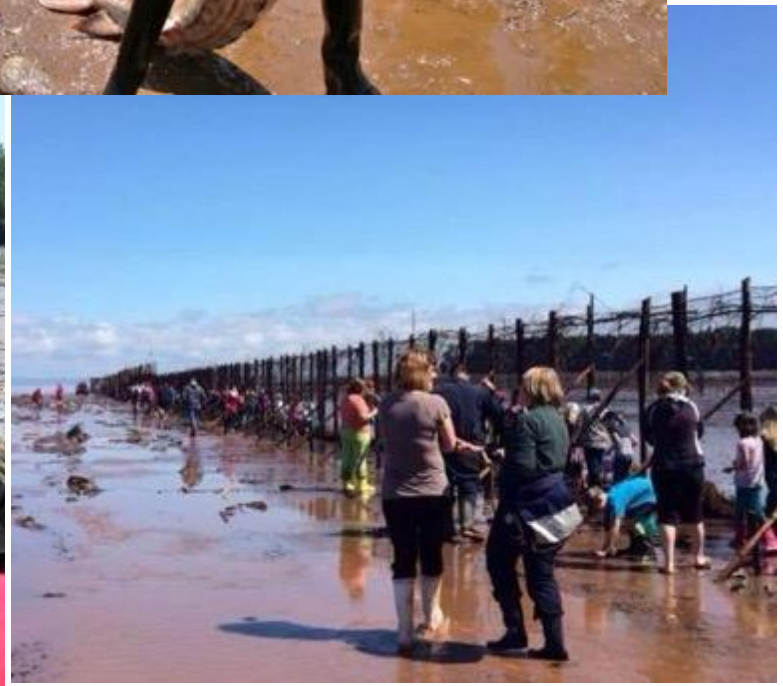
Darren Porter

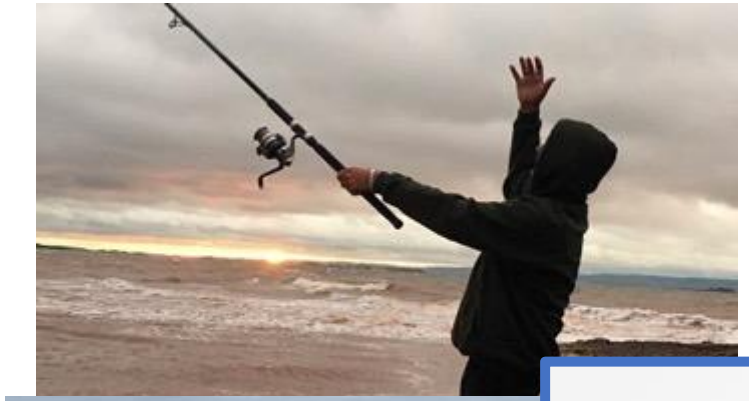
Family


des Wabanakis
(Nouveau-Brunswick)
(Île-du-Prince-Édouard)
(Nouvelle-Écosse)
la baie de Fundy

Public Resource

PUBLIC





ourfundy.ca

FundyUnited

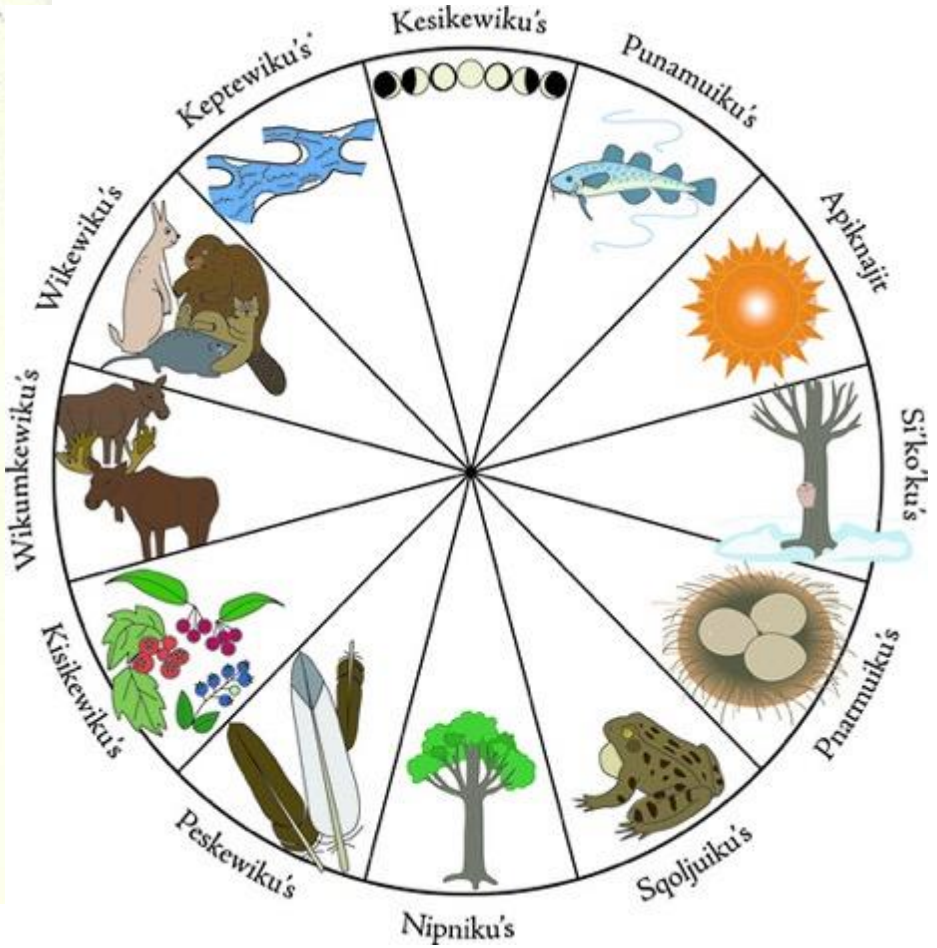

The Weir

What we see

Through our eyes

LIFE

Living Ecosystem

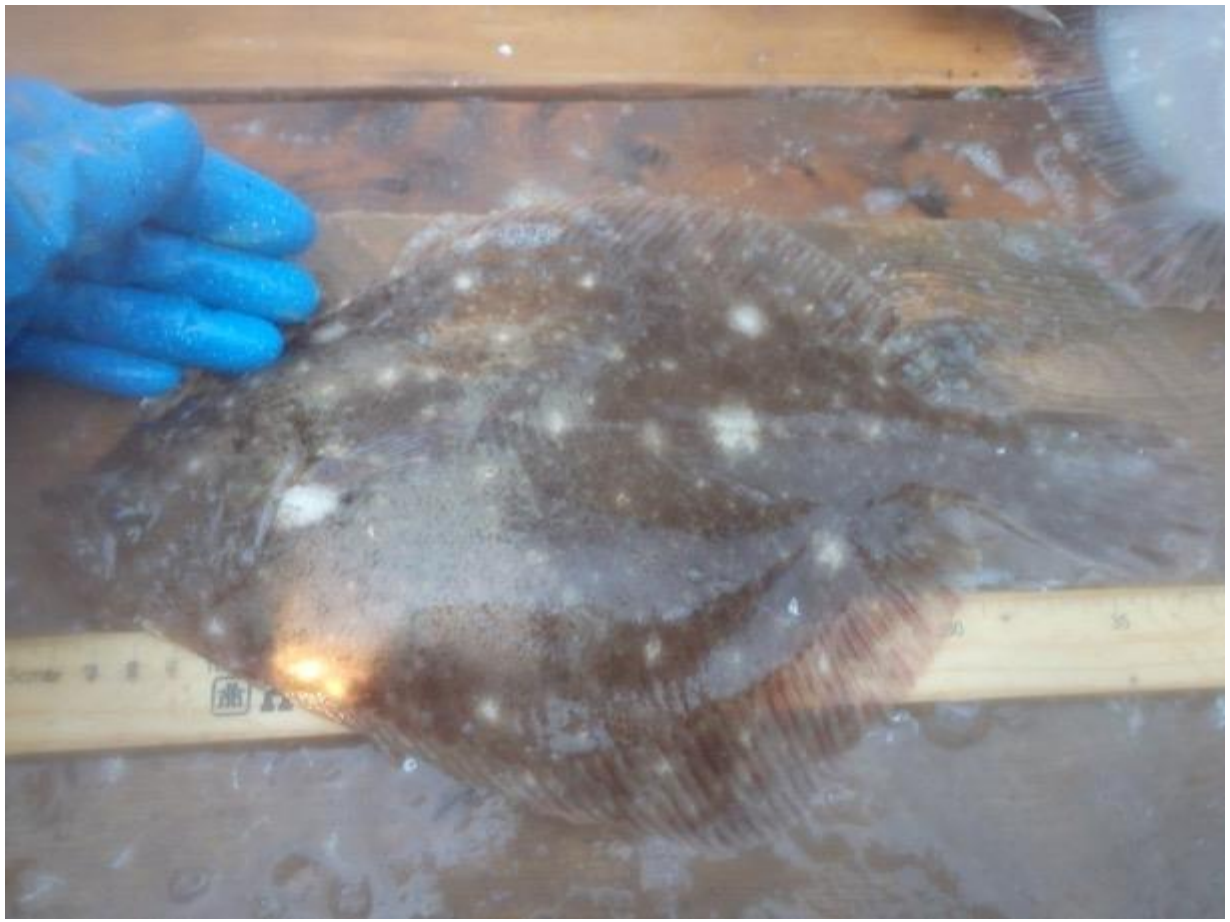


Commercial Herring catch

American Eels

Gaspereau

Mackerel



What else we see


1 cm
100 cm


BERKSHIRE

Husbandry

Knowledge

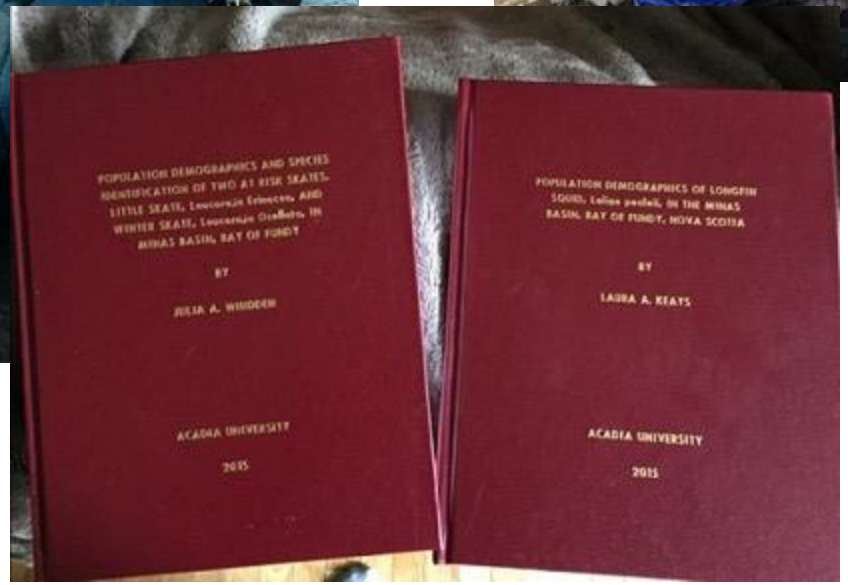
knowl·edge

‘näləj/

Noun

- facts, information, and skills acquired by a person through experience or education; the theoretical or practical understanding of a subject. (Eg. "a thirst for knowledge“)

Different Knowledge



Traditional Knowledge

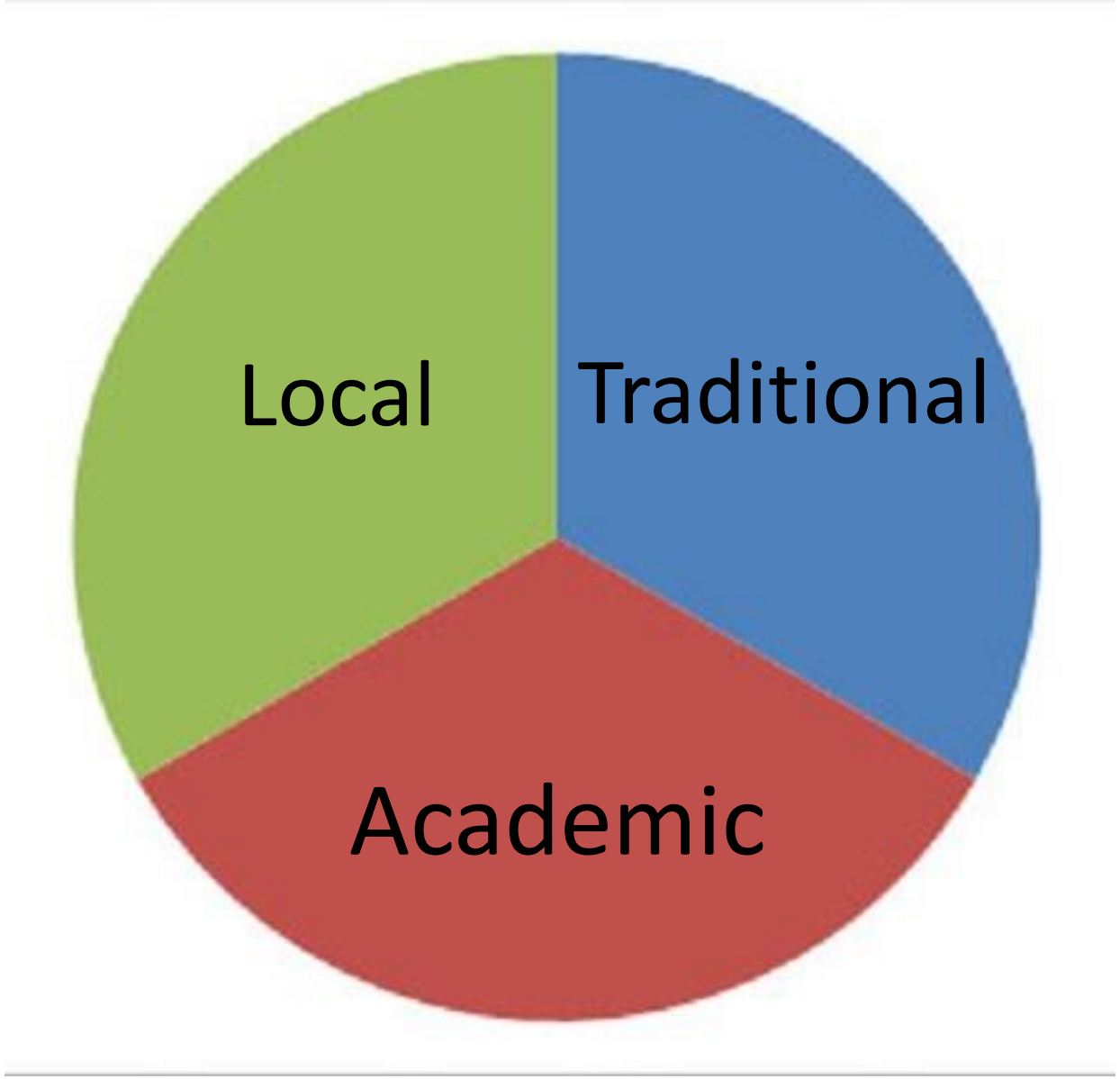
- Knowledge, know-how, skills and practices that are developed and sustained and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity.

Local Knowledge

- Knowledge that people in a given community have developed over time, and continue to develop. It is: Based on experience. Often tested over centuries of use. Adapted to the local culture and environment.

Academic Knowledge

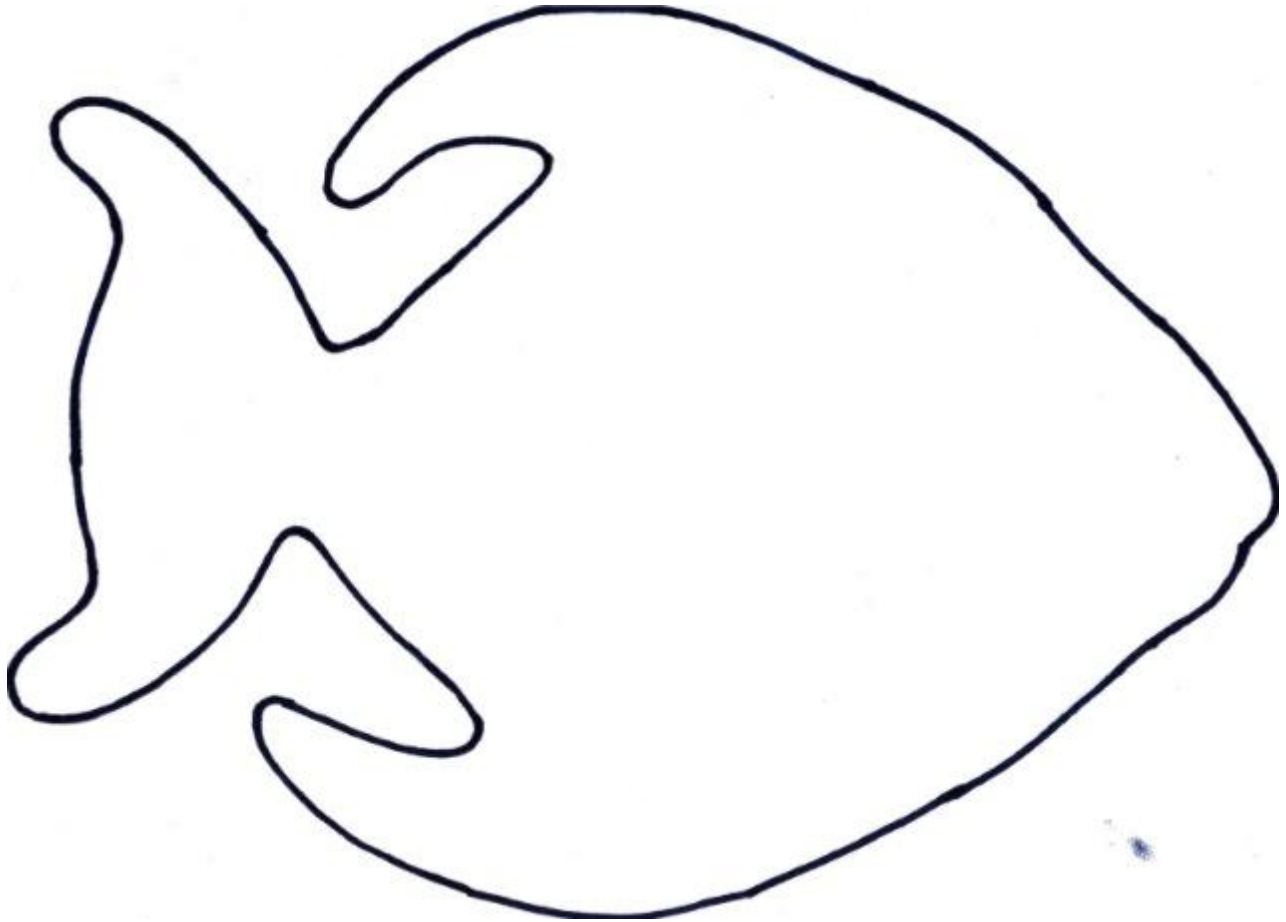
- The body of knowledge resulting from collective academic inquiry in academia, the communities of scholars engaged in research

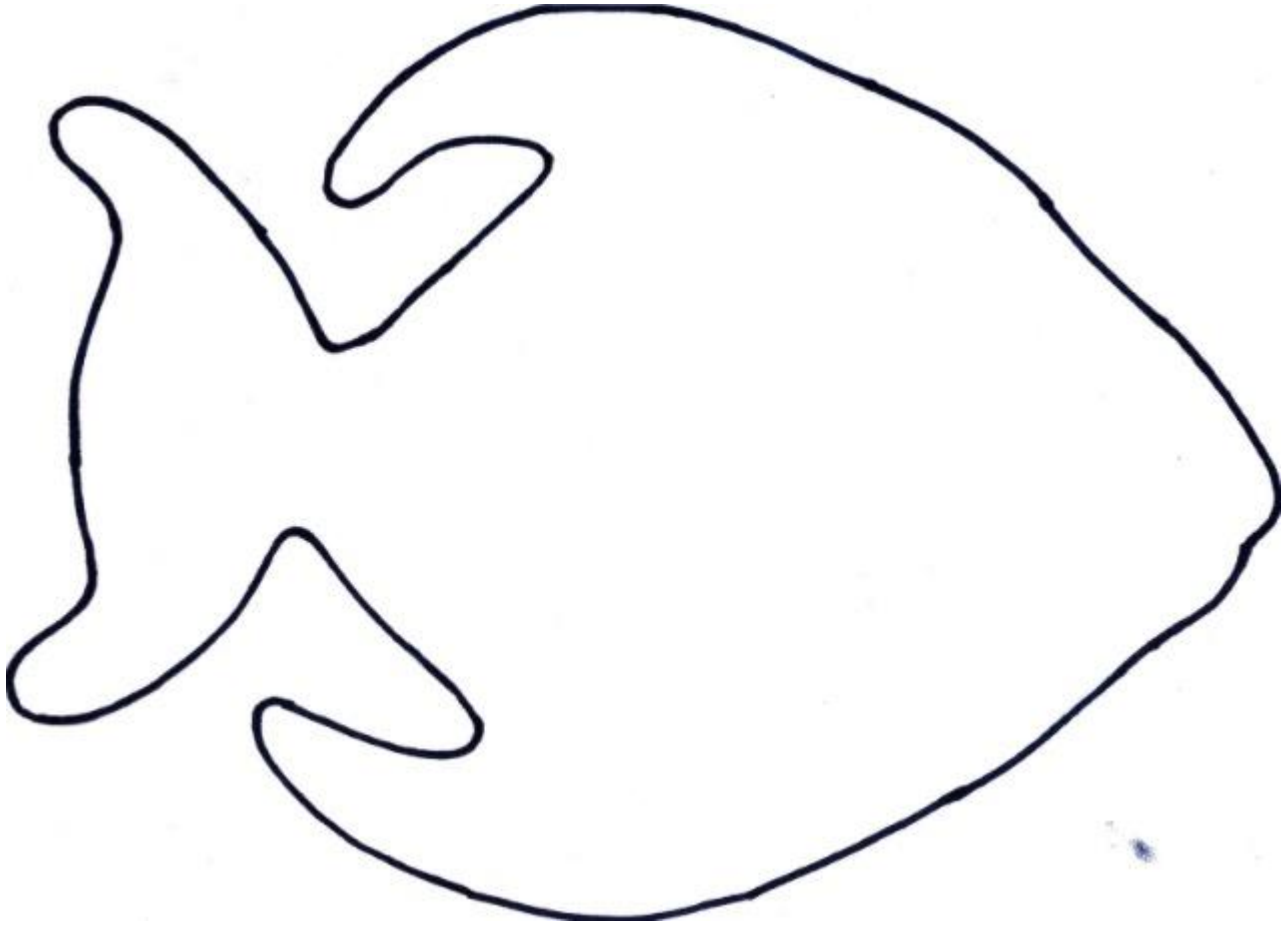

Local
Traditional
Academic

Wisdom

- An integration of knowledge and experience and deep understanding that incorporates tolerance for the uncertainties of life as well as its ups and downs. There is an awareness of how things play out over time and it confers a sense of balance.

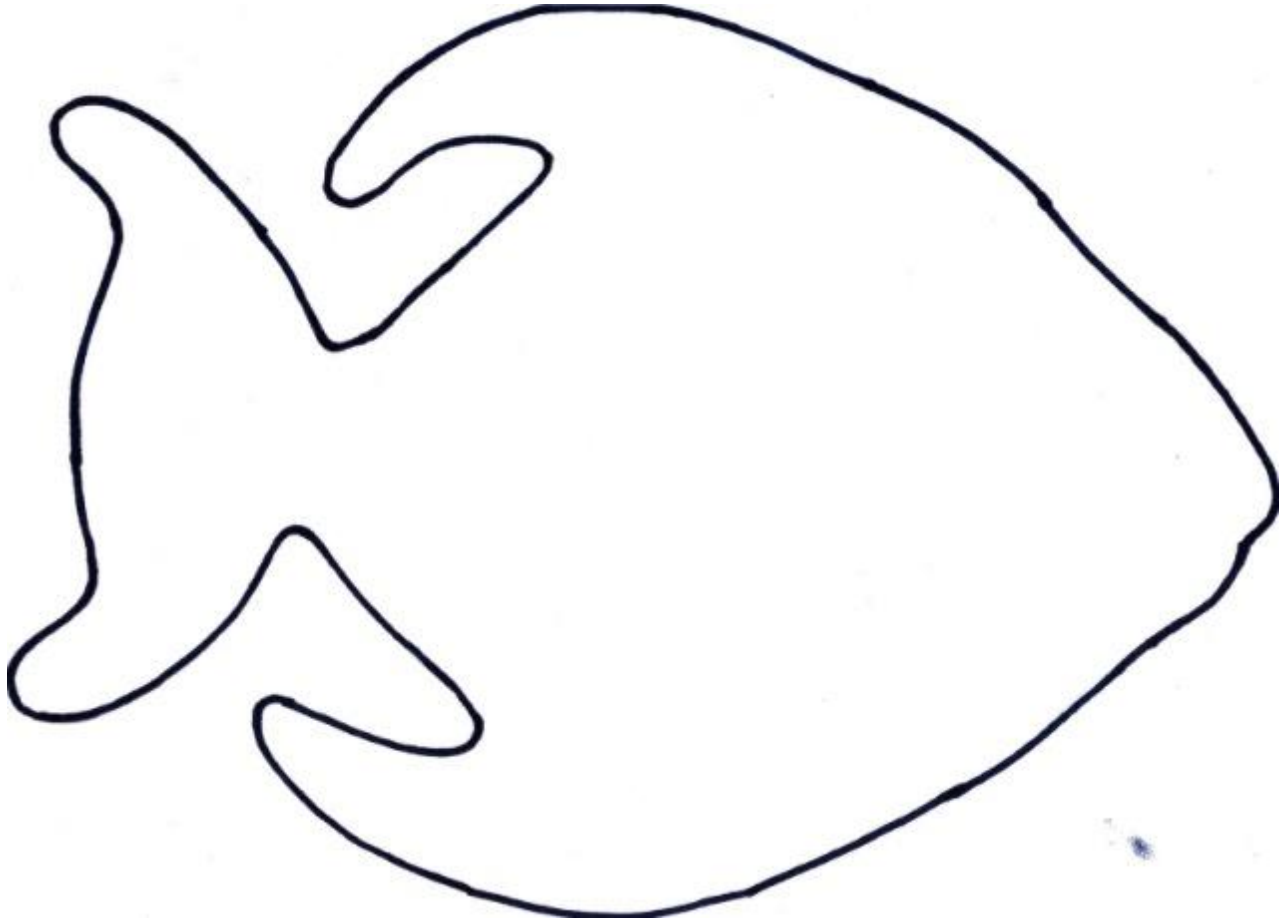
Language barriers / academic the dominant form (data)



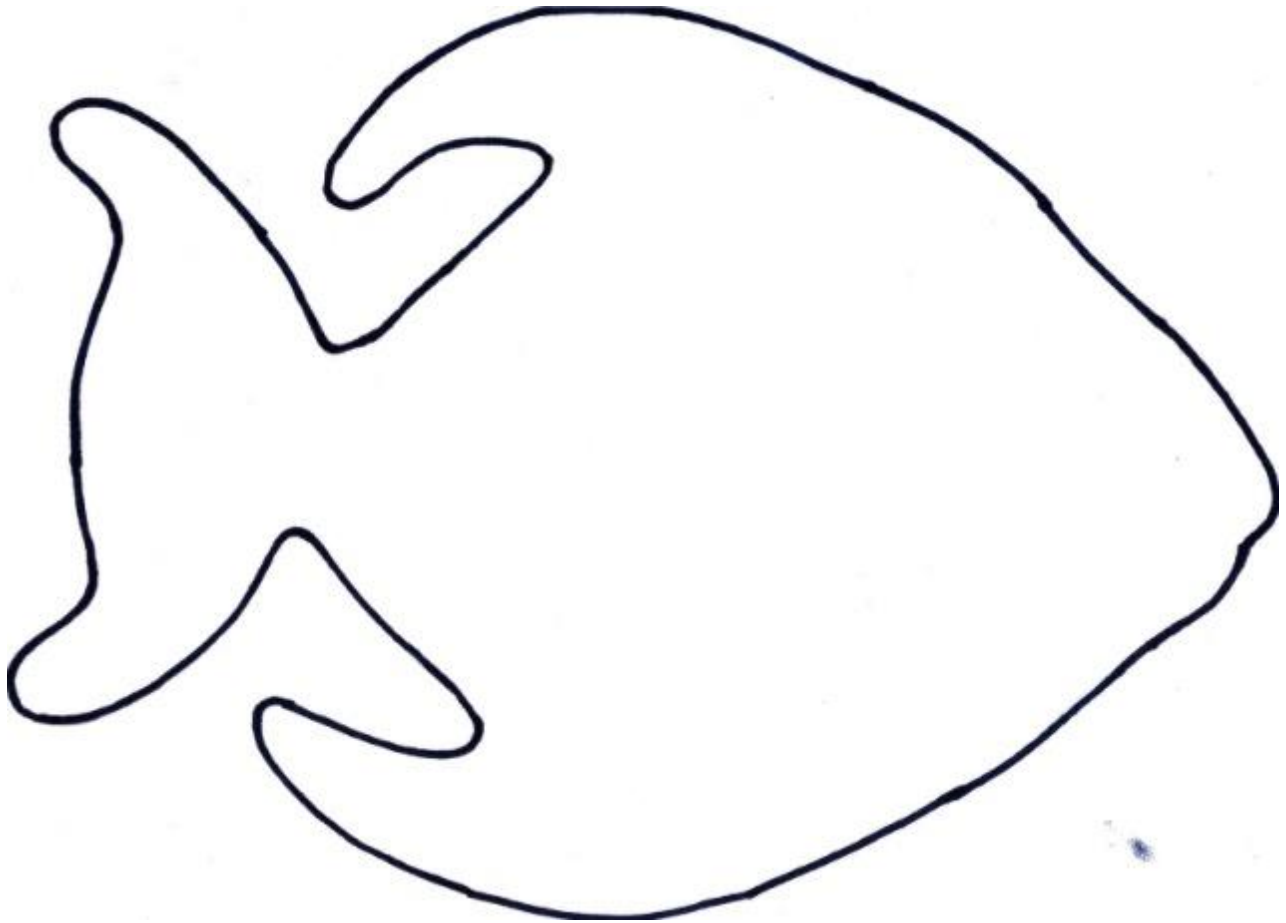


THE INK FISH CONTROL US

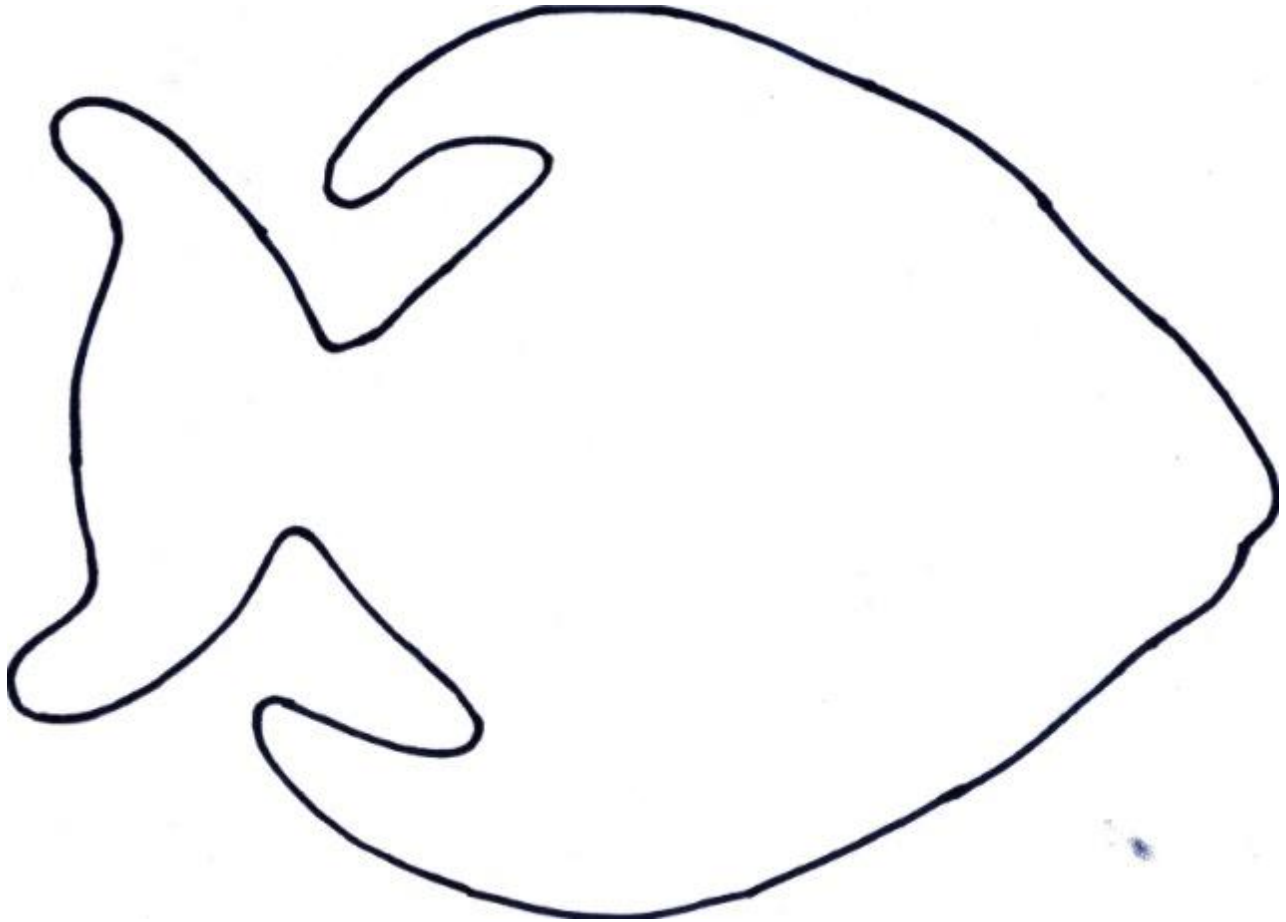
INK FISH DOES NOT ALWAYS LINE UP WITH WHAT WE SEE



NO DATA/INK, DIDN’T HAPPEN



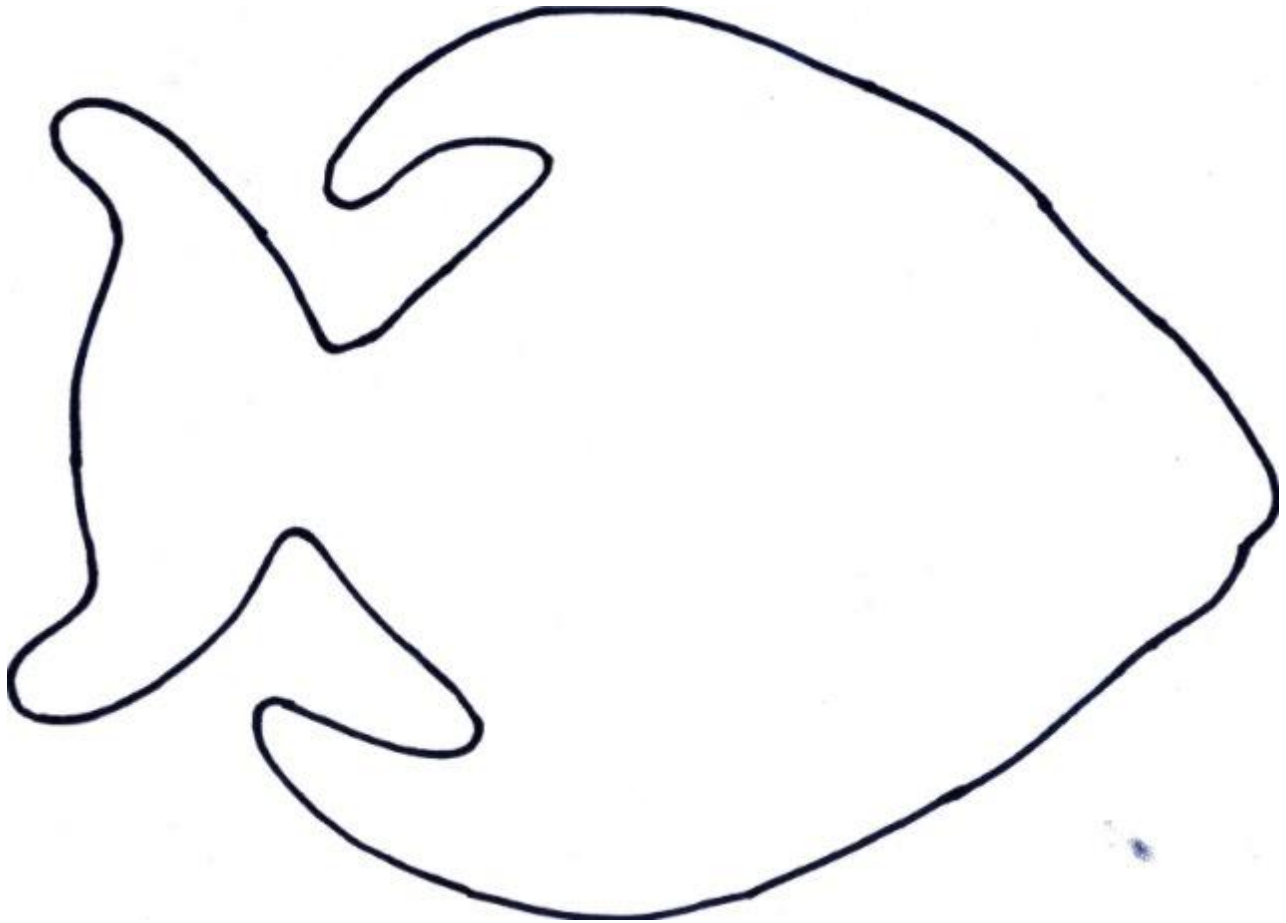
NO DATA, DOESN’T EXIST?



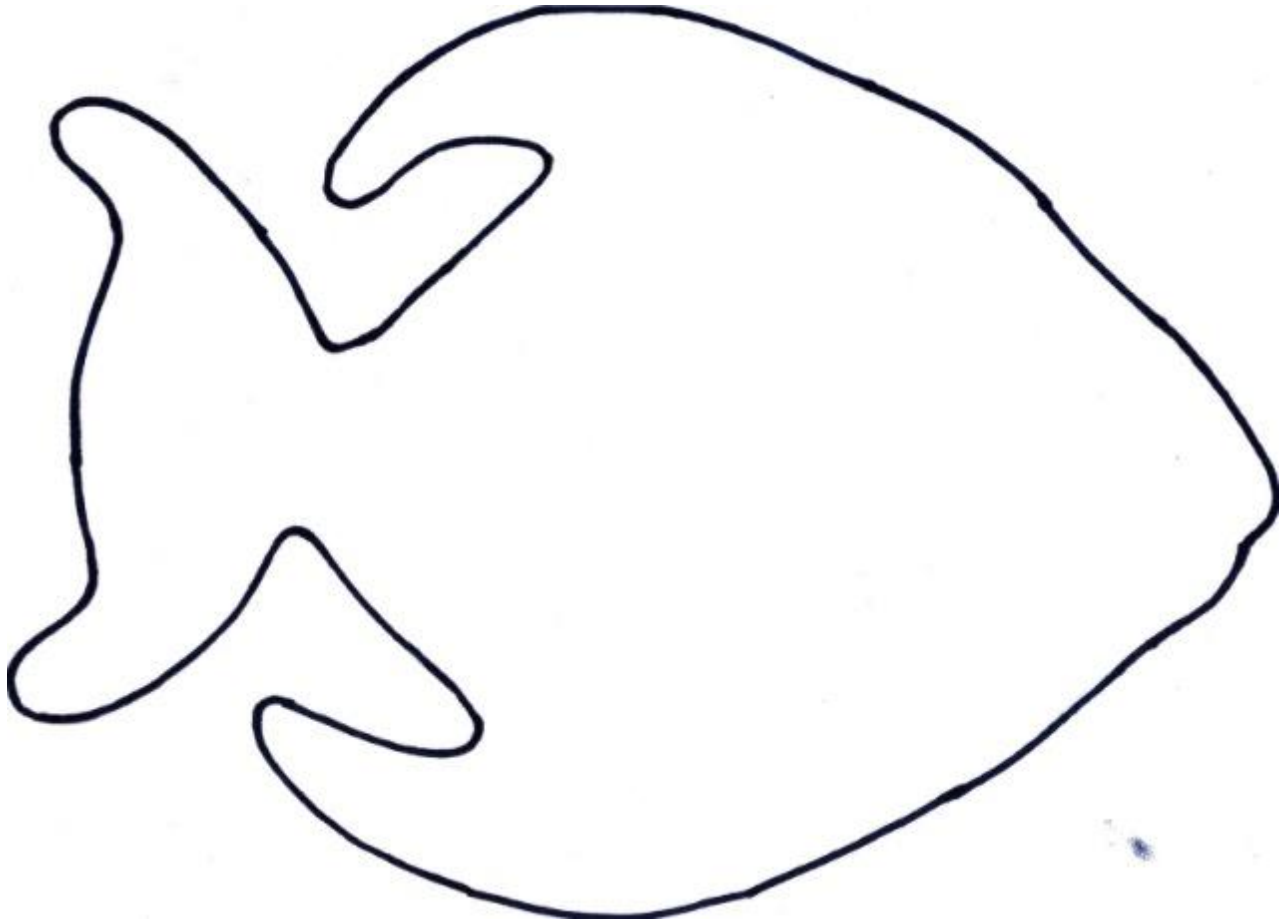
Oceans of ink

DATA
=
Access
Influence?

EVOLUTION OF THE INK FISH

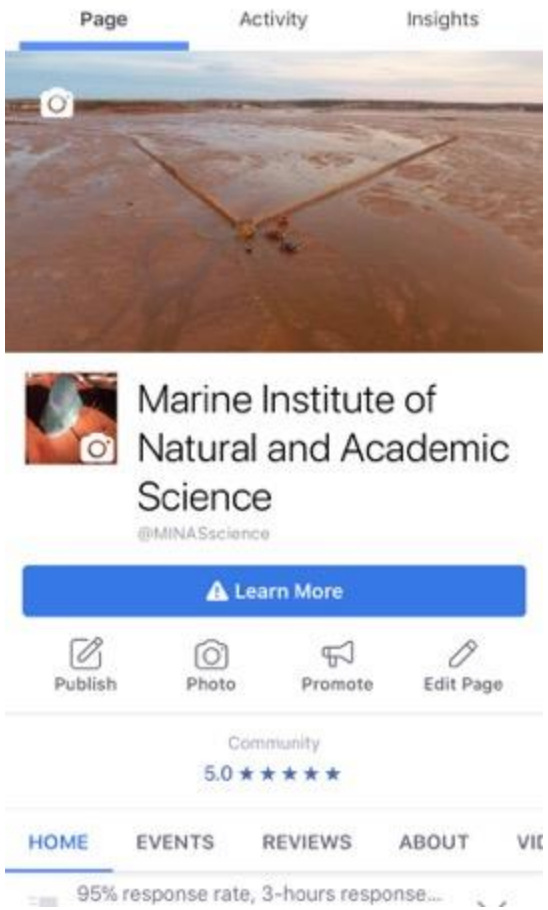


Fishermen Producing Ink



MINAS

Facebook page



Diversity and Abundance of Fish and Invertebrates Captured by an Intertidal Fish Weir at Bramber, Nova Scotia, Canada during April-July, 2017 and Movements of Selected Species

By

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Date: December 15, 2017

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LOCATION

day a week. Consequently, on June 14, 2016, in a memo posted to their website the Department of Fisheries and Oceans (DFO) recommended that further evaluation of the potential use of intertidal weirs to gather additional seasonal baseline information on fish assemblages and habitat use in the vicinity of the tidal energy projects should be undertaken.

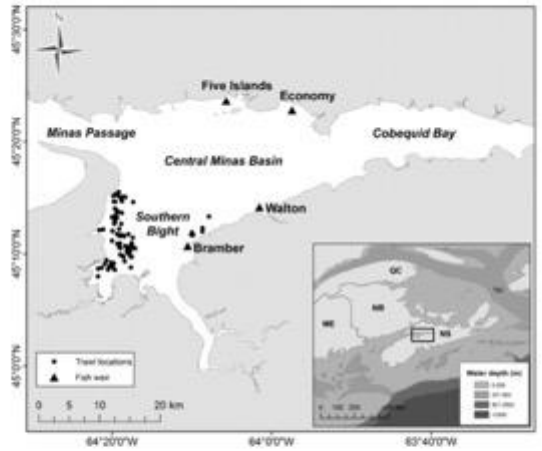


Figure 1. Minas Basin, Nova Scotia depicting sites of some present and former intertidal fish weirs. Trawl locations depicted were part of another study on the fishes of Minas Basin (Wehrell 2005).

In 2017, the commercial fishers of the Minas Basin, in conjunction with Big Moon Power Canada decided to undertake a joint project to monitor diversity, seasonal abundance trends and size structure of resident and migratory fishes. The objective was to establish a comprehensive baseline for fish assemblages in the Minas Basin, as well as an updated species index. This study was conducted as a fisher would work a weir with sampling conducted during every low tide from April to July. Fishers had criticized earlier weir studies based on the fact that sampling was not intense enough to accurately demonstrate the actual diversity, abundance and size structure

SPECIES CAPTURED DURING WEIR STUDY

Table 1. Fishes captured in the Brumber intertidal fish weir during 2017. Species counted as a group because they were difficult to separate taxonomically on site: *1 - skate; *2 – gaspereau; - *3 - hake.

Common name	Genus and Species	Catch	% Total
Sea lamprey	*Petromyzon marinus*	4	-
Spiny dogfish shark	*Squalus acanthias*	10	-
Little skate, Winter skate*1	*Leucoraja erinacea, L. ocellata*	2,874	0.41
Atlantic sturgeon	*Acipenser oxyrinchus*	247	0.03
American eel	*Anguilla rostrata*	44	-
American shad	*Alosa sapidissima*	7,176	1.06
Alewife, Blueback herring*2	*A. pseudoharengus, A. aestivalis*	350,343[a]	51.95
Atlantic herring	*Clupea harengus*	87,587[a]	12.98
Atlantic menhaden	*Brevoortia tyrannus*	1	-
Atlantic salmon	*Salmo salar*	6	-
Brown trout	*Salmo trutta*	9	-
Brook trout	*Salvelinus fontinalis*	1	-
Rainbow smelt	*Osmerus mordax*	93,976[a]	13.94
Three-spine stickleback	*Gasterosteus aculeatus*	4	-
Monkfish	*Lophius americanus*	4	-
Atlantic cod	*Gadus morhua*	6	-
Tomcod	*Microgadus tomcod*	68,212[a]	10.11
Haddock	*Melanogrammus aeglefinus*	6	-
Silver Hake	*Merluccius bilinearis*	384	-
White hake, Red hake*3	*Urophycis tenuis, U. chuss*	7,214	1.06
Spotted hake	*Urophycis regia*	1	-
Longfin hake	*Urophycis chesteri*	1	-
Pollack	*Pollachius virens*	1	-
Mummichog	*Fundulus heteroclitus*	2	-
Atlantic silversides	*Menidia menidia*	2,063	0.31
Northern pipefish	*Syngnathus fuscus*	7	-
Striped bass	*Morone saxatilis*	1,388	0.20
White perch	*Morone americana*	12	-
Cunner	*Tautogolabus adspersus*	51	-
Sea raven	*Hemitripterus americanus*	643	0.09
Shorthorn sculpin	*Myoxocephalus scorpius*	4	-
Longhorn sculpin	*Myoxocephalus octodecemspinosus*	705	0.10
Ocean pout	*Macrozoarces americanus*	1	-
Rock gunnel	*Pholis gunnellus*	5	-
Butterfish	*Peprilus triacanthus*	536	0.08
Atlantic mackerel	*Scomber scombrus*	1,820	0.27
Striped searobin	*Prionotus evolans*	1	-
Summer flounder	*Paralichthyes dentatus*	2	-
Winter flounder	*Pseudopleuronectes americanus*	24,214[a]	3.59
Smooth flounder	*Liopsetta putnami*	5,841	0.86
Windowpane	*Scophthalmus aquosus*	18,860	2.82
Halibut	*Hippoglossus hippoglossus*	2	-
	Total catch	**674,402[a]**	

[a] count estimated

MORE

Table 2. Large invertebrates captured at the Bramber weir during the summer of 2017.

Common name	Taxon	Catch	% Total
	Cnidaria		
Lion's Mane Jellyfish	*Cyanea capillata*	128	0.07
	Ctenopora		
Sea Gooseberry	*Pleurobranchia pileus*	rare	-
	Mollusca	2,560	13.8
Longfin squid	*Doryteuthis pealei*		
	Arthropoda		
Shrimp	*Dichelopandalus leptocerus*	1	-
Sand shrimp	*Crangon septemspinosa*	uncounted	very abundant
American lobster	*Homarus americana*	36	0.02
Rock crab	*Cancer irroratus*	1,626	8.77
Green crab	*Carcinus maenas*	158	0.08
Lady crab	*Ovalipes ocellatus*	13,997	75.57
Toad crabs	*Hyas acoatus*	uncounted	very abundant
	Libinia emarginata	5	-
Hermit crabs	*Pagurus acadianus*	uncounted	abundant
	Pagurus longicarpus	uncounted	rare
	Total catch counted	**18,511**	

A total of 18,511 large invertebrates captured were counted (Table 2). The most abundant invertebrate was the lady crab which made up 75.6% of the total counted catch. Longfin squid, the only invertebrate that contributed to the commercial catch, made up 13.8% of the counted catch followed by rock crabs at 8.8%. Other invertebrates were either rare, small, very abundant and/or difficult to identify and were not counted.

CHARACTERISTICS OF CAPTURED FISHES

Data collected from fishes captured during April-July, 2017 consisted of number and length of species captured during each low tide. We summarize the fishes captured below.

Sea lamprey

The total catch of sea lamprey in the Bramber weir during 2017 was only four (Table 1). Low catch was probably an interaction between the biology and migration of this species. Adult lamprey are an anadromous species which remains offshore as an adult (Scott and Scott 1988). They return to their natal stream during spring to spawn and then die. It is believed they home to

total of 105 of the released bass were tagged with external tags for researchers from Acadia University. Thirty-three of the bass caught had external tags from previous years.

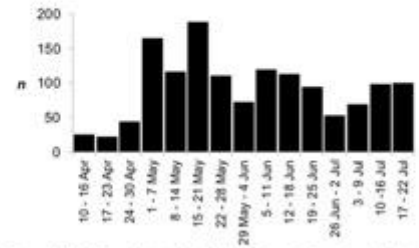


Figure 18. Weekly catch (n) of striped bass from the Bramber weir during April to July, 2017. Total catch was 1,388 fish.

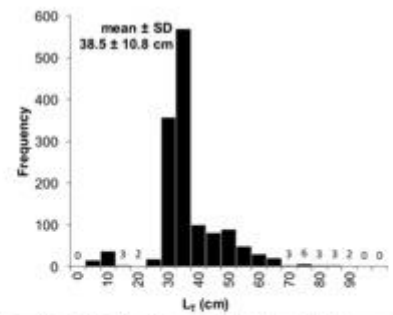


Figure 19. Total length (cm) frequency distribution of striped bass captured at the Bramber weir from April to July, 2017. Unmeasured total lengths ($n = 4$) were extrapolated based on the following fork to total length relationship ($L_T = 1.0697L_F + 4.3996$; $r^2 = 0.99$; $n = 1,381$). Numbers along of x-axis are length groups with less than 10 fish.

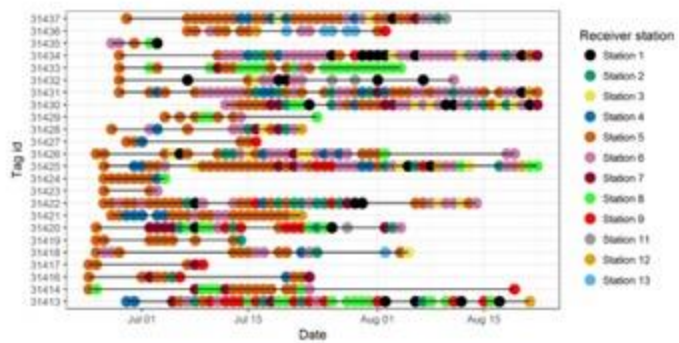


Figure 25. Acoustic detections of striped bass (*Morone saxatilis*) from June 24 to August 22, 2017 on acoustic receivers deployed in southern Minas Basin. Only the final receiver station at which there was a detection is shown for each day.

A total of 25 American shad ranging in size from 32.6 – 54.8 cm L_F were implanted with acoustic tags during the period June 24-July 21. All shad were detected by at least one receiver at distance from the weir indicating that there was probably almost complete survival from the tag implanting surgery (Fig. 26). One shad (#1038), however, was detected at only one station (#7) for an extended period and may have either expelled the transmitter, died or remained near that location because of predation. The remainder of the shad except for one (#1036) moved through the receiver array with few detections probably indicating they were rapidly moving through Minas Basin on their annual summer migration (Dadswell et al. 1987). Further information on these tagged American shad should become available when the Ocean Tracking Network retrieve their data from the Minas Passage Array in late fall.

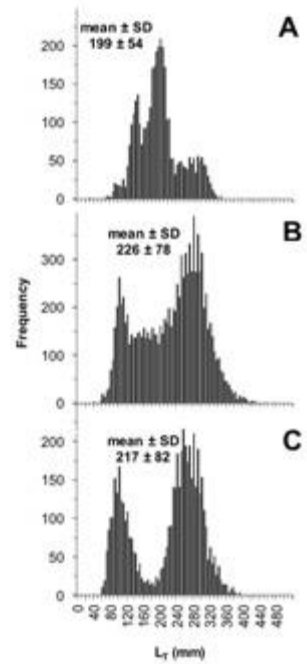


Figure 24. Total length (mm) frequency distributions of A) smooth flounder, B) winter flounder and C) windowpane flounder captured in the Bramber weir during April-July, 2017 (lengths in 5 mm bins).

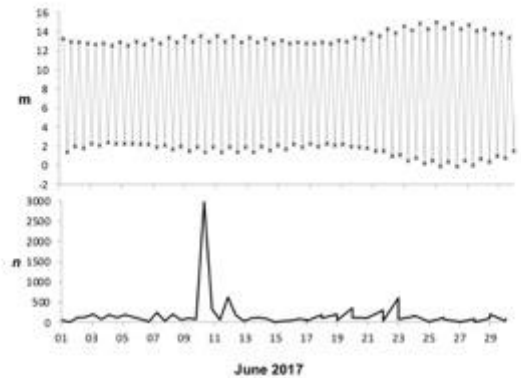


Figure 16. Tide cycle (**m**) during 1-30 June, 2017 at the Bramber weir (top) compared to catches (**n**) of Atlantic tomcod (bottom).

Monkfish

An uncommon species taken at the Bramber weir during 2017 was the monkfish, a member of the angler or goosefish family (Lophiidae). Only four individuals were captured during 2017 (Table 1). Monkfish mostly prey on flounders and follow them onto the intertidal zone at high tide. They are often stranded in the intertidal tide zone since they are a lethargic, lay-in-wait predator and the fast moving tide in Minas Basin catches them unawares (Bleakney and MacAllister 1973).

Other fishes

Other fishes that were rare or uncommonly captured in the Bramber weir were mummichog (two individuals), northern pipefish (seven), and cunner (51). All these fishes are much more common in Minas Basin than the weir catches suggest but were poorly represented because of their biology or physical characteristics (Scott and Scott 1988). Mummichog are extremely common in intertidal tide pools in salt marshes and remain close to that habitat (Bleakney and Bailey-Meyer 1979). Pipefish have a small diameter body and would pass easily through the weir mesh. Cunner are a species that remains close to rocky shores and wharfs and would rarely move over muddy, intertidal zones (Scott and Scott 1988).

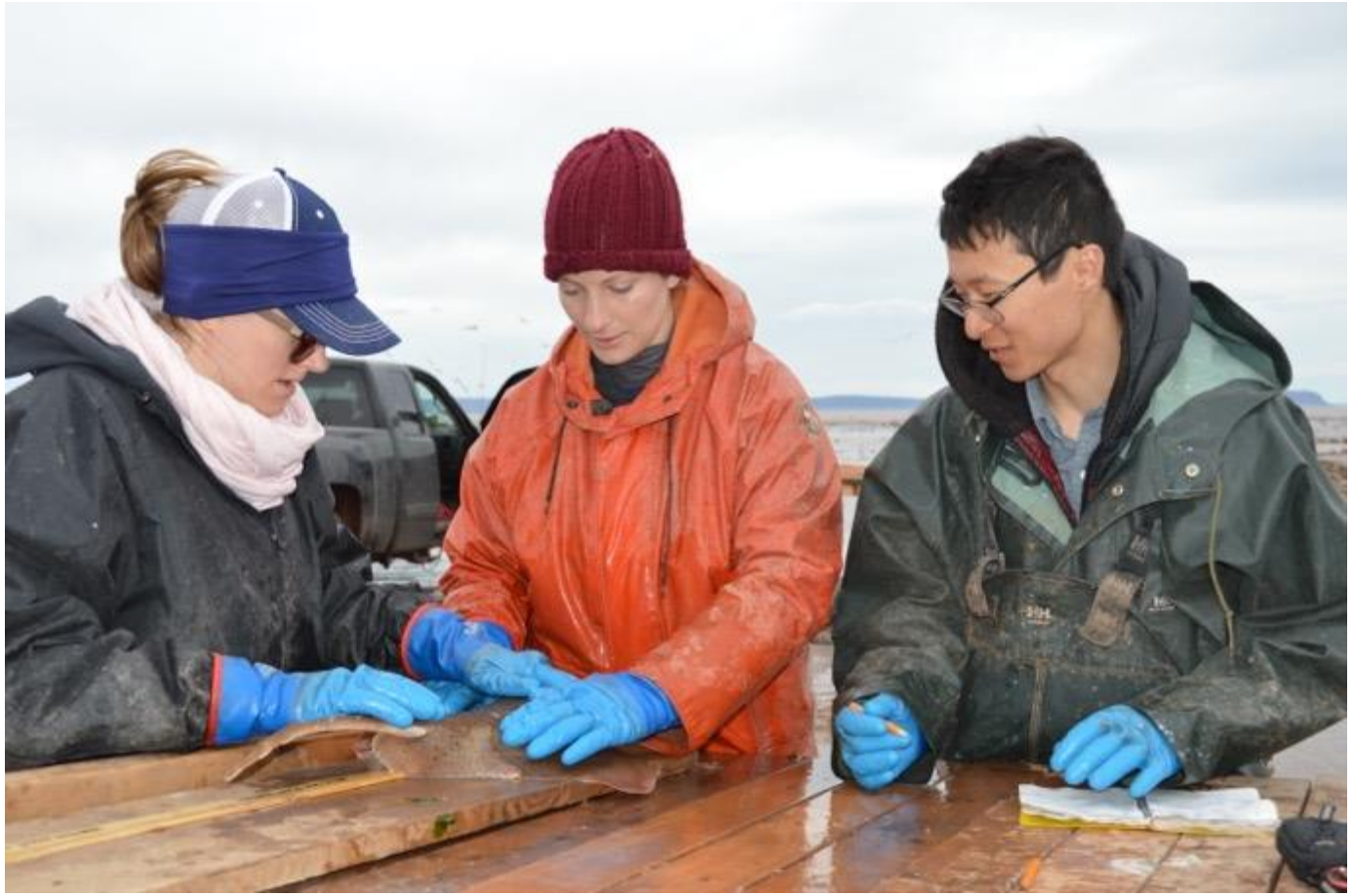
Back to the Living system

Ground Zero

The Boss

THE LAB

HIRED RESEARCHERS BY DAY



BY NIGHT

DUAL OPERATION

HIRED PROFESSOR

TAGGING GASPEREAU

TAGGING STURGEON

EDUCATION

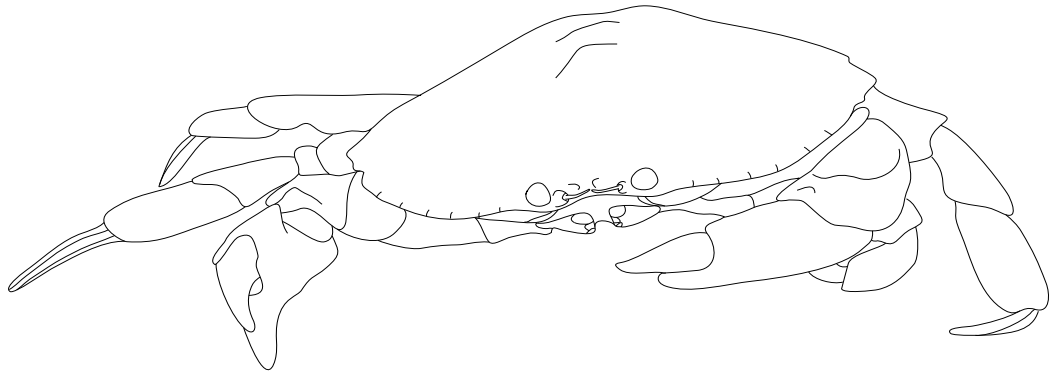
INTERACTION

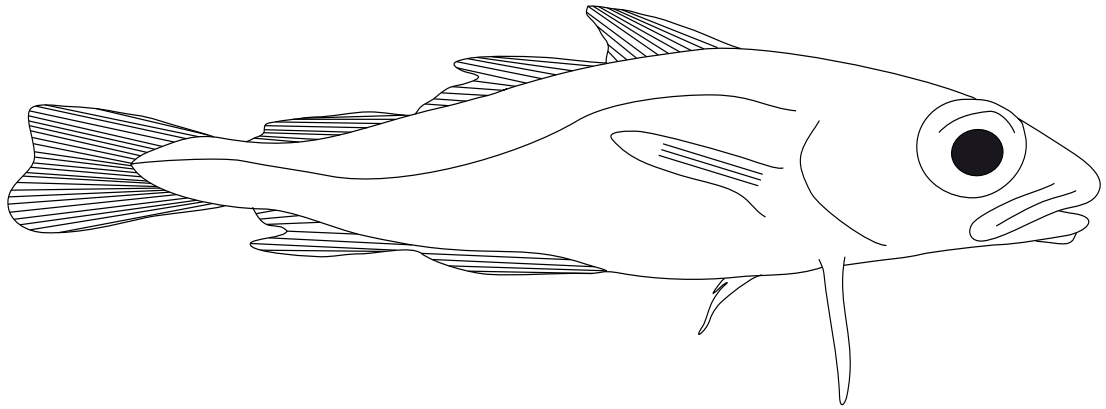
PUBLIC ENGAGEMENT

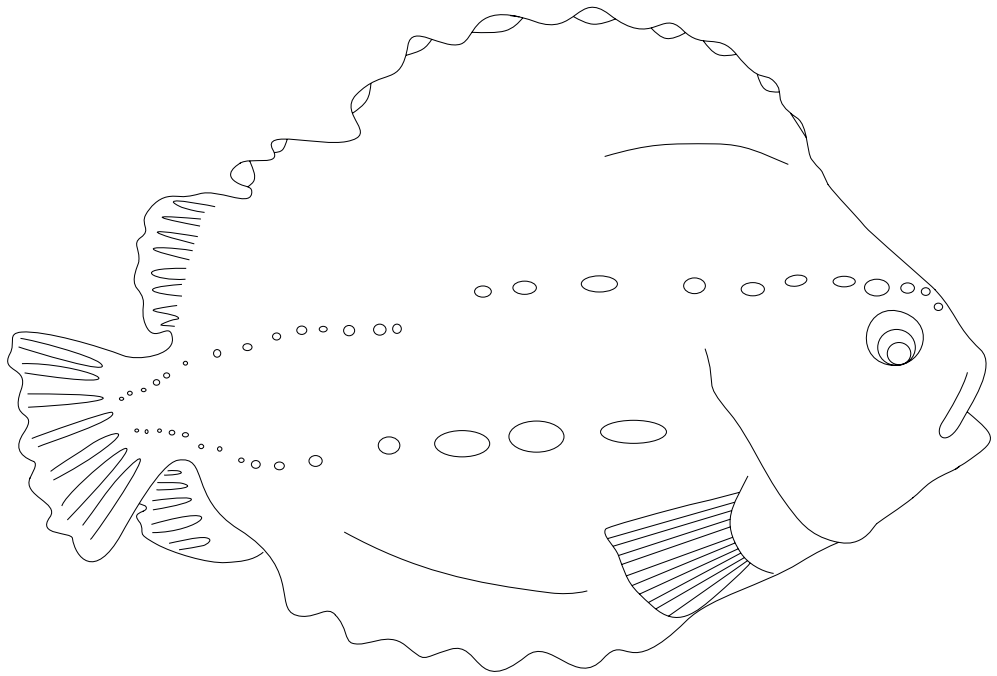
VISTING MI’KMAW

SHARING THE LOVE OF FISH

COLOURING FOR KIDS

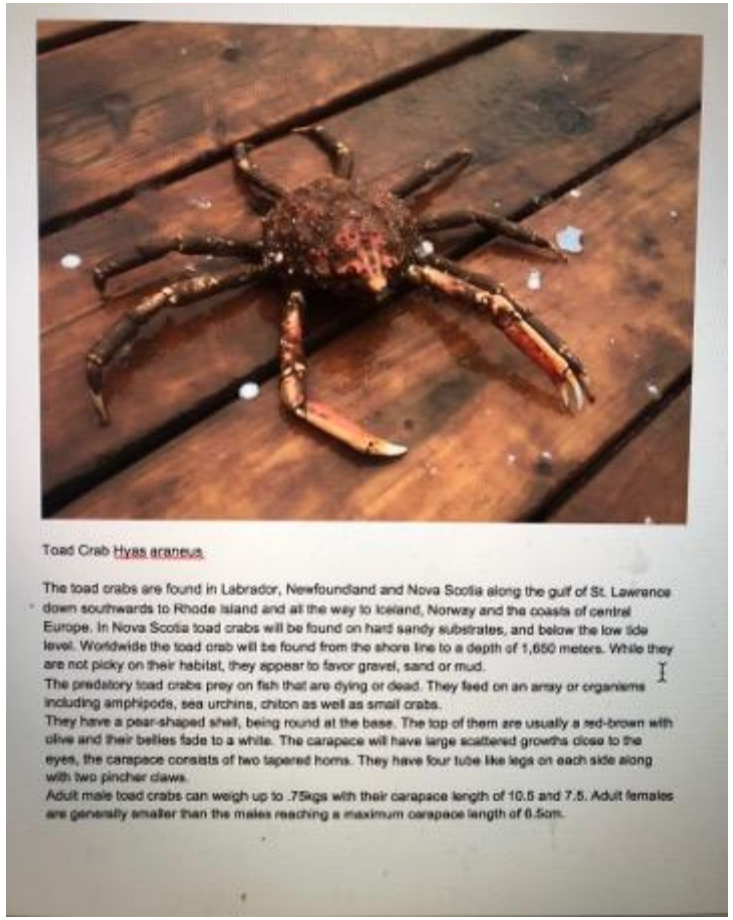






FISHY FUN FACTS FOR KIDS

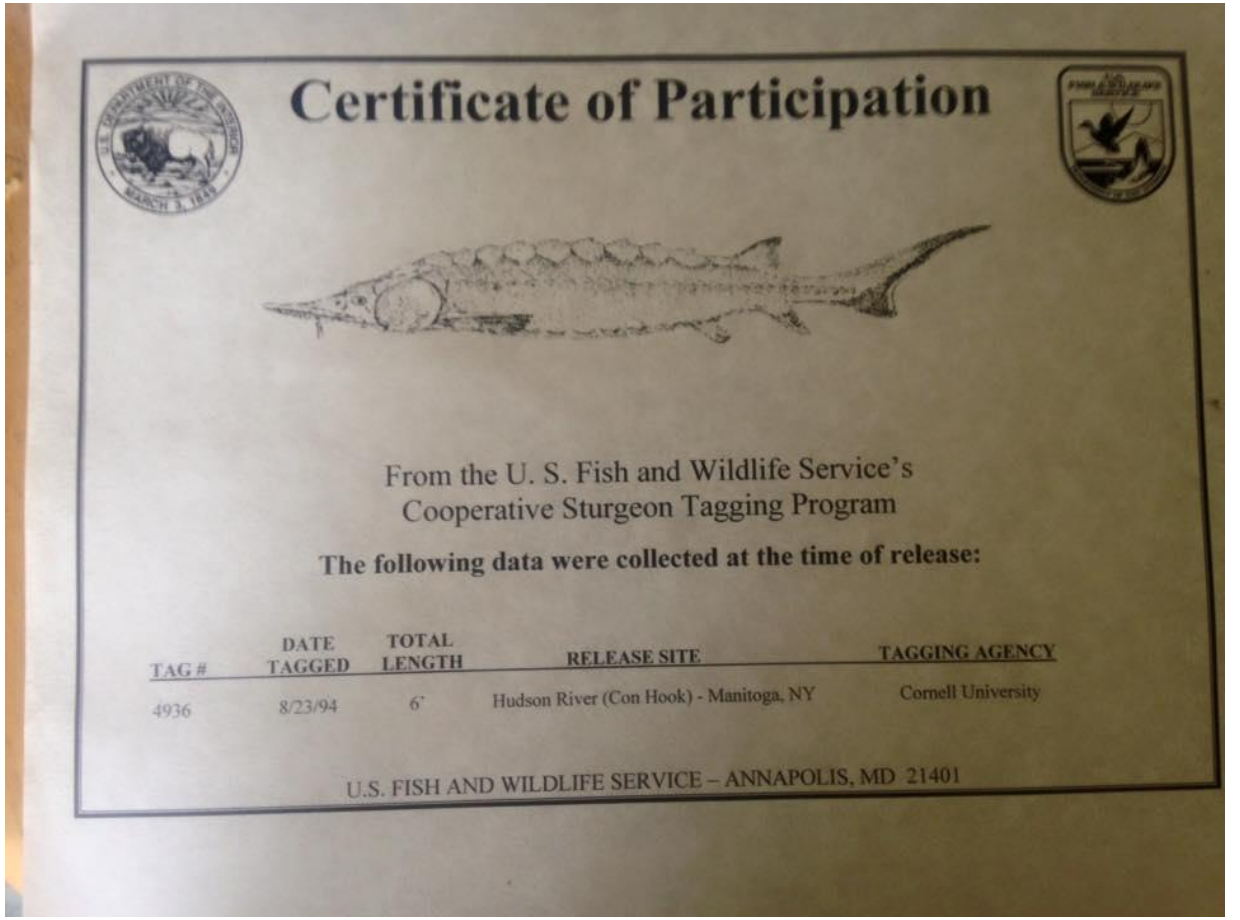
Fish of the day



Toad Crab Hyas araneus

The toad crabs are found in Labrador, Newfoundland and Nova Scotia along the gulf of St. Lawrence down southwards to Rhode Island and all the way to Iceland, Norway and the coasts of central Europe. In Nova Scotia toad crabs will be found on hard sandy substrates, and below the low tide level. Worldwide the toad crab will be found from the shore line to a depth of 1,650 meters. While they are not picky on their habitat, they appear to favor gravel, sand or mud.
The predatory toad crabs prey on fish that are dying or dead. They feed on an array or organisms including amphipods, sea urchins, chiton as well as small crabs.
They have a pear-shaped shell, being round at the base. The top of them are usually a red-brown with olive and their bellies fade to a white. The carapace will have large scattered growths close to the eyes, the carapace consists of two tapered horns. They have four tube like legs on each side along with two pincher claws.
Adult male toad crabs can weigh up to .75kgs with their carapace length of 10.5 and 7.5. Adult females are generally smaller than the males reaching a maximum carapace length of 6.5cm.

International



Certificate of Participation

From the U. S. Fish and Wildlife Service's
Cooperative Sturgeon Tagging Program

The following data were collected at the time of release:

TAG #	DATE TAGGED	TOTAL LENGTH	RELEASE SITE	TAGGING AGENCY
4936	8/23/94	6'	Hudson River (Con Hook) - Manitoga, NY	Cornell University

U.S. FISH AND WILDLIFE SERVICE – ANNAPOLIS, MD 21401

OTN PARTNERSHIP

BENEFITS ALL

TRANSMITTERS

ACOUSTIC RECIEVERS

SKATE TRACKING

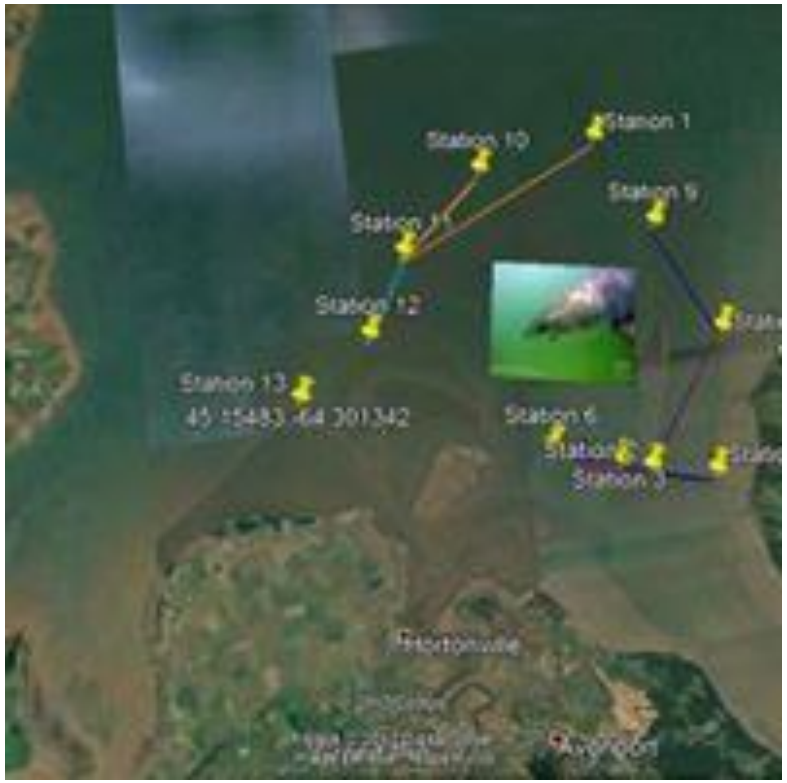
AMERICAN SHAD TRACKING

STRIPED BASS TRACKING

PUMPKIN


Atlantic White Shark Conservancy
Massachusetts Division of Marine Fisheries
'Pumpkin'
WS 16-14
7-15-2016

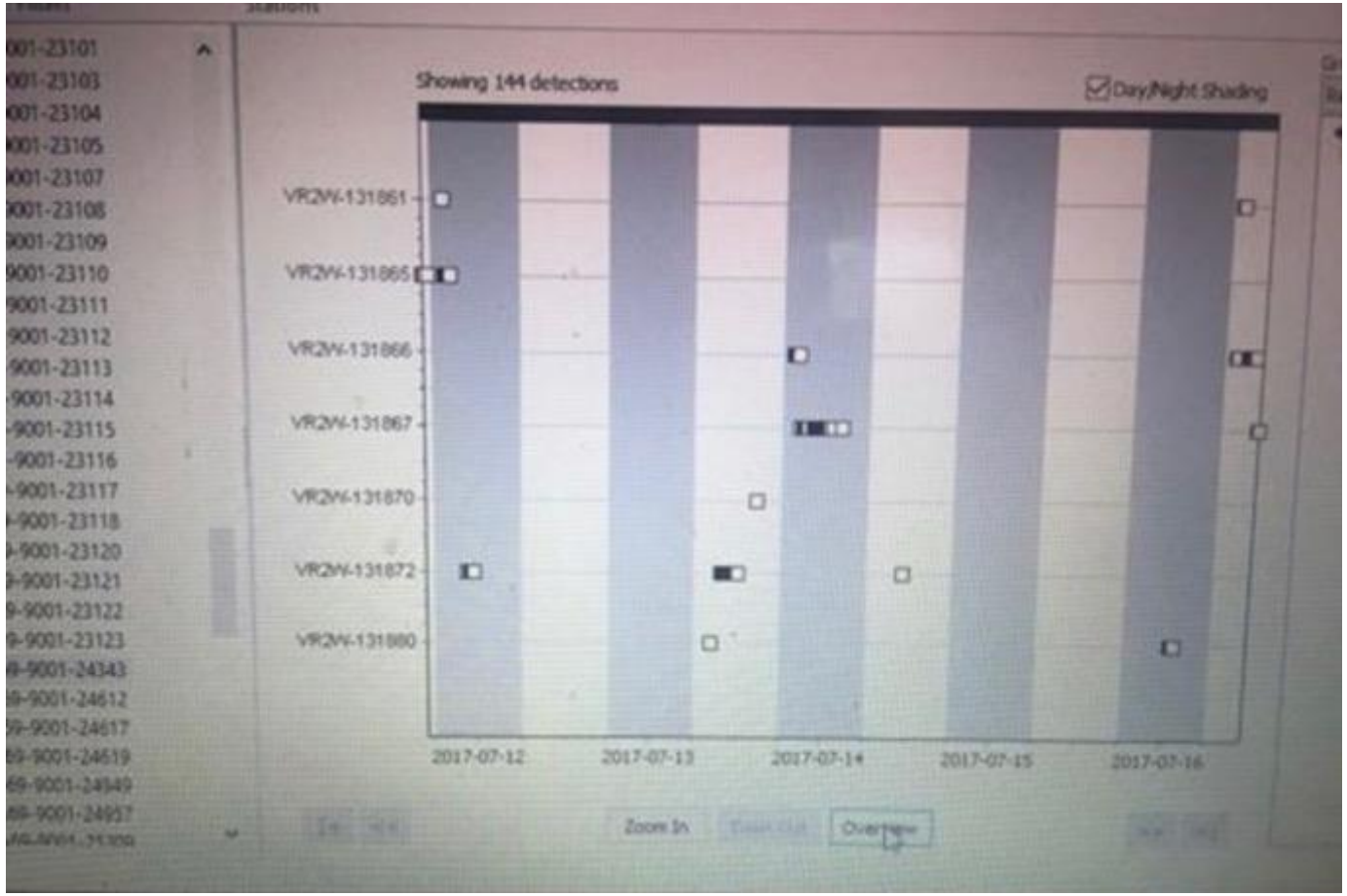
PUMKIN TRACKS



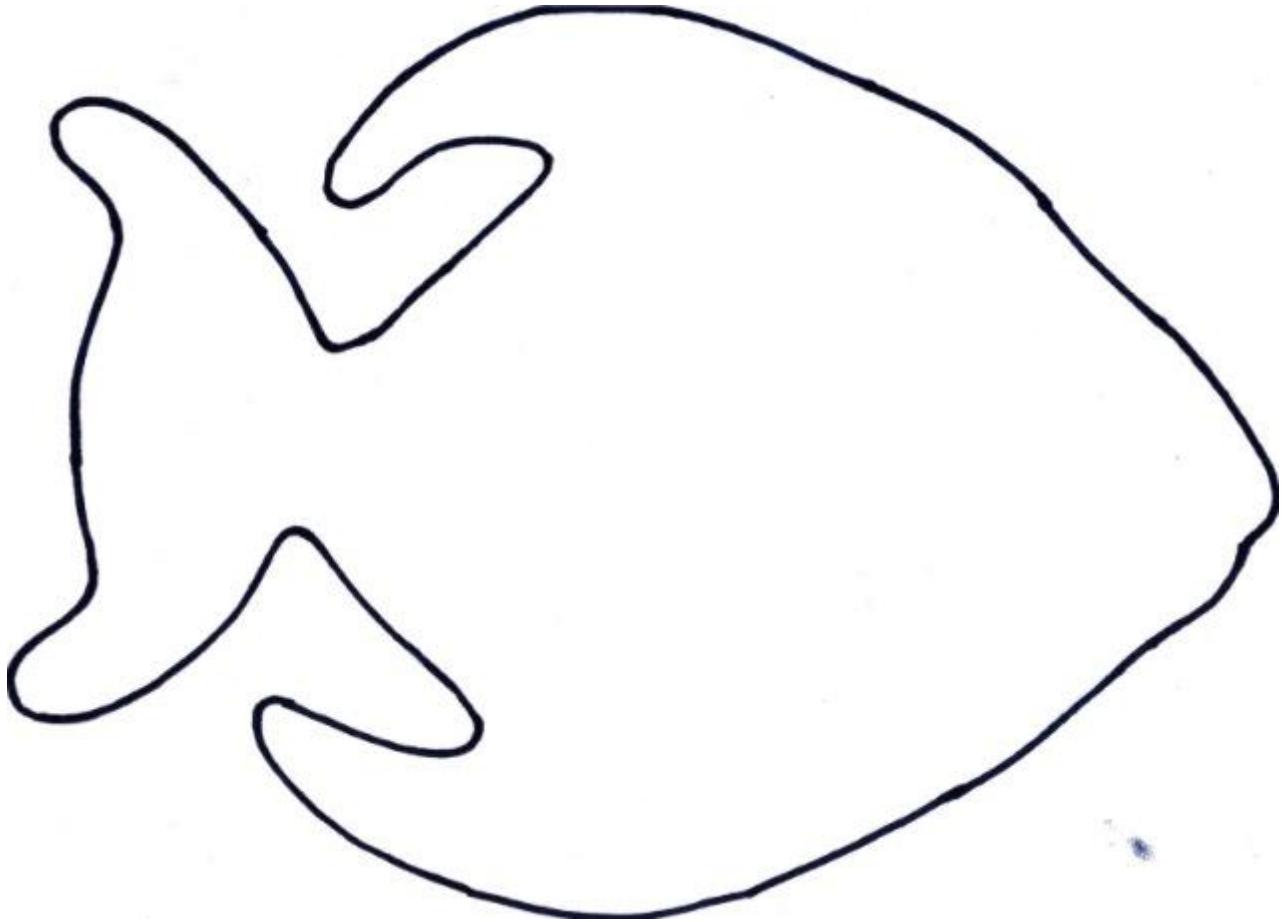
Fishers' knowledge

Legitimacy of local knowledge

PUMPKIN DATA
EARILEST WHITE SHARK EVER DETECTED IN OUR WATERS

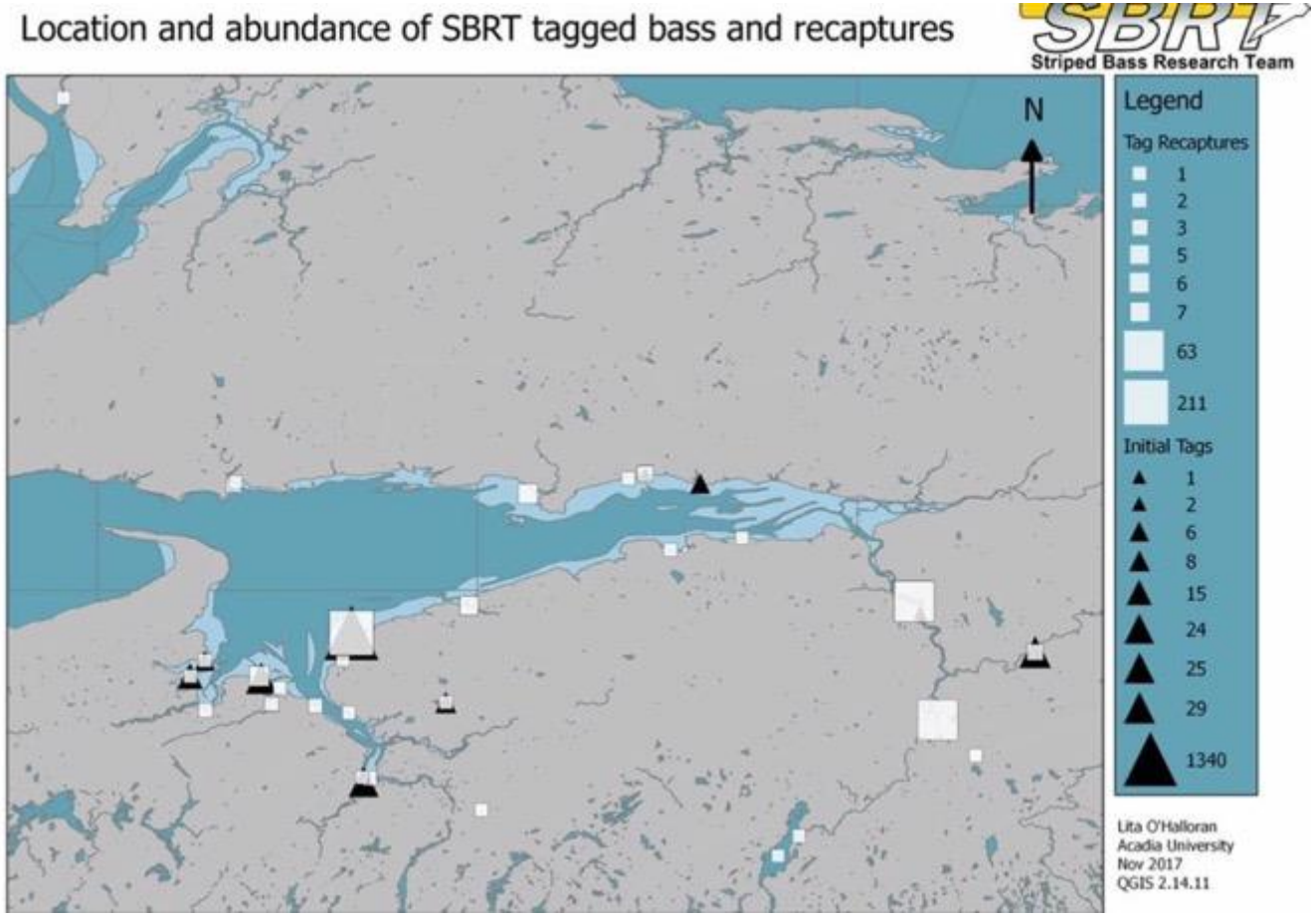


NOW IT IS REAL



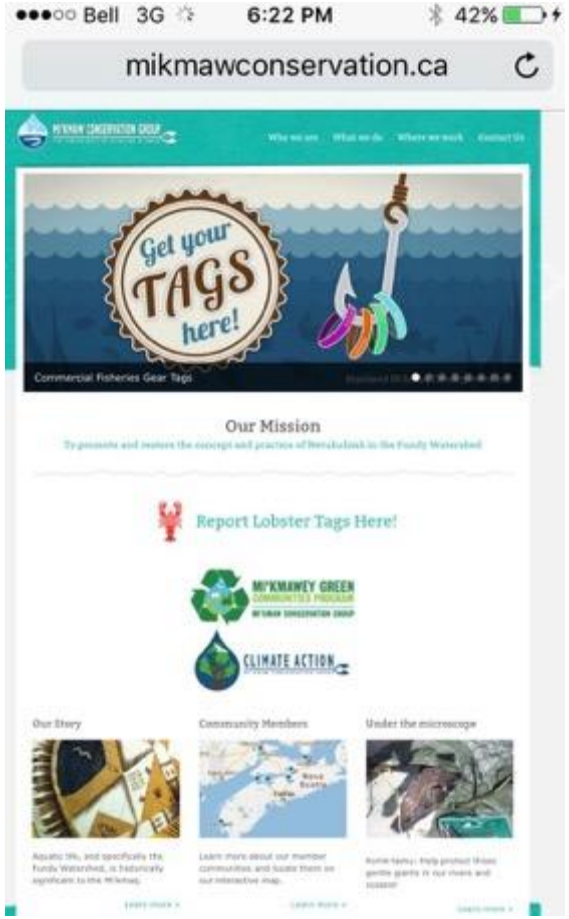
Acadia University tagging studies

MOST STRIPED BASS ARE TAGGED AT OUR OPERATION
AS WELL AS REPORTS/RETURNS



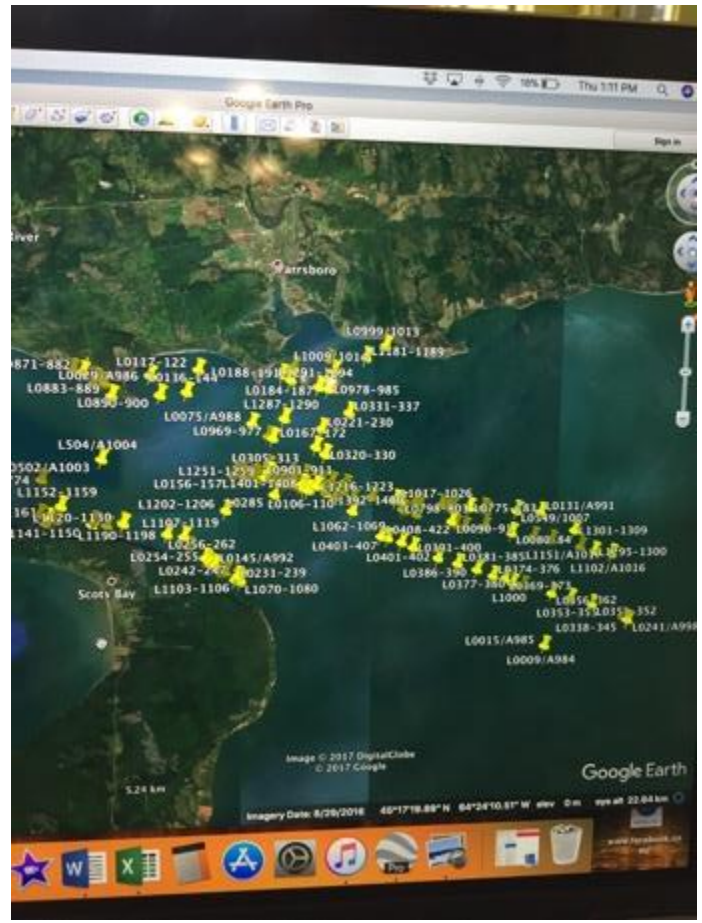
LOBSTER STUDY

MCG/FISHERS/INDUSTRY



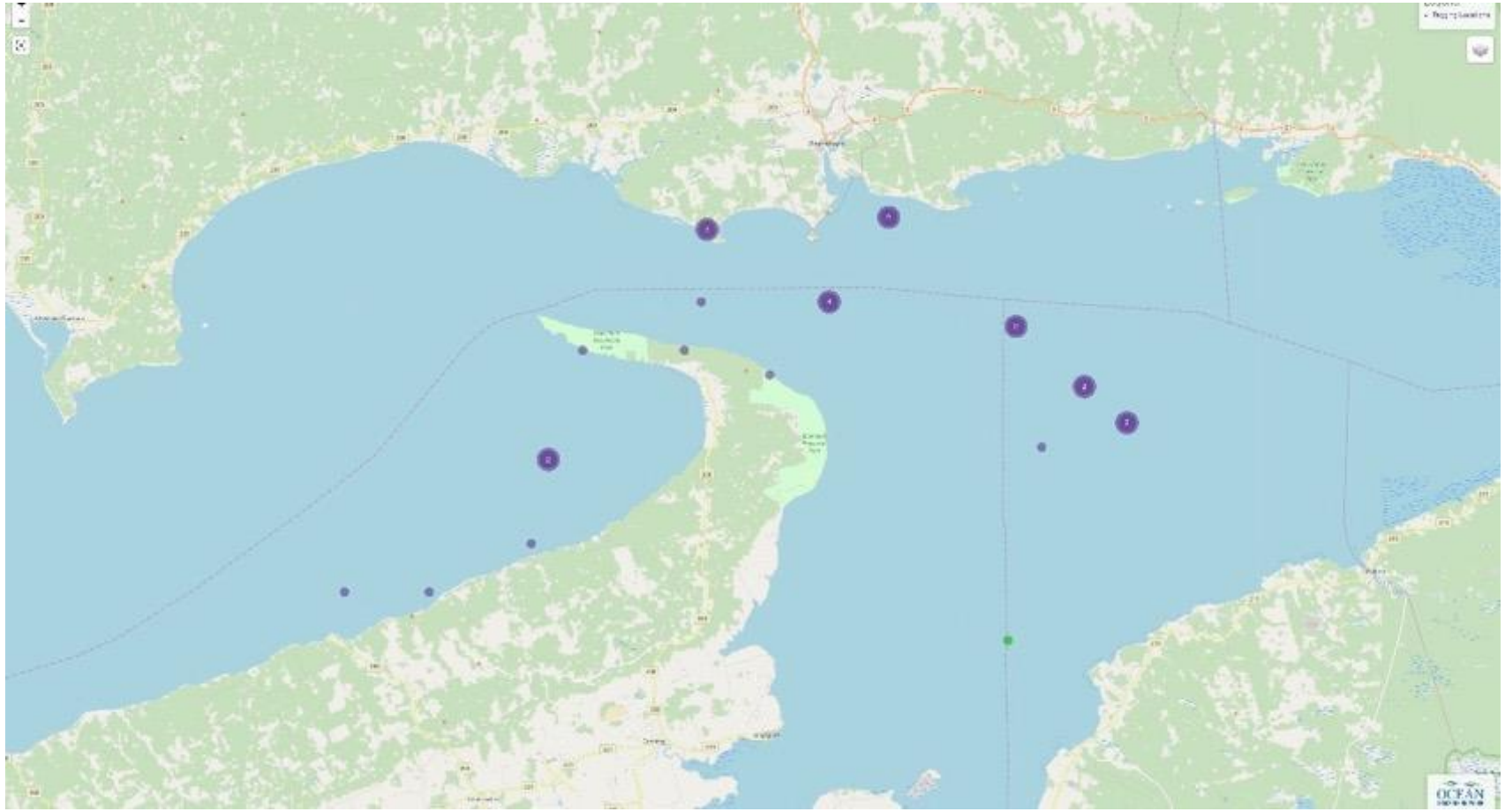
FLOY TAGS


MIKMAN CONSERVATION

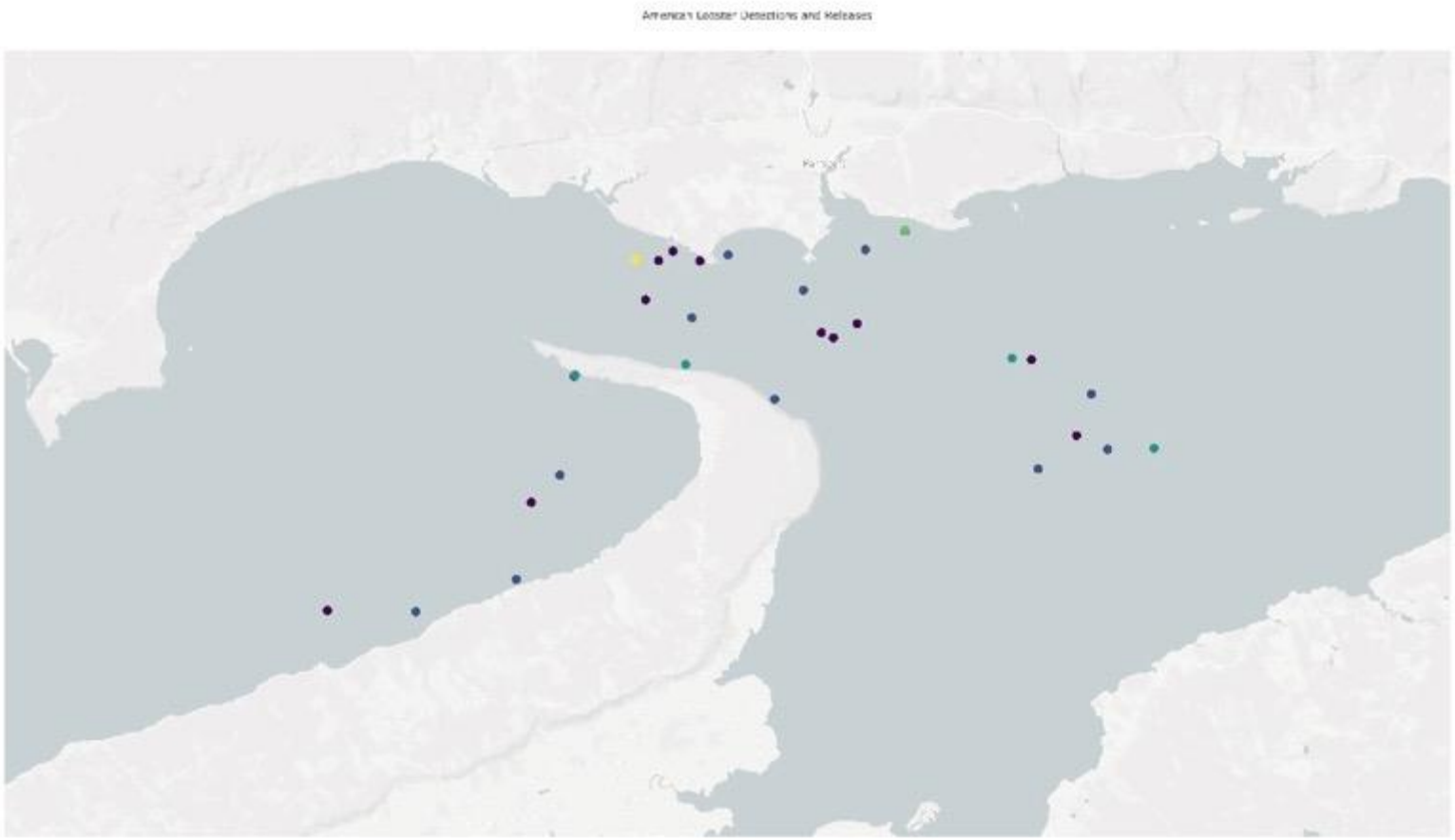

Google Earth Pro
Thu 1:11 PM
Parrsboro
Scots Bay
L0999-1013
L1181-1189
L0117-122
L0188-191
L0883-889
L0978-985
L0331-337
L0075/A988
L0221-230
L0969-977
L504/A1004
L0320-330
L1152-1159
L1202-1206
L0285
L1107-1119
L1190-1198
L0254-255
L0145/A992
L0231-239
L1103-1106
L1070-1080
L0131/A991
L0549/1007
L1062-1069
L0403-407
L0401-402
L0101-400
L0174-376
L1102/A1016
L1000
L0015/A985
L0009/A984
L0338-345
Image © 2017 DigitalGlobe
© 2017 Google
Google Earth
5.24 km

OTN/FISHERS/INDUSTRY ACOUSTIC TRACKING STUDY

Release locations



Release locations and 5 detections at Force OTN will be down loading their line in April



We have Many more receivers going out in 2018

FISHERS ARE THE LOGICAL CHOICE FOR THIS

Shubenacadie/Stewiacke river Study

Designed nets for MCG

COMMUNITY ENVOLVEMENT

FEET IN THE WATER, AND PRODUCING DATA

MCG RIVER STUDY TEAM

DATA

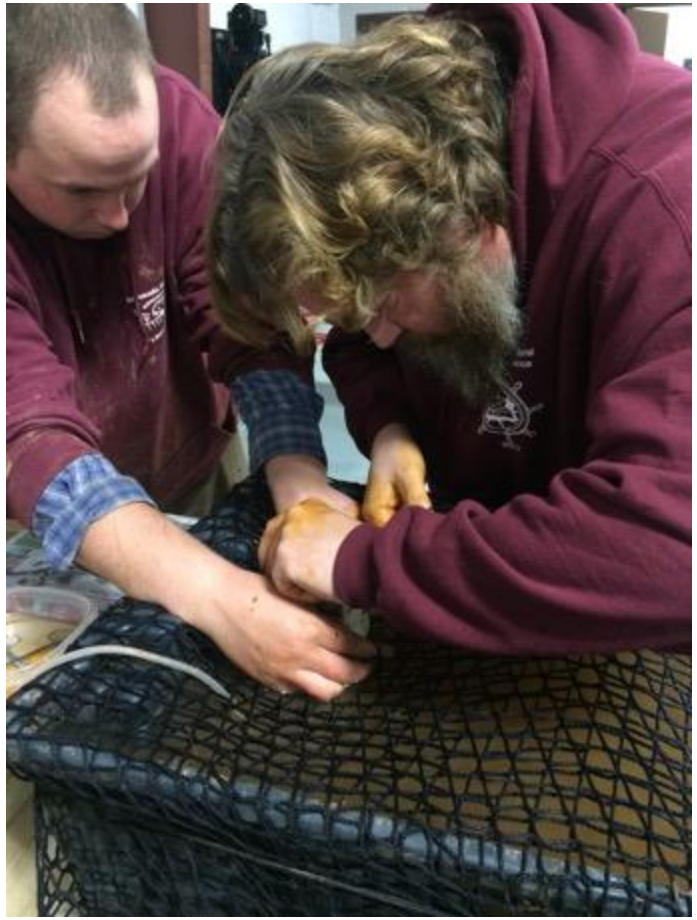
Tom Cod Acoustic Study begins at First Location

Suture

PROUD MOMENTS

The Release

Tom Cod Tracking…..OTN/MCG/MINAS Second Location



Team Work

Data

Windsor CRA Study

CRA PRELIMINARY REPORT 2017

Baseline Assessment of Commercial, Recreational, and Aboriginal (CRA) Fisheries Adjacent to the Avon River Causeway

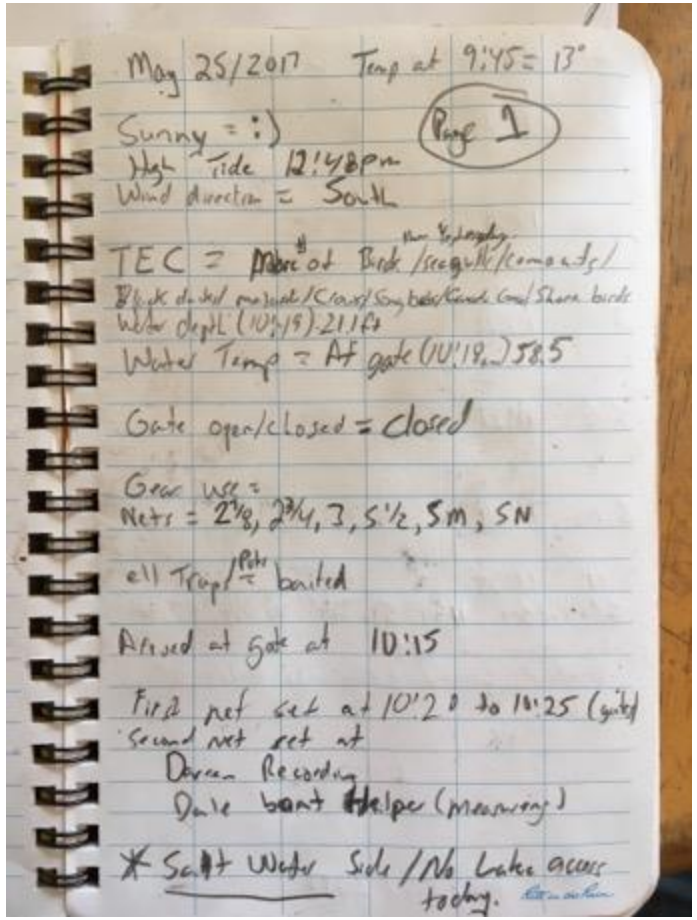
Draft Preliminary Report

22 January 2018

Trevor Avery, Maja Reinhartsen, Darren Porter

THE GATE

Data Collection



No Access, No Problem

The Lake Side

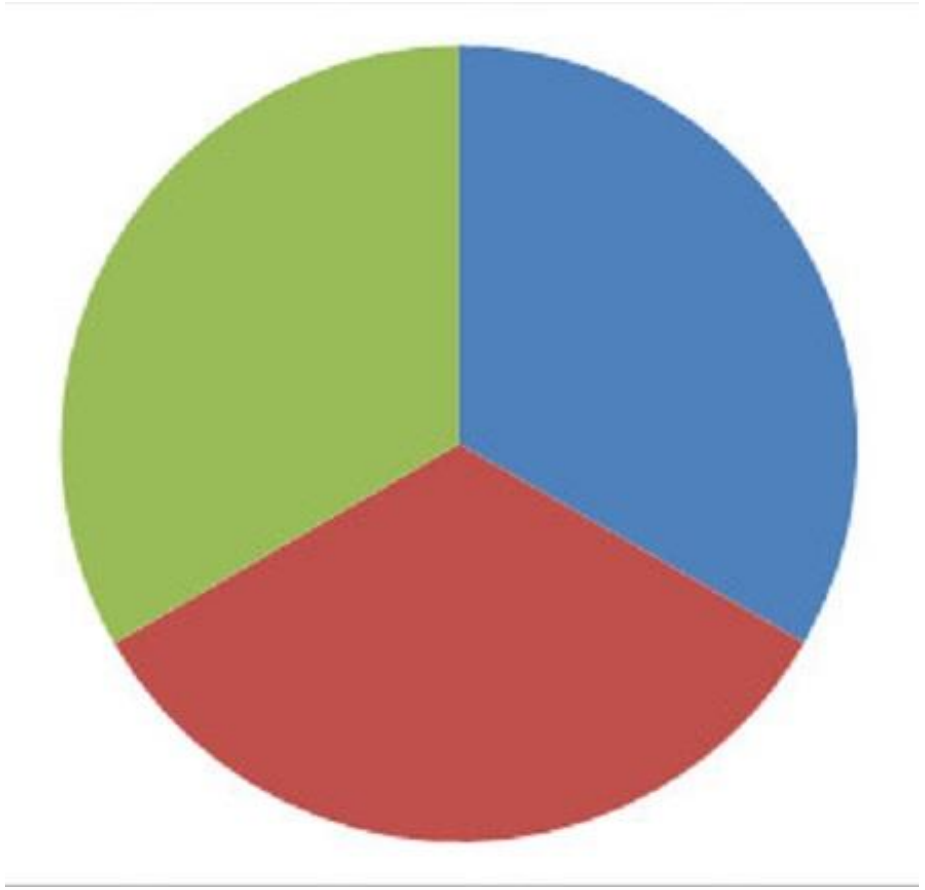
Game Changers

SALT WATER SIDE

Students Favorite

Breaking Them In

Third Eye Approach



Wisdom