

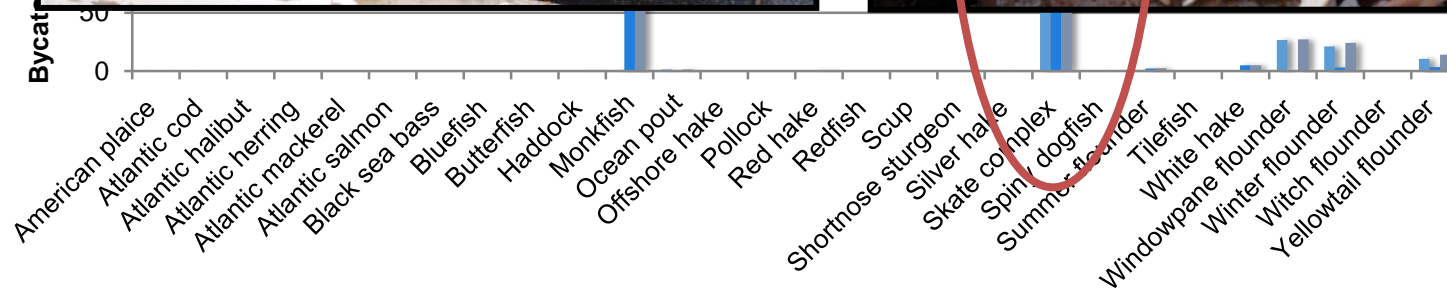
THE SURVIVAL OF RAJIDS DISCARDED IN THE NEW ENGLAND SCALLOP DREDGE FISHERIES



Project Update 4-9-2014

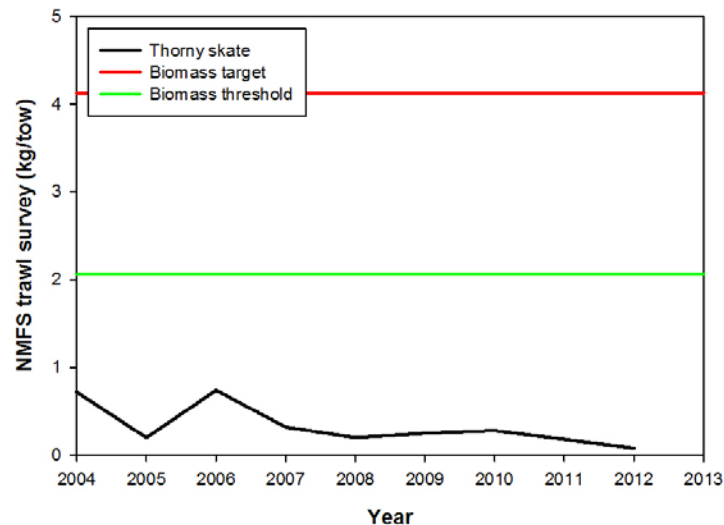
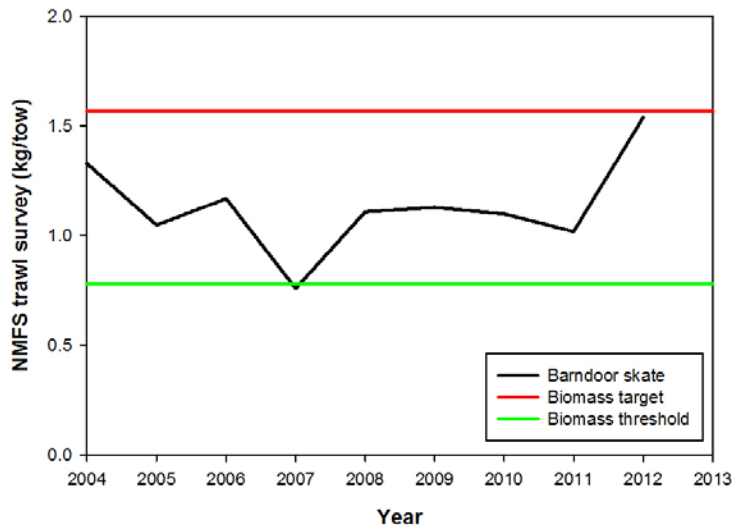
Fisheries Management/Discards

- U.S. Northwest Atlantic Ocean
- New England scallop dredge fishery

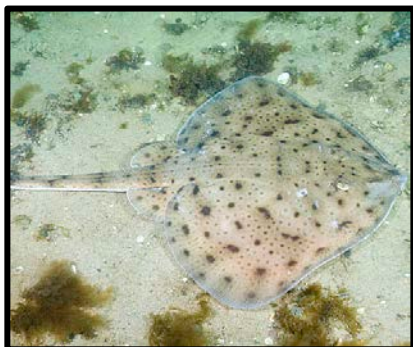


Areas

Management of Skates



Little skate
(*Leucoraja erinacea*)



Winter skate
(*Leucoraja ocellata*)



Barndoor skate
(*Dipturus laevis*)



Thorny skate
(*Amblyraja radiata*)



Skate Discard P-R Mortality

- Required for effective fisheries management
- Gulf of Maine – otter trawl fishery
 - ▣ Physical trauma
 - ▣ Species-specific differences

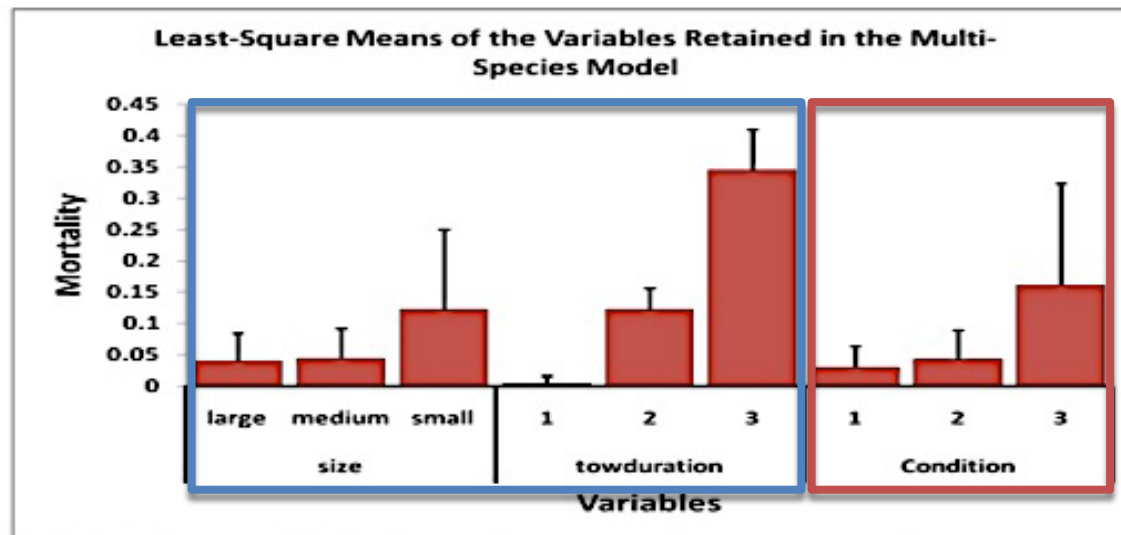


Figure 1. Preliminary results for variables exhibiting a significant effect on the delayed mortality of aggregate skates captured by trawl. Total size, tow duration and (post-capture) condition were significant predictors of delayed mortality in skates, independent of species.

Materials and Methods

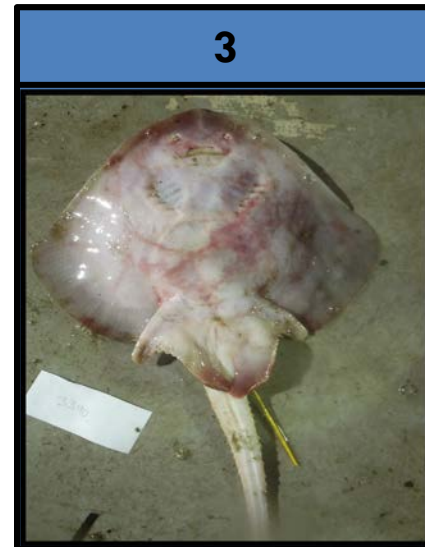
- Normal fishing operations
 - ▣ Tow times: 10-90 min
 - ▣ Fishing conditions/practices
 - Time of day
 - Depth
 - Air temperature
 - % Cloud cover
 - Sea state
 - Volume of catch
 - Catch composition
- Timed sample period
 - ▣ Aerial exposure
 - ▣ 30 minutes



Materials and Methods

- Health evaluation
 - ▣ Vitality index (0 to 1)
 - 5 reflexes
 - Absent/Present
 - ▣ Condition index (1 to 3)
 - Physical trauma

$$Vitality = 1 - \left(\frac{X_{\text{present reflexes}}}{5} \right)$$



Materials and Methods

- Health evaluation
- External measurements
- Dart tag

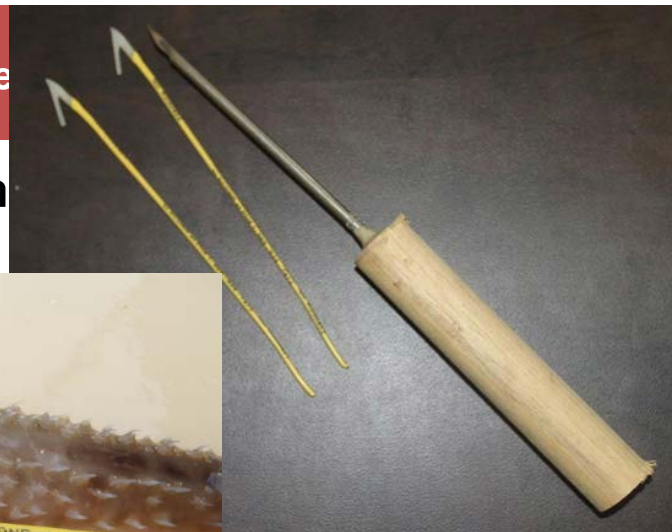
Release

- Fisheries dependent



Mortality Trial

our trial
ate health
predictors



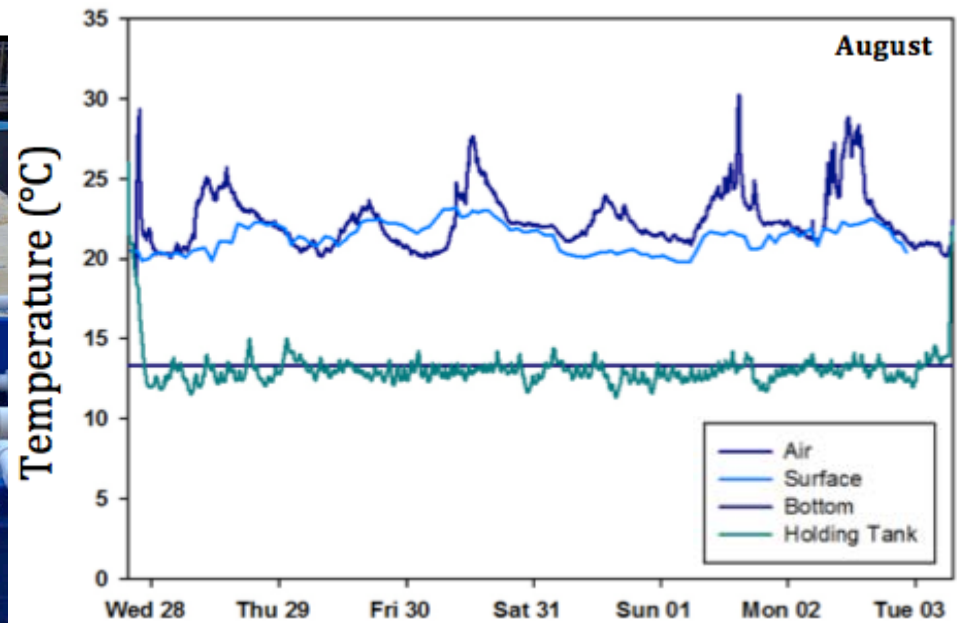
Materials and Methods

- Net pen mortality trials
 - ▣ 48-hour soak time
 - ▣ Not successful
 - Tides and currents
 - Fog and visibility
 - Fishing pressure
 - Sea lice and isopod infestation



Materials and Methods

- Holding tank mortality trials
 - ▣ Refrigerated seawater system
 - ▣ Flow-through
 - ▣ 72-hour holding time



Preliminary Results

P-R mortality and fishing conditions/practices

Specimens Sampled

Release

- Specimens collected
 - ▣ Little: 2,454
 - ▣ Winter: 1,163
 - ▣ Barndoor: 228
 - ▣ TBD: 333
- Tows: 295



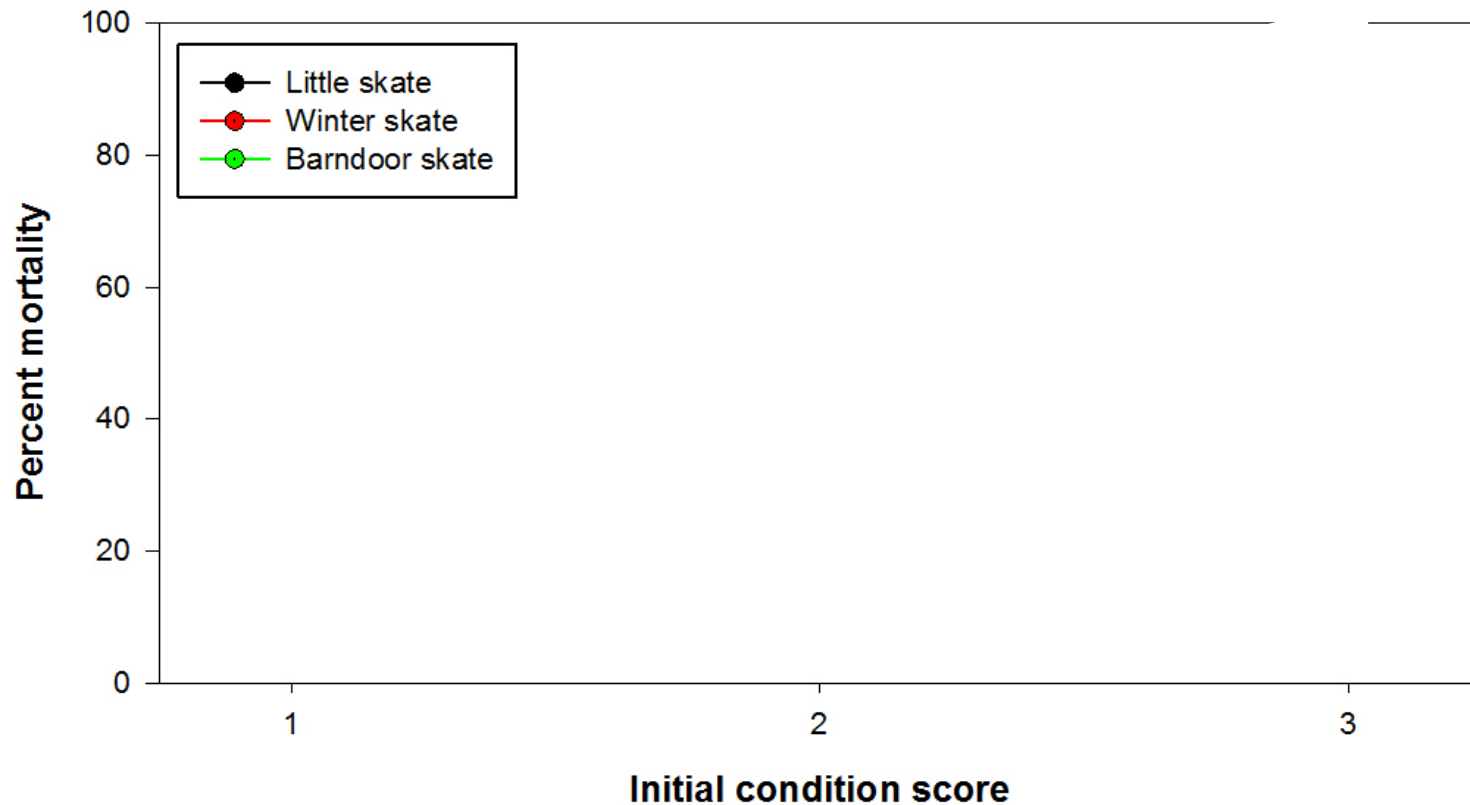
Mortality Trial

- Specimens collected
 - ▣ Little: 136
 - ▣ Winter: 100
 - ▣ Barndoor: 31
 - ▣ TBD: 23
- Tows: 115



P-R Mortality Trials

- Using the condition index to predict mortality

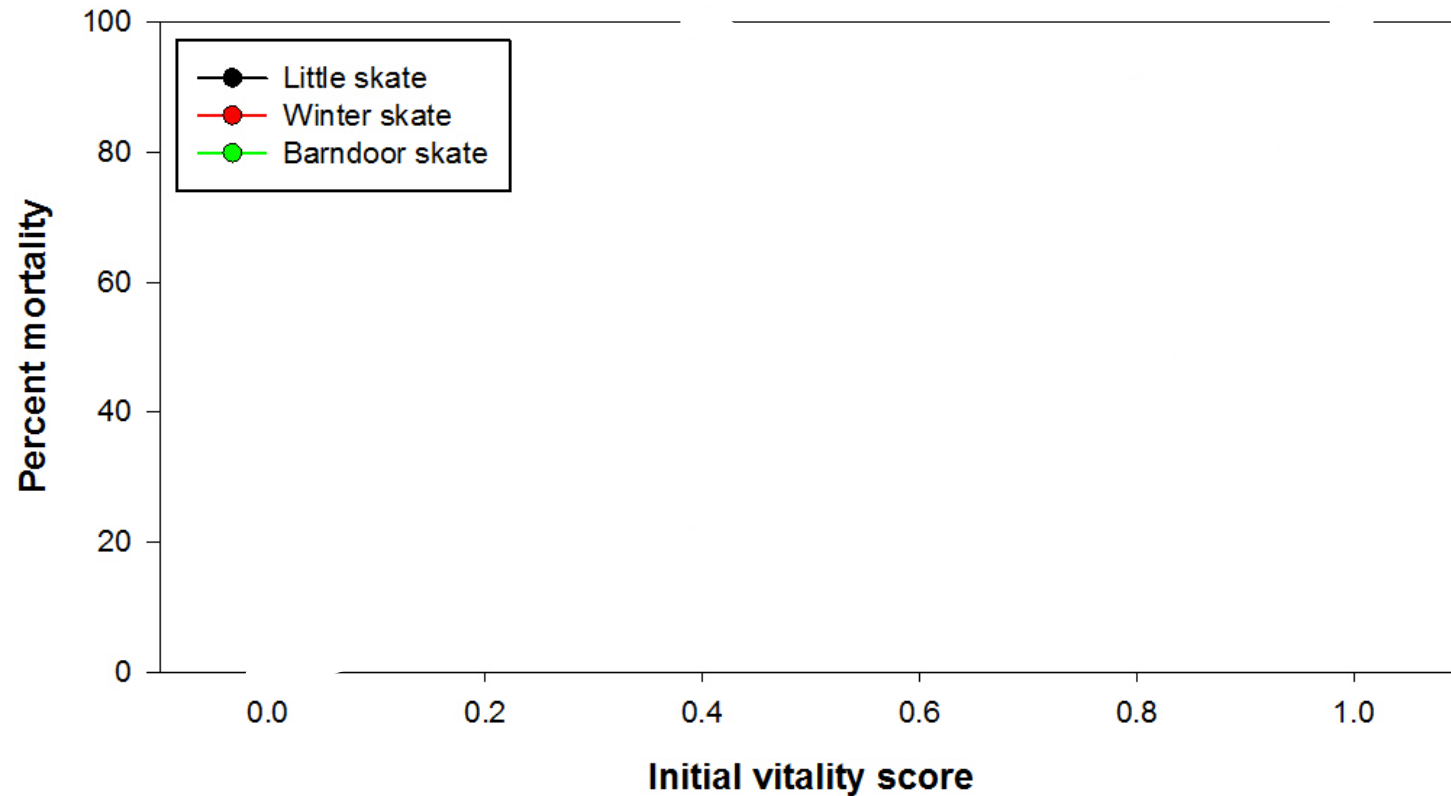


P-R Mortality Trials

- Using the vitality index to predict mortality

0.00 (no impairment)

1.00 (completely impaired)

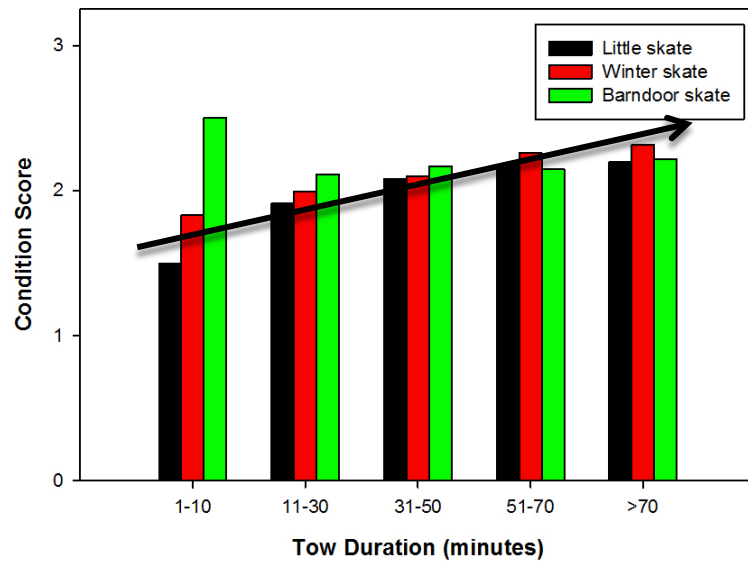


Fishing Conditions/Practices

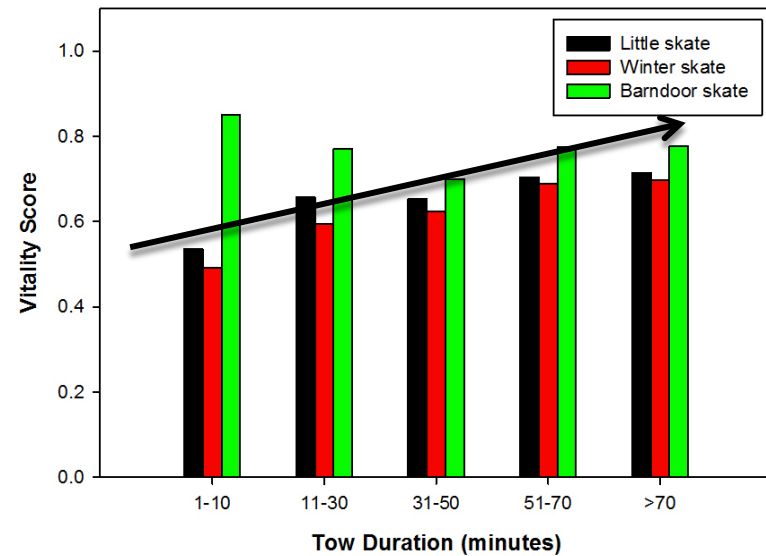
□ Tow duration

▣ 4 to 97 min

Condition



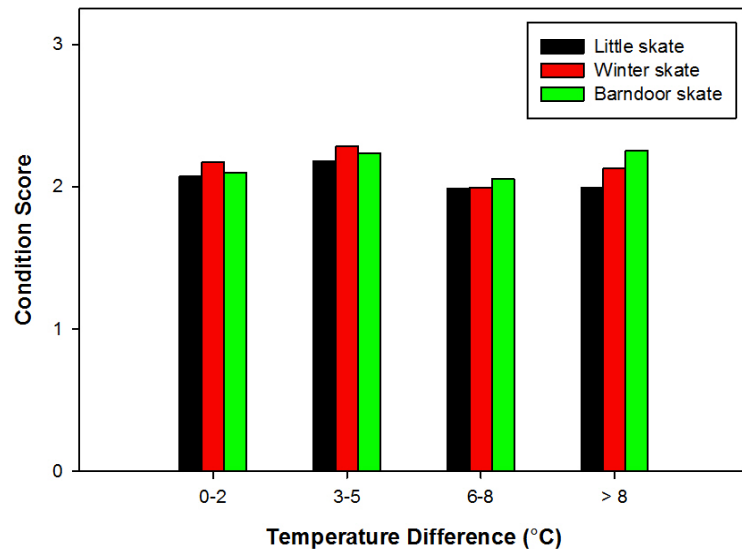
Vitality



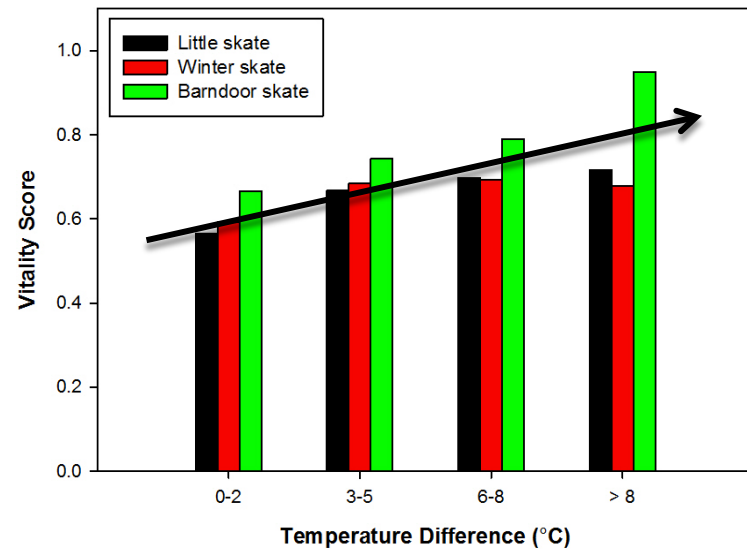
Fishing Conditions/Practices

- Bottom-surface temperature gradient
 - ▣ 0.41 to 11.52°C

Condition



Vitality

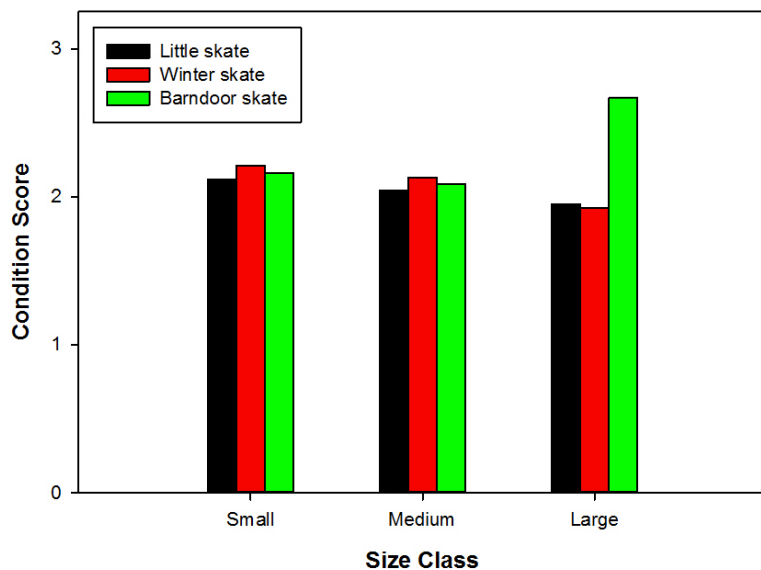


Fishing Conditions/Practices

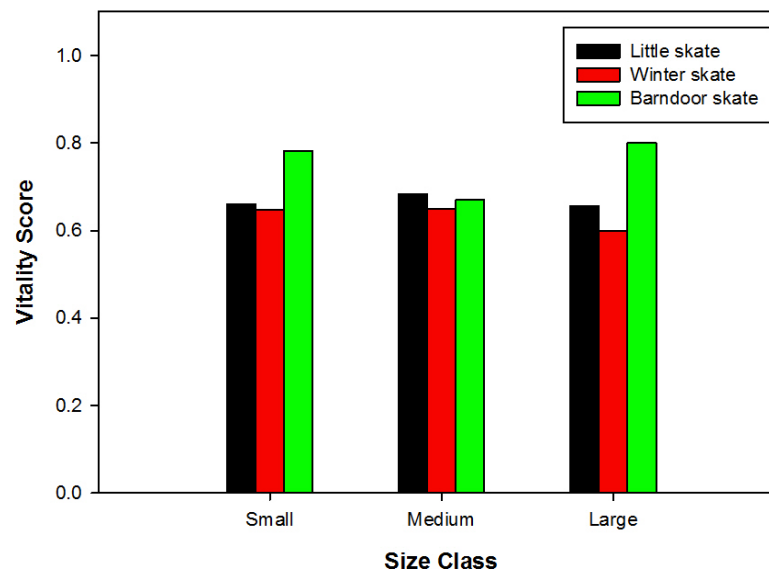
□ Species-specific size classes (cm)

	Small	Medium	Large
Little skate	36-42	43-49	> 50
Winter skate	36-45	46-70	> 71
Barndoor skate	30-60	61-90	> 91

Condition



Vitality



What's next?

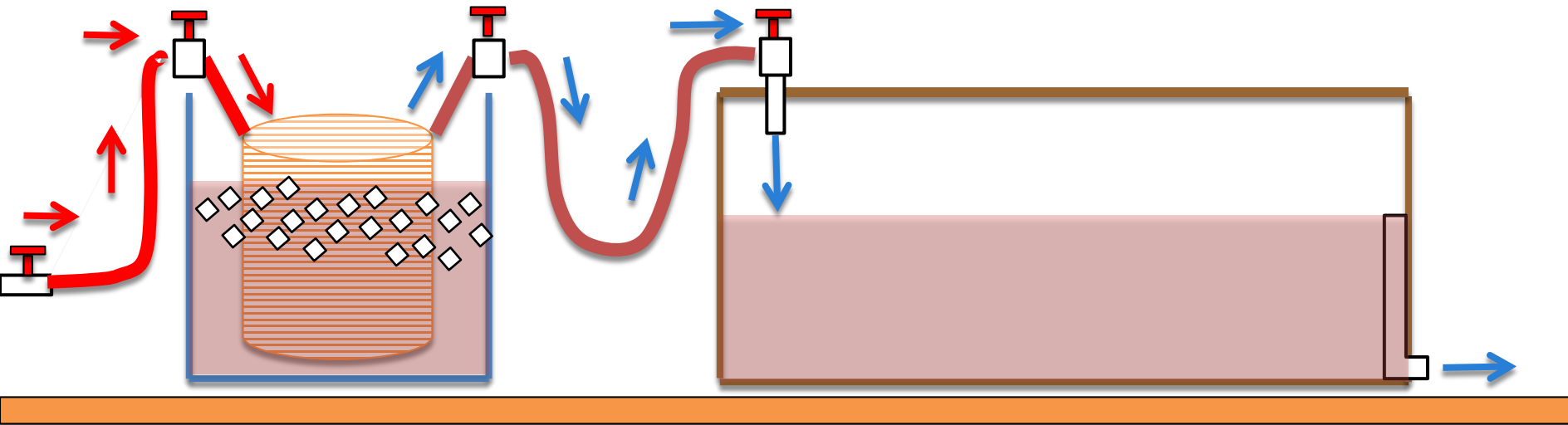
- Trip for Moncton, Canada to meet with Dr. Hugues Benoit
 - ▣ Extensive analyses of data
 - Survival analysis
 - Analysis of the multinomial data of condition and vitality scores
 - Analysis of the multinomial data of fishing conditions/practices
- RSW tank system (in prep) for Journal of Fisheries Research
- Conferences:
 - ▣ 2014 Northeast Fish and Wildlife Annual Conference
 - ▣ 2014 American Elasmobranch Society Annual Meeting
 - ▣ 2014 American Fisheries Society Annual Meeting

Questions?



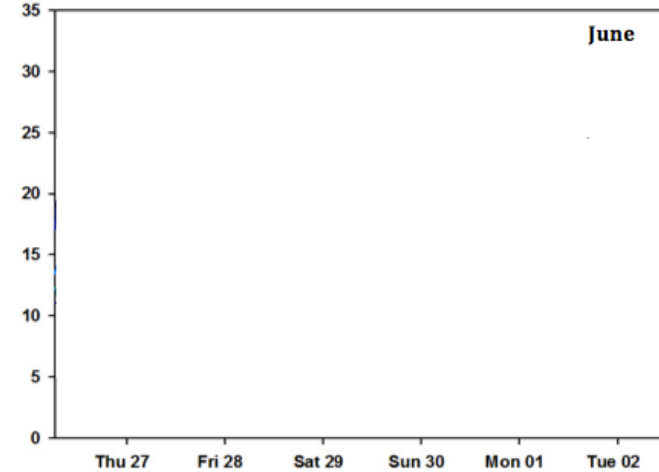
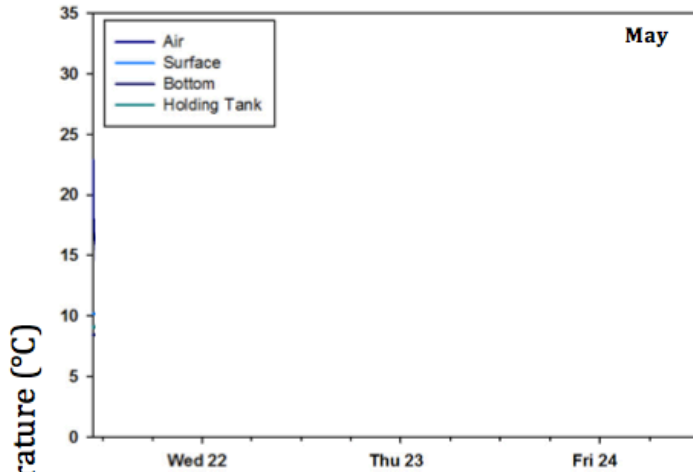
Methodology

- Drawing board



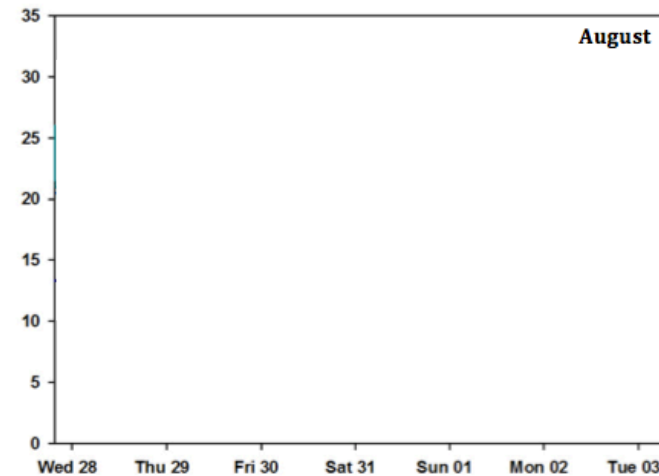
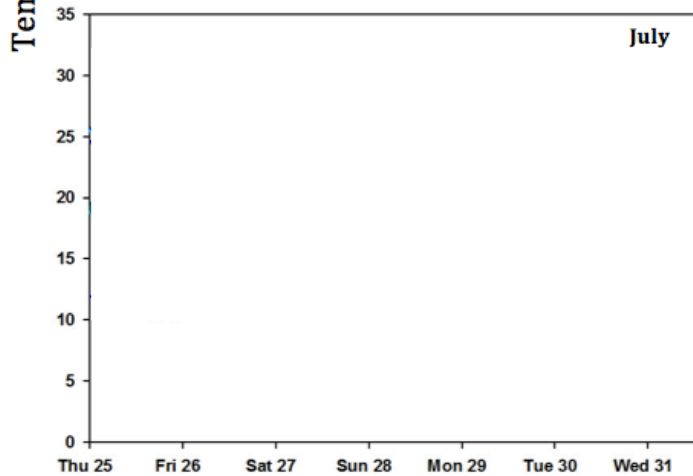
RSW Tank System

Bottom
8.29°C
Tank
8.45°C
Efficiency
92.63%



Bottom
11.04°C
Tank
10.73°C
Efficiency
95.91%

Bottom
11.80°C
Tank
12.20°C
Efficiency
86.14%



Bottom
12.99°C
Tank
12.96°C
Efficiency
96.37%

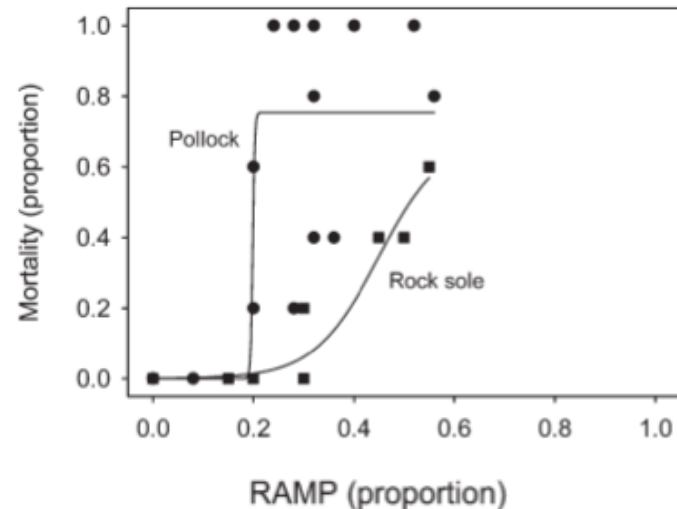
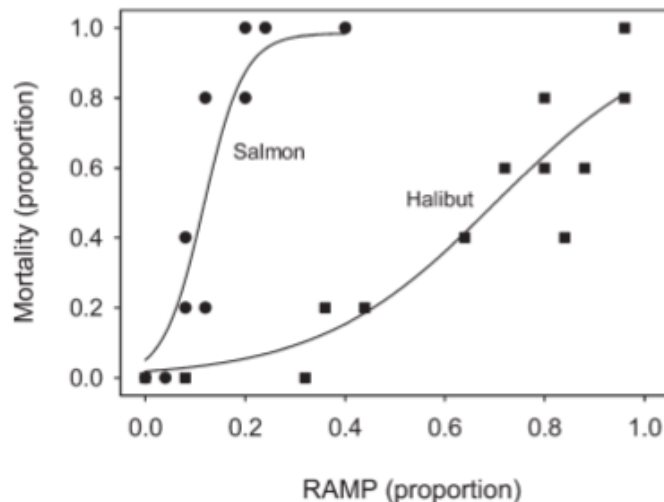
RSW Tank System



	May	June	July	August
System capacity (°C)	Mean: 1.43 ± 1.40 Max: 3.01	Mean: 4.07 ± 2.01 Max: 7.50	Mean: 7.90 ± 2.92 Max: 11.27	Mean: 8.49 ± 1.45 Max: 10.49
System efficiency (%)	92.63	95.91	86.14	96.37

Reflex Impairment

- Reflex action mortality predictors (RAMP testing)
 - Neurological response to external stimuli
 - “reflexes are whole-animal indicators of a compromised physiological state” (Raby *et al.*, 2012)
 - Based on presence/absence of reflex
 - RAMP curve
 - 0.00 (no impairment) to 1.00 (completely impaired)



Status of Fishery

Northeast Skate Complex Wing Fishery Weekly Report

For week ending: March 29, 2014
For data reported through: April 2, 2014
Quota Period: FY 2013
Quota Period Dates: 05/01/13 to 04/30/14

Previously Reported Landings (Whole Pounds)	Previous Weeks' Updates (Whole Pounds)	Current Week's Landings (Whole Pounds)	Cumulative Landings (Whole Pounds)	Quota (Whole Pounds)	Percent of Quota (%)
16,212,511	371,435	183,474	16,767,420	31,609,884	53

Notice: Effective May 1, 2013, the possession limit is 2,600 lb wing weight (5,902 lb whole weight) per trip for Season 1 (May 1 to August 31) for vessels fishing on a Northeast Multispecies, Monkfish, or Scallop Day-at-Sea (DAS). The Northeast Multispecies Category-B DAS possession limit remains 220 lb wing weight per trip, and the non-DAS incidental possession limit remains at 500 lb wing weight per trip.

Status of Fishery

Northeast Skate Complex Bait Fishery Weekly Report

For week ending:

March 29, 2014

For data reported through:

April 2, 2014

Quota Period:

Bait Season 3, FY2013

Quota Period Dates:

05/01/13 to 04/30/14

Previously Reported Landings (Pounds)	Previous Weeks' Updates (Pounds)	Current Week's Landings (Pounds)	Cumulative Landings (Pounds)	Quota (Pounds)	Percent of Quota (%)
11,488,647	1,900	158,880	11,649,427	15,923,992	73

Notice: Period 3 for the skate bait fishery began November 1, 2013, through April 30, 2014. The quota for this period is the remainder of the quota for the 2013 fishing year. The possession limit remains the same and will only be adjusted when 90% of the skate bait quota is harvested.

Skate Regulations

Possession Limits and Fish Size Requirements

*****Prohibition***** Possession or landing of barndoor and thorny skates is prohibited throughout the Skate Management Unit. In addition, possession or landing of smooth skates from the Gulf of Maine Regulated Mesh Area is prohibited. Here are two skate identification guides to help you identify each species of skate: [Skate ID Guide 1](#) and [Skate ID Guide 2](#).

Possession Limits

		Trip Limit (lb)		
		Skate Wings	Whole Skates	Whole Skate Bait w/Letter of Authorization (LOA)
Northeast (NE) Multispecies , Scallop, or Monkfish DAS	May 1 - August 31	2,600	5,902	25,000*
	September 1 - April 30	4,100	9,307	
NE Multispecies B DAS	May 1 - April 30	220	500	500
Non-DAS	May 1 - April 30	500	1,135	1,135

*These limits also apply to vessels fishing in an approved Skate Fishery Exemption Area defined in the NE multispecies regulations at § 648.80.

Fish Size Limits:

Minimum Fish Size: None

Maximum Fish Size: 23 inches if fishing with a skate bait LOA

Allowable Forms: Vessels may possess and land skate wings, skate carcasses, and/or whole skates. The weight of skate carcasses may not exceed 1.27 times the weight of skate wings, and vessels may not possess skate carcasses without retaining the associated wings. Any combination of landed skate products must adhere to the trip limits described above.

Skate Information

Stock	Barndoor	Little
Overfishing?	No	No
Overfishing Definition*	Autumn, 30%	Spring, 20%
Overfished?	No	No
Overfished Definition	When the 3-year moving average of the autumn survey mean weight per tow is less than one-half of the mean weight per tow observed in the autumn trawl survey from 1963-1966 (currently 0.81 kg/tow).	When the 3-year moving average of the spring survey mean weight per tow is less than one-half of the 75 th percentile of the mean weight per tow observed in the spring trawl survey from the selected reference time series.
Rebuilding Program	Yes, year 9 of plan	No
F/F _{MSY}	Undefined	Undefined
Fishing Mortality Rate	Undefined	Undefined
B/B _{MSY} or B/B _{MSY} Proxy	0.69	1.16
Biomass (2010)	1.08 kg/tow	8.04 kg/tow

Stock	Thorny	Winter
Overfishing?	No	No
Overfishing Definition*	Autumn, 20%	Autumn, 20%
Overfished?	Yes	No
Overfished Definition	average of the autumn survey mean weight per tow is less than one-half of the 75 th percentile of the mean weight per tow observed in the autumn trawl survey from the selected reference time series.	
Rebuilding Program	Yes, year 9 of 25 year plan	No
F/F _{MSY}	Undefined	Undefined
Fishing Mortality Rate	Undefined	Undefined
B/B _{MSY} or B/B _{MSY} Proxy	0.06	1.72
Biomass (2010)	0.24 kg/tow	8.69 kg/tow