

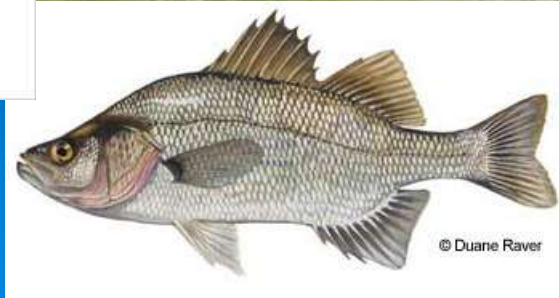


Assessing the potential movement of invasive fishes through the Welland Canal

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3 more Asian carp found in Toronto

Not known how the invasive fish, native to Asia, reached Ontario

CBC News | Posted: Sep 03, 2015 5:08 PM ET | Last Updated: Sep 03, 2015 5:19 PM ET

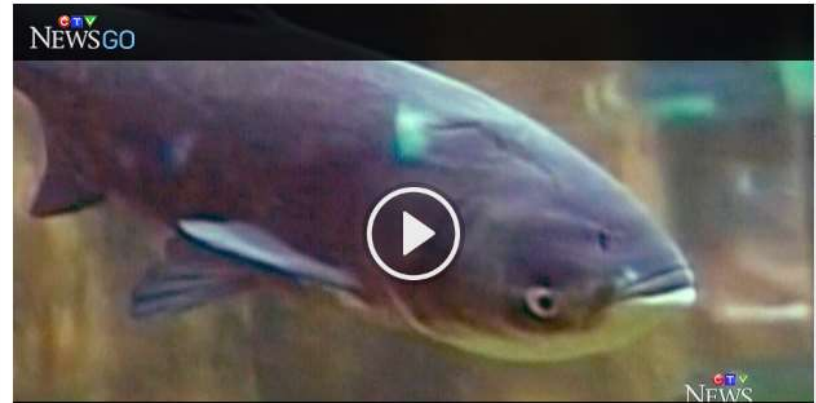


Three more Asian carp pulled from local waters

Grass carp found just off Toronto Harbour are only the latest of the invasive species to be found.



Asian carp caught in Lake Ontario weren't born locally



CTV Toronto: Test results reveal carp's origins







DFO's Asian Carp Program



Program Goal

Protect the integrity of the Great Lakes basin by preventing the introduction (arrival, establishment, & spread) of Asian carps (Grass, Silver, Bighead, and Black carps).

Program Framework

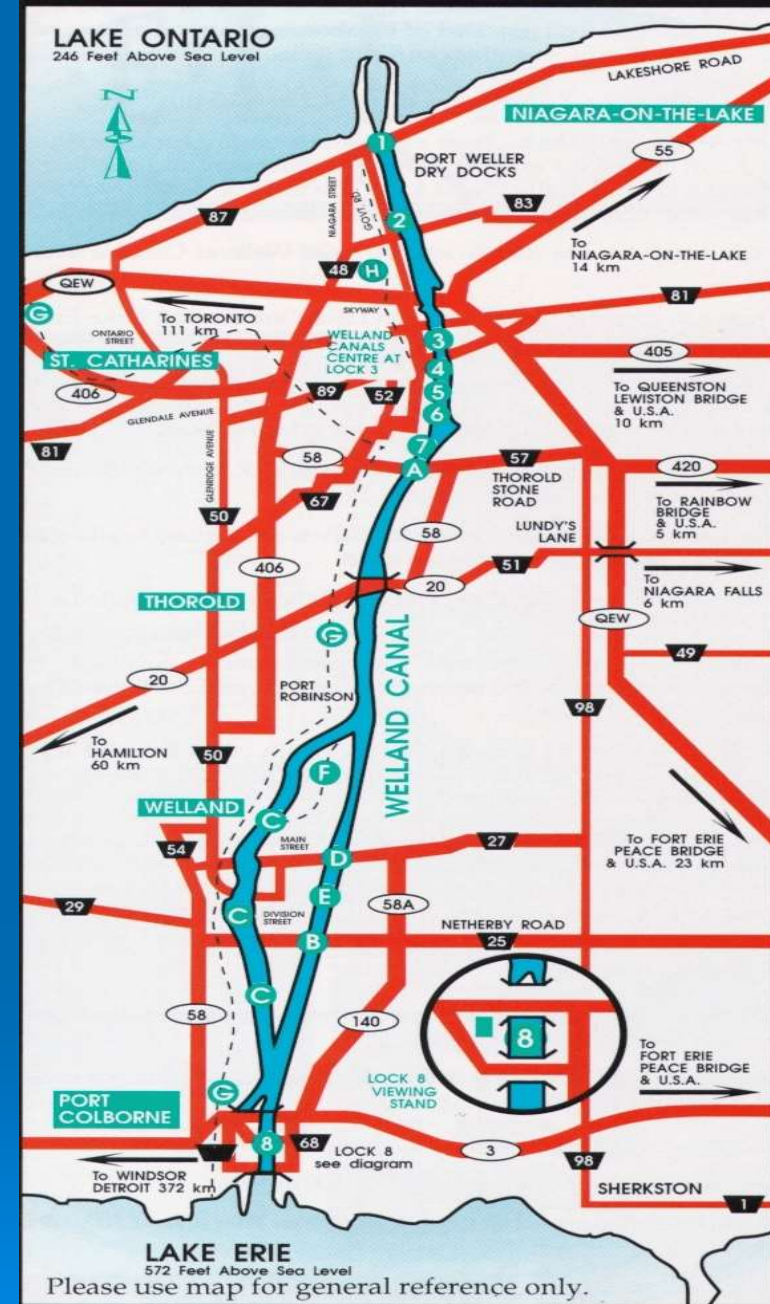
Multi-discipline approach within 4 Program Pillars:

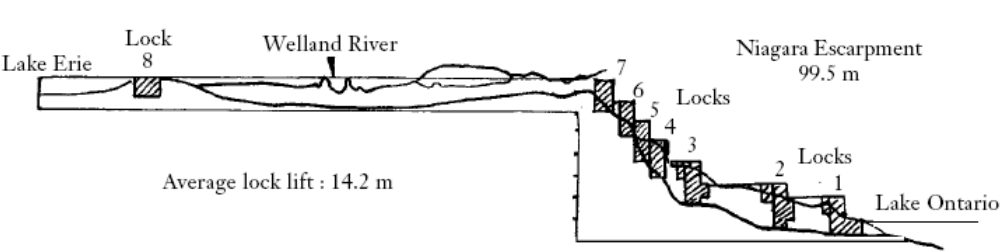
1. Prevention	2. Early Warning	3. Response	4. Management
<ul style="list-style-type: none">➤ Outreach➤ Research➤ Risk assessment	<ul style="list-style-type: none">➤ Monitoring	<ul style="list-style-type: none">➤ Advice and analysis➤ Action	<ul style="list-style-type: none">➤ Regulations➤ Pathway management



➤ Objectives

- To determine whether and how fishes directly move between lakes
- To examine how locks differentially facilitate fish movement between basins





Study area: Welland Canal

Overall canal length: 43.4 km (27 miles)

Total lift: 99.5 m (326.5 feet)

Average lift of locks: 14.2 m (46.5 feet)

Size of locks: 233.5 m (766 feet) long
24.4 m (80 feet) wide

Chamber depth: 9.1 m (30 feet)

Ch





Methods

➤ Acoustic telemetry tags

- V9 tags (Vemco)

- 2012: 79 fishes (7 species)

- 3 release sites

- 2013: 100 fishes (10 species)

- 2 release sites







Common Carp (n=68):
49.27cm (n=67), 1391.86g (n=55)



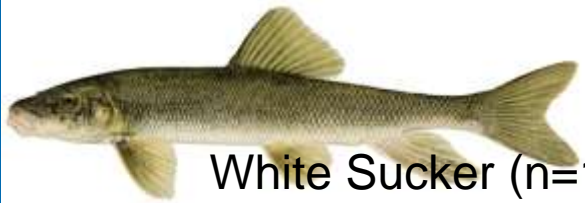
Smallmouth Bass (n=5):
40.7cm, 994.6g



Northern Pike (n=1): NA



Largemouth Bass (n=1):
44.0cm, 1243g



White Sucker (n=1): 45.4cm, 945g

2012



Freshwater Drum (n=2):
42.85cm, 886.5g



Brown Bullhead (n=1):
47.5cm, 1048g



Common Carp (n=63)



Northern Pike (n=6)



White Sucker (n=3)



Freshwater Drum (n=7)



Shorthead Redhorse (n=1)



Smallmouth Bass (n=4)



Largemouth Bass (n=5)



Brown Bullhead (n=6)



Goldfish (n=2)



Channel Catfish (n=3)

2013

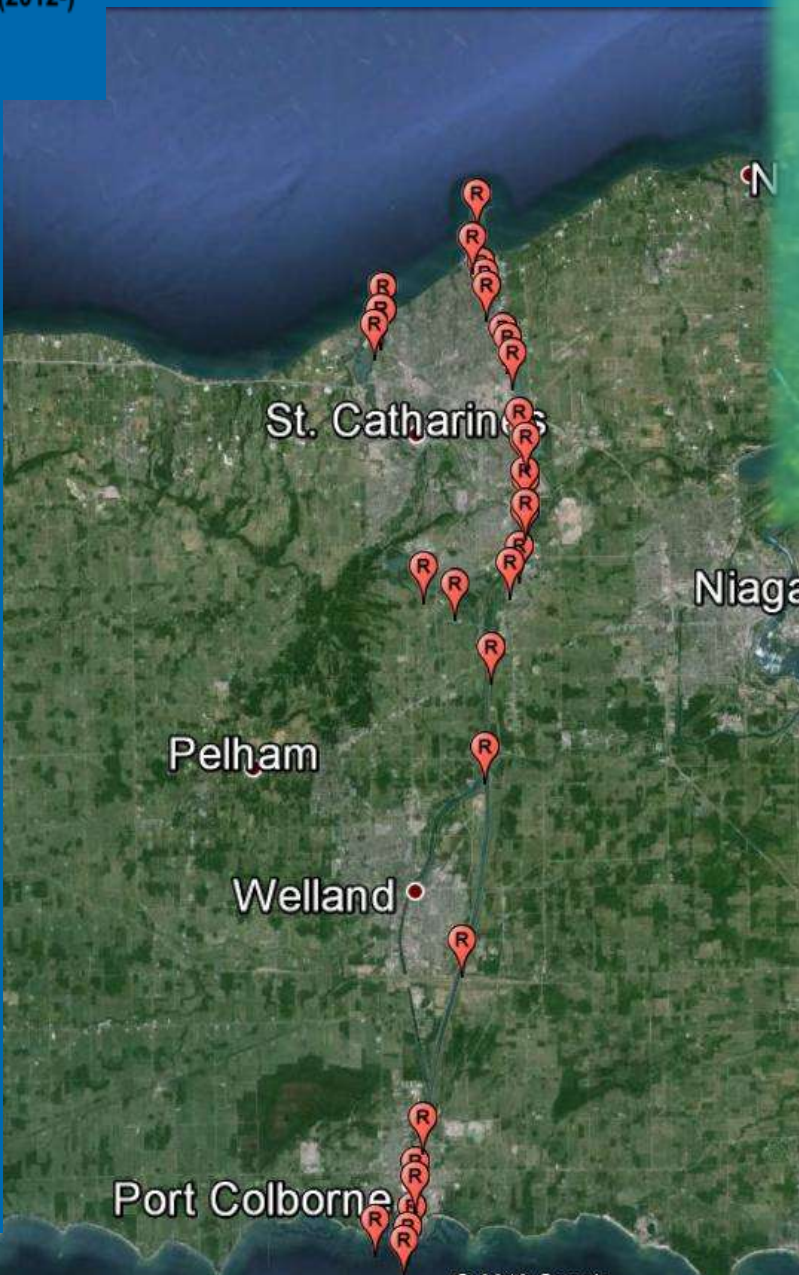
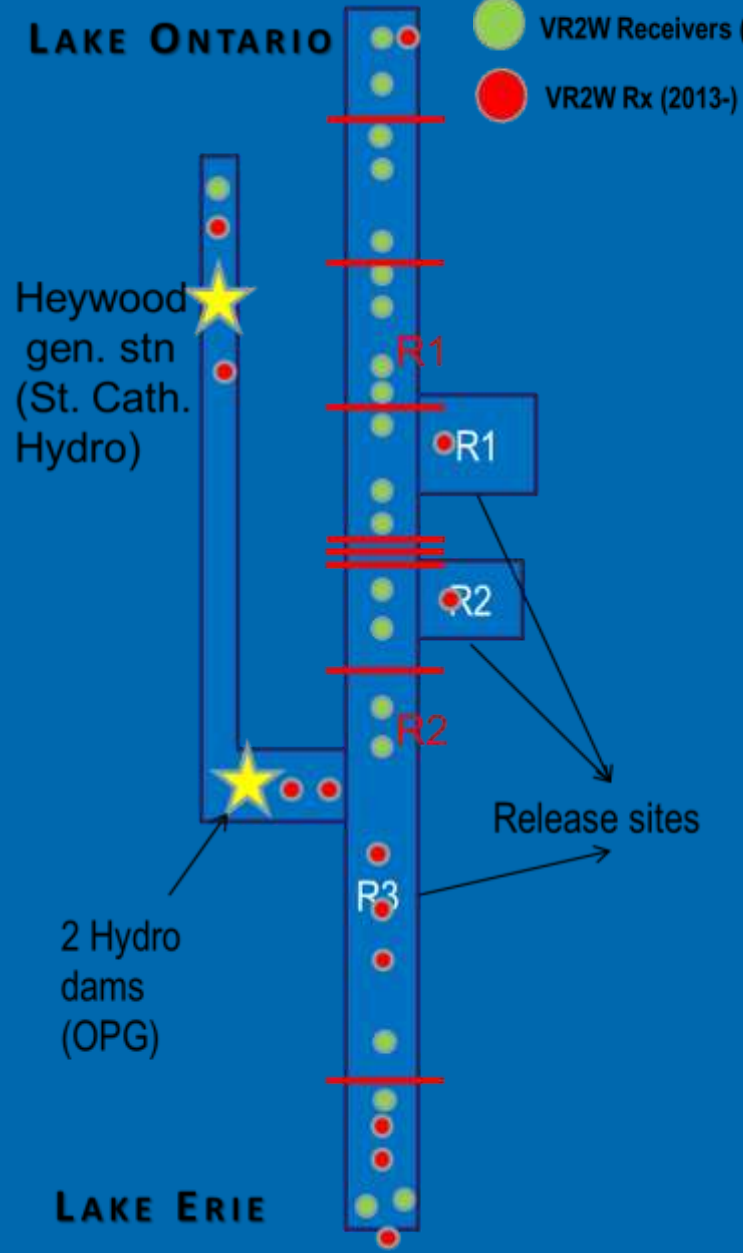
LAKE ONTARIO

- VR2W Receivers (2012-)
- VR2W Rx (2013-)

Heywood gen. stn (St. Cath. Hydro)

2 Hydro dams (OPG)

LAKE ERIE



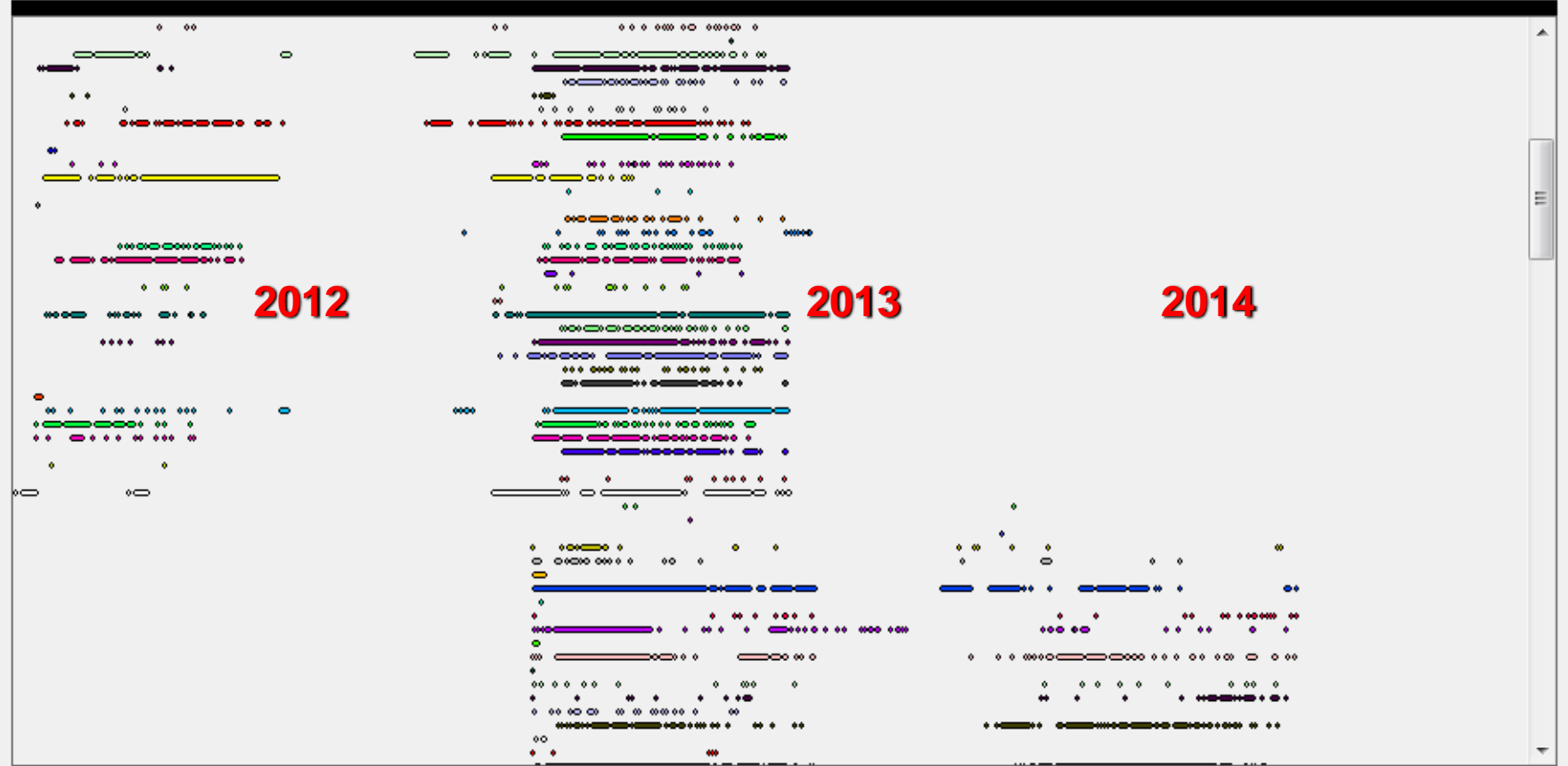
© 2013 Google
Image NOAA

Image © 2013 DigitalGlobe

2012 – 2014: ~ 1.3 million detections

Showing All Detections

Day/Night Shading



2012

2013

2014

2012-06-27

2013-12-18

2015-06-10

➤ 2012

- 2 fish detected leaving the Welland Canal towards Lake Erie (FD, CC)
- Bypassing 1-2 locks and moving ~20 km upstream

➤ 2013

- 5 fish detected leaving the Welland Canal (4 FD + CC)
 - 3 fish towards Lake Ontario (2FD, CC)
 - Bypassing 2 locks and moving ~7 km downstream
 - 2 fish towards Lake Erie (2 FD)
 - Bypassing lock 8 and travelling ~25 km upstream



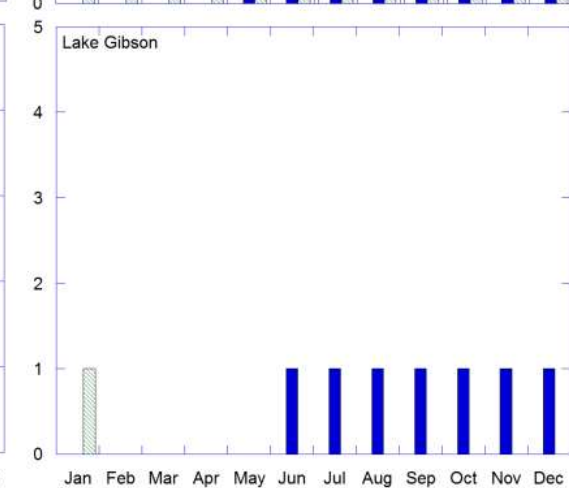
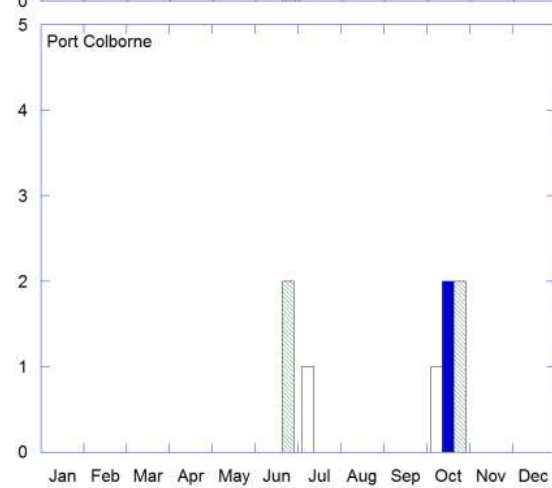
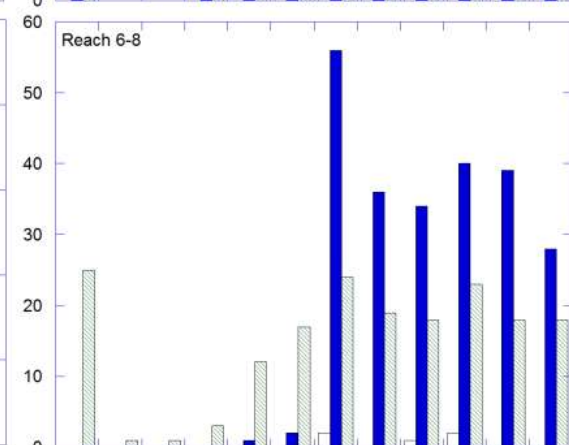
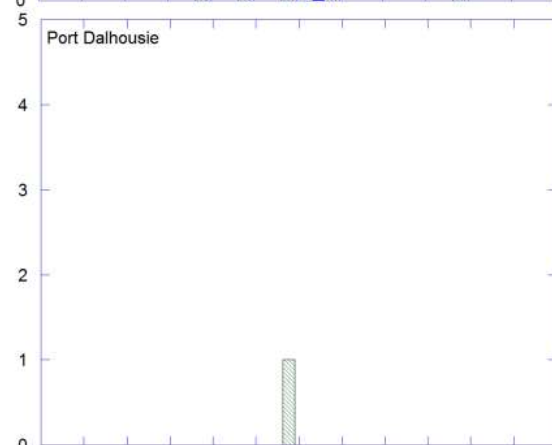
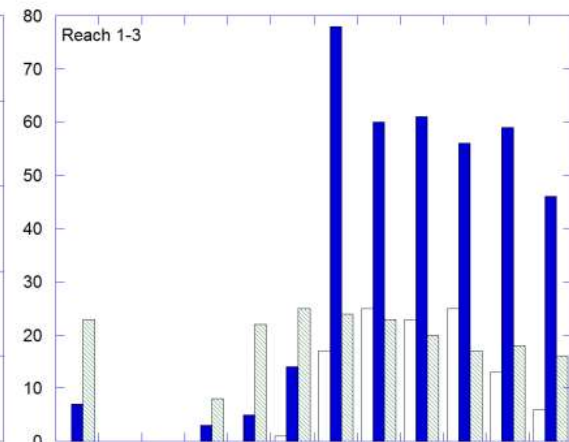
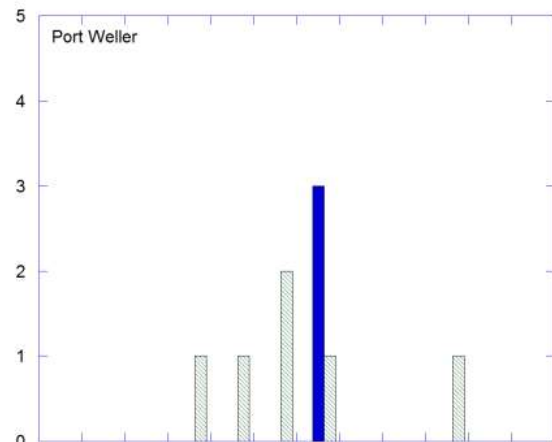


➤ 2014

- Five fishes re-entered the canal and 4 moved out
 - 1 CC and 2 FD re-entered the Canal from Lake Ontario
 - 2 FD re-entered the Canal from Lake Erie
 - 2 FD were also detected moving across Lake Erie to the western basin and then back to the Canal (GLATOS; Christopher Vandergoot, Ohio DNR)

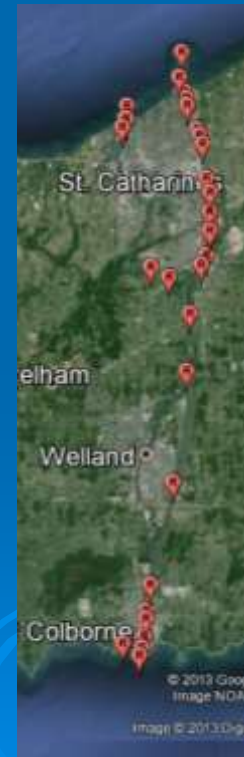


Number of fish

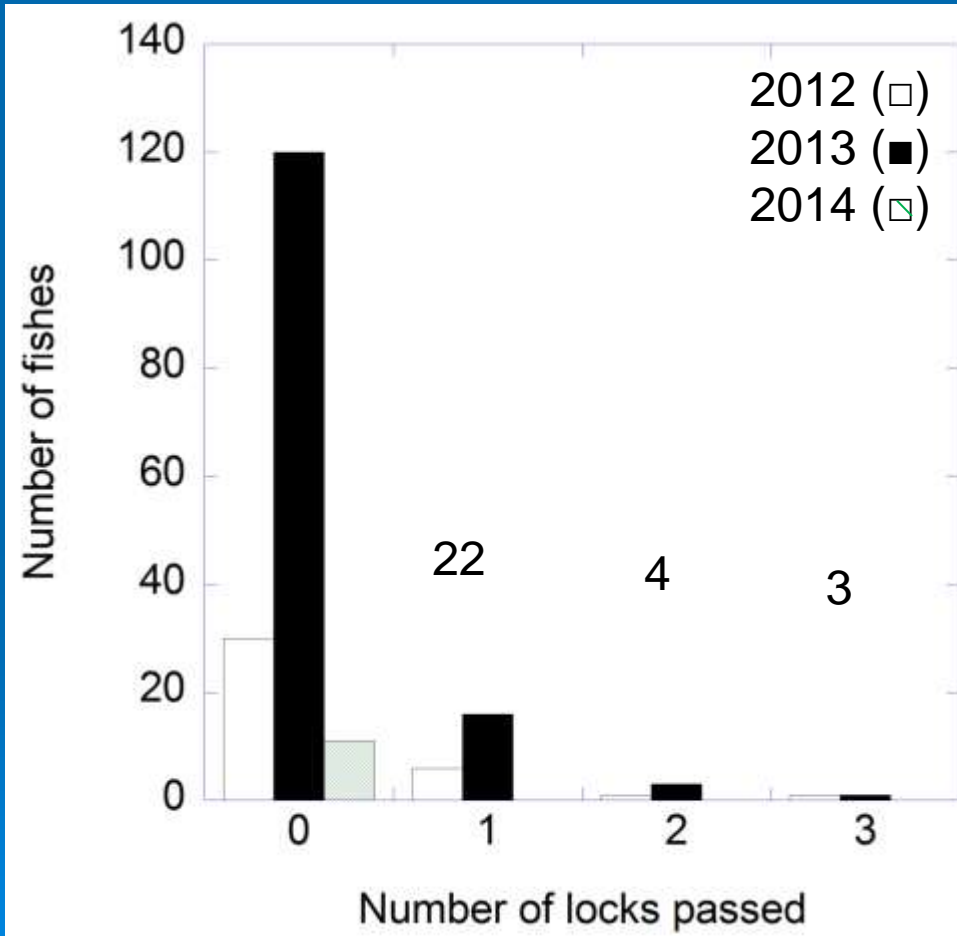


2012 (□)
 2013 (■)
 2014 (▨)

- 7 out of 179 fishes (3.9%) moved out of canal to Lake Ontario or Lake Erie



~29 individuals passed thru lock



➤ 1 fish moved through flight locks

Summary



- Fishes can move through canals and locks system to travel between water bodies in Welland Canal (Tripp et al. 2014)
 - Asian carps and other AIS
- Only small number of tagged individuals (~4%) managed to move out of canal
 - Some passed through one or more locks

➤ Risk of Asian carp establishment

- likely (>75% prob.) involving a small number of founding individuals (<20 fish)

(Cuddington et al. 2014)

➤ Monitoring and implementing mitigation measures to prevent movement

importation

- Prevent imports



Acknowledgements



➤ **Funded by Asian Carp Program**

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Thank you!