban Development – Watercourse and Habitat Destruction
6. Various Abandoned Dams and Barriers
7. Sediment Pollution
8. Stormwater Discharge
9. Untreated Sanitary Sewer Discharge
10. Cosmetic Pesticide Use

In addition, uranium mining and exploration was added as a “Pollution Source to Watch” as a result of the potential lethal consequences of this type of development in the vicinity of Turtle Creek (Greater Moncton’s water supply). However, despite the risks associated with these pollution sources, efficient and effective solutions are available to governments and other responsible parties. Action must be taken immediately to correct several pollution issues before consequences become irreversible.

Introduction

Petitcodiac Riverkeeper's mission is to lead in the restoration, protection and promotion of the ecological integrity of the Petitcodiac and Memramcook watersheds and the Shepody Bay estuary, an area of approximately 3,000 km² situated in southeastern New Brunswick and the Bay of Fundy. Our mission is accomplished by engaging in public education, promoting the rivers' cultural heritage, social and economic values, patrolling and monitoring the watershed, undertaking actions to enforce compliance with environmental laws and initiating watercourse rehabilitation projects.

Since 2001, Petitcodiac Riverkeeper has released an annual report detailing the 10 worst pollution sources of the Petitcodiac River system, an area which includes the Petitcodiac and Memramcook Rivers, Shepody Bay, and all their tributaries. The purposes of the report are to:

- Document the ten most immediate pollution threats to the health of the river ecosystem and quality of life in the region;
- Recommend effective solutions to pollution problems; and
- Increase public awareness of pollution issues in our watershed.

The 2007 version of the report represents the 7th edition of the list and remains unchanged from the 2006 report. The ten worst pollution sources from last year continue to threaten the health of the watershed. While governments and other responsible authorities continue to take little or no action to correct these environmental problems, quality of life in the watershed continues to deteriorate.

Methodology

The term “pollution source” in this document refers to an activity by individuals, corporations or government agencies that has caused and continues to cause a single or multiple negative impact on water quality, species habitat and the ecological integrity of the Petitcodiac River system. In selecting the “10 Worst Pollution Sources” of the Petitcodiac River System in 2007, the following four criteria were applied:

1. Activities that have **multiple negative impacts** on water quality, species habitat, biodiversity and the ecological integrity of the watershed;
2. Activities that **continue to create negative impacts** on the watershed;
3. Activities that have both **short and long-term negative impacts** on the watershed;
4. Activities that clearly have **identifiable and responsible parties** for the negative impacts created in the watershed.

10 Worst Pollution Sources in 2007

1. Petitcodiac Causeway

Responsible Authority: Province of New Brunswick

Built in 1968 and owned and operated by the Province of New Brunswick, the Petitcodiac causeway has dramatically and extensively altered the natural functions of the entire 3000 km² Petitcodiac River and Shepody Bay ecosystem. The causeway continues to create an obstruction to natural fish passage to nearly half (1,340 km²) of the river system, has caused the elimination of 21 km of upstream estuary, and has changed the historical tidal characteristics of the river from the Village of Salisbury to Moncton.

The Petitcodiac causeway is responsible for the elimination of at least five aquatic species from the river system as follows:

- Dwarf wedgemussel (the first case of a mussel being declared extirpated from Canada – the Petitcodiac River was its only known Canadian location);
- Inner Bay of Fundy Atlantic salmon (declared eliminated from the Petitcodiac in the mid-1990s and now declared endangered in Canada);
- American shad (formerly a run of over 75,000 in the Petitcodiac and declared eliminated in the late-1990s);
- Striped bass; and
- Atlantic tomcod (Locke et al. 2003).

The Petitcodiac causeway is also responsible for the buildup of massive silt deposits downstream from the structure, reducing the width of the Petitcodiac River from an average of one kilometre in 1968 to a mere 100 metres currently in Moncton. The Petitcodiac causeway continues to be responsible for ongoing buildup of massive deposits of silt reaching as far as 35 kilometres downstream to Shepody Bay. In recent years, the Petitcodiac has acquired the unfortunate distinction of being one of the few rivers in North America where you can see man's destructive influence from space.

The Petitcodiac causeway has further caused the near elimination of the once world-renowned Petitcodiac River tidal bore, formerly Canada's most spectacular tidal bore and one of Atlantic Canada's top tourist attractions. Once the pride of Moncton's tourism industry, the Petitcodiac River tidal bore has become an embarrassment for local tourism operators, as well as the focus of ridicule by visitors and local residents.

Moncton was once home to a thriving and proud shipbuilding industry, but natural navigational conditions for commercial and recreational boaters have been eliminated on the Petitcodiac River

as a result of extreme sediment deposits. The Greater Moncton community has become one of the few in North America to lose its inherent right to a navigable waterway because of the Petitcodiac causeway.

The battle to restore free flow to the Petitcodiac River now spans four decades, making this one of the longest standing environmental battles in Canada. Between 1961 and 2001, over 132 reports were conducted on the Petitcodiac River and its causeway. This body of research on the Petitcodiac River constitutes one of the most documented cases of a declining ecosystem in Canada (AMEC Earth & Environmental 2005; Locke and Bernier 2000). In 2003, as a result of the extensive ecological damage brought about by the Petitcodiac causeway, the environmental organization Wildcanada.net designated the Petitcodiac Canada's Most Endangered River.

While 2007 was a breakthrough year for removal of the Petitcodiac causeway, the case is far from finished. In 2007, the Province of New Brunswick announced its intention to remove the causeway and replace it with a 280-metre bridge. However, the Province has yet release a terms of reference for the project, a detailed timeline, or specific funding. In addition, federal funding for the project has yet to be secured. While acting as partners with the provincial government all along, the federal government has turned their back on the Petitcodiac River by stating publicly that they are not interested in providing their share of the funding for the project.

Therefore, the overwhelming evidence demonstrating its multiple negative impacts on the entire ecosystem, its habitat, water quality and biodiversity makes the **Petitcodiac causeway (Province of New Brunswick) The Worst Pollution Source** of the Petitcodiac River System in 2007.

Documented solution to correct the problem: In 2008, the Province must stand by its word, begin the process of causeway removal and take action by:

- Making financial commitments to and begin preliminary design and construction activities as recommended in the Environmental Impact Assessment Report released in 2005;
- Prepare clear project timelines for implementation including major milestones and deadlines for project activities; and
- Release specific details related to the Petitcodiac River Trust Fund announced in the Throne Speech.

In addition, the federal government must commit as an equal partner in the project and announce that they will fund their portion of the project.

2. Greater Moncton Wastewater Treatment Facility

Responsible Authority: Greater Moncton Sewerage Commission

The Greater Moncton Wastewater Treatment Facility is responsible for treating our region's wastewater effluent. The facility is operated by the Greater Moncton Sewerage Commission (GMSC), an organization which is publicly owned by the municipalities of Dieppe, Moncton and Riverview. The facility was promoted in the early 1990s as a state-of-the-art plant that would eventually offer full wastewater treatment. However, wastewater effluent continues to receive advanced primary treatment only (i.e. removal of solids) before being released directly into the Petitcodiac River at Outhouse Point.

More than twenty years after the project was first initiated, thirteen years after the plant was commissioned (1994), and five consecutive years of being singled out as the Petitcodiac River's second worst polluter, the GMSC has still not publicly released any plans to upgrade the facility to secondary or tertiary treatment.

Municipal wastewater is the largest single source of effluent discharge by volume in Canada. Scientific research has identified several environmental and health impacts resulting from insufficient wastewater treatment such as negative impacts on fish and wildlife populations, oxygen depletion, restrictions on recreational water use and fishing, and restrictions on drinking water consumption. Pollutants in wastewater which can impact ecosystems and human health include:

- Decaying organic matter and debris;
- Nutrients such as nitrogen (including ammonia) and phosphorus;
- Chlorine compounds and inorganic chloramines;
- Bacteria, viruses, and disease-causing pathogens;
- Metals such as mercury, lead, cadmium, chromium and arsenic; and
- Other substances such as pharmaceutical and personal care products (Environment Canada 2001 and 2007).

On average, the plant directly discharges 50 to 70 million litres of primary treated effluent every day into the Petitcodiac River. Not only are there suspected toxic substances and hormone-related chemicals entering the river at the outfall, but the extreme richness of the wastewater effluent likely causes river water to be overloaded with nutrients. Nutrient overload can cause excessive microbial activity and deoxygenation. Trying to navigate a stretch of river lacking in oxygen is a big hazard to any fish that might be swimming upstream or downstream. In addition, coliform bacteria counts at the outfall are also known to routinely exceed the Canadian Water Quality Guidelines set for recreational use.

However, the GMSC will be unable to hide behind primary wastewater treatment for much longer. Over the past four years, Environment Canada and the Canadian Council of Ministers of the Environment (CCME) have been working to develop a Canada-wide strategy for wastewater effluent. Details related to the proposed regulatory framework for wastewater were released in 2007 and the strategy includes requiring secondary wastewater treatment for all municipal systems. In 2008, new regulations under the *Fisheries Act* are expected to be introduced by the federal government and requirements for all systems to upgrade to secondary treatment will be implemented.

Since primary treated wastewater effluent continues to be discharged directly into the Petitcodiac River at an average rate of between 50 and 70 million litres a day and since no public plans to upgrade the plant to advanced secondary or tertiary treatment have been made available, the **Greater Moncton Wastewater Treatment Facility (Greater Moncton Sewerage Commission) is the Second Worst Pollution Source** of the Petitcodiac River System in 2007.

Documented solution to correct the problem: The GMSC must prepare and publicly release detailed plans to upgrade treatment to an advanced secondary or tertiary system, and develop financial scenarios (federal/provincial/municipal partnerships, long-term borrowing arrangements, etc.) to achieve this objective.

3. Former Moncton Landfill

Responsible Authority: City of Moncton

The former Moncton landfill is owned and operated by the City of Moncton and is located on 35 hectares (87 acres) of land along the Petitcodiac riverfront. It began operating shortly after the causeway was built in 1968, and was closed in 1992 after more than 20 years of operation. Historical records reference the following dangerous wastes disposed of at the facility: petroleum waste oil, liquid animal waste, asbestos pipe insulation, urea-formaldehyde foam insulation (UFFI), cleaning solution - sodium hydroxide SCA-134, septic waste, sewage sludge and medical wastes. (GEMTEC Limited 1995).

An environmental investigation conducted by the Environmental Bureau of Investigations (EBI) and the Petitcodiac Riverkeeper in the summer and fall of 2000, revealed that between 100,000 and 300,000 litres of toxic leachate was entering the Petitcodiac River every day from various discharge points at the former Moncton landfill along Jonathan Creek. In February 2002, charges were subsequently laid by Environment Canada's Enforcement Branch against the City of Moncton and a consulting firm in relation to this case.

The City of Moncton plead guilty to these charges in September 2003 and agreed to a court order and a closure plan that would eliminate the toxic discharges into Jonathan Creek and the Petitcodiac River. In 2007, the consulting firm was found guilty by the courts and ordered to pay \$28,000 in fines. More than four years after this court order and seven years after the toxic discharges were discovered, a draft closure plan is still being reviewed by provincial authorities.

However, some progress on the landfill case was made in 2007. The City of Moncton obtained approval from the New Brunswick Department of Environment to divert part of Jonathan Creek away from the landfill to minimize the amount of leachate being discharged directly into the creek. Work was expected to take place on the diversion project during the winter of 2008, but the City has been unable to secure the required permits from various federal and provincial agencies to complete the project. Unfortunately, this means that the diversion will likely be delayed until the winter of 2009, causing further degradation of water quality and species habitat in the creek.

The continuous discharge of toxic leachate directly into Jonathan Creek and the Petitcodiac River, at an estimated rate of tens of thousands of litres per day, makes the **Former Moncton Landfill (City of Moncton) the Third Worst Pollution Source** of the Petitcodiac River System in 2007.

Documented solution to correct the problem: The City of Moncton must construct a leachate collection system and an impermeable cap to cover the landfill and must begin construction work on the Jonathan Creek Diversion Project.

4. Memramcook and Shepody Causeways

Responsible Authority: Province of New Brunswick

The Memramcook and Shepody River causeways, built in 1973 and 1958 respectively, are owned and operated by the Province of New Brunswick. The causeways have completely altered natural ecosystem functions in the 400 km² Memramcook River system and the 550 km² Shepody River system. The two causeways, designed with no fish ladders, continue to create an obstruction to natural fish passage conditions to over 85 percent (approximately 350 km²) of the Memramcook River system and to over 90 percent (500 km²) of the Shepody River system. Both causeways have also caused the elimination of several kilometres of upstream estuary, affecting the historical tidal range and salt-fresh water exchange in the system.

Both the Memramcook and the Shepody causeways are responsible for the elimination of nearly every historical fish species in the river systems, including the distinct Inner Bay of Fundy Atlantic salmon (formerly a run believed to have exceeded 1,000 in each river), American shad, Striped bass, Atlantic tomcod, Sea run brook trout and others. The Memramcook and Shepody causeways also continue to be responsible for the buildup of massive sediment deposits downstream from these structures, reducing the width of the Memramcook and Shepody Rivers and affecting Shepody Bay's mudflats, a critical habitat for migrating shore birds.

In the fall of 1999, the Province of New Brunswick initiated the process of restoring free flow to the Memramcook River at the request of the community. Seven years after this public commitment was made, the plan to restore the Memramcook River has yet to be implemented. However, removal of the Memramcook causeway remains a top priority for the community. Village Council is currently developing a Green Plan and expects to have the plan approved in

2008. The Plan will attempt to address a variety of environmental issues, including removal of the causeway.

Due to evidence demonstrating multiple negative impacts on the entire river system, its habitat, water quality and biodiversity, the **Memramcook and Shepody causeways (Province of New Brunswick) are the Fourth Worst Pollution Source** of the Petitcodiac River System in 2007.

Documented solution to correct the problem: The Province of New Brunswick must return the Memramcook and Shepody Rivers to free flow conditions in the interim and undertake a detailed assessment to return the rivers to full tidal flow by replacing these causeways with partial bridges.

5. Urban Development – Watercourse and Habitat Destruction

Responsible Authority: Private Developers and Municipal Governments

Urban sprawl and land development carried out by residential, commercial and industrial developers with the endorsement of the watershed's Planning Commissions can have multiple, severe and irreversible impacts on the ecological components of river systems. Urban development creates negative impacts in the watershed by:

- Decreasing the amount of wetlands and forested areas available for aquatic and terrestrial habitat;
- Increasing the amount of impermeable surfaces (eg. concrete and asphalt) which in turn increases stormwater runoff into watercourses and erosion in riparian areas;
- Increasing the amount sediment discharged into watercourses as a result of soil disturbance activities which affects water quality and the health of fish populations; and
- Increasing the quantity of water needed to support new commercial, residential, or industrial activities.

Watersheds must have healthy wetlands, riparian zones, and forested areas to support aquatic and terrestrial life. In addition, these areas have an important role in maintaining and improving water quality. Upland and riparian areas work together to support ecosystem structure and function. Physical characteristics of wetlands and watercourses determine the types of plant and animal life which can be supported. Fish need certain types of substrate to lay eggs during the spawning season and for adequate shelter and food. Vegetation along streams and riverbanks (i.e. the riparian zone) also has an important role to play in the river system. Vegetation filters water trickling down along the edge of a watercourse, reduces erosion and provides shade, keeping water temperatures cool in the summer time and promoting high levels of dissolved oxygen which are crucial to fish survival.

Habitat destruction and declining water quality continue at an accelerated rate in the Petitcodiac River system as a result of urban sprawl and land development, causing both ecological and

socioeconomic consequences. For example, increases in stormwater runoff and watercourse sedimentation not only can affect water quality (i.e. ecological impact), but may also lead to a decline in commercial and sport fish populations (i.e. socioeconomic impact). As a result, fishermen may suffer reduced catches, fewer economic opportunities and potential loss of their livelihood in areas well beyond watershed boundaries.

The evidence demonstrating the multiple negative impacts of urban development on the Petitcodiac River system, its habitat, its water quality and all of its biodiversity makes **urban development – watercourse and habitat destruction (private developers and municipal governments) the Fifth Worst Pollution Source** of the Petitcodiac River System in 2007.

Documented solution to correct the problem: Municipal governments must implement stronger urban planning policies to protect fish habitat, wetlands, watercourses and riparian zones, in addition to increasing enforcement capabilities.

6. Various Abandoned Dams and Barriers

Responsible Authority: Various Parties

Abandoned dams and barriers located on tributaries of the Petitcodiac River continue to create obstacles to fish passage and to affect the ecological integrity of the watershed. Abandoned dams and barriers in this category include:

- Jones Lake Dam (affecting 48 km², City of Moncton);
- Mill Creek Navy Dam (affecting 50km², Town of Riverview);
- Humphrey's Brook Dam (affecting 37km², Tandem Fabrics Ltd.);
- McLaughlin and Irishtown Reservoirs (affecting 34 km², City of Moncton); and
- Fox Creek Aboiteau (affecting 34 km², Province of New Brunswick).

The dams and barriers listed above are believed to be responsible for the elimination of nearly every historical fish species in these tributaries, including the distinct Inner Bay of Fundy Atlantic salmon, Sea run brook trout and others. All of these barriers and abandoned dams continue to be responsible for the buildup of sediment deposits upstream from the structures, for increasing water temperatures and for decreasing water quality. Built for a variety of uses (eg. aesthetic, energy, flood control, water supplies) as far back as the 1800's and as late as the 1950's, some of these barriers have since been abandoned and no longer serve their intended purpose.

Decommissioning plans have now been prepared for the abandoned Navy Dam on Mill Creek (Riverview) and the abandoned dam on Humphreys Brook (Moncton). However, the plans still await approval from the owners and must secure funding before restoration projects can begin on these streams. In addition, one of the gates of the Fox Creek Aboiteau could also be opened to

free flow conditions, but this option needs further study. The reservoirs of Irishtown and McLaughlin have long since been utilized for the purposes of supplying drinking water or emergency water to city residents, but these dams may no longer be required since the City of Moncton has plans to expand the Turtle Creek Reservoir in the near future. Jones Lake in Moncton has filled up with sediment as a result of increasing urban development activities and the City is considering dredging the lake, which would have significant economic costs.

The evidence demonstrating their multiple negative impacts on the tributaries of Jonathan Creek (Jones Lake), Mill Creek, Humphreys Brook, West Branch Halls Creek, Ogilvie Brook and Fox Creek, its habitat, its water quality and its biodiversity make various **abandoned dams and barriers (various responsible authorities) the Sixth Worst Pollution Source** of the Petitcodiac River System in 2007.

Documented solution to correct the problem: Responsible authorities must:

- Remove the abandoned dams on Mill Creek and Humphreys Brook;
- Conduct assessments on restoring partial free flow conditions in Fox Creek;
- Conduct assessments on the future of the Irishtown and McLaughlin reservoirs; and
- Undertake a feasibility study on restoring fish passage and/or tidal flow in the Jones Lake system.

7. Sediment Pollution

Responsible Authority: Various Private Developers, Municipal Governments and Province of New Brunswick

Sediment pollution associated with residential, commercial or industrial quarry development can create severe impacts on aquatic environments. Inappropriate construction practices carried out by various private developers in the Petitcodiac River system continued to have widespread negative effects on watercourses and aquatic habitat in 2007.

Sediments are soil particles, such as sand and gravel that become suspended in water as a result of land use activities and accumulate on the bed of the watercourse. Sources of sedimentation include erosion from soils exposed from forestry operations, agriculture, overgrazing, construction or development activities as well as the deposition of particles into watercourses from quarries and gravel roads. Sediment pollution causes problems by covering aquatic organisms, reducing light penetration, filling in watercourses, and transporting insoluble toxic pollutants into water bodies. Sediment pollution also increases water turbidity and reduces a fish's ability to find food. Food sources such as aquatic insects and plants can be smothered or displaced as a result of sedimentation. High sediment levels can cause respiratory problems in fish, smother eggs and cover spawning beds. In addition, sediments can carry organic and inorganic toxic pollutants, further affecting water quality (Environment Canada 2004).

The evidence demonstrating its multiple negative impacts on the Petitcodiac River system, its habitat, water quality and biodiversity makes **Sediment Pollution (various private developers, municipal governments, and the Province of New Brunswick) the Seventh Worst Pollution Source** of the Petitcodiac River System in 2007.

Documented solution to correct the problem: Responsible authorities must:

- Establish conservation easements near watercourses:
- Restrict development activities within 30 metres of a watercourse in accordance with the Watercourse Alteration Regulation of the New Brunswick *Clean Water Act*;
- Ensure that private developers implement adequate mitigation measures for sedimentation as part of development activities (eg. silt fences, temporary and permanent settling ponds); and
- Increase enforcement of environmental laws.

8. Stormwater Discharge

Responsible Authority: Municipal Governments and Province of New Brunswick

Stormwater is a term used to describe water that originates during precipitation events. Stormwater that does not soak into the ground becomes surface runoff and either flows directly into watercourses or is channeled to storm sewers, settling ponds, and/or treatment facilities. Due to the widespread presence of hard surfaces such as roads, buildings, and parking lots, urban areas contribute a considerable amount of stormwater runoff into our local waterways. Impermeable surfaces also reduce groundwater infiltration, which in turn causes flooding in low-lying areas.

While new residential, commercial, and industrial land uses are required to include adequate stormwater management systems, existing urban areas continue to discharge stormwater directly into watercourses. In addition, municipalities are increasingly burdened with aging and leaking sewer infrastructure. As a result, toxic chemicals and other pollutants in stormwater are affecting water quality.

Stormwater discharges can reach high velocities during heavy rainfall events, causing erosion of adjacent watercourse banks. Stormwater discharges can elevate stream water temperatures during summer months and such drastic temperature changes can be lethal to a variety of aquatic organisms. Pollutants, such as sediments, petroleum, metals, pesticides, bacteria and nutrients, accumulate on impermeable surfaces and, in some cases, discharged directly into watercourses.

The evidence demonstrating multiple negative impacts on the Petitcodiac River system, its habitat, water quality and biodiversity make **Stormwater Discharges (municipal governments and the Province of New Brunswick) the Eighth Worst Pollution Source** of the Petitcodiac River System in 2007.

Documented solution to correct the problem: Municipal governments and the Province of New Brunswick must develop and adopt more stringent standards for stormwater management, similar to other jurisdictions in North America. In addition, municipalities must make significant financial commitments to upgrade and maintain existing sewer infrastructure in urban areas.

9. Untreated Sanitary Sewage Discharge

Responsible Authority: Municipal Governments and Greater Moncton Sewerage Commission

Municipal wastewater is the largest single source of effluent discharge by volume in Canada (Environment Canada 2001 and 2007). Sanitary sewer systems are designed to direct sewage from residential, commercial, and industrial users to treatment facilities before being released into the environment. However, as a result of improper maintenance, poor design, and sewer overflows, untreated sanitary sewage continued to be discharged directly into watercourses of the Petitcodiac River system in 2007.

Untreated sewage discharge can cause several negative environmental impacts. Due to the presence of disease causing agents (eg. bacteria, fecal coliform, ecoli), the discharge of sanitary sewage into watercourses is a threat to public health, aquatic life, and water quality. Sanitary sewage affects aquatic organisms because nutrients contained in discharges contribute to excessive algae growth. In addition, microorganisms that decompose sewage and related organic matter require high levels of oxygen, which leads less oxygen available for other aquatic organisms. This change causes increased mortality rates for aquatic organisms that need high levels of oxygen to survive, such as trout or salmonids (Environment Canada 2001 and 2007).

As a result of the multiple negative impacts created on the Petitcodiac River system, its habitat, water quality and biodiversity, **Untreated Sanitary Sewage Discharge (various municipal governments and the Greater Moncton Sewerage Commission) is the Ninth Worst Pollution Source** of the Petitcodiac River System in 2007.

Documented solution to correct the problem: Municipal governments must

- Maintain sanitary sewage infrastructure on a regular basis;
- Improve sewage capacity and treatment methods within the existing system,;
- Eliminate the use of private septic systems where possible by requiring users to connect to municipal systems; and
- Monitor the existing sewage system more frequently to detect and resolve problems.

10. Cosmetic Pesticide Use

Responsible Authority: Residential, Commercial, Industrial and Institutional Users

The cosmetic use of pesticides and herbicides by residential, commercial, industrial and institutional property owners are widespread throughout the Petitcodiac River system. Some pesticides have been linked with the development of cancer, while others are suspected to contain hormone disrupting chemicals. The risks are greatest for children and the unborn because of hormonal activity that occurs during development of their immune, nervous, and reproductive systems (Conservation Council of New Brunswick 2008b; Daborn 2001; Williston 2000).

Synthetic organic compounds found in pesticides find their way into surface and ground water by leaching into the soil or as part of stormwater runoff. Effects of pesticide exposure on aquatic and terrestrial species can be as devastating and may include direct mortality, loss of reproductive function, behavioral change, weight loss, and habitat loss. In addition, pesticides bioaccumulate in the food chain and impacts on animal and plant species increase over time. The effects of pesticide pollution are even more significant when we consider their widespread distribution in our communities.

The potential effects of pesticide use on biodiversity, water quality, and human health within the Petitcodiac River system make **Cosmetic Pesticides (Various Users) the Tenth Worst Pollution Source** of Petitcodiac River System in 2007.

Documented solution to correct the problem: The New Brunswick Minister of Environment must ban the cosmetic use of pesticides through his powers under the *Pesticides Control Act*. Municipalities within the watershed must also enact bylaws to phase-in a similar ban as many communities across Canada have already implemented. In addition, the federal government must:

- Require chemical manufacturers disclose all ingredients on labels and display clear health warning labels;
- Evaluate cumulative and synergistic health risks of long-term exposure in children and wildlife; and
- Develop and implement a comprehensive public awareness and education campaign on the risks of cosmetic pesticide use.

Pollution Sources to Watch

Uranium Exploration and Mining

Responsible Authority: Province of New Brunswick

Uranium is the heaviest naturally occurring mineral and is typically found in hard rock and sandstone. The substance is primarily used as a fuel source for nuclear reactors, in the manufacturing of weapons, and in production of radioisotopes for medical and scientific purposes. Uranium has been mined across Canada, including in the Northwest Territories, Saskatchewan and Ontario. Significant deposits of uranium have been discovered in Nova Scotia and British Columbia, but due to public opposition and research on the dangers associated with the substance, uranium mining has been banned in these provinces. (Conservation Council of New Brunswick 2008a).

Over the past few years, uranium exploration and mining companies have staked many acres of land in New Brunswick, including in the Turtle Creek watershed area which supplies Greater Moncton with drinking water. Scientific evidence has confirmed that uranium mining and exploration cause irreversible effects to the health of ecosystems, watersheds, wildlife, agriculture, recreation, and public health. Exposure to radioactive elements has been linked to serious health conditions such as lung and other cancers and reproductive system deficiencies.

Three main environmental risks are associated with uranium as follows:

- Release and deposition of radon gas during mining activities;
- Spread of radioactive dust particles in water and vegetation which bioaccumulate up the food chain and eventually are ingested by fish, animals, and people; and
- Surface and groundwater pollution by chemicals and radioactive by-products of mining activities. (BC Medical Association 1980; Conservation Council of New Brunswick 2008a; Edwards 1992, Winfield et al. 2006).

In 2007, Petitcodiac Riverkeeper and the Conservation Council of New Brunswick teamed up to support a permanent ban on uranium exploration and mining in the Turtle Creek area. However, the Province of New Brunswick has not yet taken any action on the issue. **Uranium exploration and mining** in the watershed has been categorized as a “**Pollution Source to Watch**” and activities will continue to be monitored in 2008.

Conclusion

In 2007, pollution sources in the Petitcodiac River system continued to threaten ecosystem and public health. Causeways, barriers to fish passage, wastewater and sediment pollution, and use of cosmetic pesticides continue to pose significant risks. While some progress was made on certain issues, the evidence suggests pollution sources in the watershed continue to affect the quality of life of watershed residents. Furthermore, progress on some issues has been slow and responsible parties continue to take little action to correct environmental damage.

Accordingly, Petitcodiac Riverkeeper's list of Top Ten Pollution Sources in the Petitcodiac River System in 2007 remained unchanged from the 2006 report. In addition, uranium mining and exploration was added as a "Pollution Source to Watch" as a result of the potential lethal consequences of this type of development in the vicinity of Greater Moncton's water supply. However, despite the risks associated with these pollution sources, efficient and effective solutions are available to responsible parties. Action must be taken immediately to correct several pollution issues before consequences become irreversible.

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