



**NOAA
FISHERIES**

- Northeast Fisheries Science Center



NEFSC Protected Species Programs

Aerial Surveys and Analyses of Serious Injuries and Mortalities

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April 14, 2015



NOAA FISHERIES

NE Right Whale Surveys

Reduce right whale ship strike deaths

Monitor the population

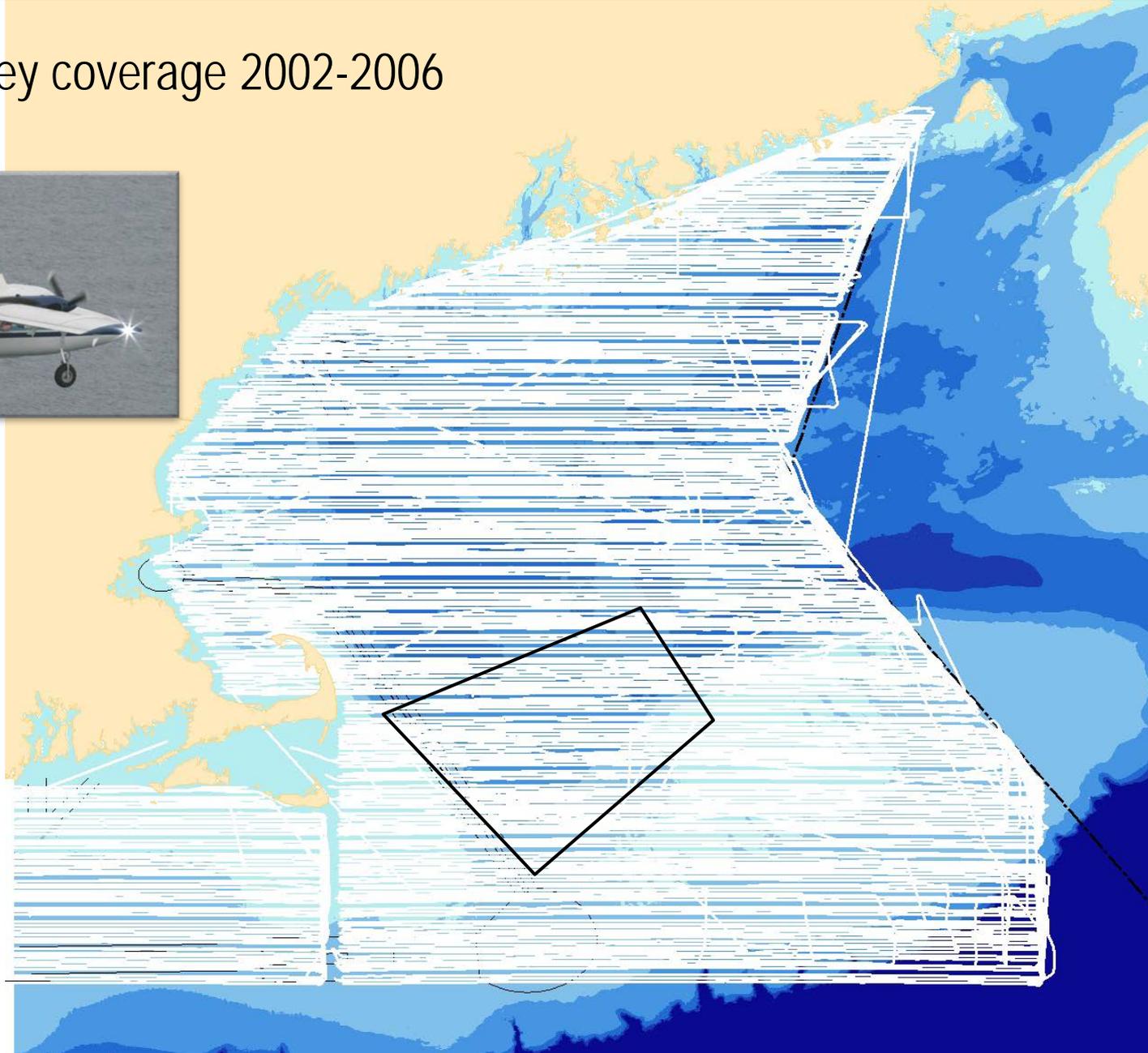
Provide distribution data of other megafauna

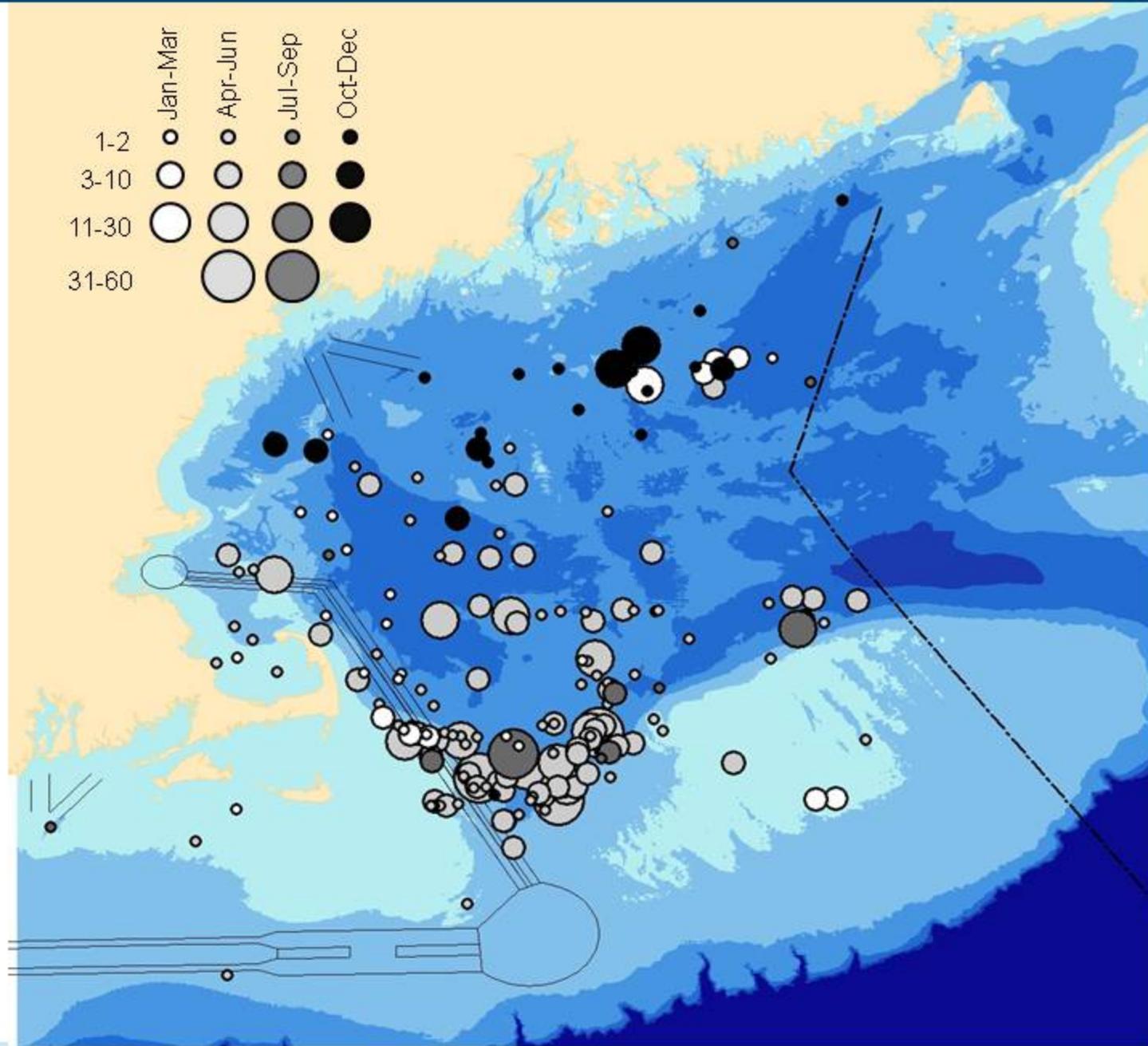
NEFSC

Broad scale survey coverage 2002-2006

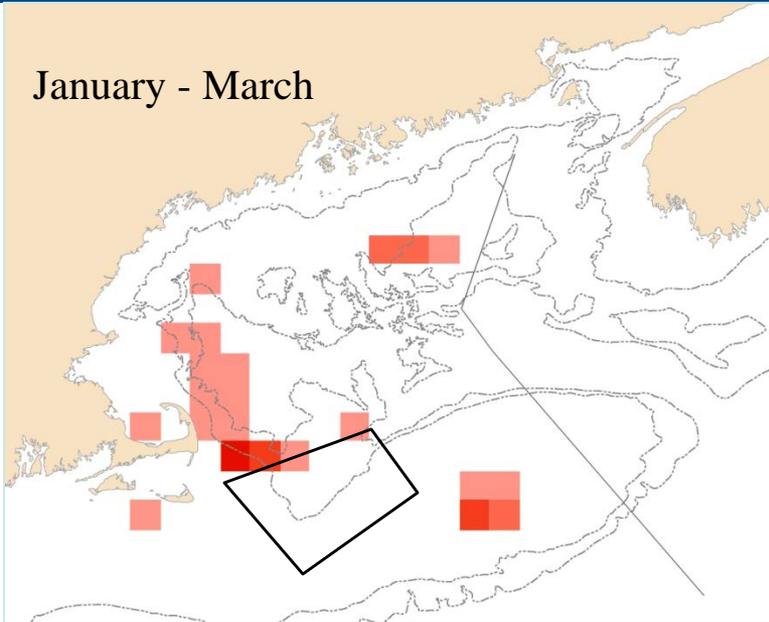


350 flights

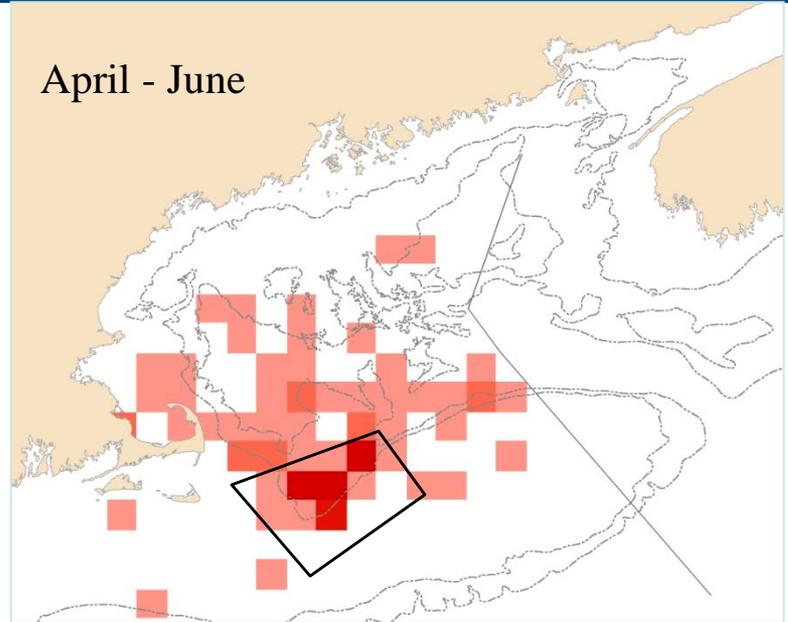




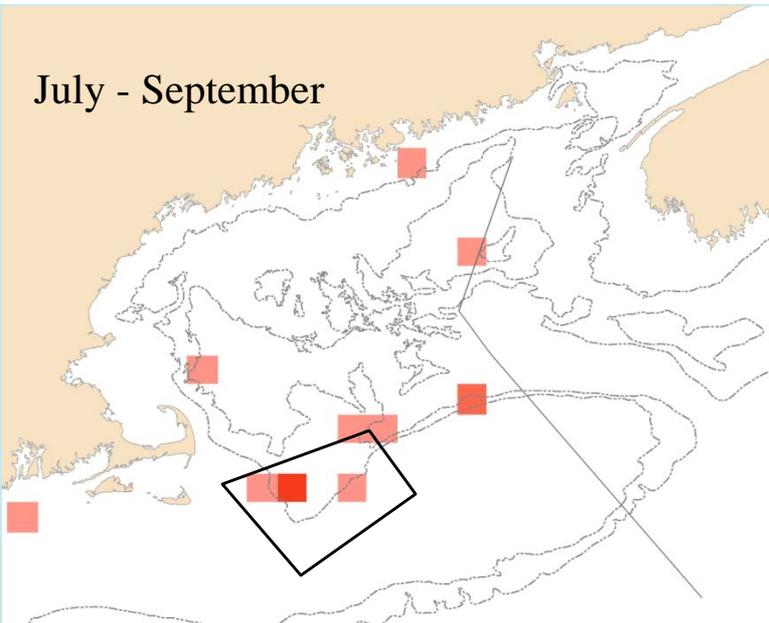
January - March



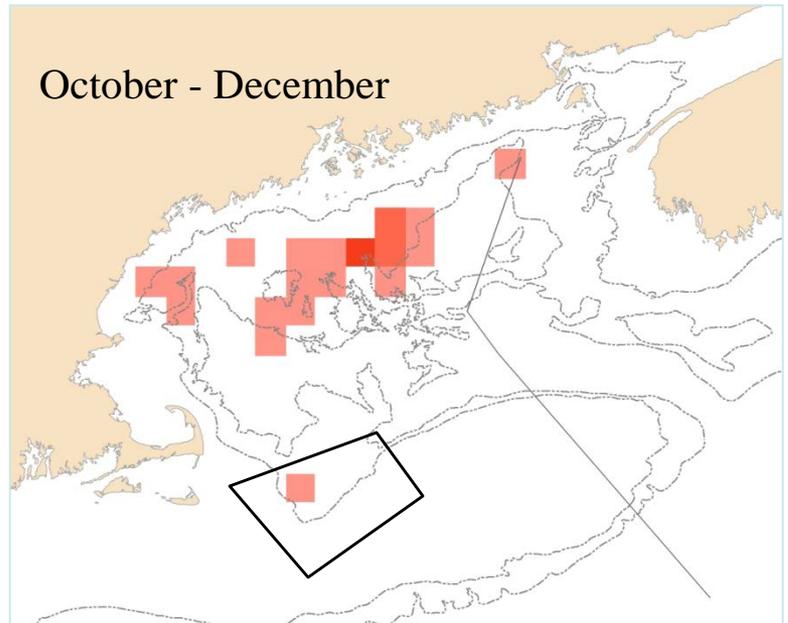
April - June



July - September



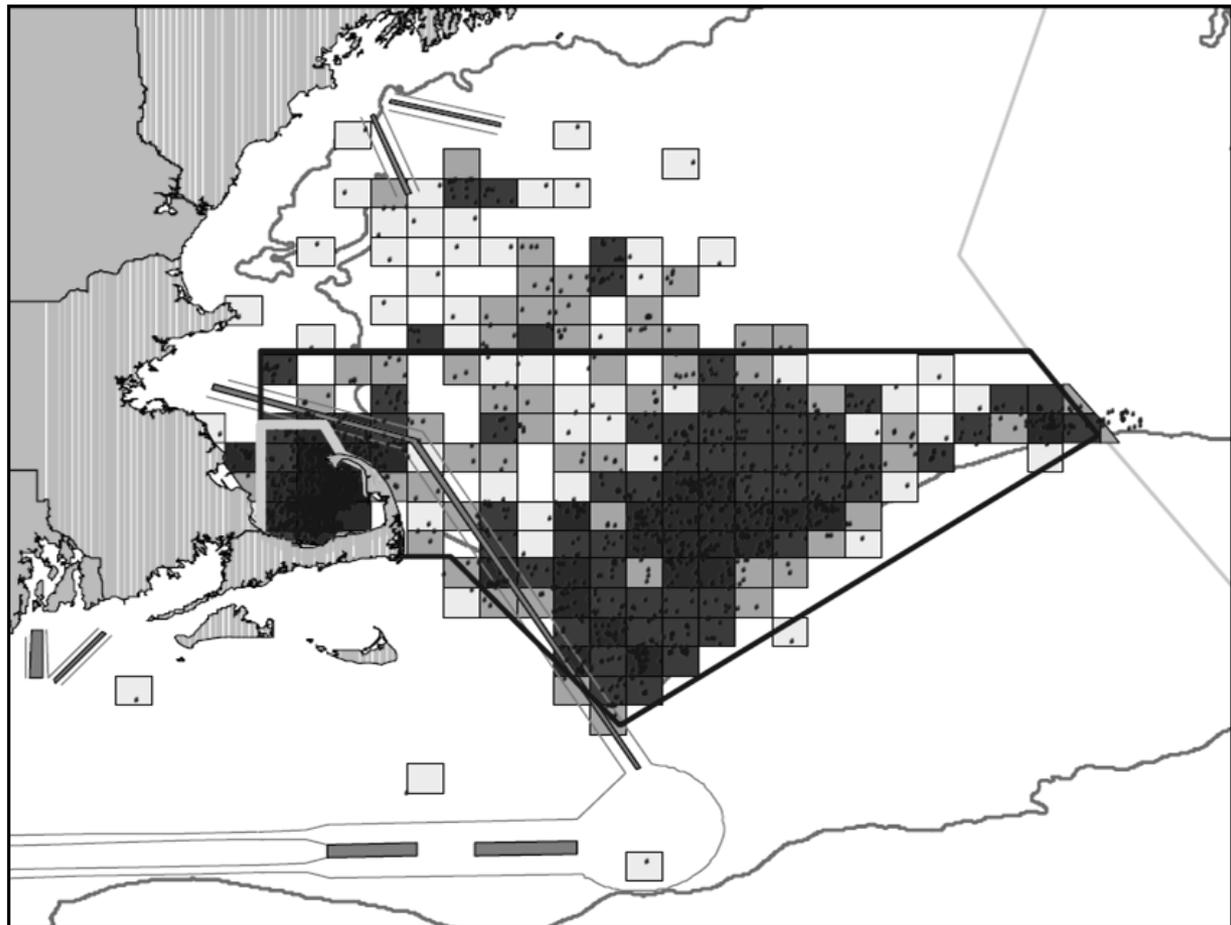
October - December



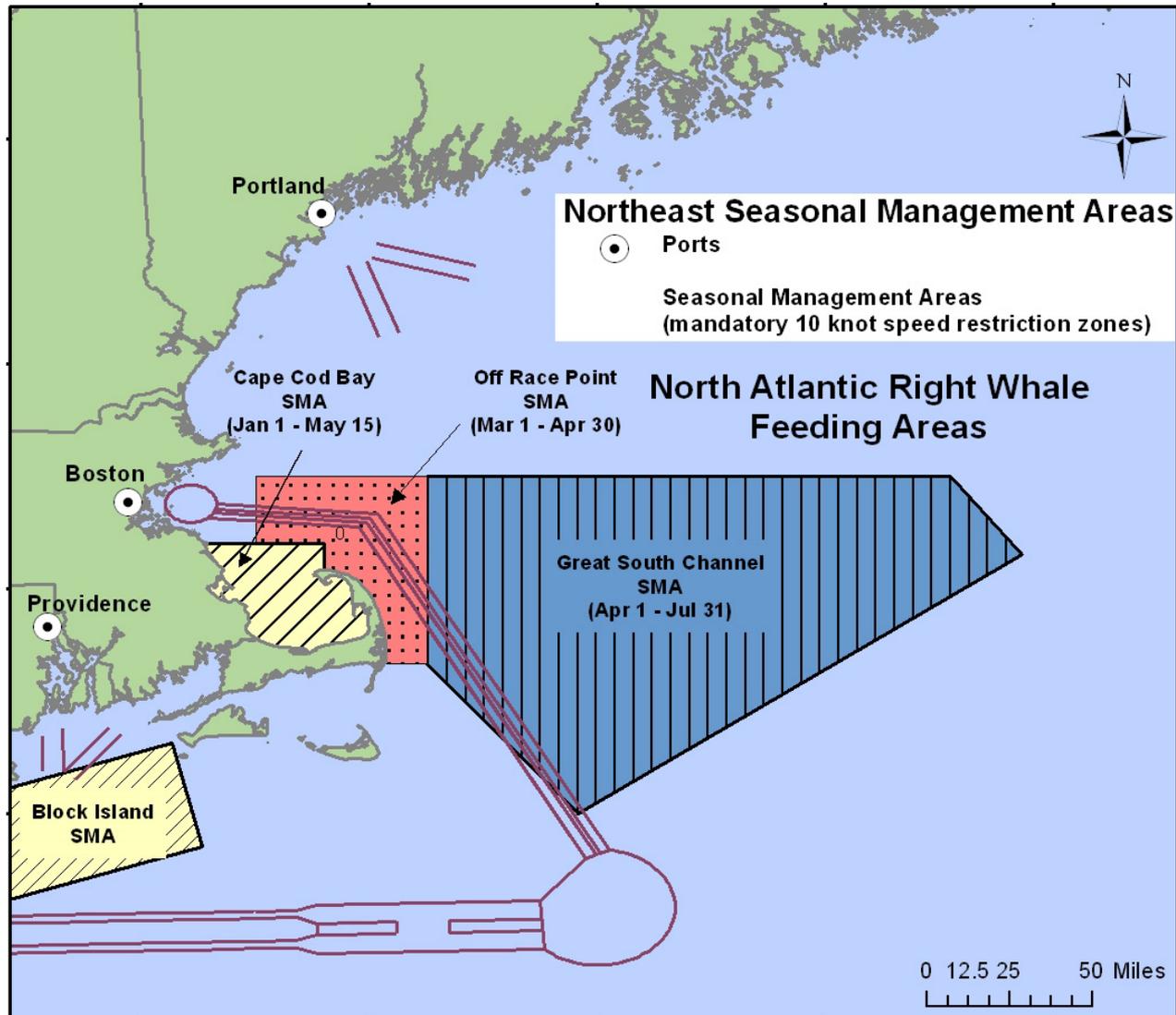
Ship strike reduction

NEFSC survey data submitted to Consortium database

Consortium sightings used to delineate vessel speed restriction zones

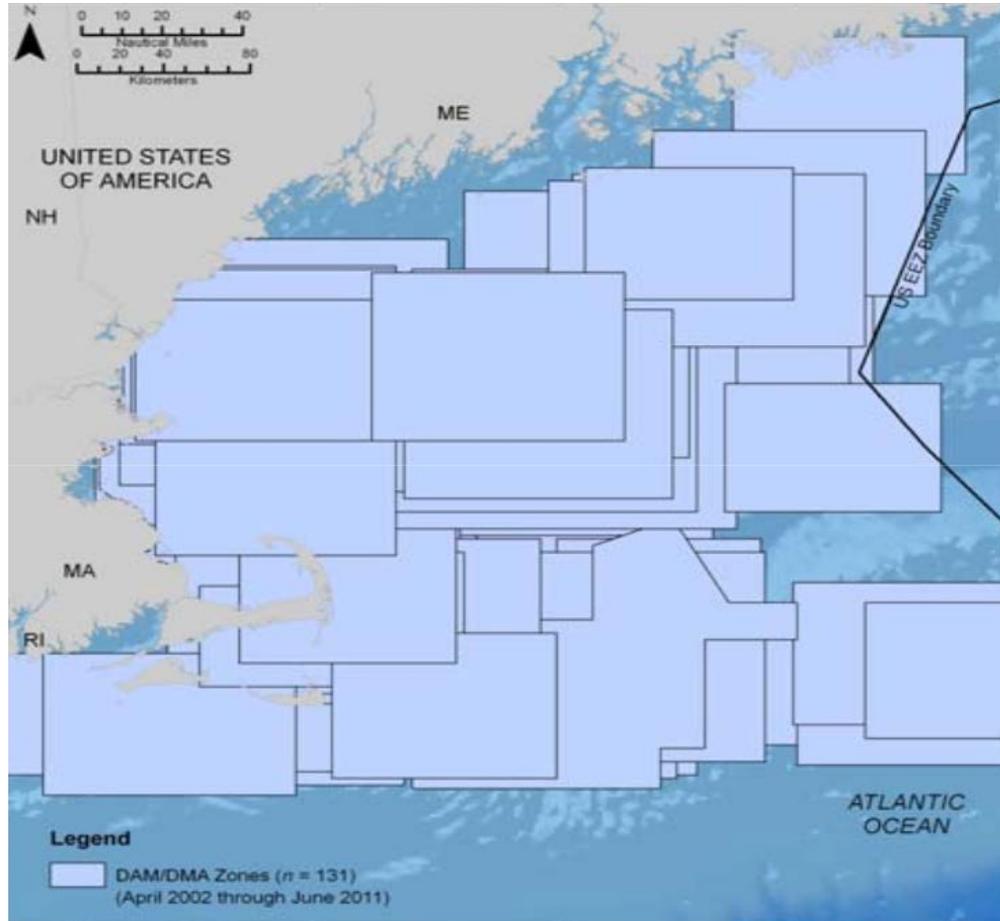
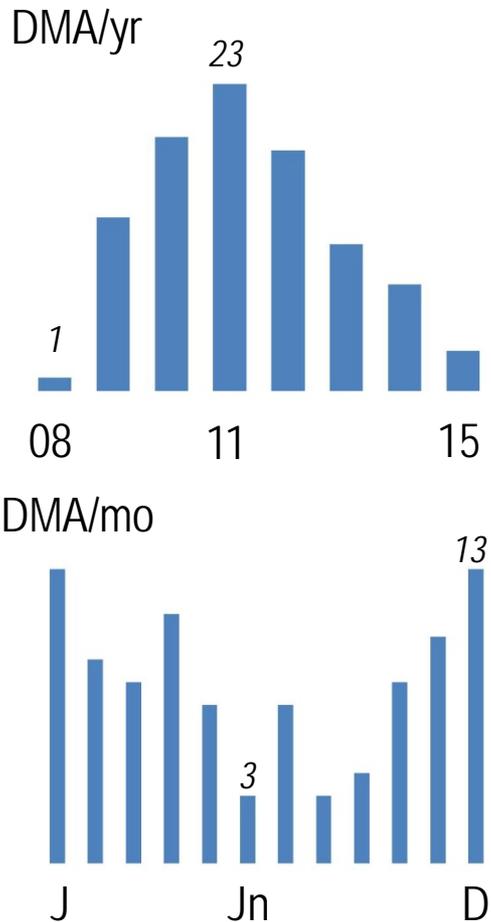


Seasonal Management Areas reflect right whale seasonal distribution observed 1980-2006



Right whale groups outside SMAs trigger Dynamic Management Areas

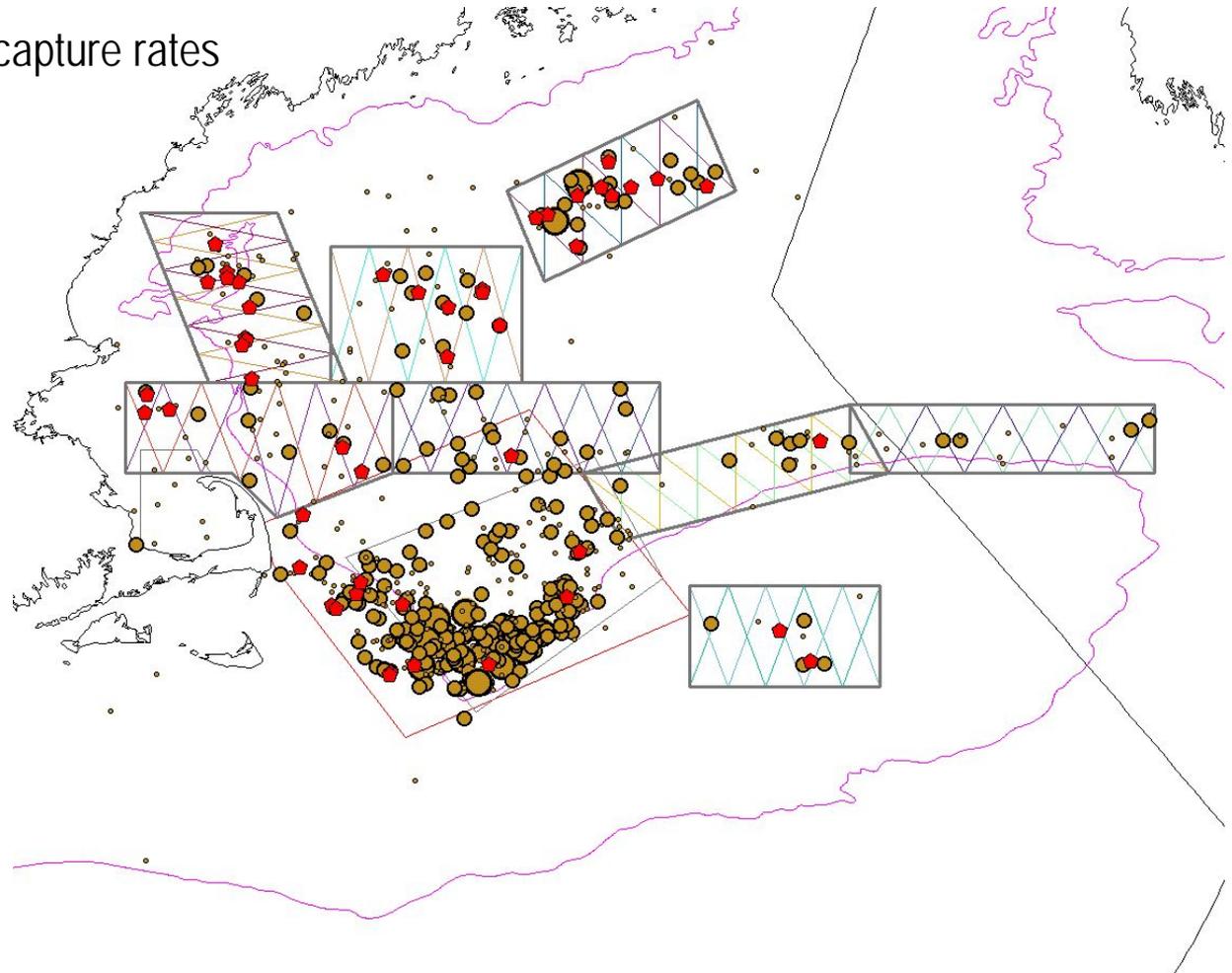
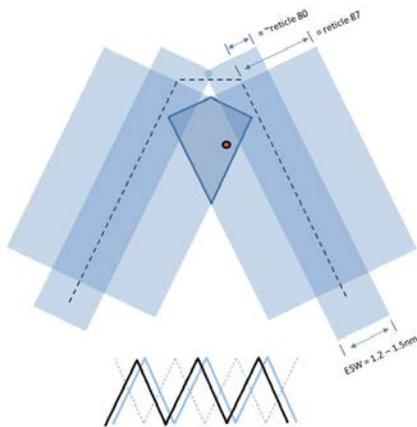
Vessels requested to reduce speed in DMAs



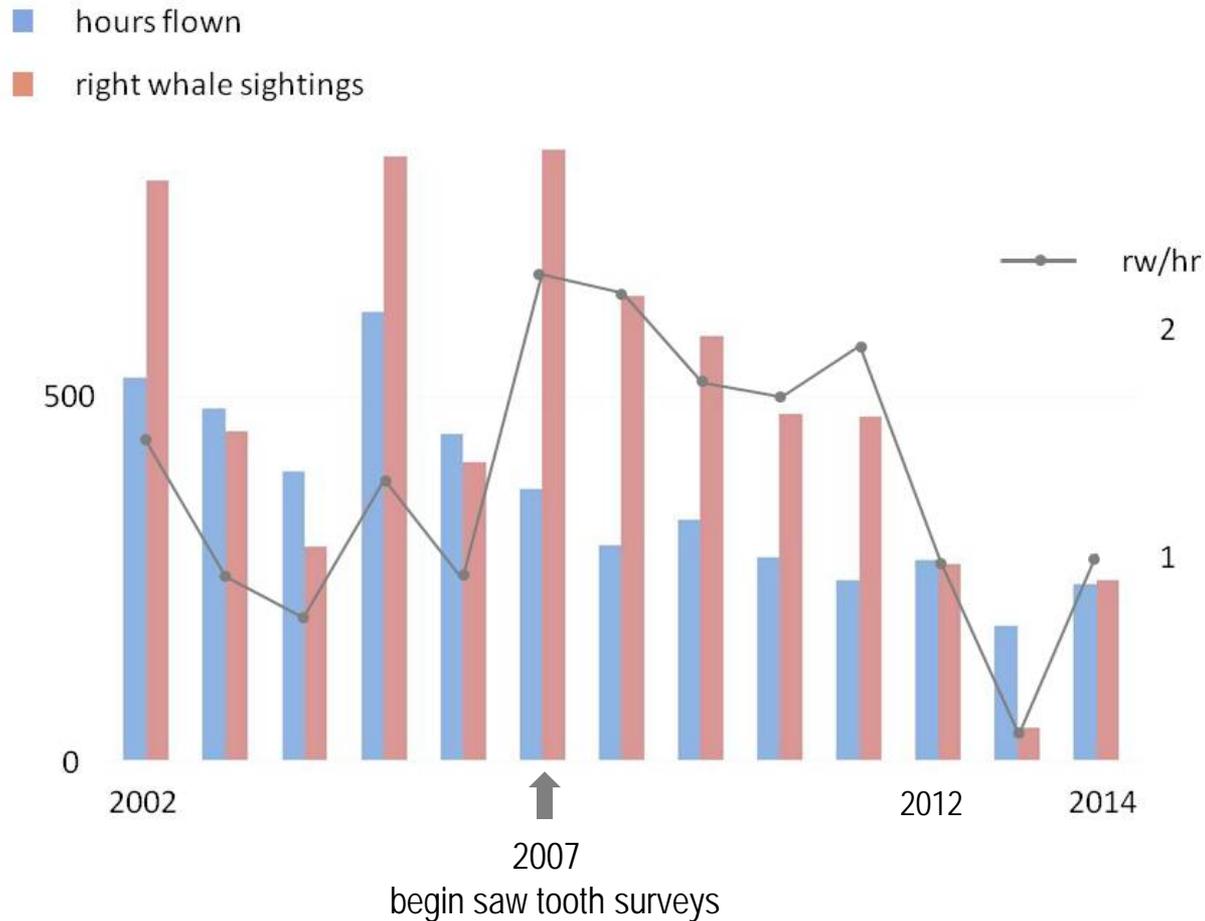
New survey design in 2007 focused in areas where whales seen and DMAs triggered

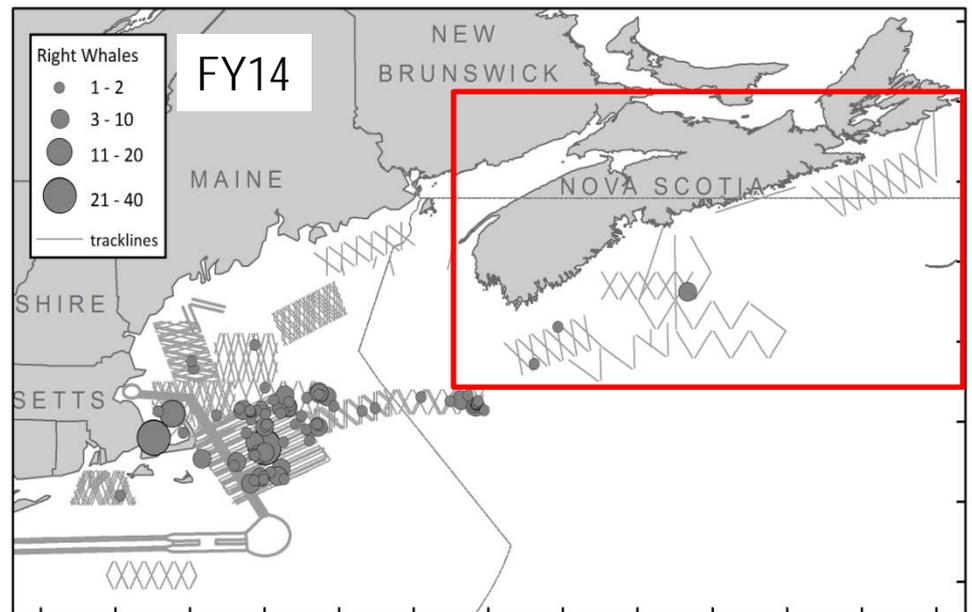
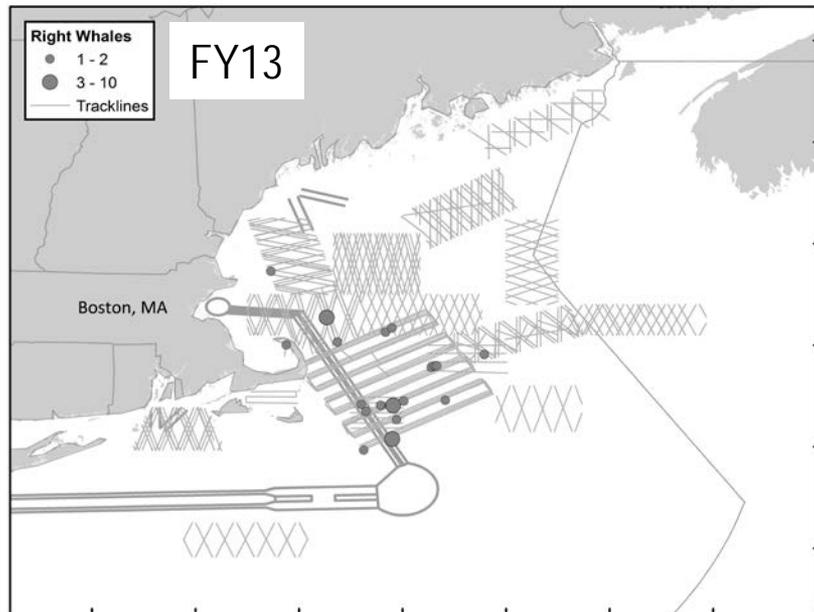
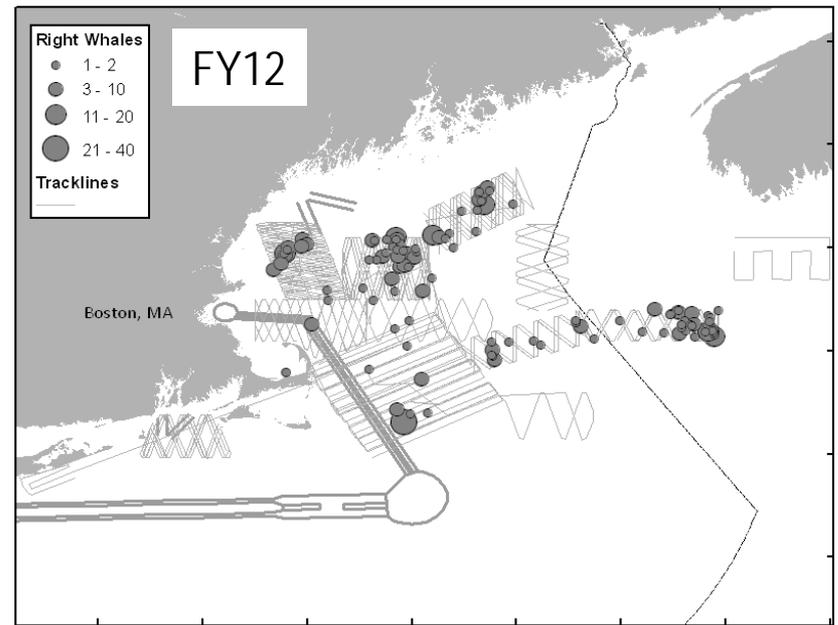
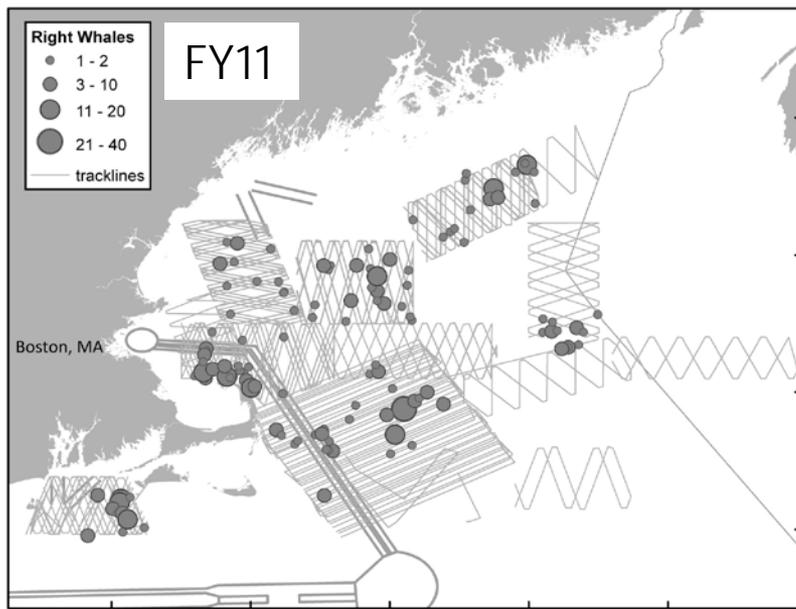
Provides increased photo capture rates for monitoring

Increased likelihood of detecting injuries

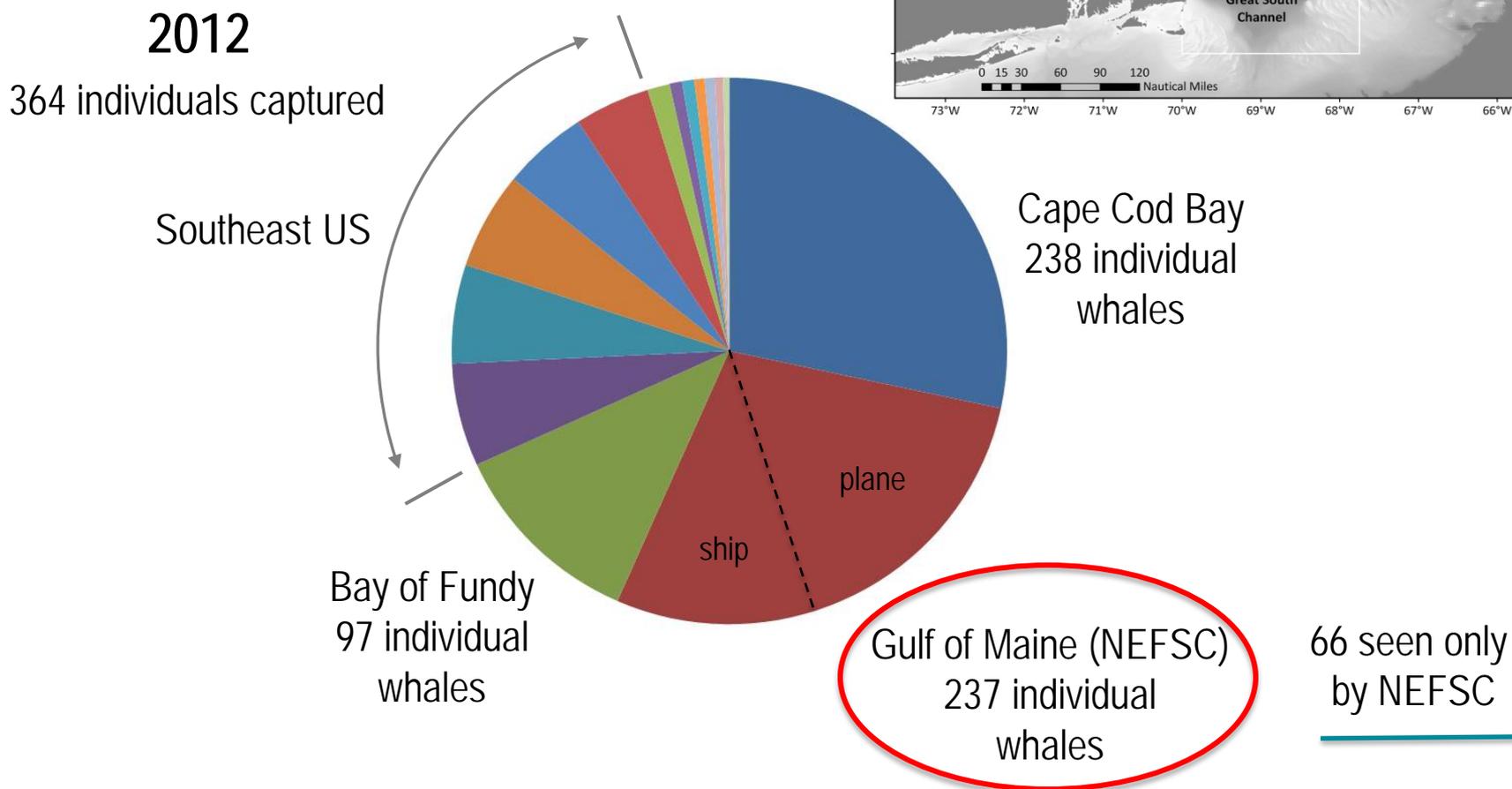
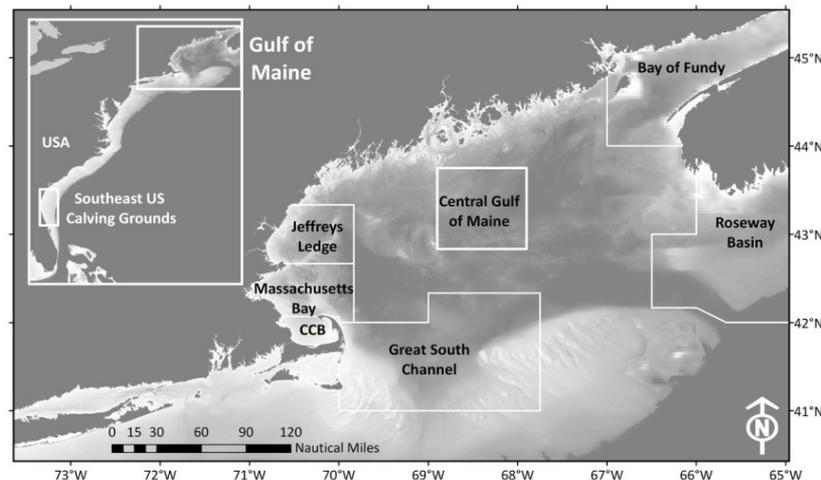


The new survey design improved our sightings rate





NEFSC contributes significantly to the right whale catalogue (photo recapture)



All survey data submitted to the Right Whale Consortium and OBIS SEAMAP

OBIS SEAMAP Quick Search Full text Help Terms of Use

Map summary

- #species / #taxa: 1 / 1
- #datasets: 30
- #records: 5,415
- Total of group size: 8,338

Species selection

Search Conservation status

Eubalaena glacialis

North Atlantic Right Whale

Dataset selection

Search Data type

All datasets

Layer selection

- Summary
- Points
- Survey tracks
- Animal tracks
- Species range map

Upload

Zoning

Environment

Other data centers

Zoom in Full extent Identify Region X:-97.56 Y:26.12 Google Earth

North Atlantic Right Whale - Eubalaena glacialis

Taxonomy & Nomenclature

Scientific Name	<i>Eubalaena glacialis</i>
Author	üller, 1776)
Taxonomic Rank	Species
Taxonomic #	180537
Common Names	English: black right whale, Northern Right Whale, North Atlantic Right Whale French: baleine noire Spanish: Ballena franca
Taxonomic Parents	Kingdom: Animalia Phylum: Chordata

ITIS TSN: 180537
Status: ESA:Endangered
#records: 2,672
#datasets: 29
Year: 1935 - 2013
Latitude: 26.01 - 49.07

Temporal changes Oceanographic variables Diversity Download Legends

Strengths

Long-term data set

Extensive spatial coverage

Adaptive

Multi-mission (RW distribution, m/r, injury detection, disentanglement)

Challenges

Changing distribution of whales

Vagaries in NOAA budget

Recommendations

Adapt design to maximize RW photo-id rate (sightings/hr)

Incorporate acoustic monitoring

Serious Injury & Mortality Determination

Consistent accounting of baleen whale injuries

Estimate cause-specific mortality

Evaluate efficacy of ALWTRP
and ship strike reduction measures

Assign country of origin
to entangling gear



Entanglement Mortality Determination Criteria

- constricting fishing gear with associated subdermal hemorrhaging or extensive necrosis
- extensive entanglement evident
- entanglement prevented feeding
- code 2 (fresh dead) carcass pulled up during fishing operations



Sconset, Massachusetts October 12, 2002 Courtesy of Nantucket Stranding Network

Vessel Strike Mortality Determination Criteria

- large linear lacerations
- large areas of subdermal hemorrhaging
- extensive skeletal fracturing
- code 2 (fresh dead) carcass found on the bow of a ship



VAQS



Serious Injury (SI)

Any injury that is more likely than not to result in mortality

>50%



Pete Duley NEFSC

Identified 16 scenarios that accommodate all types of injury event reports

Used proportion of events resulting in death or significant health decline from all events with known outcomes

Binomial test of >50%

	Events	Known outcome
Vessel Strikes	124	77
Entanglements	228	160
Total	352	237

Data from US west and east coasts, Alaska, Hawaii and Atlantic Canadian Maritimes, 2004-2008

Injury Category	Injury Determination	Value to compare against PBR
Constricting wrap	Serious Injury	1
Loose wrap	NSI	0
Deep laceration	Serious Injury	1
Superficial laceration	NSI	0
Vessel $\geq 65'$ and > 10 kts	Serious Injury	1
Vessel $\geq 65'$ and speed unknown	Prorate	0.56
Evidence of EN	Prorate	0.75
Vessel strike observed	Prorate	0.36

Original SI criteria required high quality information and near certainty of death

New criteria accommodates low quality information, which is prevalent

	Original criteria SI Rate	New criteria SI Rate	PBR
Right whales	2.4	2.85	0.9
Humpback whales	4.2	7.8	2.7
Finback whales	0.2	1.3	5.6
Minke whales	0.8	3.25	162

DETECTED INJURIES ONLY

Strengths

Known injury outcomes used to inform Serious Injury guidelines

Challenges

Unknown fraction of injuries and mortalities not seen

Difficulty in identifying gear to fishery or country (US/Canada)

Recommendations

Continue refining SI guidance with injury outcome results

Develop means to estimate actual human-caused mortality