



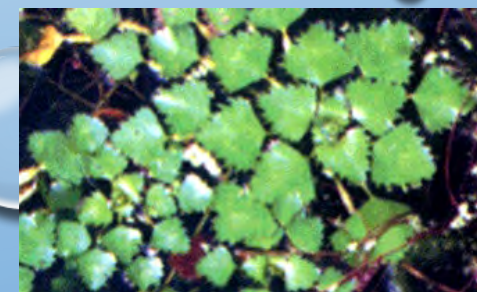
LAKE CHAMPLAIN BASIN PROGRAM AQUATIC INVASIVE SPECIES INITIATIVES



MEG MODLEY

LAKE CHAMPLAIN BASIN PROGRAM

AIS MANAGEMENT COORDINATOR



Aquatic Invasive Species

- plants, animals, and pathogens that are nonnative to this region AND cause harm
- harm- economic, ecological, or human health
- can produce self-sustaining populations



Eurasian Watermilfoil



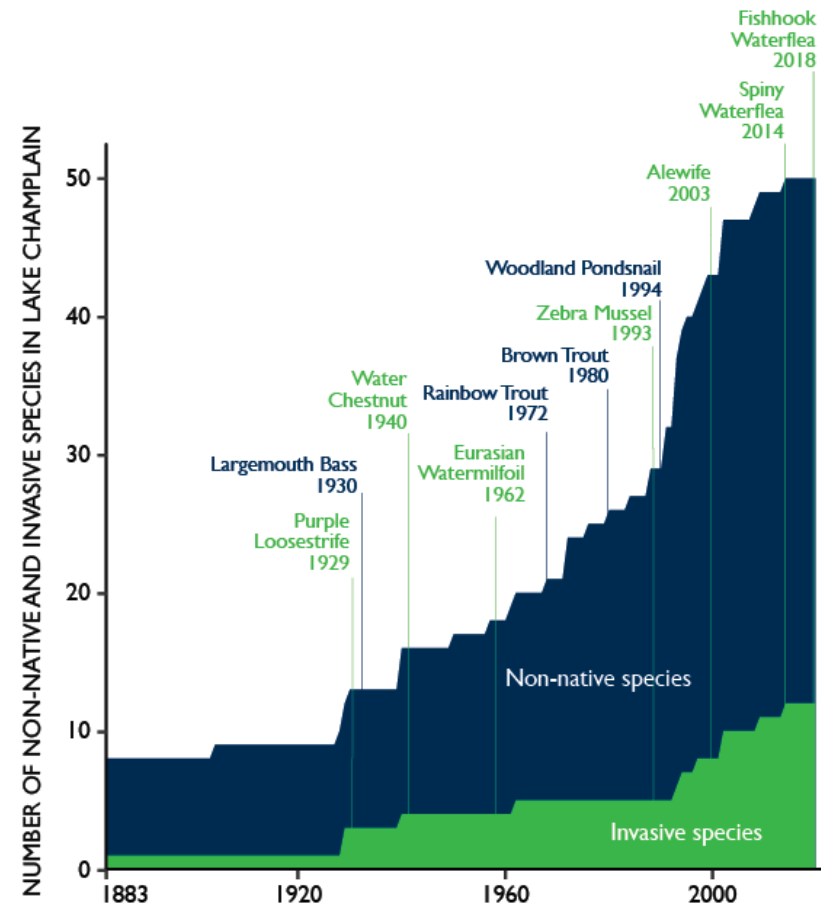
Spiny Waterflea



Zebra Mussel

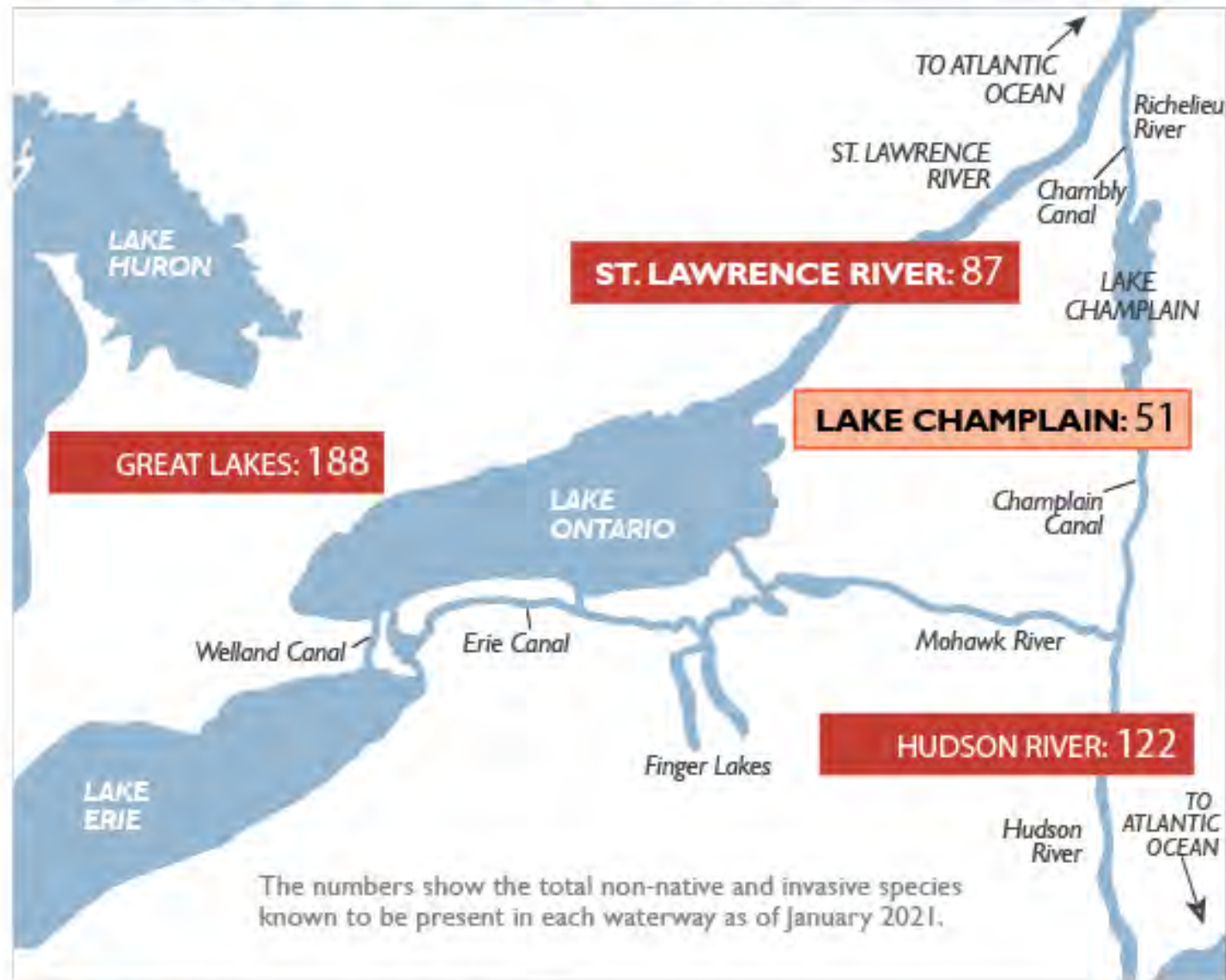


AQUATIC NON-NATIVE AND INVASIVE SPECIES IN LAKE CHAMPLAIN, 1883-2020



NOTE: Data reflects the year of first reported sighting of species.
DATA SOURCE: Ellen Marsden, University of Vermont

Non-native threats to Lake Champlain Basin from connected waterways



NOTE: All the waterways contain some overlap of species.

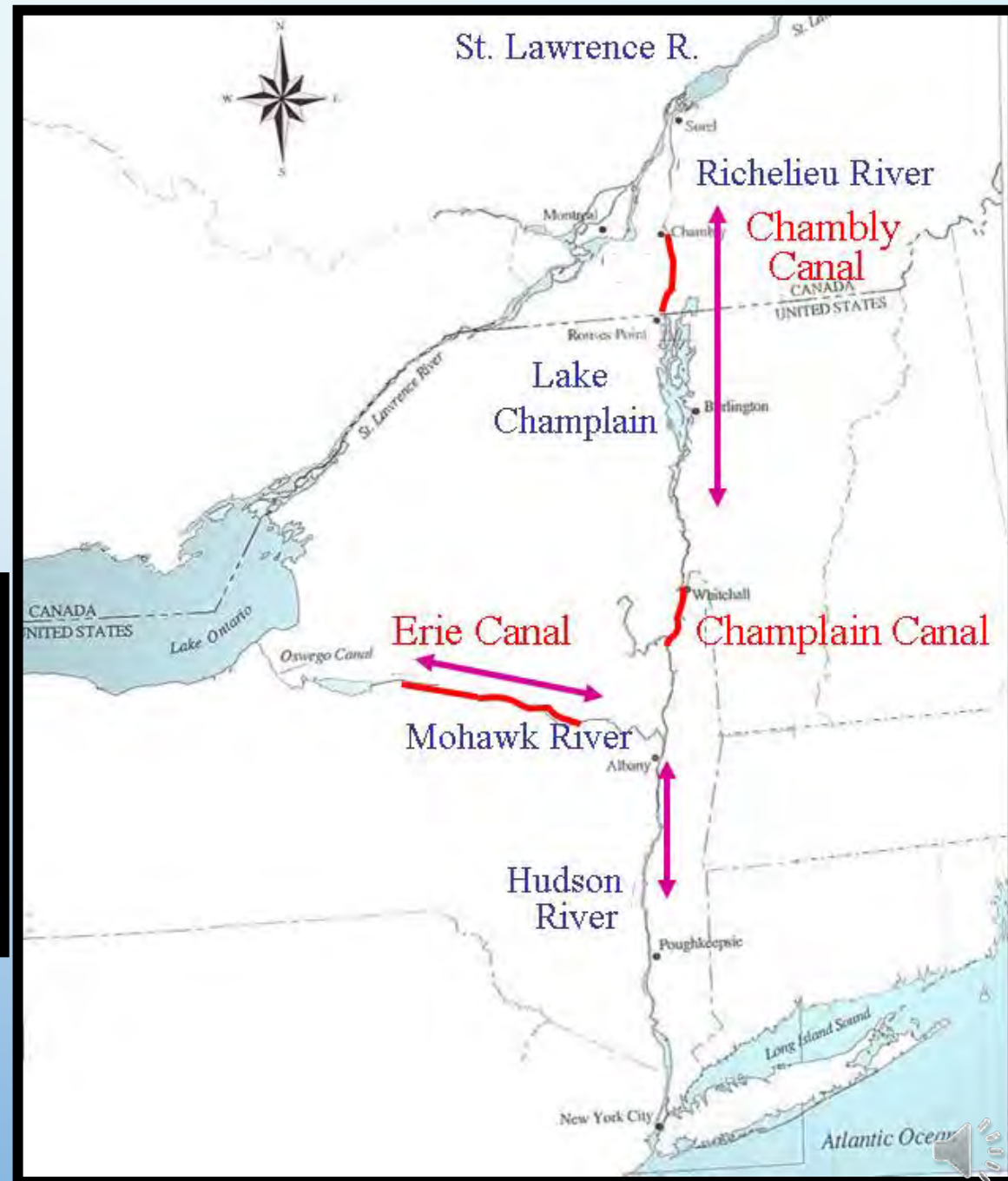
DATA SOURCES: UVM, LCBP, Lake Champlain Sea Grant, Great Lakes Environmental Research Laboratory, Lafontaine and Costan 2002, Strayer 2012 and Egan 2017. Lake Champlain data current as of January 2021.



Ballast Water Discharge



Canals & Waterways



Invasive Species Pathways



Canals & Waterways



Home Gardening



Illegal Stocking

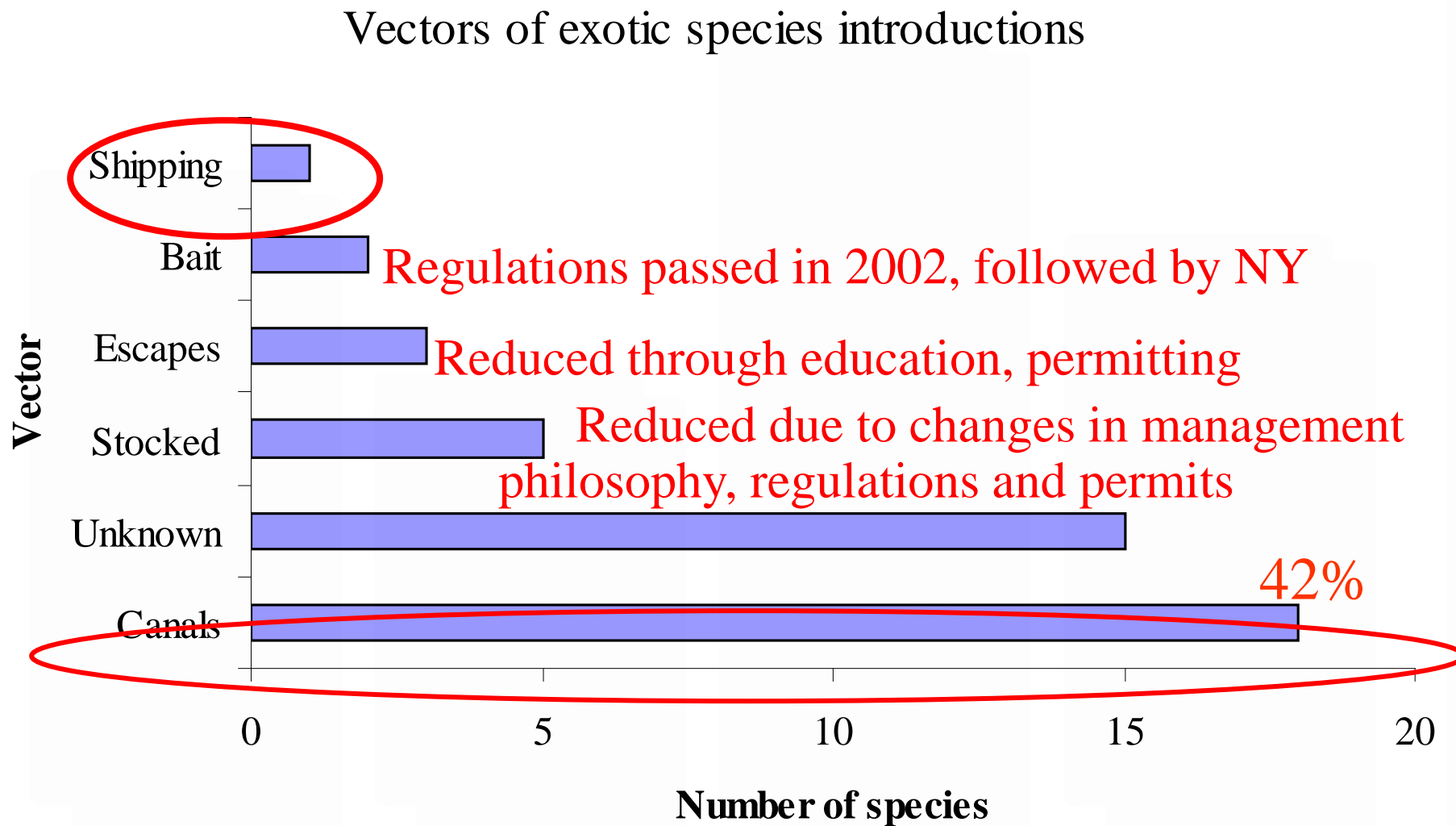


Overland Transport



Aquarium Dumping

Strategies to reduce vectors of invasive species introductions



INVADERS ALREADY IN THE CANAL SYSTEM



Round goby



Hydrilla

Asian clam



Fragile papershell



Quagga mussel

ECONOMIC IMPACTS ARE COSTLY

**Invasive species cost the U.S. more than \$120 billion
in damages every year!**

Water Chestnut Infestation, Lake Champlain



Milfoil Infestation, Upper Saranac Lake

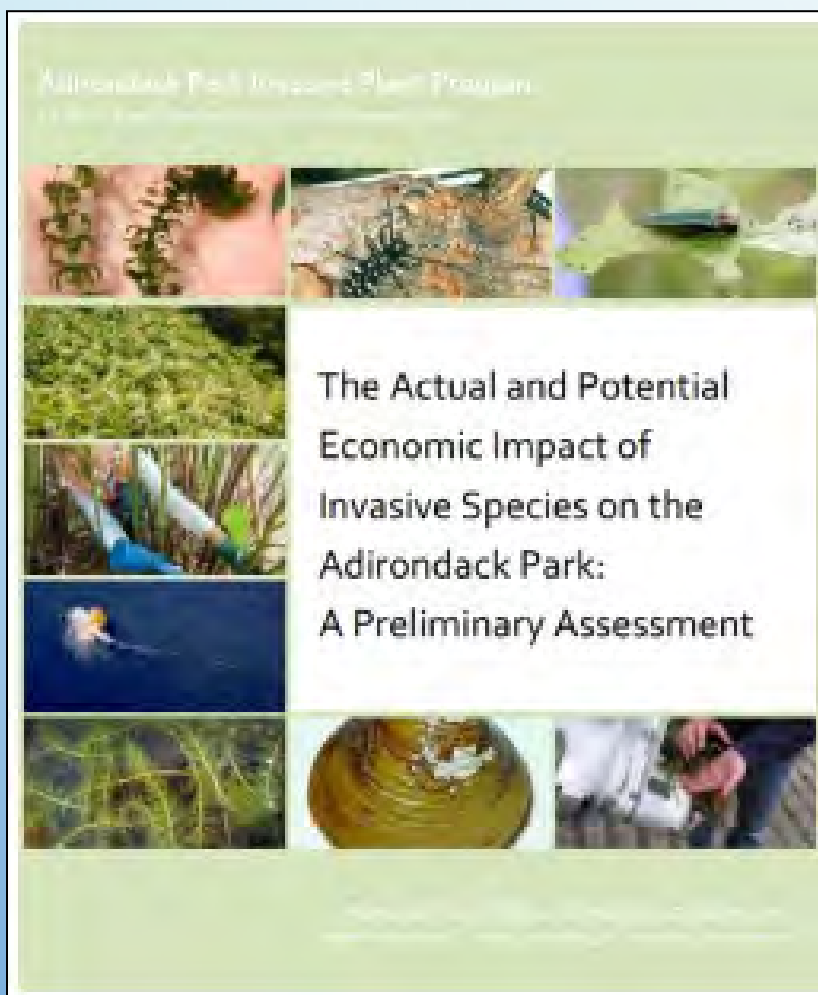


- Reduced water quality
- Reduced productivity of forestry, fisheries, agricultural and range lands
- Impaired recreational activities; access, boating, birding, fishing, hunting
- Reduced property values
- Negative impact on tourism





ADK ECONOMIC IMPACTS



- **\$4.27 MILLION** BEING SPENT ON INVASIVE SPECIES IN THE ADIRONDACKS
- ESTIMATED COST OF 8 INVASIVE SPECIES: 4 AQUATIC AND 4 TERRESTRIAL
- ESTIMATED ANNUAL LOSS OF **\$48-53 MILLION**
- TOTAL ESTIMATED PROPERTY VALUE LOSS OF **\$420-840 MILLION**



Examples of AIS impacts to Lake Champlain

- Water chestnut management in Lake Champlain ~\$600k annually
- Sea lamprey control program ~ \$500-\$800k annually
- Fish hatchery and public water supply intake expense for clearing pipes
- Injuries to citizens that cut their feet on the shells of zebra mussels while recreating
- Negative impacts to historic ship wrecks
- Imbalances in the foodweb (alewife displacing native smelt, spiny and fishhook waterflea disrupting the food chain, aquatic plant growth choking waterways for boats, swimmers and anglers)



An Ounce of
Prevention =
1 Pound of Cure

LAKE CHAMPLAIN BOAT LAUNCH STEWARDS

10 Year Highlights

CLEAN



Clean any visible
mud, plants, fish or
animals off your boat

DRAIN

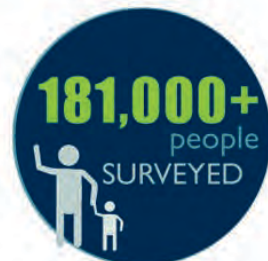


Drain live wells,
bait wells and
bilge areas

DRY



Dry boats, trailers
and equipment before
use in another
waterbody



BOATS SURVEYED:



Lake Champlain Boat Launch Steward Program: 2007-2020

*Modeled after the Paul Smiths College Adirondack Watershed Institute Program

- 2007 steward program grew from 4 steward to 12 stewards in 2019
- Program Season: Memorial Day to Labor Day (8hr days up to 4 days/week)
- Location: high use VT Dept of Fish and Wildlife and NY State DEC boat launches on Lake Champlain, provincial QC sites

Risk Assessment – Greet boat launch users, conduct courtesy inspections, collect data on AIS spread prevention behavior, inform users/hand out educational materials



Key AIS spread prevention questions:

- 1) Last waterbody watercraft visited in the previous two weeks?
- 1) Do you take any measures to prevent the spread of AIS?
- 2) Where do you intend to launch your watercraft next?

JOINT TRAINING WITH AWI



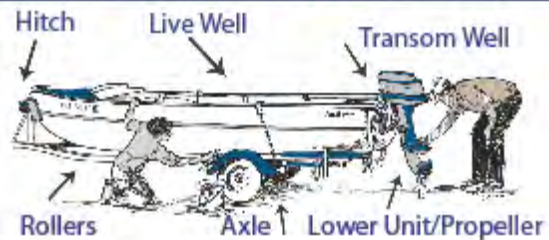


CLEAN BOATS CLEAN WATERS




Watch out for unwanted aquatic hitchhikers when you move from one waterway to another!

Aquatic invasive species (AIS) are non-native plants and animals that threaten native plants, wildlife, and their habitat. They also affect humans by degrading boating and fishing areas and reducing lake shore property values and tourism. Once AIS are established, eradication is almost impossible.

WATERCRAFT CHECK POINTS



When you leave a waterway:

-  Check and remove any visible mud, plants, fish or organisms from boats, trailers, equipment, clothing, dogs, etc.
-  Clean and eliminate water from equipment.
-  Dry anything that comes into contact with water.

Never release plants, fish, or other animals into a waterway unless they came from that waterway.



Boat Launch Steward Field Data Sheet

Lake Champlain Steward Survey

Total # of Groups:

Boat Launch:

Weather:

Steward Name:

Date:

	Boat Type	Group Size	State of Registration	Launch/Retrieve (circle one)	Time of Inspection (military)	Prior BLS contact? (circle one)	Does the Visitor Take Spread Prevention Steps? Write in Steps Taken!!	Aquatic Organism(s) Found? (circle one)	Species Identification	Brochure or Sticker? (circle)	Last Waterbody Visited in Prior 2 Weeks? (name, town, state)	What Waterbody Will the Visitor Go To Next? (name, town, state)
1				L R		Y N		Y N		B S		
2				L R		Y N		Y N		B S		
3				L R		Y N		Y N		B S		
4				L R		Y N		Y N		B S		
5				L R		Y N						
6				L R		Y N						
7				L R		Y N						
8				L R		Y N						
9				L R		Y N						
10				L R		Y N						
11				L R		Y N						
12				L R		Y N						
13				L R		Y N						
14				L R		Y N						
15				L R		Y N						
16				L R		Y N						
17				L R		Y N						
18				L R		Y N						
19				L R		Y N						
20				L R		Y N						

Boat Type = M=motorboat; PWC= personal watercraft; S=sailboat; C= canoe; K = kayak
B/S = B for Brochure, S for Sticker (circle one, both or none)

Spread Prevention = I (inspected), WB (washed boat), DB (drained bilge water),
BB (drained bait buckets), LW (drained or treated live well), Disp (dispose of bait properly)
DRY (dry boat and equipment); NONE (no steps taken); N/A (did not ask)



Collect a sample if the species is identified as INVASIVE or UNKNOWN

2019 FIELD SEASON DATA SUMMARY

For Year	2019
Stewards	13
Launches Attended	12
Wash Stations at Launches	3
Boats	10955
Number of Visitors	22861
% Groups w/Intercepted Organisms	13.2
% Groups w/Intercepted Invasives	9.1
% Groups Taking AIS Preventative Measures	75.8
# of Groups Surveyed	9883
Days	97
Surveys per Day	102
Average Group Size	2.3
For Year	2019

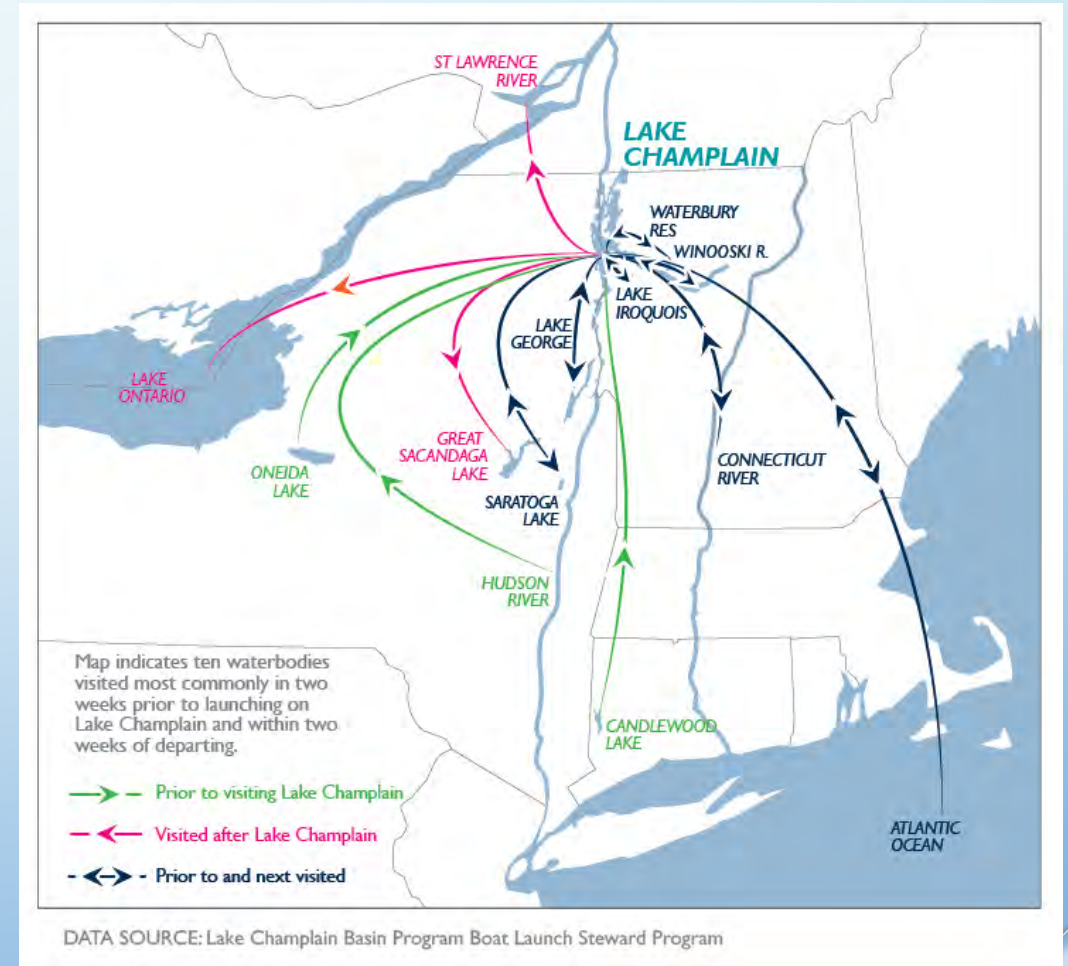
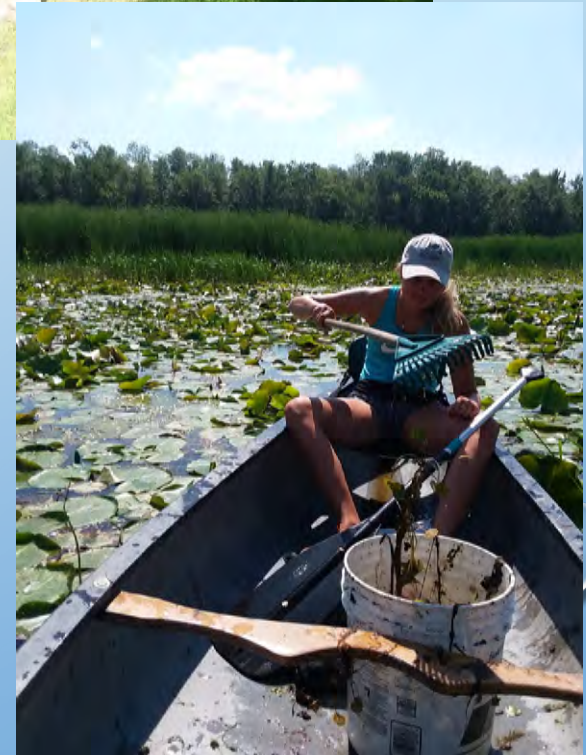


Figure 13 | Potential spread of aquatic invasive hitchhikers by trailered boats in the Northeast 2015-2017

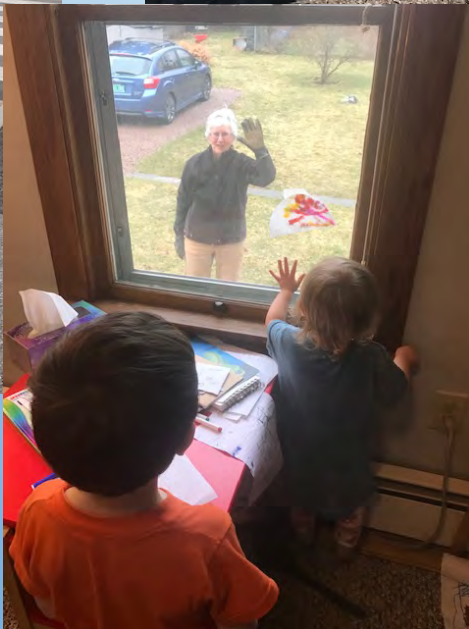
2019 YEAR OF THE FISHHOOK WATERFLEA AND HYDRILLA SAVE



ASSIST WATER CHESTNUT AND EUROPEAN FROGBIT HARVEST EFFORTS



COVID-19 TIMES- 2020 FIELD SEASON



- VIRTUAL TRAINING MAY 18-20TH
- PPE – MASKS, HAND SANITIZER, GLOVES
- UNKNOWN START DATE FOR THE FIELD WORK (EXPECT MEMORIAL DAY FOR NY; VT WAITING ON PERMIT, QC UNKNOWN)
- EXPECT TO HAVE DECON AT SHELBURNE, COLCHESTER, SOUTH HERO – SAME AS 2019
- WORKING ON ADDING DECON STATIONS (MALLETTS BAY HIGHEST RISK SITE)



**PARTNERSHIP FORMED TO REDUCE THE
SPREAD OF AQUATIC INVASIVE SPECIES
THROUGH THE CHAMPLAIN CANAL**

PARTNERSHIPS ARE KEY TO AIS SPREAD PREVENTION

- LCBP AND PARTNERS MET WITH NYSCC IN DECEMBER 2006 TO PROPOSE A PARTNERSHIP TO ADDRESS AIS IN THE CHAMPLAIN CANAL
- DEVELOPED SET OF COMMON PARTNERSHIP GOALS
- GROUP HAS MET SINCE 2006 TO DISCUSS AIS SPREAD PREVENTION EFFORTS IN THE CHAMPLAIN CANAL

WRDA 2007

SEC 5146. LAKE CHAMPLAIN CANAL, VERMONT AND NEW YORK

- (A) DISPERSAL BARRIER PROJECT – THE SECRETARY SHALL DETERMINE, AT FEDERAL EXPENSE, THE FEASIBILITY OF A DISPERSAL BARRIER PROJECT AT THE LAKE CHAMPLAIN CANAL, VERMONT AND NEW YORK, TO PREVENT THE SPREAD OF AQUATIC NUISANCE SPECIES
- (B) CONSTRUCTION, MAINTENANCE, AND OPERATION – IF THE SECRETARY DETERMINES THAT THE PROJECT DESCRIBED IN SUBSECTION (A) IS FEASIBLE, THE SECRETARY SHALL CONSTRUCT, MAINTAIN, AND OPERATE A DISPERSAL BARRIER AT THE LAKE CHAMPLAIN CANAL AT FEDERAL EXPENSE.

HISTORY OF INTEREST IN CHAMPLAIN CANAL AS AN AIS VECTOR

- 1989 (SMITH AND ROOT 1993); NYSDEC FISHERIES BIOLOGIST CONTACTS SMITH-ROOT TO EVALUATE ELECTRIC BARRIER ON THE CHAMPLAIN CANAL
- INTERSTATE HIGHWAYS AND RAILWAYS TRANSITION CANAL TO RECREATIONAL USE, PLATTSBURGH AIR FORCE BASE CLOSES 1995
- 1998 USFWS HOLDS WORKSHOP ON CHAMPLAIN CANAL AS VECTOR
- WRDA 2000 IDENTIFIES THE CHAMPLAIN CANAL AQUATIC NUISANCE SPECIES BARRIER FEASIBILITY STUDY
- 2001 – NSGO AWARD: *MULTIDISCIPLINARY ANALYSIS OF THE FEASIBILITY OF CHAMPLAIN CANAL BARRIER OPTIONS*
- 2002 LCSG STAKEHOLDER SUMMIT, CHICAGO SANITARY SHIP CANAL EXPERTS, OUTCOME = PUBLIC DOES NOT BELIEVE CANAL IS SIGNIFICANT PATHWAY FOR NONNATIVE SPECIES COMPARED TO OTHERS
- 2004 VESSEL TRAFFIC TOTALED 24,976 (22,315 RECREATIONAL, 495 CARGO, 715 TOUR, 129 HIRE, 1,322 STATE)



FEASIBILITY OF CHAMPLAIN CANAL AQUATIC NUISANCE SPECIES BARRIER OPTIONS

2005 LAKE CHAMPLAIN SEA GRANT AND NOAA STUDY (MARSDEN, MALCHOFF, AND HAUSER)

ATTRIBUTES OF AN IDEAL BARRIER =

- FEASIBLE
- AFFORDABLE
- DOES NOT IMPEDE BOAT TRAFFIC
- MINIMAL NON-TARGET EFFECTS
- EFFECTIVE AGAINST A RANGE OF TAXA (FISH, INVERTEBRATES, PLANTS, PLANKTON)

CANAL AIS MANAGEMENT OPTIONS

- ~~**ALTERNATIVE ONE:** DO NOTHING (I.E. NO CHANGE IN
CANAL ENGINEERING OR OPERATIONS)~~
- ~~**ALTERNATIVE TWO:** CLOSE THE CHAMPLAIN CANAL~~
- **ALTERNATIVE THREE: PHYSICAL/MECHANICAL
MODIFICATION OF CANAL AND OR LOCKS**
- ~~**ALTERNATIVE FOUR:** BEHAVIORAL BARRIER (ELEC., BUBBLE)~~
- ~~**ALTERNATIVE FIVE:** CHEMICAL/WATER QUALITY BARRIER~~
- ~~**ALTERNATIVE SIX:** BIOLOGICAL BARRIER~~



SAVE THE DATE – NOVEMBER 6TH, 2008

CHAMPLAIN CANAL AQUATIC INVASIVE SPECIES INFORMATIONAL MEETING
ORGANIZATIONS, BUSINESSES, MUNICIPALITIES, THE PUBLIC, AND OTHERS WITH AN INTEREST IN THE CHAMPLAIN CANAL ARE INVITED TO THE **CHAMPLAIN CANAL AQUATIC INVASIVE SPECIES INFORMATIONAL MEETING**. THE MEETING IS SPONSORED BY THE LAKE CHAMPLAIN BASIN PROGRAM (LCBP) AND THE NEW YORK STATE CANAL CORPORATION (NYSCC) IN PARTNERSHIP WITH THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION OFFICE OF INVASIVE SPECIES COORDINATION (NYSDEC-OISC).

WHEN: THURSDAY NOVEMBER 6TH, 2008 FROM 1PM-5PM

WHERE: WASHINGTON COUNTY MUNICIPAL CENTER, 383 BROADWAY, FORT EDWARD, NY

RSVP: THIS MEETING IS FREE AND OPEN TO THE PUBLIC. PLEASE RSVP TO LCBP AT 1-800-468-5227 OR KJARVIS@LCBP.ORG TO ENABLE US TO MAKE ADEQUATE SPACE AVAILABLE.

COME LEARN ABOUT AQUATIC INVASIVE SPECIES IMPACTS AND THE CHAMPLAIN CANAL. THE MEETING WILL INCLUDE PRESENTATIONS BY LCBP, NYSCC, NYSDEC-OISC, US ARMY CORPS OF ENGINEERS, INVASIVE SPECIES EXPERTS, AND WILL INCLUDE A PUBLIC COMMENT PERIOD.

OUTCOME OF THE MEETING

- NYSCC WROTE A LETTER TO THE USACE SUPPORTING A FEASIBILITY STUDY FOR A BARRIER ON THE CHAMPLAIN CANAL.



John L. Buono
Chairman

Michael R. Fleischer
Executive Director

New York State Canal Corporation
www.nyscanals.gov



Carmella R. Mantello
Director

March 3, 2009

Eugene Brickman
US Army Corp of Engineers
26 Federal Plaza
New York, NY 10278

Subject: Champlain Canal Dispersal Barrier Feasibility Project

Dear Mr. Brickman:

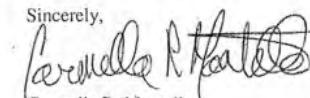
The New York State Canal Corporation (Corporation) formally requests that the US Army Corp of Engineers initiate the Champlain Canal dispersal barrier feasibility study to determine how to best prevent the spread of aquatic invasive species. This study is referenced in the Water Resources Development Act of 2007, Section 5146, which is excerpted as follows:

(a) Dispersal Barrier Project – The Secretary shall determine, at Federal expense, the feasibility of a dispersal barrier project at the Lake Champlain Canal, Vermont and New York, to prevent the spread of aquatic nuisance species.

The Corporation has formed a good working relationship with the Lake Champlain Basin Program and the New York State Department of Environmental Conservation to address aquatic invasive species spread prevention in the Champlain Canal. Our partnership held a Champlain Canal Aquatic Invasive Species Stakeholder Meeting in November, 2008, at which more than 70 stakeholders from municipalities, state agencies, non profit organizations, legislators' offices, watershed organizations, and businesses shared their thoughts and support for reducing the spread of aquatic invasive species via the Champlain Canal. The Corporation believes that the feasibility study is an important next step in managing aquatic invasive species threats to the Lake Champlain ecosystem.

The Corporation looks forward to working with the US Army Corp of Engineers on this endeavor. Please do not hesitate to contact me if you should have any questions.

Sincerely,



Carmella R. Mantello
Director

PARTNERSHIP WORKS TO ADDRESS NEW AIS IN THE CHAMPLAIN CANAL

- ASIAN CLAM – 1ST FOUND IN THE CHAMPLAIN CANAL IN FORT EDWARD, NY IN SPRING, 2008
- SPINY WATERFLEA – CONFIRMED IN GREAT SACANDAGA LAKE IN OCTOBER 2008
(CONNECTED TO THE CHAMPLAIN CANAL THROUGH THE GLENS FALLS FEEDER CANAL)
- 2009 CONGRESSIONAL TOUR OF THE CHAMPLAIN CANAL (NY AND VT)
- MARSDEN CHAMPLAIN CANAL SPECIES RESEARCH IN THE CHAMPLAIN CANAL
- STEWARDSHIP PROGRAMS IN 2013 AND 2014 TRAINED BY LCBP

Spiny Water Flea
Glens Falls Feeder Canal
June 12, 2012



CONGRESSIONAL TOUR OF CHAMPLAIN CANAL



Photos of sampling

All taxa: collections in drained locks (locks 4, 8, and 9)



Results

Canal habitat and conditions

Secchi depth 0.4 - 1.3 m (median 0.6 m)
DO (surface) 8.2 - 11 mg/L
DO (bottom) 6.8 - 1.4
Surface temp. max. 28° C
Bottom temp. averaged 1.2° C lower than surface



Conclusions of Canal Research

Champlain Canal contains a diverse community with reproducing fish communities

Habitat is largely warm, shallow, lentic, with mud-sand substrates

Canal is accessible to cold- and cool-water fishes

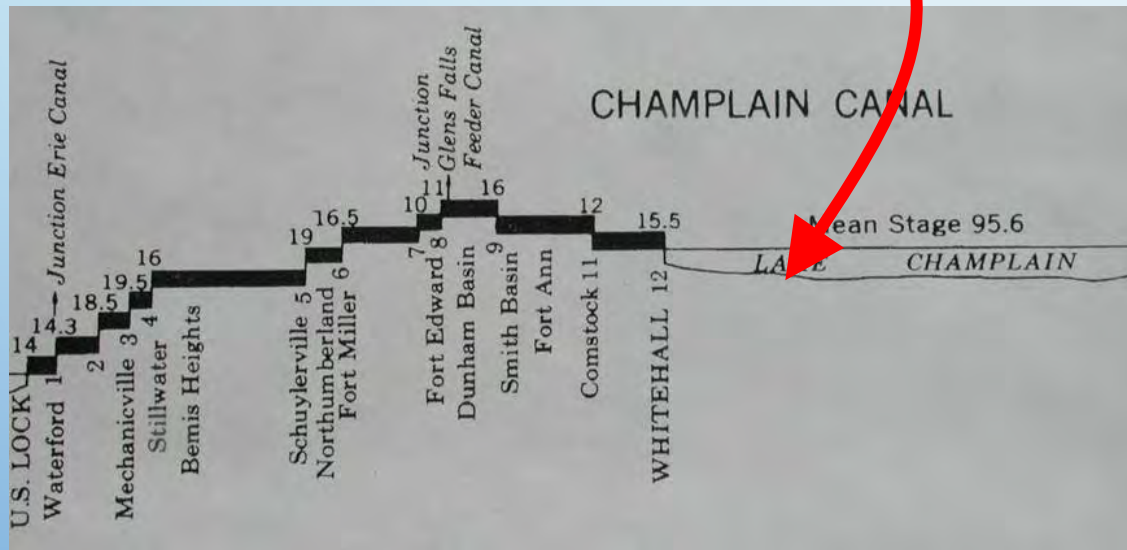
Invasion is occurring by range extension, not just rapid migration

= few obstacles to future invasions

USACE SCOPE OF STUDIES FOR CHAMPLAIN CANAL BARRIER FEASIBILITY STUDY

- NYSCC, NYSDEC, USFWS, AND LCBP PARTNERS AGREE ON LANGUAGE FOR THE CHAMPLAIN CANAL BARRIER FEASIBILITY STUDY FOR HYDROLOGIC SEPARATION
- NOT A RAPID PROCESS BUT WOULD ADDRESS ALL SPECIES MOVEMENT
- 2017 AFTER MANY ATTEMPTS (YEARS) SECURING A LOCAL SPONSOR, NEIWPCC/LCBP SERVE AS LOCAL SPONSOR AND SECURE SECTION 542 USACE ASSISTANCE TO INITIATE THE CHAMPLAIN CANAL BARRIER FEASIBILITY STUDY ~\$550K

TARGET AREA OF THE CANAL



Mouth of GF Feeder Canal –
looking upstream



OCTOBER 2018 SITE RECONNAISSANCE

- THE TEAM CONDUCTED A SITE VISIT ON OCTOBER 30, 2018 AT THE LAKE CHAMPLAIN CANAL, FOCUSING ON THE STUDY AREA OF LOCKS C8, C9, AND THE FEEDER CANAL FROM THE HUDSON RIVER AT GLENS FALLS, NY. ADDITIONAL SITES WERE VISITED IN THE VICINITY OF LOCK C7 AS IT BECAME APPARENT THAT THE CANAL BETWEEN LOCK C8 AND C7 MIGHT BECOME PART OF THE SOLUTION SET.



USACE/HDR STAKEHOLDER PROJECT TEAM

Summary of Control Measures used in Alternatives

- Defined 10 possible Measures for controlling the spread of Aquatic Invasive Species (AIS)
- Developed 6 Alternatives using combinations of the 10 measures to reduce or eliminate cross-basin transfer of AIS (Hudson River and Lake Champlain basins)
- Deliberately made the range of alternatives broad so costs & benefits of large & small investments could be considered

Control Measure	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
1) Reverse Flow C9 → C8, Raise Weir	X	X	X	X	X	X
2) Back Pump		X	X			
3) Alternate Makeup Water			X			
4) Physical Barrier (Berm / Block Flow)		X				
5) Boat Lift and Cleaning Station		X		X	X	
6) Wedge Wire Intake Screen			X	X		
7) Modified Lock Passage Scheduling and Operations	X		X			
8) Water Filtration / Storage Tank Feed			X			
9) Repair Lock Seals	X	X	X	X	X	X
10) Chlorination Treatment Chamber						X

- IDENTIFY MEASURES TO FORM 6 ALTERNATIVES
- DOWN SELECT TO 3 ALTERNATIVES
- EVALUATING VALUE FUNCTIONS FOR COST/BENEFIT ANALYSIS OF 3 ALTERNATIVES

ALTERNATIVES INCLUDE CONSTRUCTING BERM AND LIFTING BOATS SOUTH OF LOCK 9 AND PROVIDING BOAT LIFTS AT LOCK 9

- REVERSE FLOW AT LOCK C9, BACK PUMP, BUILD BURM, RAISE WEIR, BOAT LIFT WITH CLEANING STATION, REPAIR LOCK SEALS
- STUDY IS UNDERWAY

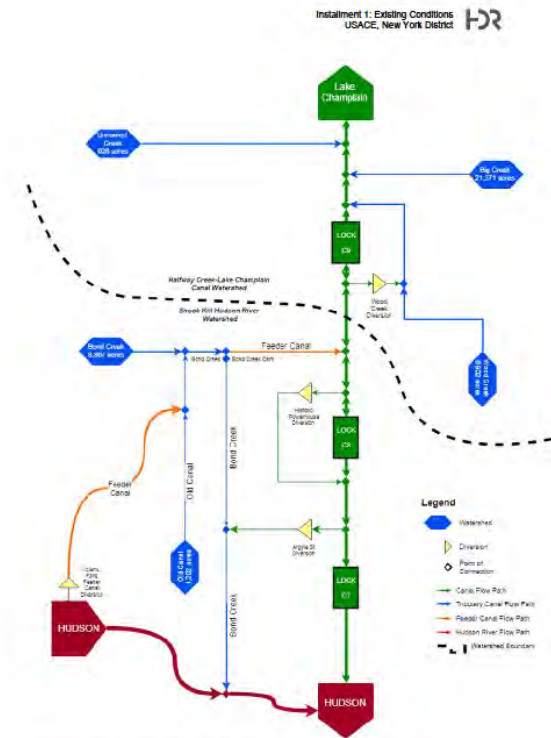
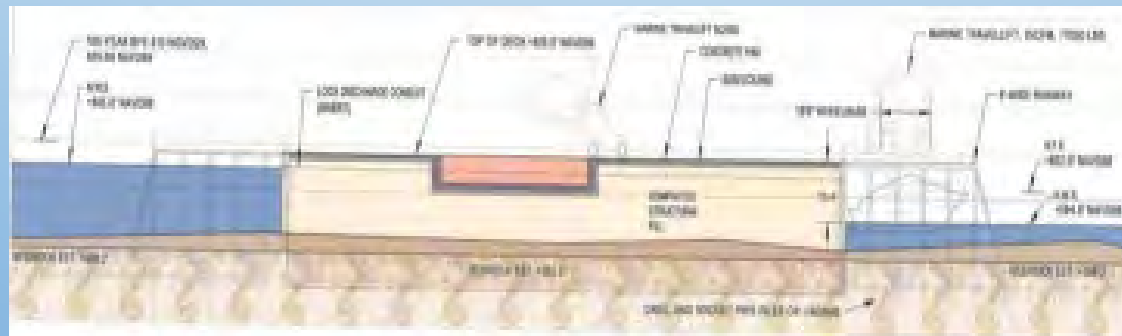
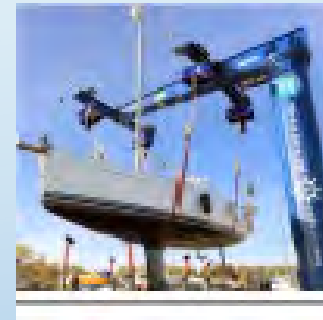


Figure 7 - Champlain Canal Schematic (Locks C7-C9)

THANK YOU!

Meg Modley Gilbertson

NEIWPCC Environmental Analyst

Lake Champlain Basin Program Aquatic Invasive Species Management Coordinator

54 West Shore Rd., Grand Isle, VT 05458

802-372-0215 mmodley@lcbp.org

lcbp.org | neiwpcc.org



Great Lakes and Lake Champlain Invasive Species Program (GLLISP) Update

NYCAC March 2021

Meg Modley

ALS Management Coordinator

Lake Champlain Basin Program

The numbers show the total non-native invasive species known to be present in each waterway as of December 2019.

GREAT LAKES: 188

ST. LAWRENCE RIVER: 87

LAKE CHAMPLAIN: 51

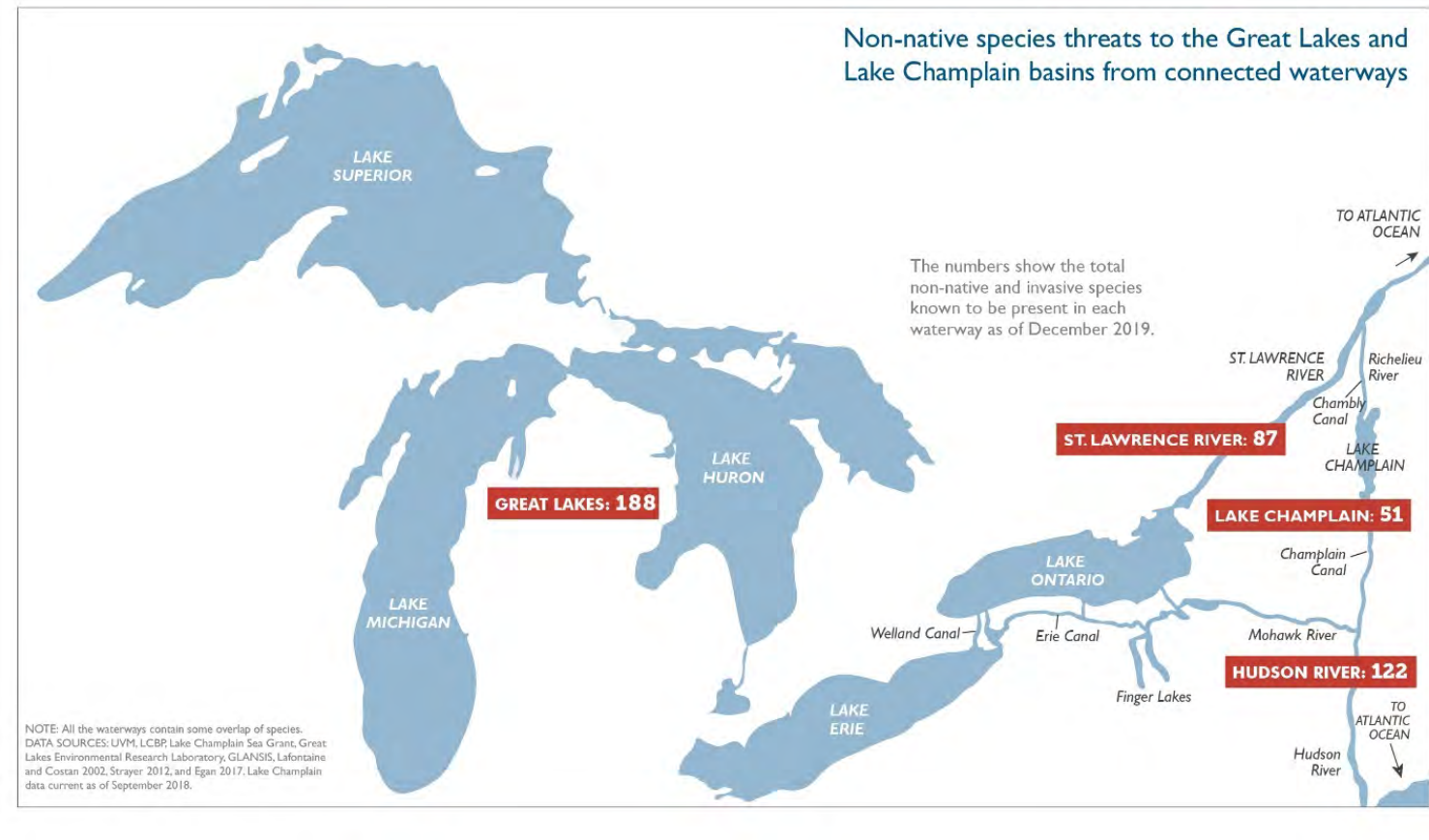
HUDSON RIVER: 122

NOTE: All the waterways contain some overlap of species.
DATA SOURCES: UVM, LCBP, Lake Champlain Sea Grant, Great Lakes Environmental Research Laboratory, GLANSIS, Lafontaine and Costan 2002, Strayer 2012, and Egan 2017. Lake Champlain data current as of September 2018.



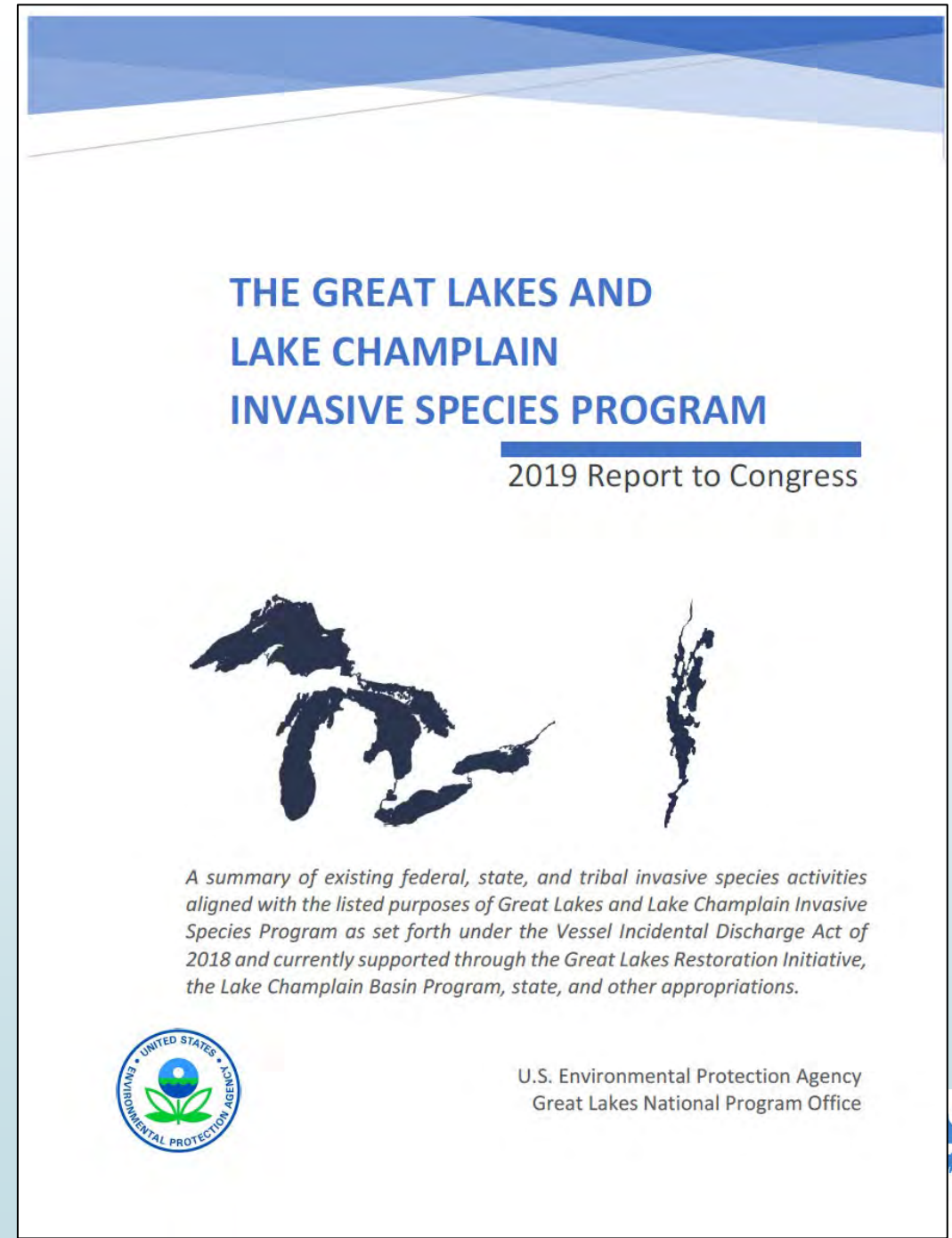
2018 GLLCISP Authorization Required Report to Congress

- Description of activities
- Multidisciplinary efforts
- Recommendations to more fully achieve GLLCISP Purposes
- Recommendations to achieve efficiency



GLLCISP Report to Congress Recommendations




- Establish a more robust Lake Champlain AIS Program
- Enhance ballast water research and development of technologies
- Increase state and tribal AIS program support
- Increase research to support surveillance and early detection approaches



2018 GLLCISP Authorization Identifies Eight Purposes of Program

- to monitor for the introduction and spread of ANS species...
- to detect newly introduced ANS prior to the establishment ...
- to inform, and assist with, management and response actions...
- to establish a watch list of candidate ANS...
- to monitor vectors...
- ...to develop criteria for prioritizing and distributing monitoring effort
- to develop, achieve type approval for, and pilot shipboard or land-based ballast water management system.... for use by commercial vessels operating solely within the Great Lakes and Lake Champlain
- to facilitate meaningful Federal and State implementation of the [ballast water] regulatory framework

Examples of Aquatic Invasive Species in the Great Lakes and Lake Champlain

	Present		Not Present (Focus of Prevention)
The Great Lakes	Grass Carp Sea Lamprey <i>Thermocyclops crassus</i> Hydrilla Round goby Quagga mussels		European water chestnut Killer shrimp Northern snakehead Golden mussel
The Great Lakes & Lake Champlain	Spiny water flea Fishhook water flea Zebra mussel		Bighead carp Silver carp Black Carp <i>Hydrilla</i> (prevent further spread in Great Lakes)
Lake Champlain	Alewife Water chestnut Eurasian watermilfoil		<i>Hydrilla</i> Quagga mussel Round goby

DATA SOURCES: GLANSIS (<https://www.glerl.noaa.gov/glansis/nisListGen.php>), Governors and Premiers "Least Wanted" List (<https://www.blueaccounting.org/print/pdf/node/5099>) and Lake Champlain Basin Program 2018 State of the Lake and Ecosystem Indicators Report (<https://sol.lcbp.org/en/>).

Format of GLLCISP Report to Congress

- By Purpose (8) and associated Key Activities (20)
- Comparison and contrast between Great Lakes and Lake Champlain

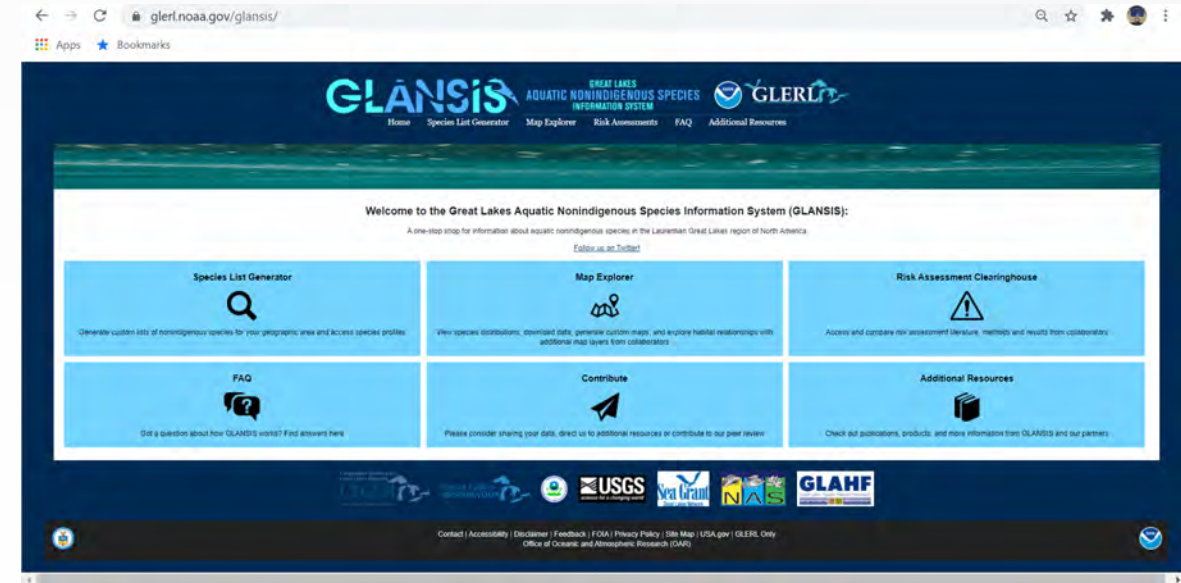
Purpose 2: Programs that “detect newly introduced aquatic nuisance species prior to the establishment”

Key Activity	Great Lakes	Lake Champlain
3. “Hotspot” early detection activities	Basin-wide program in place to monitor “hotspot” locations along with supplementary activities by partners	No established early detection monitoring efforts present at boat launches and marinas and other opportunistic areas
4. Species-specific activities or collaboratives (i.e., focus efforts on critical species)	Collaboratives exist for Asian carp, crayfish, Hydrilla, invasive mussels, Phragmites, New Zealand mud snail	Collaboratives exist for water chestnut and Asian clam, but directed efforts for other high concern species are lacking
5. Innovative technology development and deployment	Monitoring and intercepting vectors of bighead and silver carp using eDNA tools while building genomic libraries and techniques for additional species	Piloted development of genomic tools for early detection of quagga mussel, Asian clam, and Zebra mussel

Possible Next Steps for Great Lakes and Lake Champlain*

- Sharing lessons learned, technology transfer, and making more connections
 - Development of AIS data delivery system for Lake Champlain
 - Considering initial steps for developing a Lake Champlain AIS early detection program

* Does not consider next steps for ballast water research and development and regulatory framework. Also does not consider if federal appropriations for GLLCISP are made.



Thank you to GLLCISP Report to Congress Contributors!

Federal Agencies, States, Tribes, and
Regional Entities

Bryan Dore; US EPA – Region 1 (Boston, MA)
Mario Paula; US EPA – Region 2 (New York City, NY)
Jamie Schardt; US EPA – Great Lakes National Program Office
Sarah Lawhun; US EPA – Great Lakes National Program Office
Kevin O'Donnell; US EPA- Great Lakes National Program Office
Meg Modley Gilbertson; Lake Champlain Basin Program
Eric Howe; Lake Champlain Basin Program

The numbers show the total
non-native and invasive species
known to be present in each
waterway as of December 2019.

ST. LAWRENCE RIVER: 87

LAKE CHAMPLAIN: 51

HUDSON RIVER: 122

NOTE: All the waterways contain some overlap of species.
DATA SOURCES: UVM, LCBP, Lake Champlain Sea Grant, Great Lakes Environmental Research Laboratory, GLANSIS, and others.
and Costan 2002, Strayer 2012, and Egan 2017. Lake Champlain
data current as of September 2018.

