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CANADIAN ENVIRONMENTAL PROTECTION ACT, 1999

Regulations Amending the Phosphorus Concentration Regulations

P.C. 2009-947 June 11, 2009

Whereas, pursuant to subsection 332(1) ([see footnote a](#)) of the *Canadian Environmental Protection Act, 1999* ([see footnote b](#)), the Minister of the Environment published in the *Canada Gazette*, Part I, on June 28, 2008, a copy of the proposed *Regulations Amending the Phosphorus Concentration Regulations*, substantially in the annexed form, and persons were given an opportunity to file comments with respect to the proposed Regulations or to file a notice of objection requesting that a board of review be established and stating the reasons for the objection;

Therefore, Her Excellency the Governor General in Council, on the recommendation of the Minister of the Environment, pursuant to subsection 118(1) of the *Canadian Environmental Protection Act, 1999* ([see footnote c](#)), hereby makes the annexed *Regulations Amending the Phosphorus Concentration Regulations*.

REGULATIONS AMENDING THE PHOSPHORUS CONCENTRATION REGULATIONS

AMENDMENTS

1. The long title of the *Phosphorus Concentration Regulations* ([see footnote 1](#)) is replaced by the following:

CONCENTRATION OF PHOSPHORUS IN CERTAIN CLEANING PRODUCTS REGULATIONS

2. Section 1 of the Regulations and the heading before it are repealed.

3. Section 3 of the Regulations is replaced by the following:

3. The concentration of phosphorus in any household laundry detergent must not exceed 1.1% by weight expressed as phosphorus pentoxide or 0.5% by weight expressed as elemental phosphorus.

4. The concentration of phosphorus in any commercial or industrial laundry detergent must not exceed 5% by weight expressed as phosphorus pentoxide or 2.2% by weight expressed as elemental phosphorus.

HOUSEHOLD DISH-WASHING COMPOUNDS

5. The concentration of phosphorus in any household dish-washing compound must not exceed 1.1% by weight expressed as phosphorus pentoxide or 0.5% by weight expressed as elemental phosphorus.

HOUSEHOLD CLEANERS

6. The concentration of phosphorus in any household cleaner, other than a laundry detergent, dish-washing compound, metal cleaner or de-greasing compound, must not exceed 1.1% by weight expressed as phosphorus pentoxide or 0.5% by weight expressed as elemental phosphorus.

ACCREDITED LABORATORY

7. For the purposes of these Regulations, the concentration of phosphorus must be determined by a laboratory that is accredited under the International Organization for Standardization standard ISO/IEC 17025:2005, entitled *General requirements for the competence of testing and calibration laboratories*, as amended from time to time, and whose accreditation includes the analysis of phosphorus within its scope of testing.

RECORD KEEPING

8. (1) Every person who, during any year, manufactures for use or sale in Canada or imports any laundry detergent, household dish-washing compound or household cleaner within the meaning of section 6 containing phosphorus must maintain records containing the following:

(a) respecting the manufacture for use or sale

(i) the brand name of each laundry detergent, household dish-washing compound or household cleaner containing phosphorus,

(ii) the name and civic address of the principal place of business of the manufacturer,

(iii) the quantity of each of the cleaning products shipped from each manufacturing plant; and

(iv) the name and civic address of the recipient of each cleaning product that was shipped or sold;

(b) respecting the import

(i) the brand name of each laundry detergent, household dish-washing compound or household cleaner containing phosphorus,

(ii) the name and civic address of the principal place of business of the importer,

(iii) the port of entry where each cleaning product is imported,

(iv) the name and civic address of the sender of each cleaning product,

(v) the date of import,

(vi) the Harmonized Commodity Description and Coding System number for the cleaning product that is imported, and

(vii) the importer number for the shipment of the cleaning product that is imported.

(2) The records must be kept for a period of five years after the day on which the records are made, at the person's principal place of business in Canada or at any other place in Canada where they can be inspected. If the records are kept at any place other than the person's principal place of business, the person must provide the Minister with the civic address of the place where they are kept.

COMING INTO FORCE

4. These Regulations come into force on July 1, 2010.

**REGULATORY IMPACT
ANALYSIS STATEMENT**

(This statement is not part of the Regulations.)

Executive summary

Issue: The release of phosphorus into the environment resulting from the use of detergents and cleaners contributes to the over-fertilization of freshwater ecosystems, including the growth of harmful algae ([see footnote 2](#)) blooms that are proliferating in Canada's lakes and rivers.

Description: Canada's *Phosphorus Concentration Regulations* (the Regulations), which came into effect in 1989, include a concentration limit of 2.2% for laundry detergents. These *Regulations Amending the Phosphorus Concentration Regulations* (the Amendments) broaden the scope of the Regulations to include other detergents and cleaners, and lower the limits on permissible phosphorus concentrations. Specifically, these Amendments

- lower the phosphorus concentration limit for household laundry detergents from 2.2% to 0.5%;
- clarify that a phosphorus concentration limit of 2.2% still applies to commercial and industrial laundry detergents;
- introduce a phosphorus concentration limit for household dish-washing compounds of 0.5% (including hand dish-washing soap and automatic dish-washing detergent); and
- introduce a phosphorus concentration limit for household cleaners of 0.5%.

The Amendments will come into force on July 1, 2010.

Cost-benefit statement: The Amendments will decrease the release of phosphorus into the environment by an estimated 28 400 tonnes over 25 years. Benefits are expected to include reductions in phosphorus removal at wastewater treatment facilities, improvements in water quality in Canadian lakes and rivers, and reductions in human and environmental exposure to algae blooms. The Amendments will result in some additional costs to manufacturers. However, many industry stakeholders have expressed a willingness to meet the concentration limits and timelines. The present value of costs to Government for compliance promotion, enforcement activities and administration is estimated to be about \$205,000.

Business and consumer impacts: The Amendments are not expected to result in any additional administrative burden for regulatees. Regulatees will be required to maintain manufacturing and importation records in Canada; however, additional costs should be minimal, as records may already be kept in Canada for taxation purposes. In addition, records may be retained in electronic format and therefore physical storage and maintenance would be avoided. The Amendments may result in some increases in the price of dish-washing compounds; however, this impact is expected to be small, as most manufacturers have indicated a readiness to make the changes, and competitive pressures and innovation should ensure that prices remain close to baseline levels. The Amendments will increase consumer access to low-phosphorus detergents and cleaners.

Domestic and international coordination and cooperation: The Amendments align ([see footnote 3](#)) Canada's regulation of phosphorus in detergents and cleaners with similar requirements in many U.S. states, and set nationally consistent concentration limits, thereby supporting manufacturer access to regulated domestic and export markets.

Issue

Phosphorus is used in certain detergents and cleaners to soften water, reduce spotting and

rusting, keep dirt particles in suspension, and enhance surfactant performance. Phosphorus is also considered a key nutrient that, when present in excess, leads to the over-fertilization of freshwater ecosystems, including the growth of harmful algae blooms in Canada's lakes and rivers. The over-fertilization of freshwater ecosystems and the proliferation of algae blooms have become matters of concern for human health and the environment, as well as economic issues affecting governments and individual homeowners across Canada.

A full assessment of the risks associated with nutrients, including phosphorus, can be found at www.nwri.ca/issues/nr/impact-e.html.

Objectives

Canada's laundry detergent manufacturers and importers are subject to the provisions of the *Phosphorus Concentration Regulations*. The Regulations have not been updated since they came into effect in 1989. The objectives of the Amendments are to

- address the concerns of Canadians regarding harmful algae blooms and the role played by phosphorus in detergents and cleaners;
- through an approach based on pollution prevention, support the various actions that are currently being taken by municipalities, provincial and territorial governments and the federal government to address the issue of harmful algae blooms;
- respond to industry requests to create a level playing-field for manufacturers and importers of detergents and cleaners;
- provide nationally consistent concentration limits for manufacturers and importers;
- align Canada's regulations with those emerging among our major trading partners, in particular the United States; and
- reduce the need for consumers to evaluate phosphorus concentrations based on product labeling at the point of sale.

Description

The Amendments include provisions that will

- Lower the phosphorus concentration limit for household laundry detergents from 2.2% by weight of phosphorus to 0.5%, and clarify that a concentration limit of 2.2% still applies to commercial and industrial laundry detergents. ([see footnote 4](#))
- Introduce a limit on the concentration of phosphorus in household dish-washing compounds of 0.5% by weight. Dish-washing compounds include traditional hand dish-washing soap, and automatic dish-washing detergent.
- Introduce a limit on the concentration of phosphorus in household cleaners of 0.5% by weight. Household cleaners include general or all-purpose cleaners that are intended for household use, excluding laundry detergents and dish-washing compounds (which are subject to other limits), and metal cleaners and de-greasing compounds. Examples of other household cleaners include glass cleaners, floor cleaners, sink, tub and tile cleaners, carpet cleaners, disinfectants, waxes and polishes, scouring powders, spot removers, toilet bowl cleaners, and kitchen cleansers.

The Amendments also specify that, for the purposes of the Regulations, any analysis for the determination of the concentration of phosphorus shall be conducted by a laboratory accredited under the International Organization for Standardization standard ISO/IEC 17025:2005, and whose accreditation includes the analysis of phosphorus within its scope of testing.

Upon further consideration by Environment Canada, the Amendments no longer set out the methods that the Department will use to measure the concentration of phosphorus in regulated products. Also upon further consideration, record-keeping provisions have been modified such that manufacturers and importers must maintain manufacturing and importation records in Canada, instead of the records of analysis identified when the proposed Amendments were pre-published in the *Canada Gazette*, Part I.

The concentration limits, summarized in Table 1, will come into force on July 1, 2010.

Table 1: Summary of phosphorus concentration limits

	Prior to July 1, 2010	On/after July 1, 2010
Household laundry detergents	2.2%	0.5%
Commercial and industrial laundry detergents	2.2%	2.2%
Household dish-washing compounds	None	0.5%
Household cleaners	None	0.5%

Background and context

Releases of phosphorus into Canada's lakes and rivers can result in the over-fertilization of these water bodies, increased plant growth, and an overabundance of algae. Over-fertilized water bodies are characterized by increased water cloudiness, reduced aesthetic appeal and decreased recreational use. Highly over-fertilized systems tend to be predominated by algae that form dense, foul-smelling and noxious blooms, often as surface scums. Many species of algae produce potent toxins which can poison fish, avian waterfowl, terrestrial wildlife, livestock, pets and humans.

Algae blooms are a problem across Canada, and in particular where there is urban and/or recreational development in the vicinity of water bodies. Examples of regions where algae blooms and/or over-fertilization are serious issues include: Lake Simcoe in Ontario; Lake Winnipeg in Manitoba; the Bow River in Calgary, Alberta; Saskatchewan's Qu'Appelle River System; the Okanagan Basin and other water bodies in British Columbia; water bodies in Prince Edward Island; and the Province of Quebec. ([see footnote 5](#))

Releases of phosphorus into Canada's lakes and rivers originate from diffuse "non-point" sources, and from specific "point" sources. The largest non-point sources of phosphorus releases into Canada's lakes and rivers are believed to be mineral fertilizers and animal manure used for agriculture or other purposes, accounting for an estimated 82% of total phosphorus loadings in 1996 (see Table 2). The largest point sources are effluent and overflow from wastewater systems. Improperly designed or maintained on-site wastewater systems (e.g. septic systems) also release phosphorus into water bodies in rural Canada. Together, municipal wastewater, sewer and septic systems accounted for an estimated 14.3% of total phosphorus loadings in 1996 (see Table 2). In some areas, with large numbers of cottages, limited agricultural activity and no municipal wastewater treatment, releases from septic systems may be the largest single source of phosphorus loadings to nearby lakes and rivers.

Table 2: Main contributions to Canada's total phosphorus loadings 1996 ([see footnote 6](#))

	Phosphorus (tonnes)	Contribution to total
Municipal wastewater, sewers and septic systems	9.8	14.3%
Industry	2.0	2.9%
Agriculture	56.0	82.0%
Aquaculture	0.5	0.7%

As indicated in Table 3, laundry detergents, automatic dish-washing detergents and other household cleaners were responsible for approximately 11% of phosphorus loadings to wastewater in 1996. Given that more Canadian households now use dishwashers than in 1996 (there has been no significant change in the proportion of Canadian households using washing machines), it is expected that the contribution from these detergents to phosphorus loadings in municipal wastewater will be significantly higher in 2010, when the Amendments come into effect, than it was in 1996. It is also expected that releases from laundry detergents and other household cleaners are now less than in 1996, as most of these products have since moved to lower-phosphorus formulations.

Table 3: Phosphorus sources in Canadian municipal wastewater 1996 ([see footnote 7](#))

Source	Phosphorus Load (tonnes per year)	% of total
Human waste	18 952	53
Laundry detergents	165	<1
Automatic dish-washing detergents	2 520	7
Other household cleaners	1 188	3
Commercial and industrial sources	12 763	36
Total	35 588	

Many stakeholders, including Environment Canada, other federal government departments, provinces, territories, municipalities, individual farms, homeowners and cottagers, have roles to play to ensure that the algae bloom and over-fertilization problems are addressed and to ensure a cleaner, healthier environment. Contributing to improvements in non-point releases of phosphorus into Canada's lakes and rivers, Agriculture and Agri-Food Canada and the provinces have entered into a joint agreement, entitled *Growing Forward*, ([see footnote 8](#)) a successor to the Agricultural Policy Framework (APF). Through *Growing Forward*, research, technical and financial assistance support the adoption of beneficial management practices (BMPs) by agricultural producers and land managers. BMPs include many practices to reduce nutrient input to water. As of March 31, 2008, 44 000 BMPs had been implemented under the APF. In May 2008, Western provincial Premiers stressed the important role of the Federal government in protecting water resources, and urged the Federal government to take action to reduce phosphorus in products such as automatic dish-washing detergents. ([see footnote 9](#))

The Government of Canada is committed to taking action to reduce releases of pollutants to surface water, including from point sources like municipal wastewater treatment facilities. On September 26, 2007, the Minister of the Environment announced that the Government of Canada intends to regulate wastewater effluents under the *Fisheries Act*. On February 15, 2008, ([see footnote 10](#)) the Minister of the Environment announced that the Government of Canada would introduce regulations to further reduce the concentration of phosphorus in laundry detergents, and limit the amount found in dish-washing compounds and, as warranted, in other cleaners. The Amendments fulfill this commitment, and complement the aforementioned wastewater initiative by reducing the need for phosphorus removal at wastewater treatment facilities, and potentially reducing costs at these facilities.

In addition to policy guidance laid out in Canada's Federal Water Policy, ([see footnote 11](#)) the Amendments add to and complement the actions being taken in Canada at all levels of government to reduce the damage done by phosphorus and nitrogen nutrients in water environments. These actions include those outlined in the Federal Nutrients Agenda, ([see footnote 12](#)) *Growing Forward*, the National Programme of Action for the Protection of the Marine Environment from Land-Based Activities ([see footnote 13](#)) and the Canada-United States Great Lakes Water Quality Agreement. ([see footnote 14](#))

Sector profile

Canada imports, exports and manufactures both detergent ingredients and fully formed detergents. Canada's broad soap and cleaning compound manufacturing sector includes domestic manufacturers of laundry detergents, dish-washing compounds and other household cleaners to which the Amendments apply.

The domestic soap and cleaning compound manufacturing sector has been in a state of decline for several years, with the value of shipments decreasing by 23% between 1997 and 2006, and employment decreasing by 37%. During that period, exports increased by 55%, and imports increased by 76%. ([see footnote 15](#)) Environment Canada has identified 132 enterprises that are specifically involved in the manufacture or import of laundry detergents, dish-washing compounds and/or household cleaners. An estimated 76% of these enterprises are located in Ontario and Quebec, and as many as 89% are believed to be small and medium-sized enterprises (SMEs), having fewer than 500 employees and less than \$50 million in annual gross revenue.

Household, commercial and industrial laundry detergents

Since 1989, the Regulations have required that all household, commercial and industrial laundry detergents contain no more than 2.2% phosphorus by weight. Since the Regulations came into force, household laundry detergents in Canada have moved away from the use of phosphorus, with a significant proportion of household laundry detergents on the market today containing at most trace amounts. Major brands are manufactured by large multinational enterprises, although smaller enterprises also manufacture formulations that are marketed directly to consumers or under private labels. There are an estimated 40 enterprises manufacturing or importing household laundry detergent in Canada, of which 83% are located in Ontario and Quebec.

Household dish-washing compounds

When the Regulations were first introduced for laundry detergents, fewer households used dishwashers, and alternatives to phosphorus were not widely available or affordable for application in household automatic dish-washing detergents. In recent years, phosphorus alternatives have become available for automatic dish-washing detergents without a significant loss in performance, although there has been limited uptake by some manufacturers. Existing automatic dish-washing detergents typically contain concentrations of phosphorus less than or equal to 8.7% by weight. There are an estimated 42 enterprises manufacturing or importing household automatic dish-washing detergents in Canada, of which 83% are located in Ontario and Quebec. Large volumes are manufactured by multinational enterprises. However, as with other types of detergents, SMEs are engaged in the business through the import and manufacture of automatic dish-washing detergents and/or detergent ingredients for sale directly to consumers or through private labels.

Current formulations of hand dish-washing soap are not reported to contain phosphorus and, therefore, do not yield any releases of phosphorus into Canadian lakes and rivers at this time.

Other household cleaners

There are an estimated 113 enterprises manufacturing or importing other household cleaners in Canada, of which 79% are located in Ontario and Quebec.

In Spring 2008, Environment Canada tested over 200 products in Ontario retail stores, including products manufactured by SMEs and large enterprises. None of the products that are subject to the provisions of the Amendments were found to contain concentrations of phosphorus greater than 0.5%. Many household cleaners manufactured in or imported into Canada are manufactured by enterprises that also serve the U.S. market, where many states require that these products meet concentration limits not exceeding 0.5%.

Actions in other jurisdictions

United States of America

As of the Spring of 2008, at least 25 states had introduced or were in the process of introducing limits on the concentration of phosphorus in household laundry detergents, household dish-washing compounds, and/or other household cleaners. The Amendments align Canada's concentration limits for laundry detergents and household cleaners with the limits proposed or introduced in a majority of these states. For example, 10 U.S. states have introduced or proposed a 0.5% concentration limit for household automatic dish-washing detergents. The main U.S. industry association continues to advocate in favour of a common North American approach to the regulation of household automatic dish-washing detergent, based on a 0.5% concentration limit standard, the same limit included in the Amendments.

European Union

In the European Union, phosphorus discharges are addressed through reductions in phosphorus concentrations in laundry detergents and through wastewater treatment directives to reduce phosphorus releases into European lakes and rivers. This approach is broadly consistent with the two-pronged approach in Canada, in that both pollution prevention and initiatives to improve the treatment of wastewater are used to combat algae problems.

Regulatory and non-regulatory options considered

Several regulatory and non-regulatory measures were considered. These are discussed below.

Status quo

Under the status quo, it is expected that many manufacturers and importers would move voluntarily to the concentration limits that are set out in the Amendments, given movement in that direction by many U.S. states and the industry's expressed desire to have a consistent standard throughout North America. In Canada, Quebec and Manitoba have moved forward with provincial regulations. Under the status quo, some high-phosphorus formulations would likely still be available to consumers, and phosphorus loadings in Canadian lakes and rivers would therefore be higher than in a regulated scenario. In addition, there is a risk that different provinces would introduce different limits, resulting in a patchwork of regulations across Canada. In general, the status quo would not achieve the objectives stated above, and was therefore rejected.

Voluntary measure to reduce phosphorus concentration in detergents and cleaners

A voluntary measure was considered during the development of the Amendments. While it is true that industry representatives have indicated a willingness to move towards low-phosphorus automatic dish-washing detergent formulations, a voluntary measure is unlikely to result in full compliance with the standards set out in the Amendments, would not yield the desired reduction in phosphorus releases, would not create a level playing field in the manufacture of detergents, and would not create nationally consistent concentration limits.

Market-based instruments

Eco-taxation could be used as a means of reducing releases of phosphorus into Canada's wastewater systems, lakes and rivers. Taking into consideration that household expenditure on laundry detergents, automatic dish-washing detergents and other household cleaners is a very small proportion of total household spending; that consumer demand for detergents is expected to be unaffected by small tax-induced changes in prices; and that a tax on such a wide range of products would likely impose a significant increase in paper burden on SMEs and large enterprises alike, a tax was rejected as a tool for achieving the public policy objectives.

Tradeable permits have been used at a regional level in Canada and in other countries to reduce phosphorus levels in a single receiving environment (e.g. a watershed) by cost-effectively allocating reductions across a range of sources (farms, wastewater treatment facilities, etc). Since the objectives of the Amendments include addressing the water quality concerns of Canadians, there is a need to ensure that reductions in phosphorus releases occur across Canada. A Canadian tradeable permit scheme could result in high releases in one watershed and low releases in another, and would therefore not achieve this objective, nor would it contribute to the objectives pertaining to a level playing field and alignment with measures in other jurisdictions.

Regulatory measure to reduce phosphorus effluent from wastewater and septic systems

Many municipal wastewater facilities have the capacity to remove phosphorus as part of the wastewater treatment process, and some are required to meet specific standards of phosphorus discharge into lakes and rivers. [\(see footnote 16\)](#) Although further reductions in phosphorus releases from wastewater treatment facilities may be feasible, for some sources of phosphorus, like detergents and cleaners, it may be more cost-effective to achieve reductions in phosphorus input to these facilities. Such a measure would also not likely achieve significant reductions from thousands of existing septic systems, and would therefore not achieve the public policy objectives.

Regulatory measure to reduce phosphorus concentrations in detergents and cleaners

A regulatory measure to reduce phosphorus concentrations in detergents and cleaners applied at the point of manufacture and import provides a means of preventing pollution by reducing phosphorus releases from the use of detergents and cleaners to wastewater or septic systems, and into Canada's lakes and rivers. This regulatory approach favours a level playing field in the manufacture of detergents and cleaners, ensuring that those manufacturers willing to transition to low-phosphorus formulations are not disadvantaged by the continued availability of high-phosphorus alternatives. This regulatory approach can also provide nationally consistent concentration limits, ensuring that manufacturers can supply their products to Canadians from

coast to coast and in key export markets.

Benefits and costs

The Amendments will require reformulation of many automatic dish-washing detergents and, to a lesser extent, household laundry detergents and household cleaners manufactured in Canada. Products imported into Canada will also be required to meet the provisions of the Amendments.

As noted above, Quebec and Manitoba have introduced 0.5% phosphorus concentration limits for automatic dish-washing detergents that will come into force on July 1, 2010. During consultations, representatives of both provinces expressed support for the federal approach. As the federal and provincial measures are mutually supportive in these provinces, it is not possible to definitively attribute benefits and costs to either level of government. As a technical matter, for the purposes of the present analysis, these provincial initiatives are included in the baseline scenario. As a result, the household automatic dish-washing detergent provisions of the federal Amendments are assumed to have no incremental impact in these provinces.

The following sections summarize the costs and benefits associated with the incremental impacts of the Amendments.

Costs

The costs of the Amendments are expected to be borne by Canadian manufacturers. Some portion of the cost increases may be passed on to consumers through higher prices.

Detergent and cleaner manufacturers

Manufacturers and importers of regulated products are required to ensure that these products are compliant with the phosphorus concentration limits. For products that are currently non-compliant (mainly household automatic dish-washing detergents), manufacturers may incur one-time reformulation costs, as well as incremental recurring administrative and raw material costs. Importers will need to ensure that their suppliers are making the necessary changes to detergent and cleaner formulations to achieve the concentration limits. Feedback from some manufacturers indicates that reformulation costs for many products available to Canadian consumers will be incurred outside of Canada (e.g. in the United States). As well, given the anticipated availability of cost-effective phosphorus alternatives (e.g. zeolites), it is not expected that there will be a significant incremental impact on raw material costs.

Many manufacturers have expressed a willingness to move to household automatic dish-washing detergent formulations containing a maximum of 0.5% phosphorus by weight, and have indicated that alternatives are available to ensure that this move does not result in reduced performance. In the absence of quantified costs estimates, but given the existence of compliant products, the availability of alternatives to phosphorus, and the expected technological and economic feasibility of reformulation, this transition should be affordable for producers.

The Amendments are not expected to result in any additional administrative burden for regulatees. Regulatees will be required to maintain manufacturing and importation records in Canada to facilitate enforcement; however, additional costs should be minimal, as records may already be kept in Canada for taxation purposes. In addition, records may be retained in electronic format and therefore physical storage and maintenance would be avoided.

More than 95% of household laundry detergents currently available to Canadians contain at most trace amounts of phosphorus. Environment Canada expects that, for the negligible volume of detergent that is not currently compliant with the concentration limits, a transition to alternative formulations will be technologically and economically feasible. Most household cleaners currently available to Canadians contain less than 0.5% phosphorus by weight, and costs of compliance will therefore be negligible.

Given the current state of compliance of many laundry detergents and household cleaners, it is expected that the costs of the Amendments will largely result from transitions necessary to meet the concentration limits for household automatic dish-washing detergents. It is likely that most

enterprises will be able to make this transition, and Environment Canada expects that a transition to low-phosphorus formulations will also be achievable for most, if not all SMEs. To date, no concerns have been raised by SMEs with respect to the concentration limits.

Phosphorus manufacturers

Detergent uses of phosphorus account for a small portion of total demand for this mineral worldwide, with an estimated 10% of phosphorus used for detergents, ([see footnote 17](#)) and Canada is not a significant player in this market. Given that the market for phosphorus is a global market, and taking into account the expectation that the North American market for automatic dish-washing detergents is moving to align under a 0.5% concentration limit standard, the Amendments are expected to have a negligible incremental impact on the global and domestic markets for phosphorus.

Consumers

Impacts on consumers are expected to be limited to increases in the price of household dish-washing compounds should manufacturers “pass on” the compliance costs identified above. Manufacturers have already signaled a willingness to reformulate major detergent brands and it is expected that through the application of significant economies of scale to the manufacture of phosphorus alternatives and compliant formulations, price increases will be negligible.

It is not expected that there will be any significant impact on the price of household laundry detergents, hand dish-washing soaps, or household cleaners. Compliant products are already widely available, reformulation is expected to be technologically and economically feasible, and the markets for these products are generally competitive. Manufacturers should therefore have limited need or capacity to increase prices above those expected in the absence of the Amendments.

Government

Costs to government include the costs of compliance promotion and enforcement. Taking into account industry awareness of and support for the Amendments, and the relatively small expected size of the regulated community, it is expected that compliance promotion and enforcement activities would not involve significant costs.

Compliance promotion activities are intended to encourage the regulated community to achieve compliance. In fiscal year 2009–2010, compliance promotion is expected to include mailing out the amended Regulations, answering inquiries, developing and distributing promotional materials (e.g. a fact sheet, Web material) and organizing information sessions to explain the Regulations, with an estimated cost of \$30,000. In 2011, compliance promotion activities are expected to be limited to sending reminders, responding to and tracking inquiries, and contributing to the compliance promotion database, with an estimated cost of \$7,000. Compliance promotion is expected to remain at a maintenance level from 2012 to 2014, and will be limited to responding to and tracking inquiries and contributing to the compliance promotion database, with an annual cost of \$2,000. A higher level of effort for compliance promotion may be required if, following enforcement activities, compliance with the Regulations is found to be low. The discounted present value of these costs is estimated to be \$41,250. ([see footnote 18](#))

In the first five years after the Amendments come into force, enforcement activities will require an estimated undiscounted annual budget of \$23,950 for inspections (which includes operations and maintenance costs, transportation and sampling costs), \$14,330 for investigations and \$2,760 for measures to deal with alleged violations (including environmental protection compliance orders and injunctions). The discounted present value of these costs, between 2010–11 and 2014–15, is estimated to be \$163,860.

Benefits

The Amendments will help reduce phosphorus releases into Canadian lakes and rivers, and thus will contribute to improvements in environmental quality and human health. Although the extent of the benefit is not quantifiable, it is expected to be positive and significant.

Detergent and cleaner manufacturers and importers

The Amendments establish nationally consistent phosphorus concentration limits. This consistency will ensure that Canadian manufacturers and importers do not face different concentration limits across provinces, with resulting impacts on manufacturing costs (e.g. should manufacturers be required to manufacture different formulations of the same product for sale in different provinces).

Canadian wastewater treatment facilities

The Amendments will reduce the quantity of phosphorus released into municipal wastewater systems from household automatic dish-washing detergents by an estimated 56 300 tonnes between 2010 and 2035. (see footnote 19) Depending on the phosphorus removal efficiency of a given municipal wastewater treatment facility and standards for phosphorus content in facility effluent, this reduction in phosphorus loadings should reduce the quantity of phosphorus that needs to be removed from wastewater. Environment Canada estimates that the Amendments may decrease the amount of phosphorus to be removed by these facilities by 1 100 tonnes in 2011, with a total cumulative reduction of 36 300 tonnes over the 25-year period ending June 30, 2035.

The decrease in the amount of phosphorus to be removed is expected to result in a cost savings for these facilities. The magnitude of this benefit depends on a number of factors, including the size of a given treatment facility and the specific phosphorus removal processes used. Although the cost savings at a particular facility are uncertain, it is expected that the cumulative reduction in expenditure on phosphorus removal will be significant. This reduction in expenditure may be offset to some extent if manufacturers and importers of automatic dish-washing detergents transition to phosphorus alternatives that also contribute to the creation of sludge at wastewater treatment facilities, with associated removal costs. Nevertheless, it is expected that the Amendments will result in an overall net benefit to these facilities.

Environmental benefits

The reduction in phosphorus concentrations in detergents and cleaners will reduce the amount of phosphorus entering Canada's aquatic ecosystems relative to the baseline scenario. Phosphorus loadings from detergents and cleaners are a small proportion of total phosphorus loadings to the environment in some regions (about 1% of total loadings across Canada); however, this proportion will be higher where other sources of phosphorus (e.g. agriculture) are less significant contributors to phosphorus loadings.

The most advanced wastewater treatment technologies and processes available to Canadian municipalities still can not totally eliminate phosphorus releases to the environment. As a result, some phosphorus from detergents and cleaners will ultimately be released into Canada's lakes and rivers. With a 56 300 tonne reduction in phosphorus released into municipal wastewater systems over 25 years, it is expected that there will be a resulting reduction in releases of phosphorus from these systems into the environment. The magnitude of this reduction will depend on how phosphorus levels are managed at a given treatment facility. Environment Canada estimates that the cumulative reduction in releases to the environment may be as high as 20 000 tonnes by 2035.

For septic systems and lagoons, of the 6 600 tonne reduction in phosphorus releases into these systems, Environment Canada estimates that there will be a 3 300 tonne reduction in releases to the environment. There will be an additional reduction of 5 100 tonnes of phosphorus that are released directly into the environment from untreated wastewater. Environment Canada estimates that the Amendments will initially reduce total phosphorus releases from all sources by 900 tonnes in 2011, and cumulatively by 28 400 tonnes by 2035.

Through a range of actions in many areas — including the Amendments —, reductions in phosphorus loadings will result in improved water quality, improved aesthetics, increased recreational use potential, increased property values, and reduced risk of human exposure to algae blooms. The impact of the Amendments will be greatest where the contribution to total phosphorus loadings by wastewater and septic systems is high relative to other sources of phosphorus (e.g. agriculture), and in regions where wastewater facilities are less effective in removing phosphorus from wastewater. Environment Canada estimates that the benefits of the

Amendments will be more significant in Quebec, Atlantic Canada, British Columbia, and in the vicinity of cottages and non-agricultural rural communities across Canada.

Manufacturers of alternatives to phosphorus

There is no single substance that can fully replace phosphorus in detergents. Reformulations are therefore likely to include a number of different substances depending on the manufacturer's preference and the expected use of the detergent or cleaner. Some may be based on zeolite ([see footnote 20](#)) or other compounds, all of which have been implemented to some extent in existing formulations.

Manufacturers of these alternatives to phosphorus are expected to see increased demand for their products. Although some of this demand will be filled by imported substances, some Canadian firms, including SMEs, may benefit from the Amendments with increased sales.

Consumer awareness and human health

The Amendments complement other government actions to reduce human and environmental exposure to human-induced pollutants. Through the establishment of consistent, national concentration limits, the Amendments also ensure that consumers across Canada have access to low-phosphorus formulations, and by eliminating the presence of high-phosphorus detergents and cleaners on store shelves, will reduce the need for consumers to evaluate phosphorus concentrations based on product labelling at the point of sale.

Competitiveness

The Amendments will have no significant impact on the competitiveness of those products that are already compliant with the provisions of the Amendments.

The costs associated with reformulation and achieving compliance with the Amendments are not expected to be significant in general, and are not expected to result in a significant increase in prices. As a result, the Amendments are not expected to have a significant impact on the competitiveness of Canadian manufacturers.

The Amendments require that the increasing volume of imported products meet the amended concentration limits, thus maintaining the competitiveness of Canadian manufacturers in the domestic market. Several U.S. states have introduced or are in the process of introducing similar regulations with respect to automatic dish-washing detergents. Canada's Amendments with respect to automatic dish-washing detergents are aligned with this approach, ensuring that Canadian firms continue to have access to important export markets in the United States.

It is expected that the Amendments will level the playing field by requiring the small number of manufacturers and importers who may be unwilling to voluntarily make this transition to switch to low-phosphorus formulations as well.

Summary of expected incremental impacts

The cost of the Amendments will be distributed among manufacturers of household automatic dish-washing detergents. With 83% of these facilities located in Ontario and Quebec, any costs will disproportionately impact manufacturers in these provinces.

Any consumer impacts associated with higher automatic dish-washing detergent prices are expected to be distributed in proportion to population levels across Canada, and limited to dishwasher owners/users. As indicated above, the price impact is not expected to be high. Given that spending on automatic dish-washing detergents is a small portion of total consumer spending, any price change is unlikely to have a significant impact on Canadians in the long-run.

Manufacturers will benefit from consistent, national concentration limits, limits that will be aligned with those in many U.S. states. As well, the Amendments will create a level playing field, ensuring that high-phosphorus formulations are not competing with low-phosphorus formulations.

Municipal wastewater treatment facilities will benefit from the Amendments to the extent that preventing phosphorus from entering wastewater decreases the cost of wastewater treatment. These benefits will ultimately accrue to municipalities, with greater benefits to those municipalities with more costly treatment processes. Environmental and human health benefits will be greatest where wastewater treatment is limited or septic systems are used, and where other sources of phosphorus loadings are less significant.

These impacts are summarized in the cost-benefit statement in Table 4.

Table 4: Cost-benefit statement

A. Quantified costs (present value \$)		
	Government — compliance promotion	\$41,250
	Government — enforcement	\$163,860
	Total quantified costs	\$205,110
B. Quantified environmental benefits (cumulative #)		
	Reduction in phosphorus releases from municipal wastewater treatment facilities (over 25 years)	20 000 tonnes
	Reduction in phosphorus releases from septic systems (over 25 years)	3 300 tonnes
	Total reduction in phosphorus releases to the environment (including 5,100 from untreated municipal wastewater) (over 25 years)	28 400 tonnes
C. Qualitative benefits and costs		
Benefits		
	Nationally consistent concentration limits	
	Reduced expenditure on phosphorus removal at wastewater treatment facilities	
	Reduced incidence of toxic algae blooms	
	Improved human and environmental health	
	Increased consumer awareness	
Costs		
	Manufacturer reformulation costs	
	Municipal wastewater treatment facility non-phosphorus sludge removal costs	

Rationale

The Amendments are the most cost-effective method to reduce phosphorus releases from the regulated products into Canadian wastewater and septic systems, and into the Canadian environment. As indicated above, Canadians have expressed concerns with respect to the proliferation of harmful algae blooms in Canada's lakes and rivers. The Amendments complement other existing and planned actions that respond to these concerns. The Amendments also respond to competitiveness concerns communicated by industry through the creation of a level playing-field for manufacturers and importers of detergents and cleaners, the provision of nationally consistent concentration limits, and the alignment of Canada's concentration limits with those emerging in the United States. Overall, it is expected that the Amendments will result in a net benefit to Canadians.

Environment Canada consulted with provinces and territories, European and U.S. federal and state government agencies, and carried out research to ascertain the scope and nature of phosphorus limitations in detergents and cleaners in Europe and the U.S. As indicated in the

description of actions in other jurisdictions, two provinces and many U.S. states have passed or proposed to pass laws to limit the concentration of phosphorus in detergents and cleaners. The Amendments are therefore consistent with actions in the provinces and in many U.S. states.

Consultation

On February 16, 2008, Environment Canada published in the *Canada Gazette*, Part I, for a 60-day public comment period, a Notice of Intent communicating the government's intention to develop the proposed Amendments. Provincial and territorial governments and Aboriginal communities had the opportunity to comment on the Notice of intent, which contained elements of the proposed Amendments, through the CEPA National Advisory Committee. Environment Canada also consulted directly with Agriculture and Agri-Food Canada, and Health Canada.

During the 60-day comment period, the industry (SMEs and large enterprises), two industry associations, one non-governmental organization, and one provincial government provided comment on the Notice of Intent. There was broad support among these stakeholders for the proposed concentration limits for household laundry detergent, household dish-washing compounds, and other household cleaners.

On March 26, 2008, a consultation session with representatives from industry, government, non-governmental organizations and cottage owners was held to facilitate and encourage further stakeholder comment on the Notice of Intent and the proposed phosphorus concentration limits. At the session, there was broad support for the concentration limits proposed for household applications of laundry detergents, dish-washing compounds and other household cleaners.

Specific stakeholder comments and concerns raised during the comment period and the consultation session, as well as Environment Canada's responses, are provided below.

- An environmental non-governmental organization called for a January 2009 implementation date, given the benefits of reduced phosphorus releases to Canada's lakes and rivers.

Environment Canada considered this option but proposed an implementation date of July 1, 2010, to take into consideration the need expressed by manufacturers for sufficient time for the repackaging and reformulation of safe and effective products, and to align the proposed Amendments with timelines in many U.S. states. In addition, for some SMEs, the proposed implementation schedule will help to ensure that the transition to low-phosphorus formulations is not cost prohibitive.

- An industry association requested that the proposed Amendments apply to end use product formulations (following dilution by the consumer) and not to products sold in concentrated forms, given the benefits of reduced packaging associated with the use of concentrated products.

Environment Canada recognizes the benefits of marketing products in concentrated forms to reduce packaging volume and transportation costs. The proposed concentration limits, however, apply to all products including those sold in concentrated forms for dilution by the consumer. Environment Canada was unaware of any concentrated products available to Canadian consumers that exceeded the proposed regulatory limits. In the event that concentrated products are developed that would require a higher limit, the department would consider an appropriate course of action at that time to balance the environmental benefits of reduced phosphorus releases with the benefits of reduced packaging and transportation costs.

- Industry stakeholders expressed concerns with respect to possible record keeping, testing and reporting provisions under consideration prior to pre-publication.

Environment Canada took these comments into consideration and determined that there would be negligible benefit associated with detailed testing or reporting provisions, and potentially high associated costs. The proposed Amendments therefore did not require manufacturers and importers to conduct any testing. However, the proposed Amendments required that, where testing is done in the normal course of business, regulatees would be required to retain these records. Upon further consideration by Environment Canada, the

Amendments have been modified such that manufacturers and importers must maintain manufacturing and importation records in Canada, instead of the records of analysis identified in the proposed Amendments. The proposed Amendments also indicated which test methodologies would be used by Environment Canada enforcement officers to measure the concentration of phosphorus in regulated products and verify compliance with the Regulations. Upon further consideration by Environment Canada, this section has been removed from the Amendments, to allow the choice of test method that is best suited to the product under inspection.

- Some stakeholders expressed the view that the definition of cleaners should be clarified to show clearly that household cleaners would be regulated but that industrial cleaners would not.

Environment Canada agreed, and clarified the definition in the proposed Amendments.

- Some stakeholders indicated that the labelling of phosphorus content should be a requirement for all detergents and cleaners.

It was determined that Division 1 of Part 7 of the *Canadian Environmental Protection Act, 2009*, (CEPA 1999), under which the regulations are made, is not suited for this type of requirement. Environment Canada therefore did not introduce any labelling requirements.

Comments received following pre-publication of the proposed Amendments in the *Canada Gazette*, Part I, on June 28, 2008.

The proposed Amendments were pre-published in the *Canada Gazette*, Part I, for a 60-day public comment period. During that period, comments were received from two industry associations and four enterprises. The comments received, and Environment Canada responses, are provided below.

- A request was made to extend the implementation date from July 1, 2010 to July 1, 2011, or to provide a sell-through period of one year. A sell-through period would provide additional time, after the implementation date, for the sale of non-compliant products manufactured or imported prior to the implementation date.

Environment Canada has indicated that the implementation date is intended to align with similar existing and proposed legislation in many U.S. jurisdictions, and to correspond with an industry-led initiative to limit phosphorus to 0.5% in automatic dish-washing detergents by July 1, 2010. This date is expected to provide sufficient time for the reformulation and repackaging of products.

The Amendments do not include a sell-through period. The provisions of the Amendments do not apply to sale or offer-for-sale, and in the absence of such a prohibition, a sell-through period is not necessary.

- Some stakeholders reiterated that concentration limits should apply to end use product formulations (following dilution by the consumer) and not to products sold in concentrated forms.

As indicated above, Environment Canada recognizes the benefits of marketing products in concentrated forms, to reduce packaging volume and transportation costs, but remains unaware of any existing or planned concentrated products that would exceed the proposed concentration limits. The concentration limits therefore apply to all products, including those sold in concentrated forms for dilution by the consumer. As indicated above, in the event that concentrated products are developed that require a higher limit, Environment Canada would consider an appropriate course of action at that time.

- Some stakeholders indicated that the Regulations should apply only to household cleaners that go “down the drain.”

Section 117 of CEPA 1999 is restricted to prohibiting the manufacture for use or sale in Canada or import of a cleaning product that contains a prescribed nutrient in a concentration

greater than the permissible concentration prescribed for that product. Consequently, the Amendments do not address issues related to product handling or intended disposal.

- Stakeholders stressed the importance of a clear definition of household cleaners, and supported the proposed exclusion for metal cleaners and de-greasing compounds as a means to ensure that certain specialty products are not subject to the provisions of the amended Regulations.

Environment Canada intends to provide further clarity through a guidance document that will assist regulatees in determining what products are considered household cleaners.

- One stakeholder asked that the Government of Canada examine other major contributors to the formation of harmful algae blooms.

Environment Canada re-emphasizes that the Government of Canada is working in many areas to address the contribution of nutrient loading to the formation of harmful algae blooms, including from wastewater and agriculture, as indicated in the background and context section above.

- One stakeholder requested that no restrictions be placed on the country in which records must be maintained.

Environment Canada enforcement officers have powers under CEPA 1999, and in order for them to use them, record-keeping in Canada is considered a minimal enforcement requirement in all regulations under the Act, including the *Phosphorus Concentration Regulations*.

Implementation, enforcement and service standards

Specific actions prior to the coming-into force date will include mailing the Regulations to prospective regulatees, answering inquiries, developing and distributing promotional materials and, as necessary, organizing information sessions to explain the amended Regulations. Follow-up compliance promotion, in the following years, will include sending reminders, responding to and tracking inquiries, and contributing to the compliance promotion database.

Once the Amendments have come into force, Environment Canada will also begin to enforce the amended Regulations. Enforcement activities are expected to involve Environment Canada enforcement officers conducting inspections, which may include sampling and testing of regulated products, investigations of alleged violations and, where necessary, dealing with alleged violations with enforcement measures — including issuing warnings, environmental protection compliance orders, or injunctions.

Enforcement officers will, when verifying compliance with the Regulations, apply the Compliance and Enforcement Policy for CEPA 1999. The policy sets out the range of possible responses to alleged violations, which include: warnings, directions, environmental protection compliance orders, ticketing, ministerial orders, injunctions, prosecution, and environmental protection alternative measures (which are an alternative to a court trial after the laying of charges for a CEPA 1999 violation). The policy also explains when Environment Canada will resort to civil suits by the Crown for costs recovery.

When, following an inspection or an investigation, an enforcement officer discovers an alleged violation, the officer will choose the appropriate enforcement action based on the following factors:

- *Nature of the alleged violation*: This includes consideration of the damage, the intent of the alleged violator, whether it is a repeat violation, and whether an attempt has been made to conceal information or otherwise subvert the objectives and requirements of the Act.
- *Effectiveness in achieving the desired result with the alleged violator*: The desired result is compliance within the shortest possible time and with no further repetition of the violation. Factors to be considered include the alleged violator's history of compliance with the Act, willingness to cooperate with enforcement officers, and evidence of corrective action already taken.
- *Consistency*: Enforcement officers will consider how similar situations have been handled in

determining the measures to be taken to enforce the Act.

Environment Canada will monitor phosphorus concentrations and compliance with the Amendments, and review the control measure as necessary to determine whether further actions would be required to achieve additional phosphorus reductions.

Implementation, compliance promotion and enforcement activities will be resourced under existing resource capacity and allocated accordingly within the existing departmental reference level.

Performance measurement and evaluation

The Amendments expand the scope of the Regulations to include a more stringent concentration limit for household laundry detergents and new limits for household dish-washing compounds and household cleaners. The Amendments set legally binding and nationally consistent concentration limits, thereby facilitating manufacturer access to provincial markets and export markets in the United States, ensuring widespread consumer access to low-phosphorus detergents and cleaners everywhere in Canada and reducing releases of phosphorus into Canada's wastewater and septic systems, and ultimately into the environment.

The Regulations will help achieve a reduction in phosphorus releases into Canada's wastewater and septic systems by reducing substantially the concentrations of phosphorus in household laundry detergents, household dish-washing compounds and household cleaners.

Direct measurement of the impact of the Regulations on the environment is challenging, due to the loadings of phosphorus from multiple natural and man-made sources, illustrated in tables 2 and 3 above. However, through its enforcement activities, Environment Canada will be in a position to evaluate compliance with the Regulations through the extent that concentrations of phosphorus in laundry detergents, dish-washing compounds and other household cleaners have been reduced to the concentration limits specified in the Regulations. Reporting of the incidence of non-compliance by enforcement officers between 2010 and 2015 is expected to provide indicators of this achievement, and Environment Canada may use these indicators to pursue further action as appropriate.

The amended *Phosphorus Concentration Regulations* will be administered by Environment Canada's Chemicals Sector within the context of the chemical management program's risk assessment and risk management activities that are undertaken to address harmful chemicals in Canada. Limitations on the concentration of phosphorus in laundry detergents, dish-washing compounds and other household cleaners fall clearly within the activities in the program to address harmful effects of chemicals on the environment and human health. As such, the Regulations will be evaluated as part of the program evaluation for risk management of chemicals under the chemicals management program. This initial review is scheduled to be completed in 2010–2011. Follow-up evaluations will be scheduled as per the department's evaluation planning cycle. A Performance Measurement Evaluation Plan for the Chemicals Management Plan will be in place by mid-2009.

The progress, performance and overall effectiveness of individual regulatory initiatives under the chemicals management program will be reported on through the annual report for CEPA 1999 and Departmental Performance Reports.

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[Footnote a](#)

S.C. 2004, c. 15, s. 31

[Footnote b](#)

S.C. 1999, c. 33

[Footnote c](#)

S.C. 1999, c. 33

[Footnote 1](#)

SOR/89-501

[Footnote 2](#)

This term refers to cyanobacteria, also known as blue-green algae. Some species contain toxins that are known to attack the liver (hepatotoxins) or the nervous system (neurotoxins); others irritate the skin.

[Footnote 3](#)

The limits are the same as existing and proposed limits in many U.S. states, enabling continued Canadian export access to these important markets.

[Footnote 4](#)

Prior to these Amendments, the Regulations included a concentration limit of 2.2% for all laundry detergents, with no distinction between household laundry detergents and those for commercial and industrial use.

[Footnote 5](#)

An estimated 259 freshwater lakes in Quebec were reported to be affected by algae blooms in 2007. Source: gouvernement du Québec, ministère du Développement durable, de l'Environnement et des Parcs, www.mddep.gouv.qc.ca/eau/algues-bv/milieux_affectes/index.asp, April 2008.

[Footnote 6](#)

Nutrients and Their Impact on the Canadian Environment. Table 3.2. www.nwri.ca/nutrients-nutritifs/tables/table3_2-e.html

[Footnote 7](#)

Nutrients and Their Impact on the Canadian Environment. Table 3.2. www.nwri.ca/nutrients-nutritifs/tables/table3_2-e.html

[Footnote 8](#)

www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1238606407452&lang=eng and www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1238606407452&lang=fra

[Footnote 9](#)

2008 Western Premiers' Conference, Press release, May 2008.
www.scics.gc.ca/cinfo08/850111005_e.html

[Footnote 10](#)

Environment Canada, News release, "Government takes action to ensure clean water for Canadians: Phosphates in detergents to be heavily restricted," February 15, 2008

[Footnote 11](#)

Environment Canada. Federal Water Policy: Specific Policy Statements: 2. Water Quality Management. Page 13. www.ec.gc.ca/water/en/info/pubs/fedpol/e_fedpol.pdf

[Footnote 12](#)

Environment Canada. Federal Nutrient Agenda. www.npa-pan.ca/en/issues_nutrients.cfm

[Footnote 13](#)

Environment Canada. Canada's National Programme of Action for the Protection of the Marine Environment from Land-Based Activities. www.npa-pan.ca/en/about.cfm

[Footnote 14](#)

Environment Canada. Great Lakes Water Quality Agreement. www.on.ec.gc.ca/greatlakes/default.asp?lang=En&n=FD65DFE5-1

[Footnote 15](#)

Industry Canada, Strategis

[Footnote 16](#)

E.g. The City of Ottawa Sewer Use By-law limit for total phosphorus is 10 mg/l. www.ottawa.ca/residents/waterwaste/sewer_use/discharge/sanitary_sewers_en.html

[Footnote 17](#)

Köhler, Dr. Jonathan, "Detergent phosphates and detergent ecotaxes: a policy assessment", March 2001.

[Footnote 18](#)

Discounted estimates use a discount rate of 8%.

[Footnote 19](#)

Estimated over a 25-year period from July 1, 2010 to June 30, 2035.

[Footnote 20](#)

Zeolite is an inert, insoluble alumino-silicate. While natural zeolite can be mined, synthetic zeolite is typically used for detergents due to the high purity and potential for reformulation.

NOTICE:

The format of the electronic version of this issue of the *Canada Gazette* was modified in order to be compatible with extensible hypertext markup language (XHTML 1.0 Strict).

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