

BCTS Chinook Invasive Species Program Best Management Practices

Update(s): This is a new program to the BCTS Chinook Business Area (BA).

The Program includes:

1. the training requirements for implementation of the Program
2. the reporting requirements and available tools for delivery of the Program
3. a priority species list as set out by BC Inter-Ministry Invasive Species Working Group

The primary objective is to observe and report occurrence of Invasive Species to BC Inter-Ministry Invasive Species Working Group and participate in the Working Groups Early detection and rapid response (EDDR). The intent of EDRR is to prevent the establishment and subsequent spread of newly arriving invasive species into BC.

Operating areas covered by the Chinook Invasive Species Program

1. BCTS Operations in the Chilliwack, Squamish, Powell River and Haida Gwaii Forest Districts
2. BCTS Operations in TFL's within the 4 Districts noted above
3. Any other land tenure in which BCTS operates as a forest land management partner with 3rd party entities; e.g., Community Forests, First Nation Woodland Licences, etc.

The BCTS Chinook Invasive Species Program is coordinated in conjunction with the BCTS Chinook Invasive Plant Program and includes invasive mammal, fish amphibians/reptiles, insects/spiders.

Reference sources for the Invasive Species Program

This Program reflects the current information to date as it relates to the occurrence and potential occurrence of invasive species in British Columbia. Knowledge used to guide the development of this Program is based upon information obtained from the Invasive Species Council of BC (ISCBC) *Invasive Species Strategy for British Columbia* (May 2013) and the BC Inter-Ministry Invasive Species Working Group's *Invasive Species Early Detection and Rapid Response Plan for British Columbia* (November 2014).

Legislative and policy requirements concerning Invasive Species

BCTS Chinook's requirement to manage for invasive plants is driven by:

1. Sustainable Forestry Initiative 3rd party certifications

There are several pieces of federal and provincial legislation that indirectly govern invasive species. These include:

1. *Wildlife Act* (Provincial)
2. *Controlled Alien Species Regulation* (Provincial)
3. *Aquatic Invasive Species Regulation* (Federal)
 - Applies to Asian Carp (4 species) and Zebra and Quagga mussels

BCTS Chinook BA Invasive Species Program Objectives:

1. To identify and report invasive species that occur or potentially occur within the BCTS Chinook Business Area
2. To educate the staff about how to identify and report invasive species during normal forest duties
3. Limit the introduction and spread of invasive species

Limitations to the control of the introduction and/or spread of Invasive Species

Due to the extent of existing populations of invasive species within BCTS' operating areas it is not possible or prudent to attempt to manage for the introduction and spread of all invasive species on a species by species basis. Though the guidance of expert advice available on the ISCBC, BCTS Chinook is taking measures to limit the introduction and spread of specific invasive species by ensuring key vectors of spread are reduced and rapid reporting to the BC Inter-Ministry Invasive Species Working Group. Early detection is key.

Foundation of the Chinook BA Invasive Species Program

Noting the extensive range and diversity of Invasive Species in Chinook's operating areas, the Chinook BA will actively participate in the management of Invasive Species *Invasive Species Early Detection and Rapid Response Plan for British Columbia* through a program of observe and report. Additionally, the introduction and spread of Invasive Species will be mitigated through the washing of both machinery and watercraft that are used in primary forestry activities. Legally the Chinook BA is only required to manage for invasive plants as identified in the Forest and Range Practices Act (FRPA) Invasive Plant Regulation.

Steps to mitigating the introduction and spread of Invasive Species

1. Implementation of the program will be done through training of all staff and directly supervised contractors to understand the background to reduce the risk of introduction or spread, priority species, reporting requires and methods to stop the introduction or spread of invasive species. This will include:
 - a. the development of a training package that will posted on The BCTS Chinook BA website
 - b. a brief background on the Priority Species as set out by BC Inter-Ministry Invasive Species Working Group
 - c. the methods to reduce the risk of the introduction or spread of invasive species
 - d. the use of Web Based Reporting Applications (<https://www.for.gov.bc.ca/hra/invasive-species/index.htm>) as well as reporting requirements, or
 - e. via pre-work sessions for Licensees, Permittees, or, Contractors
2. When machinery is brought onto the work site the TSL Holder or contractor must ensure that is clean of soil and vegetative material. This is consistent the BCTS Chinook BA Invasive Plant Best Management Practices. The Invasive Species Program protocol for cleaning machinery is as follows:

Equipment must be washed/cleaned to remove visible plant material, and, soil/dirt prior to entry into the activity site where disturbed soil has been, or will be, created.

- a. Washing can be conducted at any vehicle washing facility. This BMP will not require the individual to collect water at the washing facility.
- b. Washing cannot occur in the field unless water containment facilities are present and contaminated ('dirty') water is removed from the site

The vector for transmittal of some species such as the Argentine Ant can be through infested soil or plant material. Adhering to this protocol will reduce the risk of introduction or spread of terrestrial based Invasive Species as well as Invasive Plants.

3. That all watercraft, vessels, used moorings or any other materials that will enter a waterbody will adhere the following;
 - a. Clean- Absent of visible Aquatic Invasive Species or attached vegetation, dirt, debris or surface deposits including mussel shells or residue on the watercraft, trailer, outdrive or equipment that could mask the presence of attached mussels
 - b. Drained- To the extent practical, all water drained from any live-well, bait-well, storage compartment, bilge area, engine compartment, deck, ballast tank, water storage and delivery systems, cooler or other water storage area on the watercraft, trailer, engine or equipment
 - c. Dry- No visible sign of standing water, or in the case of equipment, wetness on or in the watercraft, trailer, engine or equipment.

The vector for transmittal of water born species such zebra mussels are watercraft or material than have been operated and/or been in infested water. Watercraft/materials that have only been in BC waters or waters from a non-contaminated state present a low risk for introduction of invasive species (aquatic mollusks) but adherence to the clean boat procedure will prevent introduction/spread of invasive aquatic plants. <https://www.for.gov.bc.ca/hra/invasive-species/bringboattoBC.htm>

As well, further information can be found at <https://www.for.gov.bc.ca/hra/invasive-species/cleandraindry.htm>

Licensees Permittees and Contractors notification

1. Ensure all field staff are aware of the observation and reporting program for Invasive Species in the BCTS Chinook Business Area.
2. Ensure all staff are aware of the machine and boat cleaning requirement for the Invasive Species Program.

For more detailed information concerning Invasive Plant management, review the Chinook Invasive Plant SOP and BMP documents:

- <https://www2.gov.bc.ca/gov/content/industry/forestry/bc-timber-sales/forest-certification/ems-sfm>

Water Based Activities

Given that most of BCTS Chinook's operations are land based when conducting water based activities both staff and contractors must be made aware of these aquatic invasive species listed in Appendix A; e.g., when using freshwater or marine vessels, and/or, when conducting dives related to log dumps, etc., to aid in reporting any related sightings

Where to go for additional information

1. BC Inter-Ministry Invasive Species Working Group Website
<https://www.for.gov.bc.ca/hra/invasive-species/index.htm>
 - a. Priority Species List <https://www.for.gov.bc.ca/hra/invasive-species/priority.htm>
 - b. Report Invasive Species <https://itunes.apple.com/us/app/report-invasives-bc/id1004208197?mt=8>
 - c. Invasive Species Early Detection and Rapid Response Plan for British Columbia
https://www.for.gov.bc.ca/hra/invasive-species/Publications/Prov_EDRR_IS_Plan.pdf
 - d. Zebra and Quagga Mussel Early Detection and Rapid Response Plan for British Columbia
https://www.for.gov.bc.ca/hra/invasive-species/Publications/Prov_ZQM_EDRR_Plan.pdf

Appendix A

Priority Invasive Species for reporting to IAPP database

Invasive Species	Scientific name	Group	Habitat	General Distribution	Web Link
Eastern Grey Squirrel	<i>Sciurus carolinensis</i>	Mammal	inhabit deciduous and mixed forests in B.C., along with urban areas.	Lower Mainland, Okanagan, Vancouver Island	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Eastern_Grey_Squirrel_alert.pdf
Feral Pig	<i>Sus scrofa</i>	Mammal	adaptable to a variety of habitat types but are limited by deep snow, prefer riparian areas with sufficient water	Lower Mainland, Vancouver Island, Thompson-Okanagan, Peace, Chilcotin, Kootney	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/feral_pig_alert.pdf
Nutria	<i>Myocastor coypus</i>	Mammal	commonly found in marshes, wetlands, slow-moving streams and sloughs prefers freshwater but occasionally found in brackish habitats.	Lower Mainland, Fraser Valley, Southern Vancouver Island, Gulf Island	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Nutria_alert.pdf
Asian Carp Family	Bighead carp <i>Hypophthalmichthys nobilis</i> Silver carp <i>Hypophthalmichthys molitrix</i> Grass carp <i>Ctenopharyngodon idella</i> Black carp <i>Mylopharyngodon piceus</i>	Fish	prefer to spawn in areas of consistent water flow to aid in egg development prefer to spawn in areas of consistent water flow to aid in egg development	There have been no reports of Asian carp in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/asian_carp_alert.pdf
Bitterlings	<i>Rhodeus spp.</i>	Fish	found in ponds, lakes, marshes, muddy and sandy pools and backwaters of rivers habitats where freshwater mussels exist	There have been no reports of Bitterlings in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Bitterling_alert.pdf

Invasive Species	Scientific name	Group	Habitat	General Distribution	Web Link
Bullheads	<i>Ameiurus spp.</i>	Fish	slow streams and rivers with high vegetation; along with lakes, lagoons and ponds. tolerate waters with low oxygen concentrations and high temperatures	Lower Mainland, Okanagan, Vancouver Island	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Bullhead_alert.pdf
Channel Catfish	<i>Ictalurus punctatus</i>	Fish	found in deep pools and lakes prefer warmer waters for spawning	Channel Catfish have not been reported in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Channel_catfish_alert.pdf
Goldfish	<i>Carassius auratus</i>	Fish	streams and pools, ditches, and ponds areas where there is submerged aquatic vegetation wide range of temperatures and oxygen levels, and are unaffected by ice cover	Lower Mainland, Vancouver Island, Southern Interior	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Goldfish_alert.pdf
Gobies	Round Gobies <i>Neogobius melanostomus</i> Monkey Gobies <i>Neogobius fluviatilis</i> Tube-nose Gobies <i>Proterorhinus marmoratus</i> Amur Gobies <i>Rhinogobius similis</i>	Fish	different habitats depending on species type Round Gobies prefer waters with rocky and sandy bottoms Monkey Gobies found in a wide range of temperature in both fresh and brackish water Tube-nose Gobies prefer waters near the shores of lakes and rivers Little is known about the preferred habitat of Amur Gobies .	No Distribution Available	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Gobies_alert.pdf

Invasive Species	Scientific name	Group	Habitat	General Distribution	Web Link
Largemouth Bass	<i>Micropterus salmoides</i>	Fish	shallow lakes, ponds, and rivers warmer waters, near vegetation and debris	Lower Mainland, Vancouver Island, Okanagan, Thompson and Kootney Regions	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Largemouth_bass_alert.pdf
Smallmouth Bass	<i>Micropterus salmoides</i>	Fish	shallow lakes, ponds, and rivers warmer waters, near vegetation and debris	Lower Mainland, Vancouver Island, Okanagan, Thompson and Kootney Regions	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Largemouth_bass_alert.pdf
Oriental Weatherfish	<i>Misgurnus anguillicaudatus</i>	Fish	primarily found in rivers, lakes, swamps, ponds, rice fields and field ditches mud or silt substrates in shallow depths prefer stagnant or slow flowing water	Lower Fraser Valley, specifically in the Alouette River system	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Oriental_Weatherfish_alert.pdf
Snakeheads	<i>Family Channidae</i>	Fish	lakes, ponds, streams, and ditches, in shallow water with vegetation tolerance to varying temperatures and water quality conditions	One report of Snakehead in 2012, in the Lower Mainland	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Snakehead_alert.pdf
Tench	<i>Tinca tinca</i>	Fish	slow-moving water with vegetation and mud substrate can withstand low temperatures and varied oxygen levels	Osoyoos, Christina, Skaha, Okanagan lakes and Pend d'Orielle	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Tench_alert.pdf

Invasive Species	Scientific name	Group	Habitat	General Distribution	Web Link
Western Mosquitofish	<i>Gambusia affinis</i>	Fish	slow-flowing water, in vegetated ponds and lakes and pools in streams. can also be found in brackish water	Western Mosquitofish have not been reported in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Western_Mosquitofish_alert.pdf
White Cloud Mountain Minnow	<i>Tanichthys albonubes</i>	Fish	prefer slow moving waters with thick vegetation water temperatures as low as 5 degrees Celsius.	White Cloud Mountain Minnows are not present in B.C	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/White_Cloud_Mountain_Minnow_alert.pdf
Yellow Perch	<i>Perca flavescens</i>	Fish	freshwater lakes, ponds, pools of creeks, rivers, along with brackish waters	Lower Mainland, Vancouver Island, Pend d'Oreille, Thompson, Kootenay, Okanagan	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Yellow_perch_alert.pdf
African Clawed Frog	<i>Xenopus laevis</i>	Amphibians and Reptiles	aquatic habitats such as rivers, lakes, ponds, marshes, rain pools, and swamps manmade waters, including reservoirs, dams, flooded pits, ditches, and wells They prefer stagnant pools and slow flowing streams, appearing to thrive best in eutrophic waters	There have been no reports of African Clawed Frogs in B.C	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/African_clawed_frog_alert.pdf
American Bullfrog	<i>Lithobates catesbeiana</i>	Amphibians and Reptiles	prefer warm, weedy ponds and lakes also be found in ditches and slow moving streams	Vancouver Island between Victoria to Campbell River, west to Port Alberni, some Gulf Islands, Lower Mainland, Okanagan and Kootenay	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/American_bullfrog_alert.pdf

Invasive Species	Scientific name	Group	Habitat	General Distribution	Web Link
European Wall Lizards	<i>Podarcis muralis</i>	Amphibians and Reptiles	ground-dwelling, often found on rock faces, open woodlands areas of human development (stone and wood piles, concrete and brick walls, railways, roadsides)	Southern Vancouver Island, West Vancouver, Osoyoos	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/European_Wall_Lizard_alert.pdf
Red-eared Slider	<i>Trachemys scripta elegans</i>	Amphibians and Reptiles	freshwater habitats including rivers, swamps, ponds and ditches; with slow current, muddy bottoms and dense vegetation	Lower Mainland, southern Vancouver Island, Southern Interior	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Red-eared_slider_alert.pdf
Apple Maggot	<i>Rhagoletis pomonella</i>	Insects and Spiders	habitats where host fruits are found including cultivated/ agricultural land, managed forests, plantations/orchards, urban areas, and natural terrestrial areas.	Coastal B.C, Fraser Valley, Vancouver Island, Gulf Islands, and the city of Prince George.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/apple_maggot_aler.pdf
Argentine Ant	<i>Linepithema humile</i>	Insects and Spiders	top soil, under debris, or within manmade structures prefer moist areas and warm temperatures	Southern Vancouver Island (Victoria)	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Argentine_ant.pdf
Asian Long-Horned Beetle	<i>Anoplophora glabripennis</i>	Insects and Spiders	urban agricultural, rural and forested regions in/on host trees such as: Acer (Maple) Salix (Willow), Populus (Poplar), Betula (Birch), Aesculus (Horsechestnut), Albizia (White Silk), Celtis (Hackberry), Cercidiphyllum (Katsura), Koelreuteria (Goldenrain Tree), Platanus (Plane or Sycamore), Sorbus (Mountain Ash), and Ulmus (Elm)	There have been no reports of Asian Long-horned Beetles in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Asian_long_horned_beetles.pdf

Invasive Species	Scientific name	Group	Habitat	General Distribution	Web Link (Further Information)
Balsam Woolly Adelgid	<i>Adelges piceae</i>	Insects and Spiders	found on true fir trees (Abies) in natural forests, planted forests, and urban areas low elevation sites with good growing conditions (adequate water and nutrition) high elevation forests	coastal forest zones of B.C. Fraser Valley, Vancouver Island, Cascades Forest District (Coquihalla area) and the town of Rossland	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/balsam_woolly_adelgid_alert.pdf
Asian Clam	<i>Corbicula fluminea</i>	Other Invertebrates	found in brackish to freshwater rivers, lakes, streams, canals and reservoirs sediment surface or slightly buried in silt, sand or gravel substrates	Four confirmed locations in the Lower Fraser River one in the Pitt River two in the Coquitlam River one lake on Southern-Vancouver Island	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Asian_clam_alert.pdf
Chinese Mystery Snail	<i>Cipangopaludina chinensis</i>	Other Invertebrates	prefers low flowing freshwater rivers, streams and lakes Found partially buried in soft, muddy or silty substrates	five lakes on Southern Vancouver Island four confirmed reports in downtown Victoria one confirmed report in a lake near Mission	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Chinese_mystery_snail_alert.pdf
Red Swamp Crayfish	<i>Procambarus clarkia</i>	Other Invertebrates	variety of freshwater habitats including rivers, lakes, ponds, streams, canals, marshes, swamps, and ditches with organic debris and muddy to sandy substrates tend towards warm, shallow, slow moving waters	There have been no reports of Red Swamp Crayfish in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Red_swamp_crayfish_alert.pdf

Invasive Species	Scientific name	Group	Habitat	General Distribution	Web Link (Further Information)
Rusty Crayfish	<i>Orconectes rusticus</i>	Other Invertebrates	inhabit lakes, ponds and streams that provide year-round suitable water quality (well oxygenated and temperatures from 0-39°C prefer clay, silt, sand, gravel and rock substrates	There have been no reported occurrences of Rusty Crayfish in B.C.	https://www.for.gov.bc.ca/hra/invasive-species/Publications/SpeciesAlerts/Rusty_crayfish_alert.pdf
Zebra Mussle Quagga Mussel	<i>Dreissena polymorpha</i> <i>Dreissena bugensis</i>	Other Invertebrate	Freshwater attach to most substrates including sand, silt, and harder substrates optimal temperature for spawning is between 18-28°C	There have been no reported introduction of live quagga or zebra mussels into B.C. lakes or waterways.	https://www.for.gov.bc.ca/hra/invasive-species/mussel facts.htm