

Adventures of Captain Fishhook Waterflea:



Spiny Beard's Revenge

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Lake Champlain Research Institute



This book is dedicated to the staff and students who have worked at the Lake Champlain Research Institute at the State University of New York College at Plattsburgh on Lake Champlain's plankton. The story is fiction, and, obviously, plankton are invertebrates that can't talk or reason with others. However, the threat of invasive species in our waters is real, so real that the spiny waterflea successfully invaded Lake Champlain in 2014. We hope you enjoy this story, and, above all, we hope you clean your gear, cars, trucks, and boats everytime you move from one water body to another.

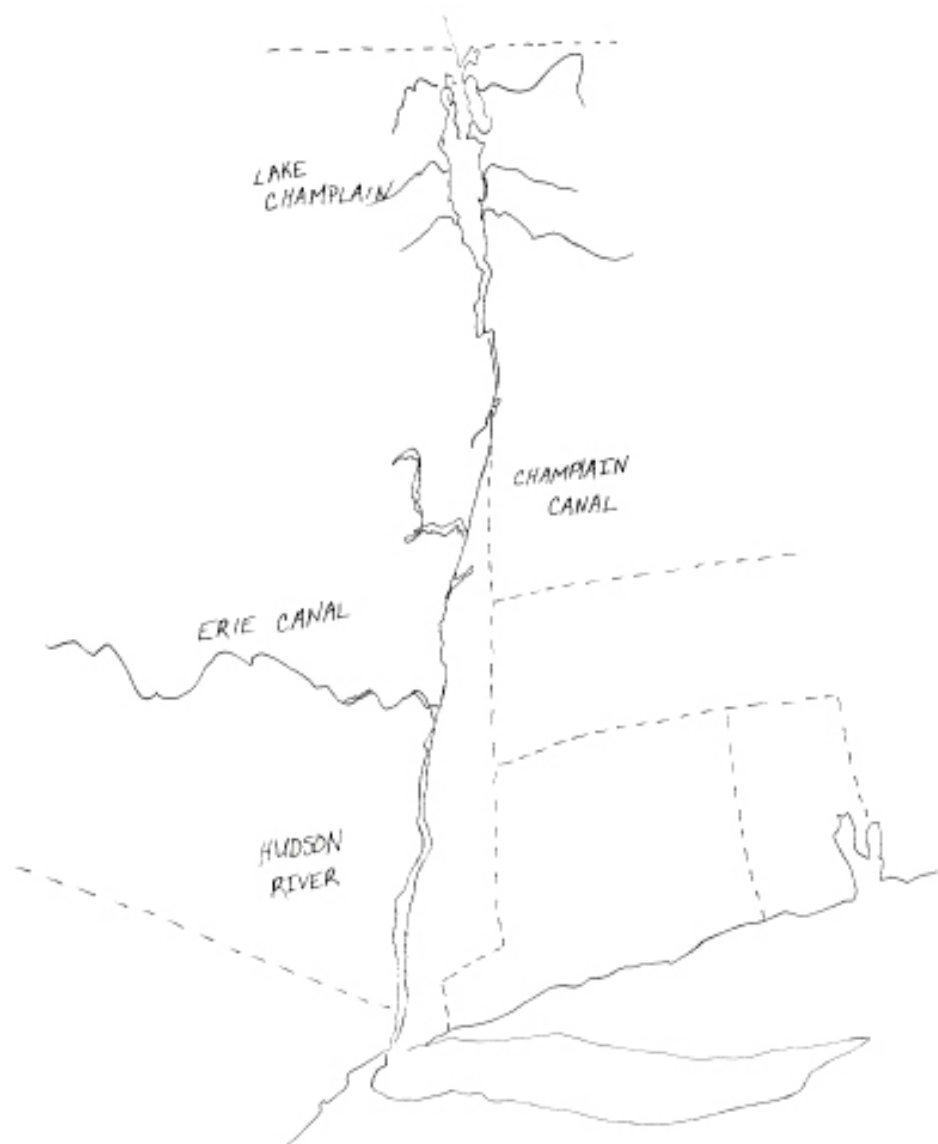
To The Parents

There were battles in the Great Lakes and Lake Champlain in the Revolutionary War and the War of 1812. The brave soldiers on both fronts, though, were humans. They used boats and cannons, bayonets, and forts to protect their land and fight for the country.

But now, there is a new battle being fought under the surface of these lakes. Not with cannons or soldiers, but between native species and invasive species.

A lake functions without problems when there is a natural balance of native species. If a non-native species enters, however, it can disrupt the entire ecosystem.

This story is about the recent invasion of a lake by a non-native, or invasive species, the Spiny Waterflea, into Lake Champlain. Spiny Waterflea and other potential invaders represent a real threat to the ecological integrity of our lakes.



After their previous defeated attempt, the Pirates Waterflea were not ready to give up their quest to invade Lake Champlain. They retreated to a safe place, holed up for the winter (as resting eggs), and prepared for another invasion attempt the next year. Awaking from a long winter's rest(-ing egg), Captain Fishhook gave the order for

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SPINY BEARD'S REVENGE.....





"Spiny," as Captain Fishhook had come to affectionately refer to his first mate, "I have a plan, matey. We ARRRRE going to get you in first, and then I'll come with reinforcements."

Spiny chuckled, "Excellent plan, Captain! I'm ready and able on your orders, sir!!"



Fact Box: Resting Eggs

Resting eggs are what most plankton use to overwinter in lakes. During the Fall they lay a resistant egg that settles to the lake bottom and then emerges the next spring after spending the winter "resting".



Captain Fishhook described in great detail the plan for Spiny Beard. By hook or crook, he would invade Lake Champlain from the south using a surprise strategy: a **FULL SCALE INVASION!**

First, Spiny had to find a nearby lake from which to stage his dastardly plan. He bid farewell to Captain Fishhook and started his journey to Lake Champlain. On the southern route, he unsuccessfully tried several of the Finger Lakes of Central New York, only to realize his miscalculation.

“None of these **BLASTED** Finger Lakes are directly connected to Lake Champlain!”

He got as far as the last Finger Lake and was just about to give up when he realized the most amazing thing: lakes are connected by rivers, and sometimes even when a natural river connection does not exist between two lakes someone can build one for you!

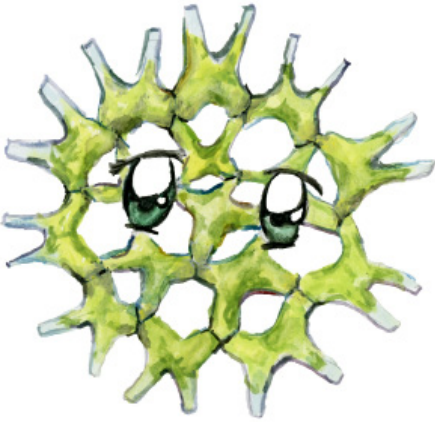
Spiny needed to find the perfect connection to Lake Champlain so he went to see an old friend, Stripes, the zebra mussel.



Fact Box: Zebra Mussels

Dreissena polymorpha are small striped- shelled mollusks which filter out tiny microscopic organisms leaving less food for native species to survive. They have pushed out native mussels from the ecosystem, clogged underwater pipes, and covered surfaces underwater. They also have very sharp shells which cut swimmers who brush against them.





Spiny knew Stripes from his time training on Lake Ontario's pirate invasion fleet. He also knew Stripes had already invaded all of the Great Lakes, the Chicago canal and Illinois River, the Mississippi river all the way down to the Atchafalaya swamp in Louisiana, and most of North America. As Spiny says, "ARRGH! No one does it better than Stripes, no one!!"

If anyone knew how to stage an invasion it would be Stripes. So Spiny decided to enlist Stripes help to invade Lake Champlain.



“ARRR,” said Spiny as he knocked on Stripes’ door. “Are ye home?”

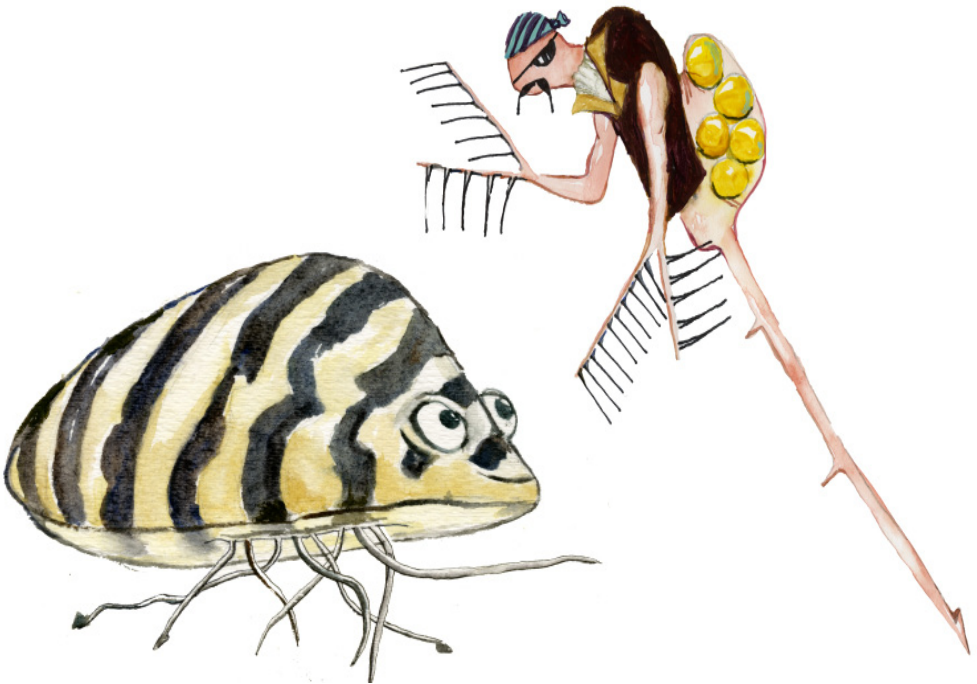
Stripes got up from a plate of nice, tasty rotifers to answer the door.

“Well, hello there my good friend, Spiny! It’s been a long time,” said Stripes in his thick British accent. “How may I be of assistance?”

“I need information and lots of it. I’m planning to invade Lake Champlain, and I need your help”, Spiny replied.

“HELP?!?!” screamed Stripes.
“YOU DON’T NEED MY HELP!!!! Invading Lake Champlain is easy. Just use the blasted canal!”

Spiny thought,“WOW, we usually just use boats.”



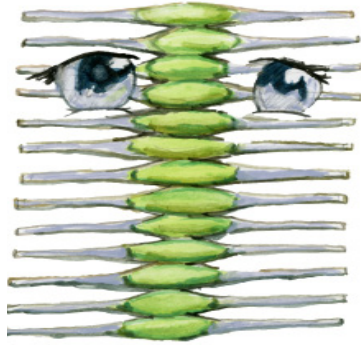
He then asked Stripes,
"Ummm, what's a blasted canal?"

Stripes responded
"Spiny, you numb-nut, a
canal is a human-made artificial
river . Like a highway, humans use
them to move around where rivers do not
naturally exist. You blimey fool, you need to use
the southern canal to access Lake Champlain. I'll
give you directions on how to get there."



Spiny replied, " Okay, thanks matey!"





Stripes continued,

“Look, this is tricky, but once you know where they made canals, you will make it there easily. You can get to Lake Champlain by going up the Hudson River to the Champlain canal; then go north, and after a few miles you’re in the south lake. From there the whole lake awaits.”

Spiny said, “I can’t swim upstream in the Hudson; I’m a plankton, ARRGH, ye know? That is not my niche.”

Stripes replied, “Ahhhh, true. Okay, we need a more complex plan.”

“First, you will need to invade a nearby lake with a river connection to the canal. That way it’s all downstream from there. You can visit me friend who apparently is in the Hudson Valley, Harry Hydrilla. He will know the way.”



Spiny turned to leave and said,
“Thanks matey! Eat lots of those rotifers. I
hate those little scallywags especially the
ones in Lake Champlain!”

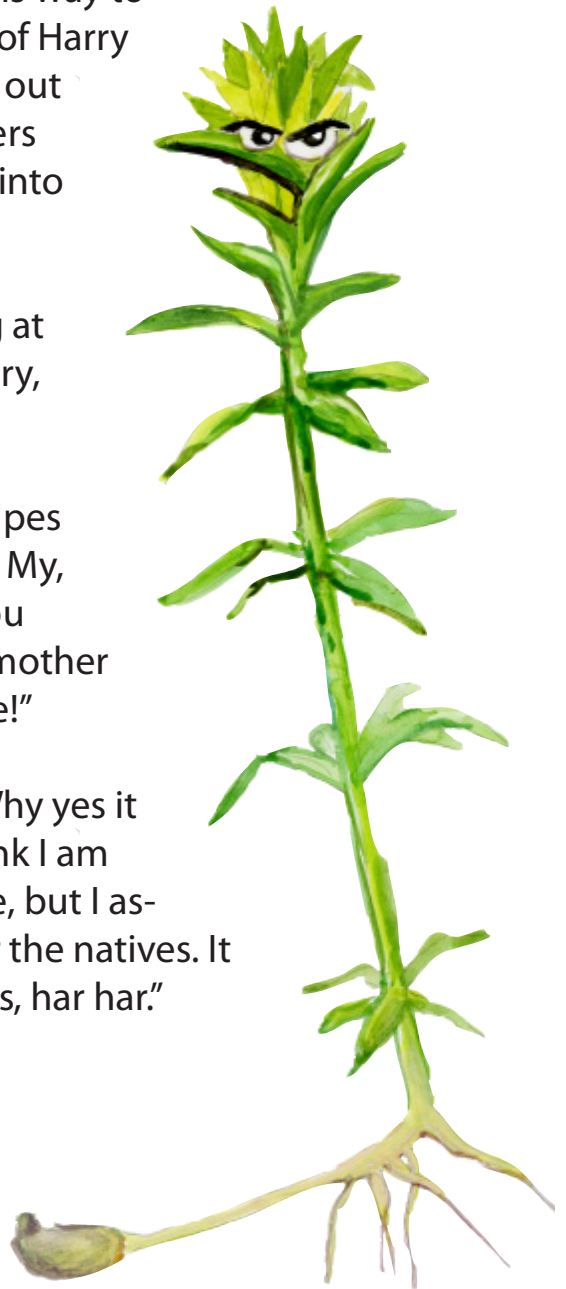
Stripes replied, “Live long and may
your journey be full of invasion success!”

Spiny made his way to the Hudson, home of Harry the Hydrilla, to find out more about the rivers and canals flowing into Lake Champlain.

Upon arriving at a pond to meet Harry, Spiny said,

“Hi Harry. Stripes sent me to see you. My, what a thick mat you have. That would smother a native fish for sure!”

Harry said, “Why yes it will. Some may think I am good when I invade, but I assure you it’s bad for the natives. It makes them restless, har har!”

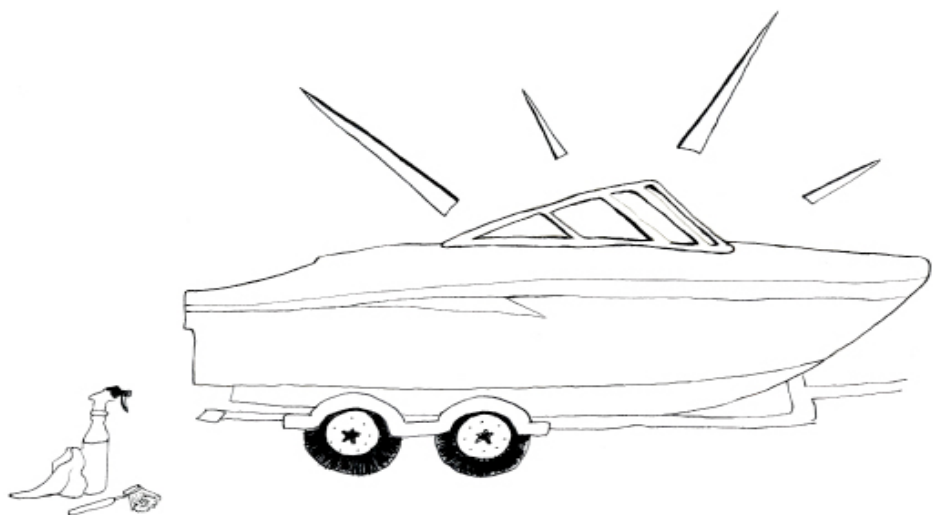


Fact Box: Hydrilla

Hydrilla verticillata is an aquatic plant that consists of five point leaves whorled around a stem. Native plants are displaced by thick mats which block out sunlight needed for other plants to do photosynthesis. Hydrilla also reduces oxygen levels in the water, causing stress to other organisms.

Hydrilla reproduces from nodes or from stem fragments, allowing it to spread easily. Hydrilla mats alter habitats - preventing people and animals from swimming and fishing, and blocking out water facilities and channels.





Spiny then continued his quest by asking, "Harry, I don't have much time. How do I invade Lake Champlain?"

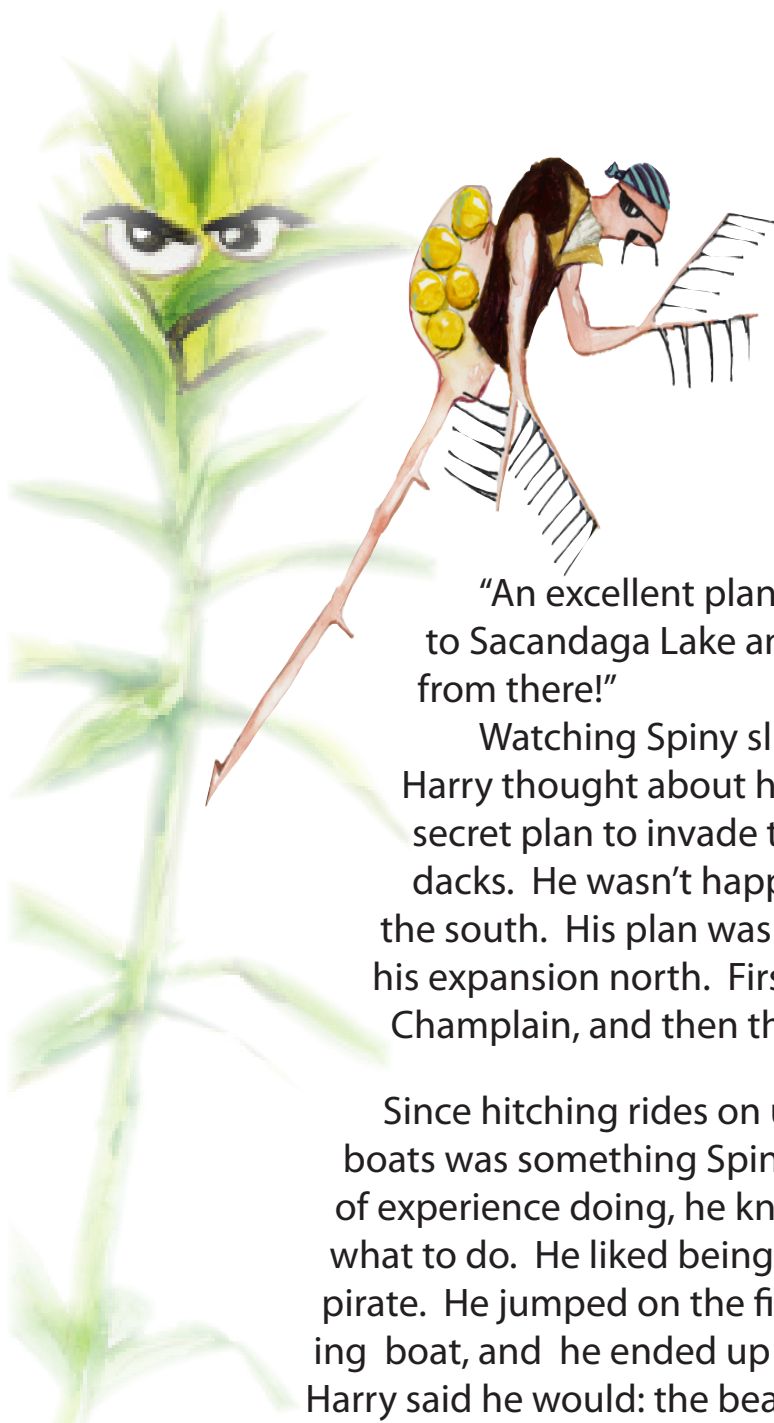
Harry stopped, pondered the situation, and said, "Okay, you need to hitch a ride on a boat. Pick one that is travelling toward Lake Champlain. Make sure you get into a body of water connected to Lake Champlain by a river or canal, and then you can carry out your dastardly revenge and invade from there. I suggest Lake George or maybe Sacandaga Lake."



“The fastest way to get to Lake Champlain would be to invade Lake George, but they have strict boat cleaning regulations - it would be hard for you to sneak in. So, you may have to get to Sacandaga first, and then go from there.”

“OK,” said Spiny. “Do you know a boat I can ride on?”

Harry replied, “Try one of the of the east-bound boats from Lake Ontario. Lots of those people fish in Sacandaga Lake in particular, and many of them don’t clean their boats.”



"An excellent plan! I will get to Sacandaga Lake and invade from there!"

Watching Spiny slink away, Harry thought about his own secret plan to invade the Adirondacks. He wasn't happy staying in the south. His plan was to continue his expansion north. First, Lake Champlain, and then the world!!

Since hitching rides on unwashed boats was something Spiny had lots of experience doing, he knew exactly what to do. He liked being a dirty pirate. He jumped on the first passing boat, and he ended up right where Harry said he would: the beautiful Sacandaga Lake.



From there he slinked his way down the Sacandaga River until he entered the mighty Hudson River. From the Hudson he found the entrance to the feeder canal that leads directly to the Champlain Canal just as Harry had predicted. He had found his destiny and finally after a few attempts he made the rest of the trip through the canal, and then into Lake Champlain. Just for fun he invaded several other lakes nearby including beautiful Lake George, where he exclaimed, "What a pretty sheet of water!"

Finally with dreadful intentions he made it to Lake Champlain his ultimate destination where he said, "Here I am!!! ARRGH mateys, time to eat some native plankton and make this ecosystem mine." The Spiny waterflea population grew and grew until there were so many waterfleas in the the local anglers cried "ENOUGH! These darned Spiny waterfleas are clogging all our lines and destroying the food web in our lake. The fishing here is ruined."

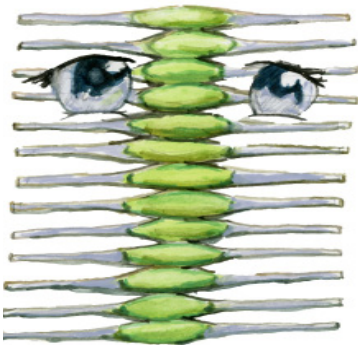
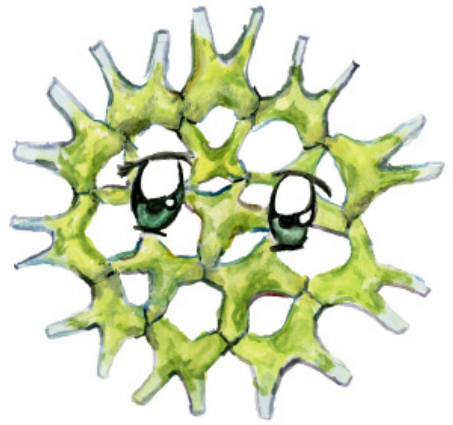


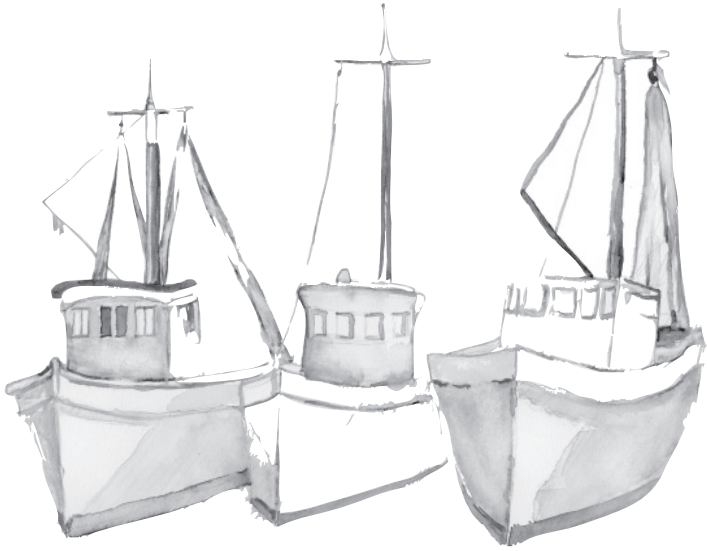
Fact Box: Spiny Waterflea

Bythotrephes longimanus is an aquatic zooplankton, native to Europe. It most likely came to the Great Lakes via shipping vessels and has now spread throughout the region into Canada and the U.S. This invasive species has severe impacts on the lakes it invades, including altered food webs, loss of native biodiversity, and clogging fishing lines for anglers. Pictured below is a Lake Champlain sample from 2014 in showing hundreds of visible Spiny waterfleas with black eyespots and long spines.



While Lake Champlain was a very hospitable place for Spiny and his mates eventually he became restless and developed a longing to explore new waters. He shouted, "Where will I go next, only the future will tell. WATCH OUT!!! I may be coming to your lake!!! I hear the Adirondack's have some nice lakes, ARGHHHHH!!!! Has anyone seen a boat leaving Lake Champlain that I can hitch a ride on?"





Addendum:

The spiny waterflea successfully invaded Sacanadaga Lake in 2008, was discovered in several nearby lakes in 2010, and in Lake George and the Champlain feeder canal in 2012. Finally it was discovered in Lake Champlain during routine monitoring by the Lake Champlain Research Institute at SUNY Plattsburgh in 2014. From initial discovery in August 2014 Lake Champlain spiny waterflea populations exploded to become the dominant planktonic taxon within only a few weeks time. Densities in Lake Champlain are now higher than most populations in the Great Lakes resulting in catastrophic impacts on the ecosystem and food web. As Spiny beard likes to say, “only the future will tell” of the impacts of this invasion on the integrity of the Lake Champlain ecosystem. We can do our part by using the “check, clean, and dry” approach when moving boats and fishing gear while recreating on our lakes and rivers. You can be part of the solution, not part of the problem.





The picture below is an individual Spiny Waterflea with brood patch from Lake Champlain. Note the four young developing babies (its brood) on its back.

