

Education Activities & Resources for Educators

Tackle invasive species: Hands-on with your students

Fishing For Native Species !

Teacher's handbook for grade 4

This handbook contains activities that will engage your students, help them investigate invasive species in the Yukon and their impacts, and explore ways we all can help prevent their spread. The activity is suitable for use in both formal school programs, as well as for informal youth groups, camps and recreation programming. Suggested age is grade 4.

For further information or support contact.
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Environment and
Climate Change Canada

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Introduction on Invasive Aquatic Species

Invasive Aquatic Species are introduced aquatic organisms that can harm native species by bringing disease and altering ecosystems. This impacts fisheries, tourism, health and recreation in Yukon.

However, most lakes and waterways in the Yukon appear to be free of invasive aquatic species. Some species of fish have been introduced to Yukon waters but are not considered invasive at this point in time (rainbow trout, stickleback, Arctic char, and goldfish).

Full definition of an invasive species:

An organism (plant, fungus, or bacterium) that is introduced into an ecosystem and has negative effects on the economy, environment, and/or health. The term “invasive” is reserved for the most aggressive species, which reproduce rapidly and cause major changes to the areas where they become established.

– Yukon Invasive Species Council

Activity Fishing for Native Species

A fishing derby that helps young students to differentiate between native and introduced species.

List of Materials Required for Activity:

- Small images of the native and non native species laminated and cut out with a couple staples on each cut out. These are the fish that the children will try to catch and identify as native or non native.
 - These images are found on pages 6-12.
- Two Buckets covered with “fishy” fabric, with a hole cut in the lid for the children to fish through.
- Ice fishing poles outfitted with neodymium magnets



Figure 1. Materials Required for Activity.

The following activity will teach children how to identify your local invasive species compared to similar native species.

Procedure:

- How non-native species of plants and animals invade our waters?

The children are guided to categorize the organism as native and non-native (See Figure 1).




- Give a short description of each animal and its harmful or beneficial contribution to the watershed. Once we feel they have an understanding of the different species, we let them go “FISHING” !

Place all the organism pictures into the bucket labeled “Ecosystem”.

The children use the fishing pole to take turns pulling out a “fish” picture from the bucket. Then they take the fish picture and compare it to how the organisms were originally sorted. If it is a native organism, they throw it back into the bucket “ecosystem”. If it is determined that the organism is not native, the child puts it in a separate “non-native habitat” bucket to be removed from the ecosystem.

The children demonstrate their knowledge about non-native and native species by identifying the organisms as they are fished out of the buckets.

Non-Native Aquatic Species




	<p>Cherry Shrimp <i>Neocaridina davidi var. red</i></p> <p>Shrimp which are bright red and have a pretty high tolerance to varying water quality, and temperature. Cherry shrimp are omnivores, can live for one to two years. At 15 to 30 mm long, they have 20 to 30 eggs, which take two to three weeks to hatch. Found in Atlin warm springs pool, BC in 2016.</p>
	<p>Goldfish <i>Carassius auratus</i></p> <p>Destroy vegetation and stir up mud by digging up lake bottoms, looking for food. Goldfish compete with and prey on local fish and amphibians. Found in Atlin warm springs pool, BC and the Takhini hot springs pond, but get rid of it.</p>
	<p>Zebra mussel <i>Dreissena polymorpha</i></p> <p>Mollusc which reproduces quickly and forms dense colonies on underwater surfaces. Zebra mussel larvae are tiny, clear and invisible. Only few are required to introduce them to new waters.</p> <p>Quagga mussel <i>Dreissena bugensis</i></p> <p>Mollusc which can live in deeper, colder, water than zebra mussels can clog boat motors and pipes. A single mussel can produce up to one million eggs per year.</p> <p>Zebra and quagga mussels attach to boat hulls and underwater infrastructure, and can cost millions of dollars of damage. Adult mussels can live several weeks out of the water and be easily transferred from one body of water to another.</p>

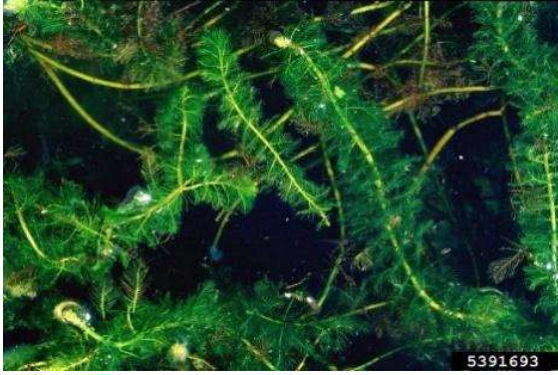
Cherry Shrimp (photo by by Taku River Tlingit First Nations).

Goldfish (photo by Windsor Aguirre, Bugwood.org).

Zebra mussel (photo by Amy Benson, U.S. Geological Survey, Bugwood.org).



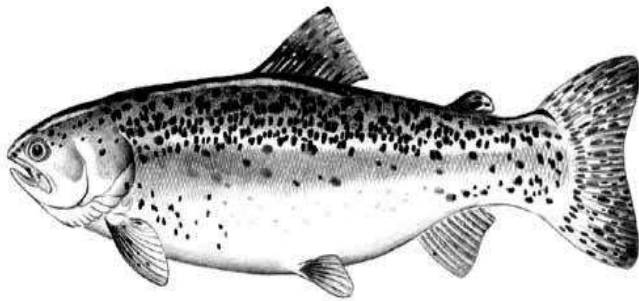
<p>Quagga mussel (photo by Amy Benson, U.S. Geological Survey, Bugwood.org).</p>	
 <p>Carolina Fanwort (photo by Leslie J. Mehrhoff, University of Connecticut, Bugwood.org).</p>	<p>Carolina Fanwort <i>Cabomba caroliniana</i></p> <p>Water plant which grows rapidly, pushing out native plants and creating thick mats along lake edges. Fanwort can become established from only a small piece of plant.</p>
 <p>New Zealand Mud Snail (photo by Mike Gangloff, Bugwood.org).</p>	<p>New Zealand mud snail <i>Potamopyrgus antipodarum</i></p> <p>Tiny mollusc which survives well out of water and reproduces quickly, coating river bottoms. New Zealand mud snails can clone themselves. A colony can start from a single overlooked snail on your fishing gear.</p>
 <p>Didymo (photo by Environment Yukon Government, http://www.env.gov.yk.ca/animals-habitat/About-Aquatic-Invasive-Species.php).</p>	<p>Didymo <i>Didymosphenia geminate</i></p> <p>Algae which can coat river bottoms in thick, unsightly mats. Only a few cells are required to introduce Didymo to a new water body. Didymo is in Yukon, but we don't have a good understanding of where it's found and whether it's spreading. Didymo is considered invasive elsewhere, but may in fact be native to Yukon.</p>



Eurasian Water-milfoil (photo by Barry Rice, sarracenia.com, Bugwood.org).

Eurasian water-milfoil
Myriophyllum spicatum

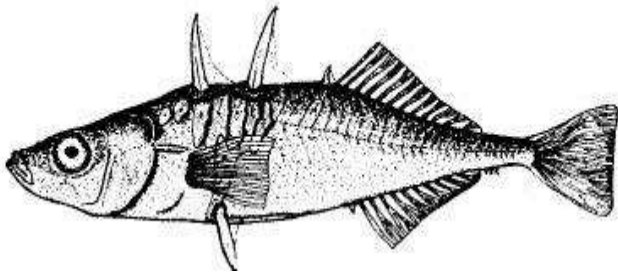
Water plant which outcompetes native plants, taking over shallow areas of lakes. Eurasian watermilfoil can grow and reproduce from a small plant fragment.



Rainbow Trout (photo by Environment Yukon, http://www.env.gov.yk.ca/animals-habitat/fish/rainbow_trout.php)

Rainbow Trout
Oncorhynchus mykiss

Adult trout feed mainly on crustaceans (freshwater shrimp), aquatic insect larvae (caddis and black fly), mollusks and the occasional small fish. Rainbow trout spawn in spring in flowing water. In lakes, rainbows feed in shallow water in spring, and move to deeper, cooler water in summer. In streams and rivers, rainbows spend time in deep pools, below rapids and beneath undercut banks. **The rainbow trout in McIntyre Creek and the Yukon River near Whitehorse resulted from lake stocking in the 1950s.** The effects of the rainbow trout on native species have not been studied.

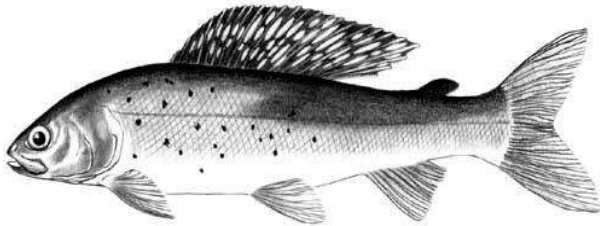


Giant Threespine Stickleback (photo by Dr. T. E. Reimchen, <http://www.dfo-mpo.gc.ca/species-especes/profiles-profiles/giantthreespine-epinochegeant-eng.html>)

Threespine Stickleback
Gasterosteus aculeatus

These fish can reach high densities in shallow water, competing with native fish for food. The threespine stickleback's large spine makes it difficult for larger fish to eat them.

Native Aquatic Species



Arctic Grayling (picture by Environment Yukon Government, http://www.env.gov.yk.ca/animals-habitat/fish/arctic_grayling.php).

Arctic Grayling *Thymallus arcticus*

Vividly coloured fish, especially during the spawning period. Feed with terrestrial insects, nymphs, snails, small fish and eggs. Live in streams, rivers and lakes throughout Yukon.



Wood Frog (photo by David Cappaert, Bugwood.org).

Wood Frog *Lithobates sylvaticus or Rana sylvatica*

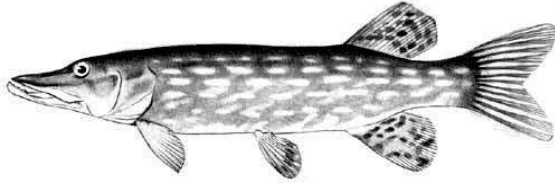
The most common and widespread frog in Yukon. It lives in a wide variety of habitats and adults can be found well away from water. They gather together to breed in clear, shallow ponds from late April through June, often with some ice still on the water. The Wood Frog thrives in the North because it grows quickly and can tolerate cold. Eggs, tadpoles, and adults can function at lower temperatures than any other amphibian.



Western Toad (photo by Kevin D. Arvin, Bugwood.org).

Western Toad *Anaxyrus boreas*

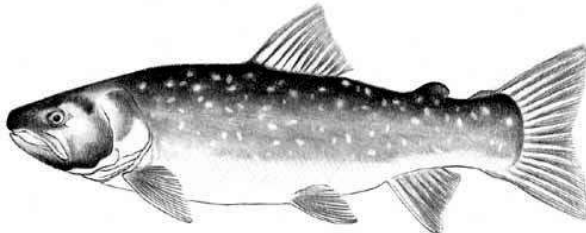
Found throughout most of northern British Columbia, Western Toad populations are so far confined to the Liard River basin in Yukon. Though it is nocturnal further south, it may be active during daylight in the North. Western Toads hibernate communally in burrows more than a metre underground. They are limited to areas where deep snow cover provides insulation. In the North they are abundant around geothermal springs such as those in Atlin, Meister River, or Coal River.



Northern Pike (picture by Environment Yukon Government, <http://www.env.gov.yk.ca/animals-habitat/fish/pike.php>)

Northern Pike
Esox Lucius

Northern pike are soft-rayed fish. They are quite long in proportion to depth and width. Pike have long, sharp teeth, used for capturing and holding their prey. Adult pike spawn in the spring in shallow, weedy, flooded areas of rivers, marshes and bays of large lakes. Pike are found throughout the year in shallow water due to their ability to tolerate higher water temperatures, lower concentrations of oxygen and higher concentrations of carbon dioxide than many species of freshwater fish. They generally lie motionless and well camouflaged among the shallow water vegetation, waiting to pounce on anything that swims too close. Although they primarily eat fish, they also take any other creatures which are small enough and within striking distance.



Bull Trout (picture by Environment Yukon Government, http://www.env.gov.yk.ca/animals-habitat/fish/bull_trout.php).

Bull Trout
Salvelinus confluentus

Very similar in appearance to the Dolly Varden and can only be distinguished by a few subtle differences. Bull Trout occupy different geographic ranges than the Dolly Varden. If found in the Liard drainage these fish are likely Bull trout, while those found elsewhere in the Yukon are likely Dolly Varden.



Common Bladderwort (Photo by Bruce Bennett)

Common Bladderwort
Utricularia vulgaris macrorhiza

An aquatic carnivorous plant that eats aquatic insects that are lured into its tiny underwater bladders. It's the most common of the Utricularia species found in Yukon.



Russet Sedge (Photo by Bruce Bennett)

Russet Sedge
Carex saxatilis

This sedge species is often dominant in wetlands and has a circumboreal distribution but also occurs in high elevations as far south as Utah and Colorado. It is easy to identify by its shiny black inflated fruits (perigynia) which have two protruding female flower parts (stigmas).



Northern Water-starwort (photo: Bruce Bennett)

Northern Water-starwort
Callitriche hermaphroditica

This aquatic plant lives in shallow lakes across the circumboreal north. It is pollinated by the wind and provides food and cover for young fish (fry) and other aquatic species. Ducks eat the seeds and foliage.



Giant Pond Snail (photo by Roberto Verzo (CC BY 4.0))

Giant Pond Snail
Lymnaea stagnalis

Perhaps the largest freshwater snail in Yukon with a thin shell that may grow over five centimetres in length. It has been used widely in studies for learning, memory, and neurobiology as it has a simple nervous system with identifiable neurons. Science has learnt a lot from this snail, including synaptic plasticity and the neurobiology of development and aging.



Northern Pondweed, (photo by Biopix (CC BY-NC 4.0))

Northern Pondweed

Potamogeton alpinus

This circumpolar aquatic species is distinguished by having a red-tinge with submerged lance-ribbon leaves that float. It can be found in rivers and lakes with clear fresh water. This species is important to Trumpeter Swans who feed on its carbohydrate-rich roots (rhizomes).

Conclusion

How are aquatic invasive species spread?

Mostly by people and their equipment when they move from place to place. For example, during water-based activities like fishing, aquatic organisms can cling to boats, fishing gear, and footwear. Aquatic invasive species can also spread because of illegal dumping of aquariums.



If you think you've spotted an aquatic invader:

Report it to YISC: info@yukoninvasives.com

Report the incident to the Fisheries Program at Environment Yukon by calling 1-800-661-0408, ext. 5721 or emailing fisheries@yukon.ca.

If possible, take a photograph, a small sample for identification in a small, secure baggie and note the exact location.

Prevent their spread with [CLEAN DRAIN DRY](#).

If you find a potential invasive species on equipment after leaving a site, throw it in the garbage and not down the drain.

– Yukon Invasive Species Council