



Invasive Species Strategy

FOR BRITISH COLUMBIA

2018 - 2022

ACKNOWLEDGEMENTS

The Invasive Species Strategy for BC (2018–2022) was updated in 2017 through a collaborative process led by the ISCBC and incorporates input from well over 100 agencies, organizations, businesses, and British Columbians from across the province.

The Invasive Species Strategy for British Columbia was developed as a strategic framework for improved invasive species management in British Columbia and provides a foundation for invasive species work across British Columbia to guide our programs and efforts.

The 2018 – 2022 Strategy development was supported by an advisory group who reviewed and provided input to the technical writer.

The advisory group members were:

Nicci Bergunder	TFN Construction / Matcon Civil Joint Venture
Clare Greenberg	Sea to Sky Invasive Species Council
Rob Higgins	Thompson Rivers University
David Hillary	Grasslands Conservation Council
Val Miller	Ministry of Forests, Lands and Natural Resource Operations
Sheri Schweb	BC Forage Council
Dominique Sigg	Ministry of Environment
Claire Watkins	City of Prince George

Danielle Toperczer, Steph Woods, Gail Wallin and Jodi Romyn of the Invasive Species Council of BC provided staff support for the strategy development, and Tom Tevlin and Trevor Figueiredo of Greenspirit Strategies Ltd. served as the strategy’s technical writers.

Cover Images

Top row; l-r:

Purple loostrife (L.West)
Zebra mussels (D.Britton)
Spotted kapweed
(R.Routeledge)

Middle row; l-r:

American bullfrog (R.Ottens)
Mountain bluet (L.Viatour)
Flowering rush (L.Mehrhoff)
Goldfish (US Geological Survey)

Bottom row; l-r:

Orange hawkweed (J.Leekie)
Eurasian watermilfoil (A.Fox)
Japanese knotweed (B.Stewart)

TABLE OF CONTENTS

- Setting the Stage** 4
- Why Care?** 5
 - Environment 5
 - Economy 5
 - Society 6
 - Vision 6
 - Scope 6
- Pillars** 7
 - 1. Establish and Enforce Effective Regulatory Tools 7
 - 2. Strengthen Collaboration 7
 - 3. Prevent Introduction and Spread 8
 - 4. Implement Effective Control, Restoration, and Monitoring Programs 8
 - 5. Support and Extend Relevant and Applicable Research 9
 - 6. Provide Stable, Long-Term Funding 10
 - 7. Promote Action through Communication and Education 10
- Moving Forward** 11
- References** 11



Orange hawkweed; J. Leekie

Invasive species are “alien species regarded as harmful and whose introduction or spread threatens the environment, the economy, or society, including human health.”

— GOVERNMENT OF CANADA 2004

Pathways are the geographic routing by which invasive species enter and move within British Columbia. They can be natural (e.g., water currents or air) or human-caused (e.g., roads and railway corridors).

Vectors are the means by which invasive species from a source population follow a pathway to a new destination. Examples of vectors include boats, vehicles, and animals.

Addressing pathways and vectors of spread will significantly reduce impacts from invasive species.

SETTING THE STAGE

British Columbia is the most biologically diverse province or territory in Canada. This diversity generates employment and provides recreational opportunities that all British Columbians benefit from. Our native ecosystems and natural resources are threatened by invasive species and it is imperative that we take action to protect them now. This *Invasive Species Strategy for British Columbia* represents a collective agreement and common vision that land managers have prioritized for the protection of BC.

Invasive species are plants, animals or other organisms that are not native to BC and whose introduction and spread has negative impacts. Invasive species lack natural predators or competitors and have populations that overtake the natural system, interrupt natural cycles of nutrient, water and food supply, or displace native species of animals and plants. While native ecosystems evolve slowly over time, the introduction of invasive species can cause rapid change and loss of native species due to heavy competition for resources.

It's important to note that only a small number of non-native species are considered invasive. Many non-native species like daffodils or wheat may become established in a non-native environment but do not pose the same impacts that invasive species do and will neither overtake the native ecosystems nor replace the native species.

People and invasive species are intrinsically linked; close to 60 percent of the invasive plants in Canada have been intentionally introduced by people (Canadian Food Inspection Agency 2008). Whether people unknowingly plant invasive plants in their gardens (without understanding the consequences) or release unwanted pets into the wild, many invasive species are introduced by British Columbians. Increased travel and trade also spread invasive species. Vehicle tires can deposit invasive species along roadsides and trails, and ships can transport them inadvertently in crates across the ocean. By educating people about these key pathways, impacts and preventative measures, and promoting behavioral change, we can make a major contribution toward reducing the introduction and spread of invasive species.

Since the original *Strategy* was released in 2012, significant progress has been made in British Columbia. We've had a great deal of success in communicating to key stakeholders and the general public about the importance of invasive species management. More organizations than ever before are taking the threat of invasive species seriously and are incorporating elements of the *Strategy* into their operations and procedures. In British Columbia, progress has been made to:

- » **Increase effective, enforced regulations** by expanding the number of government organizations — provincial, local and Indigenous — that are taking action to protect British Columbia. For example, the Controlled Alien Species Regulation was updated to include key invasive species and some jurisdictions have implemented or amended invasive species bylaws and are implementing enforcement.
- » **Improve continuity and level of long-term funding** in both urban and rural regions throughout British Columbia. Provincial, regional and local land managers are investing more to prevent and control invasive plants and animals while ensuring greater long-term continuity, collaboration and response to increasing invasive species threats.

- » **Increase public awareness** with horticulture, boating, school and youth campaigns that encourage responsible behavior.
- » **Enhance coordination with more organizations and businesses** than ever before; forest companies, recreational groups and tourism operators recognizing that prevention and management of invasive species need to be considered in their activities.
- » **Add new early detection plans and tools** to enable governments and citizens to be on the alert for new invasive species; effective reporting and faster response to invasive species has been improved through more accessible information, online data, mobile reporting apps and communication.

Many organizations across British Columbia have worked together to accomplish a great deal since 2012. However, further efforts are needed to protect and benefit ecosystems, the economy, and society. This updated *Invasive Species Strategy for British Columbia* is our plan for action.

WHY CARE?

Healthy landscapes and ecosystems are not only important to native flora and fauna, but to the health and well-being of British Columbians and the economy. By taking responsible actions now, British Columbia can maintain and improve its terrestrial and aquatic ecosystems and biodiversity for current and future generations.

Economy

Invasive species create significant economic impacts wherever they become established, including increased control costs as well as loss of resource productivity including grazing lands and fish habitat.

For example, just six species of invasive plants were estimated to cost British Columbia \$65 million in economic losses in 2008, increasing to a projected \$129 million by 2020 with further spread (Frid et al. 2009). In 2004, the loss of cattle forage to invasive knapweed was estimated at \$400,000 per year; if knapweed expands to its range limits, the economic impacts to the cattle industry could exceed \$13 million per year (Rankin and Associates et al. 2004). And it's estimated that the economic impact of invasive mussels to hydropower, agricultural irrigation, municipal water supplies and recreational boating could cost \$43 million per year (Robinson et al. 2013). This estimate does not include additional impacts on commercial and recreational fisheries. Additionally, knotweeds can grow through concrete and asphalt, damaging infrastructure. This results in significant control, management and repair costs. In the UK, the annual control cost of Japanese knotweed, on a national scale, is estimated at \$3 billion (USD). Other impacts include reduction of property values. In the UK, there have been examples where people have been unable to secure a mortgage or insurance on knotweed infested properties.

Increased prevention, detection and improved management of invasive species can provide significant economic benefits to provincial and local governments, businesses, industry, and citizens.

The 2018 Invasive Species Strategy for British Columbia calls for resourcing and collaboration to improve the management of invasive species and subsequently to reduce their widespread economic, environmental, and social impacts.



Brown bat showing symptoms of white-nose syndrome (*Pseudogymnoascus destructans*); A.Hicks

White-nose syndrome is an invasive fungal disease believed to be responsible for the mass die-off of hibernating bats throughout eastern North America. There is a possibility this disease will reach British Columbia and adversely affect several native bat species.

The 2012 – 2016 Invasive Species Strategy for British Columbia was developed and released in Spring 2012. To support the delivery of the Strategy, a Monitoring for Success Framework (MFS) was developed as a guide to determine if collective efforts were being successful. This *Monitoring For Success Framework* can be accessed online at www.bcinvasives.ca/documents/Monitoring_For_Success_2012-2016_Exec_Summary_170725_Final.pdf



Eurasian Green Crab; J.Adams

An example of collaboration is the Pacific Coast Collaborative.

The collaborative provides a formal basis for cooperative action, a forum for leadership and information sharing, and a common voice on shared issues facing Alaska, British Columbia, Washington, Oregon, and California.

The Collaborative's Action Plan on Ocean Conservation and Coastal Climate Change Adaptation includes addressing the spread of invasive species such as: cordgrasses, tunicates, and green crab.

The Strategy's purpose is to enhance the coordination of invasive species prevention and control, and to develop a common vision for British Columbia.

Environment

Invasive species threaten British Columbia's ecosystems, as they can displace native species and disrupt natural ecological processes.

Leafy spurge (*Euphorbia esula*), for example, is an invasive plant that is threatening Spalding's campion, a federally listed species at risk found in the south eastern corner of British Columbia. British Columbia's grasslands – a highly sensitive ecosystem that makes up less than one percent of the landbase – are also at risk from invasive species. And less than five percent of Garry oak ecosystems in British Columbia are in a near-natural condition, these are threatened by more than 173 invasive species in the form of trees, shrubs, herbs, reptiles, birds, and mammals.

These examples of invasive species-related impacts on a range of ecosystems and habitats demonstrate the importance of preventing establishment and the need to undertake prompt control when required. Removing invasive species from British Columbia's natural environments will abate the threat and impact of invaders, and will help our native ecosystems to thrive.

Society

Invasive species can have large impacts on society as a whole, affecting everything from the use of our private and public spaces to human health and safety concerns. Invasive plants such as Giant hogweed are considered high risk and can have serious health implications due to its toxic sap that can cause burns, blisters and scarring. Other species such as cheatgrass, if left to overgrow, can severely increase the risk of fire, impacting public safety and property.

Preventing new invasions and effectively managing established invasive species can help maintain property values and infrastructure and can minimize impacts to land and water-based recreation.

VISION

The vision for the *Invasive Species Strategy for British Columbia* is:

“British Columbia's citizens, ecosystems, and resources are protected from invasive species impacts.”

SCOPE

The *Invasive Species Strategy for British Columbia* is designed to be flexible, reflecting British Columbia's wide variety of industries, regions and ecosystems.

The Strategy's scope includes:

- » Terrestrial and aquatic (freshwater and marine) ecosystems, including, but not limited to, estuaries, lakes and rivers; and
- » Invasive plants, animals, microbes (including bacteria), and fungi that have the potential to impose undesirable or detrimental impacts on society, species, ecosystems, or the economy.

The *Strategy* does not specifically address:

- » Diseases directly related to human or domestic animal health,
- » Invasive species whose ranges are expanding due to warming climates, or
- » Any native plants, animals and organisms.

PILLARS

Given the vision and scope of this *Strategy*, there are 7 main pillars that have been identified as overarching priorities, and within each of those are key areas of action to be delivered on:

1. Establish and Enforce Effective Regulatory Tools

Jurisdiction over invasive species in British Columbia involves four levels of authority: federal, provincial, local, and Indigenous governments. These many levels of authority can lead to multiple Acts and regulations and bylaws that each may address only some aspects of invasive species management instead of a cohesive, comprehensive framework. Often, invasive species management can fall between jurisdictions. Even when legislation makes jurisdictional responsibility clear, a lack of capacity may prevent effective enforcement. Therefore, developing both regulatory tools and the effective means to enforce them is a key necessity.

This *Strategy*'s key actions for agencies with regulatory authority in British Columbia—at the federal, provincial, local and Indigenous level, are:

- » Review and update existing legislation, regulations and bylaws on invasive species to address not just invasive plants but all invasive species, and ensure the list of species is current.
- » Enact a single, harmonized provincial Act for invasive species in British Columbia.
- » Explore new opportunities to address invasive species through policy.
- » Actively enforce legislation and regulations through clear, coordinated, and effective enforcement actions by all applicable enforcement agencies. Incentive-based tools are a positive way to support and encourage invasive species management. Where needed, and with improved capacity and coordination, the establishment and enactment of fines may be effective.

2. Strengthen Collaboration

Successful invasive species management requires collaboration, cooperation, and coordination among many different levels of government, land management agencies, land users, provincial and regional invasive species organizations, Indigenous groups, researchers, industry organizations, community groups, and the public. More organizations are involved today than ever before, which requires additional collaboration, stronger relationships and active communication on key initiatives to avoid duplication of efforts. This collaboration must occur both in local communities where people know the land best, and also provincially, where planning occurs at the



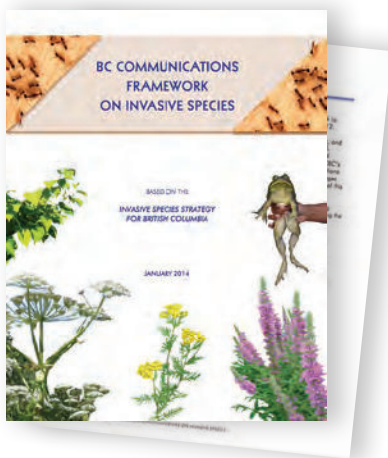
Identifying Common tansy; S.Leverkus



Yellow flag iris; J.Leekie



Cooperative planning in resource stewardship; R.Whiten



Communications Framework for BC document



Clean Drain Dry – an important behaviour change program in British Columbia

landscape and regional levels.

Strong collaboration and coordination requires bringing together all concerned organizations while supporting current partnerships and fostering new, cross-jurisdictional ones.

This Strategy's key actions on collaboration are:

- » Continue enhancing coordination, communications and information-sharing by expanding networks, alliances, collaborations and partnerships with bordering regional, provincial, territorial, state, and national jurisdictions – from the local to the international level.
- » Review, update and build on the existing *Communications Framework for BC* to foster and encourage a common approach and messaging to improve awareness and understanding related to invasive species in British Columbia.
- » Expand and support a provincial hub for information, such as through provincial government and the ISCBC to provide a central source of common information.
- » Develop a collective approach on how to best work with the large number of key industry sectors on invasive species.
- » Increase opportunities for in-person discussions within and between Indigenous groups and stakeholders.

3. Prevent Introduction and Spread

Prevention is British Columbia's best and most cost effective tool for invasive species management. Reducing the number of invasive species establishing and spreading within British Columbia, requires eliminating the ways by which they spread. This is best supported by promoting positive behavior change among the public and target groups, by enabling best management practices for land base users and resource managers, and through support for early detection and reporting.

This Strategy's key actions to prevent introduction and spread include:

- » Work with local, provincial, and federal governments in coordination with national border agencies and neighboring jurisdictions to close the key pathways of invasive species.
- » Develop an all inclusive invasive species database and mapping application that is structured to include all invasive species identified through risk assessments.
- » Develop a provincial level behaviour change program that identifies common messages for key pathways and standardized resources for province-wide implementation.

4. Implement Effective Control, Restoration, and Monitoring Programs

Whether through control, restoration or monitoring, taking action to address invasive species is central to this Strategy.

The control and elimination of invasive species is most successful when applied with restoration and monitoring strategies. The inclusion of restoration activities ensures that

ecosystem functions and services are reinstated and prevents future invasive species establishment. In addition, monitoring of management efforts to determine short and long-term trends, will lead to improved knowledge and management effectiveness and efficiencies.

Eliminating new invasive species introductions requires implementing the BC Invasive Species Early Detection and Rapid Response (EDRR) Plan for British Columbia, which increases the likelihood that new priority invasions will be addressed successfully while populations are still localized and relatively small.

This Strategy's key actions for effective control, restoration and monitoring, are:

- » Support the BC Invasive Species EDRR Plan (2014). Establish an action plan that incorporates a stable pool of funds or mechanism to quickly access necessary resources, readily available resources and tools, and the authority to act immediately.
- » Increase funding and operational programs across all jurisdictions to ensure effective invasive species control and management and determine roles and responsibilities for all agencies involved; and identify new funding opportunities for secure, stable and long-term funding.
- » Develop new or update existing database to record and track all invasive species occurrences and management efforts inclusive of plants and animals.
- » View restoration as an integral component of all management plans and activities; identify and share available resources to support restoration efforts; and develop standardized restoration guidelines that are applicable across jurisdictions and to stakeholders.
- » Develop and/or enhance a provincial monitoring strategy for invasive species management in British Columbia while also improving existing monitoring standards and protocols and enhancing intra-jurisdictional and cross-jurisdictional coordination.

5. Support and Extend Relevant and Applicable Research

Future research efforts require adequate investment and extension. These efforts should expand on existing knowledge while incorporating the needs of resource managers. For example, local governments and landowners within British Columbia have expressed the current lack of and critical need for increased research on knotweed species and the movement and disposal of infested soils.

Applicable research on invasive species is required, as is the transfer of knowledge to promote sound policy development and to assist in delivering effective management practices. Increased collaboration and linkage between research and practical application is a shared priority requiring support and coordination to allow for improved on-the-ground management and delivery.

This Strategy's key actions for research are:

- » Update and gain support for a guiding document for invasive species research in British Columbia, providing a shared vision on the collective needs and priorities for invasive species research.



Invasive plant control; ISCBC

Invasive species research needs to include the consequences of lost ecosystem services and compare those to prevention and control costs.

Effective invasive species management requires adequate, stable, long-term funding to address all areas of invasive species management, including but not limited to regulations, education, outreach, research, prevention, control activities, and monitoring.



Presentation to youth; ISCBC



Feral pigs; D.Clark

- » Establish a web-based invasive species research hub profiling British Columbia researchers, current research being conducted, new research opportunities, research gaps, funding opportunities, and to improve connection to practitioners.

6. Provide Stable, Long-Term Funding

Obtaining adequate, stable, long-term funding for invasive species management is a serious challenge, particularly when the potential economic impacts are not fully understood by all citizens or by all decision-makers.

Investing adequate funding now is critical and is an essential aspect of this *Strategy*.

This *Strategy*'s key actions on funding are:

- » Develop and distribute a guiding document for invasive species funding in British Columbia that outlines a shared vision on collective funding needs.
- » Identify and promote new, diverse funding mechanisms; increase funding and investments from all jurisdictions, including industry, with a focus on prevention and control of high priority provincial and regional species.
- » Develop multi-year contracts to allow for longer-term planning and contractor investment.
- » Increase partnerships between stakeholders to leverage expertise and equity.
- » Support and invest in a multi-source independent trust fund developed for enhanced activities and emergency response on invasive species. This trust fund would not be used to replace legal responsibilities of agencies and organizations but would be used for emergency situations related to invasive species management, to augment research, coordination, educational outreach and to enhance practices.

7. Promote Action through Communication and Education

A key component of this *Strategy* is to encourage positive behavioral changes in British Columbians using an approach that assists residents and visitors to adopt and foster responsible actions that prevent new introductions and minimize the spread of existing invasive species.

This *Strategy*'s key actions are:

- » Promote responsible practices through positive behavioral changes in British Columbians by encouraging partnerships, education, awareness and outreach activities in schools, industry operations and day-to-day activities of all British Columbia citizens.
- » Create a network of invasive species specialists that can contribute ideas, approaches, and expert advice that will be used to develop and support messaging and training programs for officials, educators, professionals and the public.
- » Develop and distribute a guiding document for invasive species in British Columbia that includes consistent messaging and enhanced communication and education activities.

MOVING FORWARD

We've made a great deal of progress since the first *Invasive Species Strategy for British Columbia* was developed in 2012. But there's much more work to be done. Invasive species management, like this strategy itself, is an ongoing commitment and a work of continuous improvement.

As we move forward with implementation of the ideas identified above, it is vitally important to continue to:

- » build recognition of and broad support for this strategy;
- » develop an implementation plan, encourage organizations to incorporate this strategy into their activities, and;
- » solidify a long-term funding approach for invasive species management in BC that includes baseline funding targets and possible new funding mechanisms.

Moreover, using the *Monitoring for Success Framework*, we need to develop performance indicators that measure our ability to effectively implement the strategy and apply it to existing and potential invasive species in British Columbia.

There is much work to be proud of and there is much more work to do. Together, we will continue to make progress in support of strong and effective invasive species management for British Columbia.

REFERENCES

Canadian Food Inspection Agency. *Invasive Alien Plants in Canada*. CFIA. Ottawa, ON, 2008.

Frid, L., D. Knowler, C. Murray, J. Myers, and L. Scott. 2009. *Economic Impacts of Invasive Plants in British Columbia*. Prepared for the Invasive Plant Council of BC by ESSA Technologies Ltd., Vancouver, BC. IPCBC Rep. #12. 105 pp.

Invasive Species Council of BC. 2017. *Monitoring for Success Framework for the Invasive Species Strategy for BC (2012-2016)*. Available at www.bcinvases.ca/about/invasive-species-strategy-for-bc

Rankin, C. & Associates, Madrone Environmental Services Ltd., The Nature Conservancy of Canada, Jacqueline Booth & Associates, S. Cannings, and Osiris Wildlife Consulting. 2004. *Invasive alien species framework for BC: identifying and addressing threats to biodiversity*. Prepared for BC Ministry of Water, Land and Air Prot. May. Available at www.env.gov.bc.ca/wld/documents/alien_species_framework_BC_0205.pdf

Robinson et al. 2013. *Preliminary Damage Estimates for Selected Invasive Fauna in B.C.* Prepared for Ecosystems Branch B.C. Ministry of Environment Victoria, B.C. Available at www.for.gov.bc.ca/hra/invasive-species/Publications/BC_Invasives_Final_Report.pdf



Identifying Japanese knotweed; D.Sigg



Himalayan knotweed; N.Page

