

Defending Nature Against Rodenticides

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I. INTRODUCTION: RATS, RODENTICIDES, AND RIGHTS OF NATURE

The Norway (brown) rat and the Roof (black) rat thrive in urban environments where an abundance of food and shelter is available, incidental to human development. They have earned global notoriety for gnawing through building structures and feeding on crops and stored foods. Their resourcefulness, rapid proliferation and disease-carrying potential have caused serious problems for residential, commercial and agricultural property owners. It is estimated that rats cost the United States \$19 billion a year in damage to food products.¹ Despite our current understanding of rats as intelligent,² highly social³ and empathetic⁴ animals, the dominant approach to managing them does not reflect an appreciation for their sentience and resilience. Rather, pest management strategies designed to decimate these animals have been widely justified and encouraged in an effort to protect Canadian property rights and human health.

Anticoagulant rodenticides (ARs) are the most commonly used form of rodent control worldwide.⁵ When ingested, these poisons cause internal bleeding by reducing the production of blood clotting agents.⁶ First-generation anticoagulant rodenticides (FGARs) require the rodent to consume several portions of the bait to receive a lethal dose. As some populations developed a resistance to FGARs, second-generation anticoagulant rodenticides (SGARs) were introduced in

¹ Pimentel, D., Lach, L., Zuniga, R. and Morrison, D. 2000. Environmental and Economic Costs of Non-indigenous Species in the United States. *BioScience* 50:53-65.

² Davis, H. (1996). Underestimating the rat's intelligence. *Cognitive brain research*, 3(3-4), 291-298.

³ Ben-Ami Bartal, I., Rodgers, D. A., Bernardes Sarria, M. S., Decety, J., & Mason, P. (2014). Pro-social behavior in rats is modulated by social experience. *eLife*, 3, e01385; Makowska, I. J., & Weary, D. M. (2013). Assessing the emotions of laboratory rats. *Applied Animal Behaviour Science*, 148(1-2), 1-12.

⁴ Sivaselvachandran, S., Acland, E. L., Abdallah, S., & Martin, L. J. (2018). Behavioral and mechanistic insight into rodent empathy. *Neuroscience & Biobehavioral Reviews*, 91, 130-137.

⁵ Hindmarch, S., Elliott, J. E., & Morzillo, A. (2018). Rats! What triggers us to control for rodents? Rodenticide user survey in British Columbia, Canada. *International Journal of Environmental Studies*, 75(6), 1011-1030 [Hindmarch, Rats!].

⁶ Nico W. van den Brink et al, "Foreword" in *Anticoagulant Rodenticides and Wildlife*, [ed] (Cham, Springer, 2018).

the 1970s and have since become the predominantly used rodenticide.⁷ SGARs are highly toxic: rodents can receive a lethal dose of SGARs in a single feeding.

Symptoms of SGAR poisoning can take days to appear, and rodents can survive for four to 13 days after ingesting a lethal dose.⁸ The delayed onset of symptoms, combined with their recognition of the bait as a food source, permits the poisoned rat to continue feeding at the bait stations for days leading up to their death. SGARs are highly bioaccumulative and can persist in the liver for weeks to months after ingestion.⁹ By the time the rat finally dies, it is possible that it has accumulated poison far exceeding the lethal dose.¹⁰ A weak, poisoned rat serves as easy prey,¹¹ which can give rise to the secondary poisoning of predators such as owls and other raptors who consume the rodent.

The legislative framework in Canada mandates the active control of rodents for human health and safety reasons, but its application fails to adequately address the unique risks posed by SGARs. For decades, studies have demonstrated that the widespread use of these chemicals has adverse effects on native wildlife species and the wider ecosystem.¹² Furthermore, there is apparently no data to indicate that SGAR baiting is the most effective method of controlling rat populations long-term.¹³ Instead, research suggests that SGARs facilitate the rebound of rat

⁷ Hindmarch, Rats!, *supra* note 5.

⁸ Hindmarch, S. & Elliott, J. E., “Ecological Factors Driving Uptake of Anticoagulant Rodenticides in Predators” in Nico W. van den Brink et al (eds), *Anticoagulant Rodenticides and Wildlife*, [ed] (Cham, Springer, 2018) [Hindmarch & Elliot, Ecological Factors].

⁹ *Ibid.*

¹⁰ Rats have been shown to ingest nine to 46 times the lethal dose before their deaths. See US, Environmental Protection Agency, *Risks of non-compliant rodenticides to nontarget wildlife. Background paper for scientific advisory panel on notice of intent to cancel non-RMD compliant rodenticide products* (Office of Chemical Safety and Pollution Prevention; Office of Pesticides Programs; Environmental Fate and Effect Division, 2011); Hindmarch & Elliot, Ecological Factors, *supra* note 8.

¹¹ *Ibid.*

¹² Between 1998 and 2015, various raptor species had over 60% had traces of anticoagulant rodenticides in their bodies. See Nakayama, S. M., Morita, A., Ikenaka, Y., Mizukawa, H., & Ishizuka, M. (2018). A review: poisoning by anticoagulant rodenticides in non-target animals globally. *Journal of Veterinary Medical Science*, 17-0717.

¹³ Hindmarch, Rats!, *supra* note 5.

populations,¹⁴ and that a comprehensive, multi-pronged approach involving environmental modification may be better suited to managing these resilient pests.¹⁵

This report will demonstrate that the permitted use of SGARs is inconsistent with the self-imposed obligations owed by the Canadian government to protect its citizens and the environment. Though “rights of nature”¹⁶ are not explicitly recognized in Canadian law,¹⁷ this report will argue that the values foundational to recognizing such rights can be found in the existing legislation, and the governments’ failure to fulfill its obligations is due in part to its refusal to acknowledge such rights exist.

It is time for the Province of British Columbia to adopt a more ambitious approach to recognizing and protecting nature and its inhabitants. With hundreds of cases of poisoning of non-target animals each year, wildlife organizations have been urging members of the public to stop hiring pest management companies that use rat poisons.¹⁸ Legal action is required to reflect our current appreciation for natural ecosystems and understanding of how SGARs are adversely impacting them. Through examination of the risks SGARs pose to wildlife, the environment, and the interests of present and future generations, the current report will generate recommendations

¹⁴ Andrews, Richard V., "Should We Kill The Rats Or Is Biological Control Preferable?" (1977). *Transactions of the Nebraska Academy of Sciences and Affiliated Societies*, 448 [Andrews, Should we kill rats?].

¹⁵ Himsworth, C. G., Feng, A. Y., Parsons, K., Kerr, T., & Patrick, D. M. (2013). Using experiential knowledge to understand urban rat ecology: a survey of Canadian pest control professionals. *Urban Ecosystems*, 16(2), 341-350 [Himsworth, Experiential knowledge]; Feng, A. Y., & Himsworth, C. G. (2014). The secret life of the city rat: a review of the ecology of urban Norway and black rats (*Rattus norvegicus* and *Rattus rattus*). *Urban Ecosystems*, 17(1), 149-162.

¹⁶ “Rights of nature” refer to the rights of non-human species, elements of the natural environment and...inanimate objects to a continued existence unthreatened by human activities.” See David Boyd, *The Rights of Nature, A Legal Revolution That Could Save The World* (Toronto: ECW Press, 2017) at 137 [Boyd, “Rights of Nature”].

¹⁷ Boyd, “Rights of Nature”, *supra* note 16 at xix.

¹⁸ Raptors are the Solution, online: < <https://www.raptorsarethesolution.org/>>; BarnOwlsBC, online: <<http://www.barnowlsbc.ca/raptor-rodenticide-project.html>>; OWLRehab, online: <<https://www.owlrehab.org/dangers/rat-poison/>>.

that aim to reduce the direct and indirect poisoning of wildlife by restricting the use of second-generation anticoagulant rodenticides in British Columbia.

Part II of this report provides an overview of the current regulatory framework for pesticides in Canada, and rodenticides in particular, at the three levels of government. Part III examines the practical effects of the legislation, evidencing the harms associated with SGAR use and inefficacy of these products to illustrate the dubious value of their registration. Further, the inadequacy of the current risk mitigation measures and existence of alternative methods of rodent control are discussed to support the argument that the use of SGARs is inconsistent with the regulatory framework outlined in the former section. Part IV recommends action that can be taken at the municipal, provincial and federal levels of government to address this inconsistency, and also provides examples of similar action taken in other jurisdictions. Potential challenges to implementing the recommended measures are also discussed. Part V closes the report with some concluding remarks.

II. THE LEGAL FRAMEWORK FOR PESTICIDE REGULATION IN CANADA

Under the *Constitution Act*,¹⁹ jurisdiction over the environment and public health is not explicitly defined as being exclusive to either the provincial or federal government. As such, the power to regulate pesticides has come to be shared between the two levels of government.²⁰

¹⁹ *Constitution Act*, 1867, c 11.

²⁰ The provincial government has jurisdiction over all matters concerning property and civil rights, as well as over matters of local or private nature, see *Constitution Act, ibid*, s 92(13),92(16). The federal government has jurisdiction over public/federally owned property, and residual powers that have come to include other environmental subject matters, such as water pollution. See *Constitution Act, ibid*, s 91(1A), and see also Penny Becklumb, *Federal and Provincial Jurisdiction to Regulate Environmental Issues Background Paper*, Economics, Resources and International Affairs Division Publication No. 2013-86-E, 2013.

A. Federal Regulations

Under the *Pest Control Products Act*²¹ (PCPA), Health Canada sets the standards for the regulation of pest control products in Canada. The Pest Management Regulatory Agency (PMRA) is the branch of Health Canada that administers the PCPA and Regulations.²²

The PMRA's mandate is to protect the health of Canadians and the environment against unacceptable risks from the use of pesticides.²³ In furtherance of this objective, the PMRA is obligated to afford consideration and protection to future generations, and encourage the development of sustainable pest management strategies²⁴ in a manner consistent with the precautionary principle.²⁵ The PMRA's main responsibilities include registering pest control products for manufacture, sale and use in Canada, re-evaluating pesticides currently on the market, and promoting sustainable pest management strategies.

To refine and strengthen pesticide regulations, the PMRA works with the provincial/territorial governments and other federal departments,²⁶ as well as foreign and international organizations including the United States Environmental Protection Agency.²⁷

²¹ "Minister" refers to the Minister of Health. See *Pest Control Products Act*, SC 2004, c 28 ["PCPA"], s 2(1).

²² *Pest Control Products Regulations*, SOR/2006-124 ["PCPR"].

²³ PCPA, *supra* note 21, s 4(1).

²⁴ *Ibid*, s 4(2).

²⁵ "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent adverse health impact or environmental degradation." See PCPA, *supra* note 21, s 20(2).

²⁶ The Federal, Provincial, Territorial (FPT) Committee on Pest Management and Pesticides was established to provide advice and direction to the two levels of government on programs, policies and issues to coordinate pest management programs across jurisdictions. The British Columbia Ministry of Agriculture and Ministry of Environment are members of the FPT Committee. See Health Canada, *Pesticides in Canada: Federal, Provincial, Territorial* (modified 08 December 2015), online: *Government of Canada* <<https://www.canada.ca/en/health-canada/services/consumer-product-safety/pesticides-pest-management/public/federal-provincial-territorial.html>>.

²⁷ Other international organizations the PMRA works with includes the North American Free Trade Agreement Technical Working Group on Pesticides, the Organization for Economic Co-operation and Development Programme on Pesticides and Sustainable Pest Management, Codex Committee on Pesticide Residue and the United Nations Environment Programme. Health Canada, "Pesticides and pest management: Frequently asked questions" (modified

Pesticides must be registered under the PCPA before they can be manufactured, possessed, handled, stored, imported, distributed, or used in Canada.²⁸ Companies must apply to the PMRA with all information relevant to evaluating their product's potential value²⁹ and health or environmental risks included in their applications.³⁰ The PMRA then conducts a scientific-based evaluation of the product's risks and efficacy controlling the pest it was designed for.³¹ Products can only be registered if they make a useful contribution to pest management,³² and if the risks are acceptable.³³ In evaluating the acceptability of the risks, the PMRA considers whether there is reasonable certainty that no harm to human health, future generations or the environment will result from exposure to or use of the product, and whether any possible adverse impacts on health or the environment can be prevented through proposed conditions of registration.³⁴

Pesticides are designated to one of four classes.³⁵ Domestic class products are the only pesticides that may be distributed to the general public for personal use in or around homes. Commercial class products are restricted to use in commercial activities, as specified on the label. Restricted class products may only be used by qualified persons, strictly adhering to the

15 February 2019), online: <<https://www.canada.ca/en/health-canada/services/consumer-product-safety/pesticides-pest-management/frequently-asked-questions.html>>.

²⁸ PCPA *supra* note 21, s 6(1).

²⁹ The PCPA defines the "value" of a pest control products as the product's actual or potential contribution to pest management, taking into account its conditions or proposed conditions of registration, and includes the products (a) efficacy; (b) effect on host organisms in connection with which it is intended to be used; and (c) health, safety and environmental benefits and social and economic impact. See *ibid*, s 2(1).

³⁰ PCPR, *supra* note 22, s 8.

³¹ PCPA, *supra* note 21, s 7(7).

³² Canada, Health Canada, *Information Note: The New Pest Control Products Act* (Ottawa: Health Canada, 28 June 2006), online: <canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/pesticides-pest-management/fact-sheets-other-resources/new-pest-control-products-act.html>.

³³ PCPA, *supra* note 21, s 8(1).

³⁴ *Ibid*, s 2(2).

³⁵ Classes provide who may use the products, and under what conditions they may be used. See PCPR, *supra* note 22, s 5.

conditions provided on the label. Manufacturing class products may only be used in the manufacture of pest control products.

Once the product is registered, the PMRA is responsible for monitoring and enforcing compliance with the rules and conditions.³⁶ Companies must also apply to renew the registration of their product every five years.³⁷

The registered active ingredients are required to be re-evaluated on 15-year cycles to ensure that they continue to satisfy the current scientific health and environmental protection standards.³⁸ The PMRA may also initiate a special review of an active ingredient if there are reasonable grounds to believe that the health or environmental risks of the product are, or its value is, unacceptable.³⁹ Consistent with the precautionary principle as set out in the PCPA,⁴⁰ full scientific certainty is not required to amend or cancel the registration of a product where there is reasonable grounds to believe such action is required to deal with a threat to human health or safety, or the environment.⁴¹

1. Developments in Federal Regulation of Rodenticides

In March 2006, upon re-evaluating the AR active ingredients brodifacoum, bromadiolone, chlorophacinone, diphacinone and warfarin,⁴² the PMRA determined that these products were acceptable for continued registration, despite acknowledging evidence of anticoagulant exposure

³⁶ PCPA, *supra* note 21, s 48.

³⁷ PCPR, *supra* note 22, s 16(1).

³⁸ PCPA, *supra* note 21, s 16(2).

³⁹ *Ibid*, s 17(1).

⁴⁰ *Ibid*, s 20(2).

⁴¹ *Ibid*, s 20(1)(b).

⁴² Brodifacoum and bromadiolone are SGARs and chlorophacinone, diphacinone and warfarin are FGARs.

and secondary non-target effects among wildlife.⁴³ In an effort to protect children, pets, the environment and people who work with these products, the PMRA added new labelling directions as risk mitigation measures.⁴⁴

On November 1, 2010, the PMRA published a Re-evaluation Note setting out additional risk mitigation measures required for rodenticides containing any of eight active ingredients.⁴⁵ At the time of publication, the available data on incidents involving children, pets and non-target wildlife to rodenticides in Canada was “insufficient to adequately assess” accidental exposure to these vulnerable groups. Therefore, in making its decisions and developing its risk mitigation strategies, the PMRA relied on the US EPA’s evaluation in its *Risk Mitigation Decision for Ten Rodenticides*⁴⁶ on the basis that the US EPA’s observations and assessments were considered to be representative of the situation in Canada. Of the eight rodenticides, the SGARs brodifacoum and difethialone were identified to pose the greatest secondary risk to predators and scavengers and as such are now restricted to indoor use. The SGAR bromadiolone is still permitted for use outdoors. Further, domestic class products containing SGARs are prohibited.⁴⁷

In response to persistent concerns regarding the adverse impacts exposure to SGARs has on children and other non-target species, the PMRA imposed new restrictions on commercial

⁴³ Canada, Pest Management Regulatory Agency, *Re-Evaluation Decision Document on brodifacoum, bromadiolone, chlorophacinone, diphacinone and warfarin* (Ottawa: Alternative Strategies and Regulatory Affairs Division, PMRA, 2006).

⁴⁴ *Ibid.*

⁴⁵ The eight rodenticides requiring additional mitigation measures were brodifacoum, bromadiolone, bromethalin, chlorophacinone, difethialone, diphacinone, warfarin or zinc phosphide. See Canada, Pest Management Regulatory Agency, *Risk mitigation measures for eight rodenticides* (Ottawa: Health Canada Pest Management Regulatory Agency, 2010) [Health Canada, “Risk mitigation measures”].

⁴⁶ The US EPA found that SGARs pose greater risks to non-target wildlife than FGARs due to their high toxicity and long persistence in body tissues, warranting stricter regulations. United States, Environmental Protection Agency, *Risk Mitigation Decision for Ten Rodenticides* (Washington, DC: *Office of Prevention, Pesticides, and Toxic Substances*, 2008) at 7.

⁴⁷ Health Canada, “Risk mitigation measures”, *supra* note 45 at 7.

class rodenticides in agricultural settings in 2013.⁴⁸ The major change was the requirement that baits be either contained in tamper-resistant bait stations or in locations children, pets, livestock and non-target wildlife cannot access. Outdoor bait stations also acquired placement requirements⁴⁹ to prevent SGARs from contaminating the wider ecosystem. Additional labelling requirements were also added.⁵⁰

A. Provincial Regulation

Provinces and territories may further restrict or prohibit the use, sale, storage, transportation and disposal of registered pesticides in their jurisdictions through the enactment of regulations, as long as they are consistent with and no less protective than the federal legislation.⁵¹ British Columbia's *Integrated Pest Management (IPM) Act*⁵² and Regulation⁵³ set out the requirements for the use and sale of pest control products in the province. Like the federal legislation, the IPM Act dictates that a person must not "use, handle, release, transport, store, dispose of or sell a pesticide in a manner that causes or is likely to cause an unreasonable adverse effect."⁵⁴ Integrated pest management is a proactive and preventative approach to managing

⁴⁸ Canada, Pest Management Regulatory Agency, *New Use Restrictions for Commercial Class Rodenticides in Agricultural Settings* (10 May 2012), online: <<https://www.canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/pesticides-pest-management/fact-sheets-other-resources/rodenticides-agricultural-settings.html>> [PMRA, New Restrictions].

⁴⁹ Outdoor bait stations must be placed within 15 meters of buildings/structures, or less than 100 meters from buildings/structures if placed along fence line. See *ibid.*

⁵⁰ All bait stations containing domestic class rodenticides must be labelled "WARNING POISON," accompanied by the skull and crossbones symbol. See Health Canada, "Risk mitigation measures", *supra* note 45.

⁵¹ Canada, Health Canada, *Pesticides and Health* (Ottawa: Minister of Health Canada, 2007), online: <https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/contaminants/pesticides-eng.pdf>.

⁵² *Integrated Pest Management Act*, SBC 2003, c 58 [IPM Act].

⁵³ *Integrated Pest Management Regulation*, BC Reg 604/2004 [IPM Regulation].

⁵⁴ *Ibid*, s 3(1)(a).

pests and involves a range of elements, such as the suppression of populations using strategies based on considerations of environmental and human health protection.⁵⁵

The Ministry of Environment has power to make regulations under the IPM Act.⁵⁶ Appointed under the *Public Service Act*,⁵⁷ the Administrator of the IPM Act⁵⁸ also has the power to establish and enforce regulations, and make decisions regarding the issuing or amending of licenses, certificates or permits to pesticide product users or distributors.⁵⁹ Decisions made by the Minister or Administrator may be appealed to the Environmental Appeal Board.⁶⁰

Pesticides are provincially regulated through a classification scheme that establishes licensing, certification, permit and ministry oversight requirements for distributors and users of pesticide products. In addition to the domestic, commercial and restricted pesticide classes set out in the federal PMRA, the IPM Regulation establishes a permit-restricted pesticide class and an excluded pesticide class.⁶¹ Permit-restricted pesticides are the most strictly controlled, requiring a permit for purchase or application of these products.⁶² Excluded pesticides do not require a license, certificate, permit or confirmation from the administrator⁶³ because the Administrator has determined that there will not be an increased risk of unreasonable adverse effects from the use of the product.⁶⁴

⁵⁵ IPM Act, *supra* note 52, s 1.

⁵⁶ British Columbia, Ministry of Environment, *Integrated Pest Management Act and Regulation: Summary* (February 2016), s 1.2.

⁵⁷ RSBC 1996, c 385.

⁵⁸ IPM Act, *supra* note 52, s 9(1); The current Administrator is the Director of Environmental Standards – Clean Air, Integrated Pest Management and Industry.

⁵⁹ *Ibid*, s 9.

⁶⁰ *Ibid*, s 14(3).

⁶¹ IPM Regulation, *supra* note 53, s 2.

⁶² *Ibid*, s 2(a).

⁶³ IPM Act, *supra* note 52, s 7(3). The Administrator must confirm receipt of a new or amended pesticide use notice if satisfied that the notice complies with s 7(2), the applicant meets the prescribed criteria and the applicant is not subject to any restrictions under s 15(4).

⁶⁴ IPM Regulation, *supra* note 53, s 2(e).

Since domestic class rodenticide products are prohibited from containing SGARs under the federal legislation, SGARs fall under the category of commercial class products.⁶⁵ Licenses are required for people who sell or offer to sell a non-excluded pesticide, use a pesticide for a prescribed use, or provide or offer any service respecting pesticides.⁶⁶ A “prescribed use” requiring a license includes the management of pests of structures and pests of goods on public lands.⁶⁷ The Regulation sets out the preliminary required actions a licensee must complete in accordance with integrated pest management principles before they use pesticide products.⁶⁸ Some of the requirements include: identifying and implementing reasonable measures to prevent pests; monitoring to determine the population and location of pests; and selecting treatment methods considering practical alternatives to pesticide use and the protection of human health and the environment.⁶⁹ When they are needed, pesticides must be used in a manner that minimizes hazards to human health and the environment.⁷⁰

The Regulation sets out specific use requirements in relation to rodenticide use. Rodenticide bait must be deployed in rigid, walled containers fastened down or in an area inaccessible to people and domestic pets.⁷¹ Consistent with the federal legislation, bait stations must be labelled with the appropriate information in accordance with the Regulation.⁷² If the bait

⁶⁵ Anticoagulant rodenticides are not included in the list of permit-restricted pesticides in Schedule 1 or the excluded class in Schedule 2. However, corn cellulose is a non-anticoagulant rodenticide that falls under the category of excluded pesticides. See *ibid*, s 43(1) and (2).

⁶⁶ There are three categories of licenses. A pesticide vendor license is required to sell pesticides, and to purchase pesticides for the purpose of reselling. A pesticide user service license is required for a person or company that provides services for fee. A pesticide user non-service license is required for a person using a pesticide on their own land, or if their employees use a pesticide on their land. See IPM Act, *supra* note 52, s 44(2), (3) and (4).

⁶⁷ IPM Regulation, *supra* note 53, s 5(1)(h). Rodents are considered “structural pests.”

⁶⁸ *Ibid*, s 32(a).

⁶⁹ *Ibid*, s 68(1)(a), (c), (e).

⁷⁰ *Ibid*, s 33(3)(a).

⁷¹ IPM Regulation, *supra* note 53, s 81(1).

⁷² The label on the bait container must include the word and/or symbol for “poison,” the contact name and phone number of the licensee, and the active ingredient and PCP number. See *ibid*, s 81(2).

is deployed in higher-risk areas set out in the Regulation, the rodenticide must contain a bittering agent and be removed from the treatment area and destroyed when the program is complete.⁷³ A pesticide dispenser or pesticide applicator certificate is required by anyone who sells a commercial pesticide, performs the use or supervises the use of a pesticide for the holder of a license.⁷⁴

C. Municipal Role

Provinces and territories may grant municipalities in their jurisdiction the authority to further regulate the use of pest control products.⁷⁵ Under its *Community Charter* Regulation, British Columbia explicitly denies its local governments the power to create by-laws pertaining to pesticides for the management of pests that transmit human disease or impact agriculture.⁷⁶

While unable to regulate rodenticides, municipalities such as North Vancouver and Coquitlam have enacted bylaws that prohibit residents and businesses from permitting conditions on their property that provide shelter and food for rodents or vectors,⁷⁷ pursuant to their power to regulate in relation to public health under the *Community Charter*.⁷⁸ In its own regional parks, Metro Vancouver claims to have stopped using rodenticides, and have reverted to snap traps or

⁷³ Rodenticide used in living accommodations, areas of multi-residence buildings or properties children have access to, or any other facilities frequented or likely to be frequented by children must contain a bittering agent. See *ibid*, s 81(3)(4).

⁷⁴ IPM Regulation, *supra* note 53, s 50(2), (3) and (4).

⁷⁵ Provinces and territories may grant local governments may enact bylaws to regulate the use, but not sale, of pesticide products. See *114957 Canada Tee (Spraytech, Societe d'arrosage) v Hudson (Town)*, [2001] 2 SCR 241, 2001 SCC 40 (CanLII) [*Spraytech v Hudson*].

⁷⁶ A municipality may not exercise authority to regulate, prohibit and impose requirements in relation to pesticides for the management of pests that transmit human diseases or impact agriculture or forestry. See *Spheres of Concurrent Jurisdiction - Environment and Wildlife Regulation*, BC Reg 235/2008, s 2(2)(a).

⁷⁷ District of North Vancouver, By-law No. 5899, *Rodent Control Bylaw, 1988* (09 May 1988) and City of Coquitlam, By-law No. 4284-2012, *Vector Control Bylaw* (23 April 2012).

⁷⁸ *Community Charter*, S.B.C. 2003, c. 26, s 8(3)(i) [*"Community Charter"*].

electrocution traps.⁷⁹ The Vancouver Park Board has also begun asking restaurants located in city parks to implement similar changes.⁸⁰ These actions encourage but do not require the use of alternative methods be prioritized over chemical rodenticides.

III. THE USE OF SECOND-GENERATION ANTICOAGULANT RODENTICIDES IS INCONSISTENT WITH THE CURRENT REGULATORY FRAMEWORK

It is foremost relevant to acknowledge that rats pose problems to humans that arguably necessitate pest management strategies. Rats are among the most pervasive, resilient and destructive pests in the world, costing nations millions of dollars each year in food production losses.⁸¹ Furthermore, as Norway rats are invasive to North America, there is concern that they pose a threat to native wildlife through predation, disease transfer and competition for resources.⁸²

However, human health implications are less clear. The common belief that rats were responsible for the Black Death epidemic has given rise to their stigma as a dangerous, disease-carrying vermin.⁸³ While they do have the potential to carry and spread zoonotic diseases, wild

⁷⁹ Larry Pynn, “Vancouver park board moves to end use of rodenticides” (31 May 2018), online: *The Vancouver Sun* <<https://vancouversun.com/news/local-news/vancouver-park-board-moves-to-end-use-of-rodenticides>>.

⁸⁰ *Ibid.*

⁸¹ The United Nations reported in 1982 that rats destroyed an estimated \$30 billion worth of food worldwide. See Almeida, A., Corrigan, R., & Sarno, R. (2013). The economic impact of commensal rodents on small businesses in Manhattan’s Chinatown: trends and possible causes. *Suburban Sustainability*, 1(1), 2; Stenseth, N. C., Leirs, H., Skonhøft, A., Davis, S. A., Pech, R. P., Andreassen, H. P., ... & Zhang, Z. (2003). Mice, rats, and people: the bio-economics of agricultural rodent pests. *Frontiers in Ecology and the Environment*, 1(7), 367-375.

⁸² Banks, P. B., & Smith, H. M. (2015). The ecological impacts of commensal species: black rats, *Rattus rattus*, at the urban–bushland interface. *Wildlife Research*, 42(2), 86-97.

⁸³ There is little support for the proposition that rats were the predominant means of spreading the plague through Europe. More recently, studies have asserted that human ectoparasites were more likely responsible for the rapid spread of the disease. See Dean, K. R., Krauer, F., Walløe, L., Lingjærde, O. C., Bramanti, B., Stenseth, N. C., & Schmid, B. V. (2018). Human ectoparasites and the spread of plague in Europe during the Second Pandemic. *Proceedings of the National Academy of Sciences*, 115(6), 1304-1309.

rats have been rarely studied, and consequently, there are significant gaps in our knowledge of the actual health risks they pose to humans.⁸⁴

While potential threats to human health, property and ecosystems legitimate the implementation of effective pest management strategies, the current approach to managing rats fails to adequately address the problem. Canada's pest management industry is currently valued at \$400 million⁸⁵ but nevertheless relies on short-term solutions in the form of dispersing toxic chemicals into the environment. In British Columbia alone, brodifacoum sales have increased by 36 percent and bromadiolone sales have increased by 136 percent between 2003 and 2010, with a total of 148 kilograms of rodenticide active ingredient sold in 2010.⁸⁶ While this may not seem like a significant amount, for context, most rodenticides are formulated at less than 0.01 percent active ingredient,⁸⁷ given their high toxicity.

The following section will demonstrate that the severe ecological disruption and serious threats to the health of Canadians caused by the use of SGARs is inconsistent with the governments' obligations under the PCPA and IPM Act to its people and the environment.

A. There is Reasonable Certainty that Harm Results from SGAR Use

The PCPA explicitly acknowledges that the goals of sustainable pest management are to meet the existing society's needs for health protection, and to conserve or enhance the quality of

⁸⁴ Kaylee Byers, "Rat race! How pest control can backfire" (23 October 2019), Medium, online: <<https://medium.com/ubcscience/rats-d423f7f53ae8>>.

⁸⁵ Melissa Shaw, "BC SPCA launches world's first pest control accreditation program" (21 March 2018), online: <<https://www.richmond-news.com/news/bc-sPCA-launches-world-s-first-pest-control-accreditation-program-1.23209133>>.

⁸⁶ Wins-Purdy, A. (2013). 2010 Pesticide Sales in British Columbia. Integrated Pest Management Program, British Columbia Ministry of Environment.

⁸⁷ *Ibid.*

the environment for future generations in an economically viable manner.⁸⁸ Reasonable certainty that no unmitigable harms to human health, future generations or the environment is required to justify the registration of pest control products.⁸⁹ It follows that since a wide range of registered products contain SGAR active ingredients, these compounds should not pose any unacceptable risks.

1. Risks to Nature: Wildlife and the Environment

i. Direct poisoning of non-target primary consumers

SGARs pose risks of direct poisoning to non-target species that ingest these chemicals because SGARs are designed to be acutely lethal to small mammals, but are not selective to rats.⁹⁰ Despite the effort to reduce non-target species poisoning by requiring SGAR products to be contained in tamper-proof bait stations,⁹¹ traces of SGARs have been found in a wide range of species, including small mammals, birds, and invertebrates. This is not surprising, since bait stations are designed to accommodate and attract the hefty Norway rat:⁹² any non-target animals that feed on grain-based, meat-based, vegetable or fruit baits,⁹³ and are of the same size or smaller, may also readily enter and access the bait. In 2018, the District of North Vancouver conducted an investigation into the use of rodenticide bait traps and determined that the amount

⁸⁸ PCPA, *supra* note 21, preamble.

⁸⁹ *Ibid.*, s 2(2).

⁹⁰ US, EPA, *Potential risks of nine rodenticides to birds and non-target mammals: a comparative approach* (Washington, DC: Office of Prevention, Pesticides and Toxic Substances, 2004) [US EPA, “Nine rodenticides”]

⁹¹ PMRA, New Restrictions, *supra* note 48.

⁹² Norway rats are described as having thick, heavy bodies, averaging 280-480g. See: City of Vancouver, “Identify rats and mice” (accessed 05 November 2019), online: <<https://vancouver.ca/home-property-development/identify-rats-and-mice.aspx>>.

⁹³ Shore R.F., Coeurdassier M. (2018) Primary Exposure and Effects in Non-target Animals. In: van den Brink N., Elliott J., Shore R., Rattner B. (eds) Anticoagulant Rodenticides and Wildlife. *Emerging Topics in Ecotoxicology* (Principles, Approaches and Perspectives), vol 5. Springer, Cham.

of rodenticides being placed in the environment is not being monitored, and that the baits are more often frequented by non-target animals.⁹⁴

Small non-target mammals, such as field mice, shrews and voles, feed directly on baits containing SGARs.⁹⁵ Mammals comparably sized to the target species also only require a single feeding of SGAR product to receive a lethal dose,⁹⁶ and thus may also accumulate significant levels of SGARs in their livers before they die. Small herbivorous and granivorous birds are also able to access the bait within the stations, and songbirds have demonstrated a willingness to enter bait stations and feed on bait blocks.⁹⁷

ii. Indirect poisoning of secondary consumer predator and scavenger species

Many of British Columbia's treasured native and endangered species face serious risks of indirect poisoning once SGARs contaminate the food-chain. Rodents, small birds and invertebrates are primary food sources for a wide range of predators and scavengers in British Columbia, including raptors, crows, raccoons, coyotes, weasels and snakes.⁹⁸ The highly toxic, persistent, bioaccumulative nature of SGARs makes them particularly dangerous to secondary consumers, especially where the prey animal has ingested several SGAR doses. Though the

⁹⁴ Skunks, raccoons, mice, squirrels and insects were observed to access the bait traps. See District of North Vancouver, "Information Report to Council," (29 October 2019).

⁹⁵ Elliott, J. E., Hindmarch, S., Albert, C. A., Emery, J., Mineau, P., & Maisonneuve, F. (2014). Exposure pathways of anticoagulant rodenticides to nontarget wildlife. *Environmental monitoring and Assessment*, 186(2), 895-906 [Elliott, Exposure Pathways]; Shore R.F., Coeurdassier M. (2018) Primary Exposure and Effects in Non-target Animals. In: van den Brink N., Elliott J., Shore R., Rattner B. (eds) *Anticoagulant Rodenticides and Wildlife. Emerging Topics in Ecotoxicology (Principles, Approaches and Perspectives)*, vol 5. Springer, Cham; Sánchez-Barbudo, I. S., Camarero, P. R., & Mateo, R. (2012). Primary and secondary poisoning by anticoagulant rodenticides of non-target animals in Spain. *Science of the Total Environment*, 420, 280-288.

⁹⁶ US EPA, "Nine rodenticides", *supra* note 90.

⁹⁷ Elliott, Exposure Pathways, *supra* note 95.

⁹⁸ WildSafeBC, "Rats", (accessed 2019), online: <<https://wildsafebc.com/rats/>>; Howald, G. R. (1997). The risk of non-target species poisoning from brodifacoum used to eradicate rats from Langara Island, British Columbia, Canada (published master's thesis). The University of British Columbia, Vancouver, Canada.

consumption of single poisoned rodent may not be enough to directly kill a larger predator, the persistence and accumulation of SGARs in the predator's liver can give rise to deadly consequences.

Owls and other birds of prey are at a disproportionately high risk of secondary poisoning because of their dependence on rodents as a food source. A study investigating the diets of urban barred owls in British Columbia found Norway and black rats are their primary prey (54.5%), followed by field voles and deer mice.⁹⁹

Between 1988 and 2003, 70% of dead owls from British Columbia and the Yukon region of Western Canada had residues of at least one rodenticide in their livers, and 41% had at least two.¹⁰⁰ While only six of the 164 owls were suspected to have died directly from poisoning, SGARs were believed to have indirectly contributed to a greater proportion of deaths. The high levels of SGAR residue in owls that died of trauma (e.g., collisions with vehicles, windows, etc.) and undetermined causes point to the possibility that behavioral changes (e.g., lethargy¹⁰¹) resulting from poisoning may have contributed to the resulting lethal accidents.

Another study estimates that a minimum of 11% of the sampled great horned owl population across Canada was at risk of being directly killed by SGAR poisoning,¹⁰² though this

⁹⁹ Hindmarch, S., & Elliott, J. E. (2015). When owls go to town: The diet of urban barred owls. *Journal of Raptor Research*, 49(1), 66-75.

¹⁰⁰ 164 owls were examined, and SGARs brodifacoum and bromadiolone were the most common detected. See Albert, C. A., Wilson, L. K., Mineau, P., Trudeau, S., & Elliott, J. E. (2010). Anticoagulant rodenticides in three owl species from western Canada, 1988–2003. *Archives of Environmental Contamination and Toxicology*, 58(2), 451-459.

¹⁰¹ Owls suffering from AR poisoning have been observed to become lethargic approximately 24 hours before death. See Mendenhall, V. M., & Pank, L. F. (1980). Secondary poisoning of owls by anticoagulant rodenticides. *Wildlife Society Bulletin*, 311-315.

¹⁰² Thomas, P. J., Mineau, P., Shore, R. F., Champoux, L., Martin, P. A., Wilson, L. K., ... & Elliott, J. E. (2011). Second generation anticoagulant rodenticides in predatory birds: probabilistic characterisation of toxic liver concentrations and implications for predatory bird populations in Canada. *Environment International*, 37(5), 914-920.

may be an under-estimation, given that proportion of poisoned owls likely die out of sight. Further, the number of young, dependent raptors who die when their parents are killed directly or indirectly by SGARs are not accounted for in the estimate.

Of the scavengers examined, common ravens were identified as the most significant scavenger of Norway rat carcasses, placing them at an extreme risk of secondary poisoning.¹⁰³

Though there is less data on the impact of rodenticides on other predators and scavengers in British Columbia, other jurisdictions have identified 29 mammalian and 11 avian threatened or endangered species that are potentially at risk of AR exposure.¹⁰⁴ In the United States, the most commonly reported avian species are great horned owls and red-tailed hawks, and mammalian species include coyotes, foxes, raccoons, bobcats, skunks, mountain lions and weasels.¹⁰⁵

Wildlife care and conservation organizations are well-aware of the serious threats that SGARs create for predatory wildlife species. With the number of owls dying of poisoning in British Columbia rapidly escalating over the recent years,¹⁰⁶ these organizations have been working hard to bring these concerns to the public's attention to encourage the adoption of

¹⁰³ Howald, G. R. (1997). The risk of non-target species poisoning from brodifacoum used to eradicate rats from Langara Island, British Columbia, Canada (published master's thesis). The University of British Columbia, Vancouver, Canada.

¹⁰⁴ US EPA, "Nine rodenticides", *supra* note 90.

¹⁰⁵ *Ibid.*

¹⁰⁶ Slepian, Katya, "Twice as many owls dying from rat poison: B.C. government", *The Abbotsford News* (12 March 2018), online: <<https://www.abbbynews.com/news/double-the-b-c-owls-are-dying-from-rat-poison-agriculture-ministry/>>.

alternative means of rodent control.¹⁰⁷ The killing of barn owls is of particular concern because of their status as threatened/endangered under the *Species at Risk Act*.¹⁰⁸

The increasing number of owls in urban city regions¹⁰⁹ means an increase in natural rodent control; however, the continued use of rodenticides poses a lethal threat to these emigrating owls. The B.C. Orphaned Wildlife Rehabilitation Centre (“OWL”)¹¹⁰ reported a recent spike in rodenticide cases they encountered in 2017.¹¹¹ 46 of the injured raptors taken in between January to October 2018 had signs of rodenticides in their systems.¹¹²

iii. Poisoning of the environment

SGARs can infiltrate the food web through various routes of exposure. For instance, the bromadiolone that earthworms uptake from soil can bioaccumulate and give rise to secondary poisoning for the wide range of species than feed on earthworms.¹¹³ AR residue has also been detected in other invertebrate species who come into contact with the bait directly, including slugs and carrion beetles.¹¹⁴

¹⁰⁷ CBC News, “Bird rescue centre raises concerns about rat poison”, *CBC News* (29 December 2017), online: <<https://www.cbc.ca/news/canada/british-columbia/birds-poison-1.4468165>>; Strandberg, Diane, “Rat poisoning suspected in Coquitlam owl death”, *Tri-City News* (09 January 2019), online: <<https://www.tricitynews.com/news/rat-poisoning-suspected-in-coquitlam-owl-death-1.23587925>>; BarnOwlsBC is a resource site for barn owl conservation, run by Sofi Hindmarch. See BarnOwlsBC, online: <<http://www.barnowlsbc.ca/>>.

¹⁰⁸ *Species at Risk Act*, SC 2002, c 29, Schedule 1 [“SARA”].

¹⁰⁹ Larry Pynn, “Barred owl invasion results in 150 of the raptors taken to rehab facility” (19 March 2018), online: *The Vancouver Sun* <<https://vancouver.sun.com/news/local-news/barred-owl-invasion-results-in-150-of-the-raptors-taken-to-rehab-facility>>.

¹¹⁰ OWL Orphaned Wildlife website, online: <<https://www.owlrehab.org/>>.

¹¹¹ OWL, “OWL Newsletter, Fall/Winter 2017 Ed.” (2018), online: <<https://www.owlrehab.org/newsletter-vol-2/>>.

¹¹² OWL, “OWL Newsletter, Fall/Winter 2018 Ed.” (2019), online: <<https://www.owlrehab.org/newsletter-vol-4/>>.

¹¹³ Liu, J., Xiong, K., Ye, X., Zhang, J., Yang, Y., & Ji, L. (2015). Toxicity and bioaccumulation of bromadiolone to earthworm *Eisenia fetida*. *Chemosphere*, 135, 250-256.

¹¹⁴ Elliott, Exposure Pathways, *supra* note 95.

A study investigating the environmental distribution of SGARs following aerial application of brodifacoum bait detected brodifacoum residues were in 84.3% of the carcasses collected, representing 15 species of birds, fish, reptiles and invertebrates.¹¹⁵ Results suggested that brodifacoum residues could reach many parts of terrestrial and marine food webs within one-month.

When poisoned rats die and are not consumed by predators or scavengers, their decomposing carcasses can give rise to contamination of the environment. ARs have been found in the aquatic food web, and research suggests that these toxins may be entering the aquatic environment through municipal sewer systems, or when poisoned carcasses enter bodies of water.¹¹⁶

2. Risks to Present and Future Canadians

i. Threats Human Health and Domestic Pets

British Columbians are growing increasingly concerned about the detrimental impacts the use of rodenticides are having on local wildlife populations,¹¹⁷ but also about the risks these poisons pose to children and domestic pets.¹¹⁸ These concerns are legitimate: in the United States, the American Association of Poison Control Centers annually receives around 12,000 to

¹¹⁵ Pitt, W. C., Berentsen, A. R., Shiels, A. B., Volker, S. F., Eisemann, J. D., Wegmann, A. S., & Howald, G. R. (2015). Non-target species mortality and the measurement of brodifacoum rodenticide residues after a rat (*Rattus rattus*) eradication on Palmyra Atoll, tropical Pacific. *Biological Conservation*, 185, 36-46.

¹¹⁶ Julia Regnery et al, "Rating the risks of anticoagulant rodenticides in the aquatic environment: a review," *Environmental Chemistry Letter* (2019) Switzerland Springer Nature.

¹¹⁷ Sandor Gyarmati, "Delta won't outlaw rat poison despite calls from naturalists" (22 April 2019), online: *Delta Optimist* <<https://www.delta-optimist.com/news/delta-won-t-outlaw-rat-poison-despite-calls-from-naturalists-1.23798268>>; Brent Richter, "Owls fall prey to poison in North Van" (20 December 2017), online: *North Shore News* <<https://www.nsnews.com/news/owls-fall-prey-to-poison-in-north-van-1.23127211>>.

¹¹⁸ Nina Grossman, "Metchosin mom pleads for the end of rat poison use after cat dies" (25 July 2019), online: *Victoria News* <<https://www.vicnews.com/news/metchosin-mom-pleads-for-the-end-of-rat-poison-use-after-cat-dies/>>.

15,000 reports of rodenticide exposures in children under six years of age. Reporting in Canada is considerably poor compared to that in the United States. As such, the 140 incidents involving rodenticides reported to Health Canada between April 2007 and May 2012 grossly underrepresent the issue.¹¹⁹ In British Columbia alone, there have been a total of 30 incidents of SGAR (brodifacoum, bromadiolone and difethialone) poisoning involving domestic animals (22) and humans (8) submitted to Health Canada.¹²⁰

Primary or secondary SGAR poisoning can put pets at risk of internal bleeding, and sometimes death.¹²¹ Many of the poisons ingested by pets had been contained in bait boxes, suggesting that the poisons were either able to be accessed by the pets themselves, or had been spread outside of the boxes by primary consumers.¹²² As natural rodent predators, cats are at a high risk of coming into contact with rodenticides, as poisoned rats make easy prey. There have also been incidents of dogs destroying bait boxes and consuming the poisons inside.¹²³ Given that the rodenticides are intended to be palatable for their target species, pets will also be inclined to consume these toxic products.

¹¹⁹ Canada, Health Canada, *Questions and Answers - Additional Mitigation Measures for Rodenticides*, (Ottawa: Health Canada, 2012), online: <<https://www.canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/pesticides-pest-management/fact-sheets-other-resources/rodenticides-agricultural-settings/questions-answers.html>>.

¹²⁰ Note that the database relies on self-reporting. See Canada, Health Canada, *Pesticide Product Information Database*, (accessed 15 October 2019), online: <<https://pesticide-registry.canada.ca/en/incident-report-search.html>>.

¹²¹ Merola, V. (2002). Anticoagulant rodenticides: deadly for pests, dangerous for pets. *Veterinary Medicine-bonner Springs Then Edwardsville*, 97(10), 716-727.

¹²² Aaron Hinks, "Owl found dead after eating rat poison leaves B.C. woman concerned" (16 December 2017), online: *Goldstream News Gazette* <<https://www.revelstokereview.com/news/owl-found-dead-after-eating-rat-poison-leaves-b-c-woman-concerned/amp/>>.

¹²³ A dog destroyed a bait station that had been placed by a pest control operator and ingested the bait. See Health Canada, Incident report 2018-0496 (Pesticide Product Information Database, 2018), online: <<https://pesticide-registry.canada.ca/en/incident-report-details.html?q=2018-0496>>.

ii. Harm to Future Generations

The PCPA sets out that one of the goals of sustainable pest management is to conserve or enhance the quality of the environment for future generations in an economically viable manner.¹²⁴ As discussed, endangered species are being further threatened by the use of SGARs, and will face extinction if efforts to protect them are not enacted.¹²⁵ If the wellbeing of the environment and the wildlife it fosters are to be preserved for future generations to enjoy for their inherent value, as well for the economic benefits,¹²⁶ the poisoning and consequent extinction of an iconic native species would constitute a harm that must be considered.

B. Inefficacy of SGARs at Controlling Rats

Under the PCPA, pest control products are only to be registered if they make a useful contribution to pest management.¹²⁷ As such, registered SGARs should be reasonably effective at suppressing rodent infestations. However, there is increasing evidence to suggest that SGARs are not only ineffective at controlling rat populations long-term, but may actually be making the problem worse.

First, SGARs do not address the root of the rodent infestation problems. Rats are drawn to areas where they have access to food and shelter, and so structural access points to these resources must be addressed if rats are to be permanently removed.¹²⁸ By eliminating the resident

¹²⁴ PCPA, *supra* note 21, preamble.

¹²⁵ SARA, *supra* note 108.

¹²⁶ Ecotourism featuring wildlife generated \$6.2 billion from wildlife viewing activities in British Columbia in 1996. See Tourism British Columbia, “Wildlife Viewing Product Overview: Building Tourism with Insight” (April 2009), online: <https://www.destinationbc.ca/content/uploads/2018/08/Wildlife_Viewing_Sector_Profile.pdf>.

¹²⁷ Canada, Health Canada, *Information Note: The New Pest Control Products Act* (Ottawa: Health Canada, 28 June 2006), online: <canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/pesticides-pest-management/fact-sheets-other-resources/new-pest-control-products-act.html>.

¹²⁸ An article on Humane Solutions’ (a Vancouver-based humane and eco-friendly pest control company) blog, pest control companies may overlook these structural access-points in the interest of having to provide continued services

rat population, SGARs clear the way for a new population move in.¹²⁹ Further, in response to the thinning of their populations, poisoned rats mate faster in the days to weeks before their deaths.¹³⁰ Relying solely on methods of killing instead facilitates the rebound of populations.¹³¹

Second, raptors and other predators that feed primarily on rodents serve as a natural and chemical-free method of pest control. For example, a nesting barn owl pair and their chicks will consume an average of 1,200 rodents per year.¹³² By poisoning rodent predators, SGARs are effectively reducing the effectiveness of alternative means of controlling rat populations.

Finally, as discussed above, SGARs were introduced to replace FGARs, as populations had developed a resistance to the latter.¹³³ However, signs of resistance to SGARs are emerging in Europe,¹³⁴ suggesting that increasing the toxicity of rodenticides is a dangerous and unsustainable solution.

Consistent with the above findings, a majority of surveyed pest control professionals believe that while poisoning is the easiest and cheapest method of controlling rats, this strategy

to clients. See Joe Abercrombie, “Ultimate guide to home rat control: Eco-friendly & humane” (25 July 2019), online: <https://humanesolutions.ca/2019/07/25/ultimate-rat-removal-guide/#Lastly_forget_rat_poison> [Abercrombie, “Guide to home rat control”].

¹²⁹ Kaylee Byers, “Rat race! How pest control can backfire” (23 October 2019), *Medium*, online: <<https://medium.com/ubcscience/rats-d423f7f53ae8>>.

¹³⁰ Jordan Kisner, “Rats spread disease, decimate crops and very occasionally eat people alive. For centuries, we have struggled to find an effective way of controlling their numbers. Until now...” (20 September 2016), online: *The Guardian* <<https://www.theguardian.com/science/2016/sep/20/man-v-rat-war-could-the-long-war-soon-be-over>>.

¹³¹ Andrews, Should we kill rats?, *supra* note 14.

¹³² BarnOwlsBC, “Barn Owls: A Pest Management Ally for Berry Farmers” (January 2017), online: *BarnOwlsBC* <http://www.barnowlsbc.ca/uploads/3/0/2/7/30276721/final_barn_owls_as_a_pest_management_ally_jan_2017_1_.pdf>.

¹³³ Hindmarch, Rats!, *supra* note 5.

¹³⁴ Buckle, A.P., Prescott, C. and Ward, K.J., 1994, Resistance to the first and second generation anticoagulant rodenticides: a new perspective. *Proceedings of the 16th Vertebrate Pest Conference*, 7; Pelz, H. J. (2007). Spread of resistance to anticoagulant rodenticides in Germany. *International Journal of Pest Management*, 53(4), 299-302; Meerburg, B. G., van Gent-Pelzer, M. P., Schoelitz, B., & van der Lee, T. A. (2014). Distribution of anticoagulant rodenticide resistance in *Rattus norvegicus* in the Netherlands according to Vkorc1 mutations. *Pest management science*, 70(11), 1761-1766.

fails to provide a long-term solution because they fail to deal with the factors promoting and sustaining rat infestations.¹³⁵ Moreover, Vancouver remains the “rattiest city in B.C.” after three years,¹³⁶ even with the prevalence of poison bait stations littering the city. Despite recognizing these limits, SGARs remain the default method used by pest control companies.¹³⁷

C. Possible Adverse Impacts are Not Prevented by the Risk Mitigation Measures

Risks posed by products can be considered “acceptable” if conditions of registration can be established to prevent the potential adverse impacts.¹³⁸ While the PMRA acknowledges that SGARs are highly acutely toxic compounds that pose serious threats to the health and safety of children and non-target species through both primary and secondary exposure,¹³⁹ the risk mitigation measures implemented are incapable of adequately addressing these threats.

Requiring SGARs to be kept in tamper-proof bait boxes may prevent the direct poisoning of larger species, but this measure fails to address that target and non-target animals alike are directly consuming these products and thereafter being ingested by predators and scavengers. As discussed above, a range of non-target species, including mammals, birds and vertebrates, have demonstrated a willingness to consume poisoned bait from the bait boxes.

Efforts to mitigate risks of secondary poisoning by restricting the placement of commercial class SGARs¹⁴⁰ may also not be as effective as intended. Rats have been shown to feed on highly

¹³⁵ Half of a subgroup of respondents further believed that poisons are the least effective way to eliminate rat infestations long-term. See Himsworth, *Experiential knowledge*, *supra* note 15.

¹³⁶ CTV News Vancouver, “Vancouver named B.C.’s ‘rattiest’ city for 3rd year in a row”, (09 April 2019), online: <<https://bc.ctvnews.ca/vancouver-named-b-c-s-rattiest-city-for-3rd-year-in-a-row-1.4372598>>.

¹³⁷ Hindmarch, *Rats!*, *supra* note 5.

¹³⁸ PCPA, *supra* note 21, preamble.

¹³⁹ Health Canada, “Risk mitigation measures”, *supra* note 45 at 5.

¹⁴⁰ SGARs brodifacoum and difethialone are restricted to indoor use only, and baits containing bromadiolone must be placement within 15 meters of buildings/structures, or up to 100 meters from buildings/structures if bait is placed along fence lines. See PMRA, *New Restrictions*, *supra* note 48.

toxic indoor-restricted baits and move outdoors where they can be consumed by predators.¹⁴¹ As for outdoor baits placed near buildings and infrastructures, non-target small mammals have also been shown to disperse away from baiting sites after feeding.¹⁴² By spreading themselves away from where baits are stationed and toward surrounding natural habitats, the exposure risk for rodent predators increases, proving the risk mitigation measures to be impractical.

Further, while companies in the pest management industry may claim that SGARs usually cause rats to return to their nest to die¹⁴³ or to another inaccessible place,¹⁴⁴ studies suggest that the pre-lethal effects of ARs on rat behaviour instead make them more accessible to predators. Norway rats were found to die above ground, increasing the risk of exposure of both predators and scavengers to SGARs.¹⁴⁵ Poisoned rats have been observed to spend more time outside of their dens, even during daylight hours, expanding their availability to both diurnal and nocturnal predators.¹⁴⁶ They also tended to remain motionless in the presence of observers, rather than bolting into hiding.

The risk of secondary poisoning has only been increasing: in a population of barn owls, the SGAR residue concentration in the liver was significantly higher in the period of 2006 to 2013

¹⁴¹ Elliott, Exposure Pathways, *supra* note 95.

¹⁴² Elmeros, M., Bossi, R., Christensen, T. K., Kjær, L. J., Lassen, P., & Topping, C. J. (2019). Exposure of non-target small mammals to anticoagulant rodenticide during chemical rodent control operations. *Environmental Science and Pollution Research*, 26(6), 6133-6140.

¹⁴³ <https://www.tomcatbrand.com/en-ca/library/how-use-bait-bait-stations>

¹⁴⁴ <https://www.orkin.com/ask-the-orkin-man/brodifacoum-and-warfrin-poison>

¹⁴⁵ Howald, G. R., Mineau, P., Elliott, J. E., & Cheng, K. M. (1999). Brodifacoum poisoning of avian scavengers during rat control on a seabird colony. *Ecotoxicology*, 8(6), 431-447.

¹⁴⁶ Cox P, Smith RH (1992) Rodenticide ecotoxicology: pre-lethal effects of anticoagulants on rat behaviour. In: Proceedings of the 15th vertebrate pest conference. University of Nebraska, Lincoln, pp 165–170.

relative to 1992 to 2003.¹⁴⁷ Despite the research over the years into the impacts rodenticides are having on wildlife, much remains unknown and their use continues to be widespread.

Since the PMRA found the US EPA's observations to be representative of what is expected to be observed in Canada, the results of the mitigation measures adopted in the US should be similarly representative. In California, since removing SGARs from consumer shelves in 2014, there has been no decrease in the rate of wildlife poisoning because licensed pest control companies are still permitted to use these poisons.¹⁴⁸

E. Alternative Methods of Rodent Control Exist

The British Columbia IPM Act requires that pesticides be administered in accordance with integrated pest management principles.¹⁴⁹ It follows that if they exist, alternative methods of controlling rat infestations that minimize risks to harm to human health and the environment must be exhausted before turning to potentially harmful chemical products.¹⁵⁰

The primary step that sustainability-oriented pest management companies recommend is “rat-proofing” the premises by addressing the active and potential access-points in the structures.¹⁵¹ Further, food and other resources that attract rats must be secured or eliminated. It is in the economic interest of pest control companies that use poisons to ignore these steps, as

¹⁴⁷ Huang, A. C., Elliott, J. E., Hindmarch, S., Lee, S. L., Maisonneuve, F., Bowes, V., ... & Martin, K. (2016). Increased rodenticide exposure rate and risk of toxicosis in barn owls (*Tyto alba*) from southwestern Canada and linkage with demographic but not genetic factors. *Ecotoxicology*, 25(6), 1061-1071.

¹⁴⁸ US, AB 2422, *Council Agenda Report: Re. Assembly Bill (AB) 2422: Pesticides, Use of Anticoagulants — SUPPORT (Councilmember Rosenthal)*, City of Malibu, Cal, April 2018, online: <<https://www.malibucity.org/AgendaCenter/ViewFile/Item/3193?fileID=4260>>.

¹⁴⁹ IPM Regulation, *supra* note 53, s 32(a).

¹⁵⁰ IPM Act, *supra* note 52, s 1.

¹⁵¹ Abercrombie, “Guide to home rat control”, *supra* note 128.

permitting such conditions to persist invites new populations of rats to invade, thus giving rise to continued business for the company.

Novel approaches to rodent control are currently being developed and implemented. The District of North Vancouver has recently tested the efficacy of Goodnature traps¹⁵² to address rodent problems and found this method to be promising. In the United States, a rat contraceptive product has recently been introduced as an effective approach to significantly reducing rat populations in major cities, such as New York.¹⁵³

F. Issues with the Implementation of the Pesticide Legislation

The above analysis supports the conclusion that SGARs should not be registered. It is established that the use of SGARs poses real risks to Canadians, wildlife and the wider ecosystem. Further, the value of these products is negligible, given their failure to achieve their intended pest management purpose. As such, the unacceptability of these risks should demand that the registration of SGAR products to be cancelled.¹⁵⁴

While the PCPA establishes a clear obligation on the federal government to treat the well-being and protection of the environment as a primary consideration,¹⁵⁵ the implementation of the legislation falls short of its stated purpose. One of the explanations put forth is that the PMRA takes an industry-favourable approach to its registration scheme.¹⁵⁶

¹⁵² Developed in New Zealand, Goodnature traps deliver automatic and lethal blows to rodents that enter the trap via a CO2 powered piston. These traps are non-toxic comparably humane. See District of North Vancouver, “Information Report to Council,” (29 October 2019).

¹⁵³ Alice Klein, “Menopause-causing bait is curbing rat populations in New York” (05 May 2017), online: *New Scientist* <<https://www.newscientist.com/article/2130114-menopause-causing-bait-is-curbing-rat-populations-in-new-york/#ixzz68P9fIcb1>>.

¹⁵⁴ Scientific certainty of harm is not required, as per the precautionary principle. See PCPA, *supra* note 21, s 20(2).

¹⁵⁵ See discussion with note 29 and note 50.

¹⁵⁶ CELA suggests that this industry-focused approach is “unduly”, and causes problems for the implementation of an otherwise fundamentally sound Act. See CELA, “Briefing note: Strengthening Canada’s legal framework to

The PMRA's industry-favourable studies and lack of transparency concerning data on pesticide use and sales has given rise to accusations that the agency may be strongly influenced by the agri-chemical industry.¹⁵⁷ The PMRA has been criticized for failing to disclose industry involvement in key studies relied on its decision to continue the registration of certain pesticides: said studies were presented as being independent, while in fact had been either co-written or reviewed and edited by agrochemical companies.¹⁵⁸ Other criticisms concern the PMRA's secrecy surrounding its approval processes, as key data provided by agrochemical companies about their products are not generally released to the public.¹⁵⁹

Moreover, groups have observed that the PMRA rarely cancels the registration of products on the market, despite mounting evidence of widespread health and environmental damage caused by certain pesticides.¹⁶⁰ Rather, the PMRA regularly authorizes conditional registrations, which permit companies to sell pesticides before necessary data is provided where risks are deemed to be acceptable. This has been troubling to many environmental advocates, and in the past couple years, two lawsuits have been filed against the PMRA over its failure to satisfy its requirements under the PCPA.¹⁶¹

reduce pesticide exposure" (November 2015).

¹⁵⁷ See Robert Arnason, "An open letter to leaders of Pest Management Regulatory Agency" (16 September 2015), online: *The Western Producer* <<https://www.producer.com/2015/09/an-open-letter-to-leaders-of-pest-management-regulatory-agency/>>; Bruce Livesey, "Has Ottawa sold out to Big Agro and its toxic chemicals?" (25 July 2017), online: Canada's National Observer <<https://www.nationalobserver.com/2017/07/25/news/has-ottawa-sold-out-big-agro-and-its-toxic-chemicals>> [Livesey, "Has Ottawa sold out?"]; Gil Shochat, "'Troubling allegations' prompt Health Canada review of studies used to approve popular weed-killer" (11 November 2018), online: CBC News <<https://www.cbc.ca/news/technology/monsanto-roundup-health-canada-1.4896311>> [Shocat, "Troubling allegations"].

¹⁵⁸ *Ibid.*, Shocat, "Troubling allegations."

¹⁵⁹ See Livesey, "Has Ottawa sold out?" *supra* note 157.

¹⁶⁰ *Ibid.*

¹⁶¹ *David Suzuki Foundation v. Canada (Health)*, 2017 FC 682; *Équiterre v. Canada (Health)*, 2016 FC 554.

Whether or not the PMRA is in fact failing to meet its obligation due to industry influences, the issue remains that the permitted use of SGARs is inconsistent with the pest management legislation, as well as the current societal values held by society. People across the world are increasingly of the view that the undisturbed survival and wellbeing of animals and the environment should be respected.¹⁶² The adoption of the federal *Species at Risk Act* encodes the perspective that nature is entitled to certain protections, by recognizing in its preamble that all forms of wildlife has value in and of itself, and that Canadian wildlife species and ecosystems should be protected as part of the world's heritage.¹⁶³ Moreover, even the Supreme Court of Canada has repeatedly articulated that “environmental protection [has] emerged as a fundamental value in Canadian society.”¹⁶⁴ Finally, the PCPA itself clearly appreciates that the environment should not be subjected to unnecessary harms, and recognizes that the interests of future generations to enjoy the environment is an important consideration.¹⁶⁵

Nevertheless, Canada is notorious for its poor enforcement of environmental protections,¹⁶⁶ and I argue that one reason for this is its failure to explicitly enshrine the rights of nature. Though the legislation already establishes a government obligation to protect the environment from unacceptable harm, human interests are too often treated as infallible justifications for infringements on nature, due to the characterization of nature as “property.”¹⁶⁷ Accepting that nature has rights will help overcome this inherent inequality, and facilitate an appropriate

¹⁶² David Boyd, “Rights of Nature”, *supra* note 16 at xxxiv.

¹⁶³ SARA, *supra* note 108, preamble.

¹⁶⁴ *Ontario v. Canadian Pacific Ltd.*, [1995] 2 S.C.R. 1031 at para 55; *R v. Hydro-Québec*, [1997] 3 SCR 213 at para 127.

¹⁶⁵ PCPA, *supra* note 21, s 2(2).

¹⁶⁶ Boyd, “Rights of Nature”, *supra* note 16 at 90.

¹⁶⁷ “Ownership in all wildlife is vested in the Crown” under the B.C. *Wildlife Act*, RSBC 1996, c 488, s 2.

weighing of values and harms. In other jurisdictions where rights of nature are enshrined, advancements in environment protection are slowly being realized.¹⁶⁸

Taken together, the existing legislation pertaining to pesticides provides the framework for recognizing the rights of nature. While such rights have yet to be established in Canadian law, an appropriate evaluation of the value and risks of SGAR use must afford ample consideration to the interests of wildlife and the environment in order to reflect the current values of Canadian society.

IV. RECOMMENDATIONS

Though this report was produced to stimulate reform in British Columbia, the multi-tiered nature of the pest management scheme, combined with the nationwide impacts of SGARs, demands action at all levels of government. The following recommendations should be implemented in order to advance the protection of wildlife, nature and present and future generations of Canadians. Further, examples of jurisdictions that have implemented measures modelling the recommendations are discussed.

A. Municipal level recommendations

1. Endorse a Resolution Opposing the Sale, Purchase and Use of SGARs

The local governments of British Columbia should formally express their concerns regarding the harms caused by SGARs and their intent to reduce SGAR use through establishing

¹⁶⁸ For example, in Ecuador, the court upheld the constitutional rights of a river, and made an order for the immediate clean-up of existing damage, and for the implementation of protections against future damage. See Boyd, “Rights of Nature”, *supra* note 16 at 163.

a resolution. While not legally binding, resolutions formally communicate the municipality's concerns and propose action to be taken.

The Union of B.C. Municipalities (UBCM) is an organization that represents the interests of local governments in the province and assists in the implementation of new policies.¹⁶⁹ One of their roles is to host Conventions for consideration and endorsement of Resolutions sponsored by municipalities. Draft resolutions identifying a problem, the cause of the problem and best solutions can be submitted to the UBCM by local governments.¹⁷⁰ Local government members have the opportunity to consider and endorse these resolutions through a vote.

i. Calabasas Local Government Resolution

The City of Calabasas, California, passed a resolution opposing the sale, purchase and use of ARs in their jurisdiction.¹⁷¹ The resolution expresses the concern that ARs can cause pets and wildlife to become sick or die from exposure to rodenticides. It urges businesses to cease using and selling ARs, and property owners to cease purchasing or using ARs. It further commits the city to not use ARs at City-owned parks and facilities. A resolution passed in British Columbia should also encompass these elements.

¹⁶⁹ Union of BC Municipalities, "General Information: UBCM Overview" (accessed 14 December 2019), online: <<https://www.ubcm.ca/EN/main/about/general-information/ubcm-overview.html>>.

¹⁷⁰ Union of BC Municipalities, "Resolutions & Policy: Resolutions Procedures" (accessed 14 December 2019), online: <<https://www.ubcm.ca/EN/main/resolutions/resolutions/resolutions-procedures.html>>.

¹⁷¹ US, Resolution No 2013-1379, *A Resolution of the City Council of the City of Calabasas, California, opposing the sale, purchase and use of anticoagulant rodenticides in Calabasas*, Calabasas, Cal, 2013.

2. Enact Bylaws that Prohibit Conditions that Provide Shelter, Refuge or Food for Rodents

Given that addressing structural problems is the most effective, long-term means of suppressing rat infestations,¹⁷² municipalities should be promoting, or better yet, requiring property owners and occupiers to undertake such preventative measures.

As discussed above, municipalities have powers to regulate in relation to public health under the *Community Charter*.¹⁷³ The District of North Vancouver and City of Coquitlam, for example, have existing bylaws that prohibit residents and businesses from permitting conditions on their property that provide shelter and food for rodents. Following their lead, municipalities that have yet to do so should enact similar bylaws.

B. Provincial level recommendations

1. Prohibit or Severely Restrict SGARs

The Province of British Columbia should prohibit or severely restrict the sale, purchase or use of SGARs pursuant to the power of the B.C. Ministry of Environment to make regulations under the IPM Act.¹⁷⁴ The Minister could go about this by establishing a new class of “prohibited” pesticides¹⁷⁵ and have the administrator assign pesticides containing SGARs to this new class.¹⁷⁶

¹⁷² Abercrombie, “Guide to home rat control”, *supra* note 128; Himsworth, *Experiential Knowledge*, *supra* note 15. 151

¹⁷³ *Community Charter*, *supra* note 78.

¹⁷⁴ IPM Act, *supra* note 52, s 1.

¹⁷⁵ *Ibid*, s 38(2)(b): the minister may make regulations establishing classes of pesticides.

¹⁷⁶ *Ibid*, s 39(a): the administrator may make regulations assigning pesticides to classes established under section 38(2)(b).

In the interim, the administer of the IPM Act may order any person¹⁷⁷ to refrain from using a particular pesticide if the administer considers that the product has caused or is likely to cause an unreasonable adverse effect.¹⁷⁸ By order, the Minister may further prohibit the sale of SGAR products before the regulation is adopted.¹⁷⁹

Prohibiting a pest management product that causes an unreasonable adverse effect¹⁸⁰ where there are effective and environmentally-sound alternatives is wholly consistent with the goal of integrated pest management, and will bring the government in line with its obligations to its people and the environment.

i. California Bill to Ban Second-Generation Anticoagulant Rodenticides

In February 2019, Bill AB 1788 was introduced in California to prohibit the use of pesticides containing SGARs, except for agricultural use or by special permit.¹⁸¹ AB 1788 arose in response to the failure of implemented risk mitigation measures to decrease the impacts on wildlife and the environment.¹⁸² Despite opposition by the biotech and chemical industry,¹⁸³ the

¹⁷⁷ Here, “any person” may include bodies responsible for pest management programs of parks and schools, where there are the highest risks of secondary exposure to vulnerable groups such as children, pets and wildlife.

¹⁷⁸ IPM Act, *supra* note 52, s 16(2)(b).

¹⁷⁹ *Ibid*, s 8(1)(a).

¹⁸⁰ *Ibid*, s 3(1)(a).

¹⁸¹ AB 1788 would create the “California Ecosystems Protection Act.” It also sought to ban the use of FGARs on state-owned lands. See US, AB 1788, *An act to amend Section 12978.7 of, and to add Section 12978.8 to, the Food and Agricultural Code, relating to pesticides*, 2019-20 Reg. Sess, Cal, 2019, (pulled from the Senate Appropriations Committee 22 August 2019).

¹⁸² US, AB 2422, *Council Agenda Report: Re. Assembly Bill (AB) 2422: Pesticides, Use of Anticoagulants — SUPPORT (Councilmember Rosenthal)*, City of Malibu, Cal, April 2018, online: <<https://www.malibucity.org/AgendaCenter/ViewFile/Item/3193?fileID=4260>>.

¹⁸³ The National Pest Management Association (NPMA) and Pest Control Operators of California (PCOC) outwardly opposed AB 1788. See Brad Harbison, “California Rodenticide Ban Dies in State Senate” (26 August 2019), online: *Pest Control Technology* <<https://www.pctonline.com/article/rodenticide-ban-bill-california-ab1788/>>.

bill passed the California State Assembly and was approved by the state Senate Committee on Environmental Quality.¹⁸⁴

Unfortunately, AB 1788 was pulled from the Senate Appropriations Committee in August 2019 and was converted to a two-year bill to be picked up again in 2020.¹⁸⁵ Despite this setback, the fact that AB 1788 made it past six committee and floor votes represents an appreciation of the harms SGARs pose to wildlife. The willingness of California to adopt a ban on SGARs in the interests of native wildlife species has potential implications in Canada, considering that the PMRA has heavily relied on environmental risk assessments conducted in the United States.¹⁸⁶

ii. Provincial and Municipal Bans on Cosmetic Pesticides

In 2003, Quebec was the first province to enact a ban on pesticides intended to be applied on lawns under its *Pest Management Code*,¹⁸⁷ following numerous municipality bylaws doing the same.¹⁸⁸ Six years later, Ontario passed its *Cosmetic Pesticides Ban Act*¹⁸⁹ to prohibit the use of “non-essential” pesticides for cosmetic purposes,¹⁹⁰ inspiring a ripple effect across the country. Today, seven provinces have implemented similar legislation, and over 180 municipalities have passed their own restrictions¹⁹¹ on the grounds that pesticide products that

¹⁸⁴ Lisa Owens Viani, “Blood-Thinning Rat Poisons Need to Be Strictly Regulated. A California Bill Aims to Do Just That” (25 June 2019), online: *Earth Island Journal* <<http://www.earthisland.org/journal/index.php/articles/entry/blood-thinning-rat-poisons-need-to-be-strictly-regulated.-a-california-bill-aims-to-do-just-that/>>.

¹⁸⁵ Brad Harbison, *supra* note 171.

¹⁸⁶ Health Canada, “Risk mitigation measures”, *supra* note 45 at 7.

¹⁸⁷ *Pesticides Management Code*, CQLR c P-9.3, r.1.

¹⁸⁸ The town of Hudson in Quebec was the first municipality to exercise its power to enact bylaws regulating cosmetic pesticide use. The bylaw survived numerous legal challenges by a large lawn-care company, and set precedent in the Supreme Court of Canada for the municipal power to regulate cosmetic pesticide use. See *Spraytech v Hudson*, *supra* note 75.

¹⁸⁹ The Bill amends the *Pesticides Act*, RSO 1990, c. P. 11. See *Cosmetic Pesticides Ban Act*, 2008, S.O. 2008, c. 11 - Bill 64.

¹⁹⁰ *Ibid*, s 7.1(1).

¹⁹¹ While British Columbia is one of the three provinces that have not passed a province-wide ban on cosmetic pesticides, 40 of its municipalities have passed by-laws restricting their use. See Canadian Nursery Landscape

serve negligible benefits cannot justify the public health risks associated with their widespread use in and around areas where children frequent.¹⁹² Environmental advocacy organizations and health professionals have been urging the government to implement measures to minimize the exposure of Canadians and the environment to unnecessary pesticides.¹⁹³ This advancement demonstrates a shift in the social and legal acceptance of the use of toxic compounds and the risks these products pose to communities and the environment.

2. Public Education

Public education should accompany the proposal to prohibit SGARs. Wildlife and environmental advocacy groups are already engaging with local residents, landowners and farmers to increase awareness on the issue of rodenticides.¹⁹⁴ The province should also be disseminating information not only to emphasize the danger that SGARs pose to nature, but also to dispel the myths purporting SGARs as effective, long-term solutions.

Association, “Summary of Pesticide Regulations across Canada (Federal, Provincial and Municipal): Urban Landscapes” (2019), online: <<https://cnla.ca/uploads/pdf/Pesticide-Regulation-Across-Canada.pdf>>.

¹⁹² CELA, “Debunking Industry Opposition to a Province-wide Ban on Lawn and Garden Pesticides” (26 March 2008), online: <<https://cela.ca/debunking-industry-opposition-province-wide-ban-lawn-and-garden-pesticides/>>.

¹⁹³ The Canadian Environmental Law Association (CELA) has been working on issues regarding pesticide use since the 1980s. See CELA, “Pesticide By-Laws and the Courts” (24 September 2005), online: <https://cela.ca/wp-content/uploads/2019/07/519PestBylaw_Courts.pdf>; CELA, the David Suzuki Foundation, Ecojustice and others have collaborated on this issue. See CELA, “Strengthening Canada’s legal framework to reduce pesticide exposure” (November 2015), online: <<https://cela.ca/strengthening-canadas-legal-framework-to-reduce-pesticide-exposure/>>;

Sanborn, M., Kerr, K. J., Sanin, L. H., Cole, D. C., Bassil, K. L., & Vakil, C. (2007). Non-cancer health effects of pesticides: systematic review and implications for family doctors. *Canadian Family Physician*, 53(10), 1712-1720.

¹⁹⁴ BarnOwlsBC has a wealth of resources on its website instructing farmers on how to utilize barn owls as the best pest management partner. See BarnOwlsBC, “A Resource Site for Barn Owl Conservation” (accessed 14 December 2019), online: <<http://www.barnowlsbc.ca/>>; Burke Mountain Naturalists conducts seminars concerning the use of rodenticides and risks to owls and the environment. See Burke Mountain Naturalists, “Be Owl Wise - Owls and Rat Poisons” (20 June 2019), online: <<https://www.burkemountainnaturalists.ca/event/be-owl-wise-owls-and-rat-poisons/>>.

3. Request for Special Review

The Ministry of Environment should provide information to the PMRA regarding the health and environmental risks posed by SGARs. Under the PCPA, the PMRA for the Minister of Health may initiate a special review of the registration of a pest control product if information provided by a provincial government department suggests there are reasonable grounds to believe that the health or environmental risks of the product are, or its value is, unacceptable.¹⁹⁵

C. Federal level recommendations

1. Re-Evaluation of SGARs

The PMRA should re-evaluate the registration of SGAR products. On behalf of the Minister of Health, the PMRA has the discretion to initiate a re-evaluation of a registered pest control product if there has been a change in the information required or the procedures used for the evaluation of the health or environmental risks or value of the product.¹⁹⁶ Following re-evaluation, the registration of a product may be cancelled or amended, even in the absence of scientific certainty, if there are reasonable grounds to believe that such action is necessary to deal with a situation that endangers human health or safety or the environment, applying the precautionary principle.¹⁹⁷

¹⁹⁵ PCPA, *supra* note 21, s 17(3).

¹⁹⁶ *Ibid*, s 16(1).

¹⁹⁷ *Ibid*, s 20(1)(b).

i. Re-Evaluation by the California Department of Pesticide Regulation

Mirroring the risk mitigation strategies implemented in Canada, in 2014 the California Department of Pesticide Regulation¹⁹⁸ designated SGAR active ingredients as “restricted materials.”¹⁹⁹ However, these restrictions proved insufficient as the impacts on wildlife health and the environment did not decline.²⁰⁰ Consequently, the Department received a request to have seven pesticide active ingredients undergo re-evaluation.²⁰¹

D. Potential Challenges

As exemplified in California, the prohibition of SGAR products is likely to receive pushback from the pest management industry, since SGARs are currently the most common method of rodent control employed by these companies.²⁰² However, by eliminating the ability to rely on traditional, harmful methods, the industry will be incentivized to invest in studying wild rats to develop informed, efficacious rodent management solutions.

Again, a number of humane and sustainably-focused pest management companies have introduced more effective means of approaching rat infestations.²⁰³ Following their lead,

¹⁹⁸ The Department of Pesticide Regulation is responsible for regulating rodenticides, including the tasks of evaluating and registering pest control products. See California, Department of Pesticide Regulation, *How California regulates pesticide use: Factsheet* (accessed 16 December 2019), online: <<https://www.cdpr.ca.gov/docs/dept/factshts/main2.pdf>>.

¹⁹⁹ Registered SGAR ingredients include brodifacoum, bromadiolone, difenacoum and difethialone. Restricted materials must be sold by licensed dealers and purchased by certified applicators. See California, Department of Pesticide Regulation, *An Investigation of Anticoagulant Rodenticide Data Submitted to the Department of Pesticide Regulation* (16 November 2018).

²⁰⁰ US, AB 2422, *Council Agenda Report: Re. Assembly Bill (AB) 2422: Pesticides, Use of Anticoagulants — SUPPORT (Councilmember Rosenthal)*, City of Malibu, Cal, April 2018, online: <<https://www.malibucity.org/AgendaCenter/ViewFile/Item/3193?fileID=4260>>.

²⁰¹ See note 180.

²⁰² Hindmarch, *Rats!*, *supra* note 5.

²⁰³ See notes 144, 145 and 146.

hopefully Canada will see pest control shift toward non-toxic, sustainable solutions that address the factors influencing the problem, rather than temporarily exterminating the results.

V. CONCLUSION

Taken together, the analysis presented in this report provides a critique of the provincial and federal government's continued registrations and permitted use of SGARs. To satisfy its obligations to Canadian citizens and the environment, and adapt to the evolving societal values, the B.C. Ministry of Environment must take action and lead the PMRA to reconsider the registration for SGARs. A shift toward recognizing the rights of nature is necessary to ensure the protection of Canadian wildlife and ecosystems, both for the enjoyment of future generations and for the interests of nature itself to thrive and exist.