

# Ongoing Offshore Atlantic & Great Lakes Acoustic Bat Research

US Department of Energy  
Offshore Wind Webinar

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# Review

- Summarize ongoing acoustic bat surveys in Gulf of ME, mid-Atlantic coastal states, & Great Lakes regions
- Year 1 of 3-year DOE supported study (2012-2014)
- 3-year Stantec Gulf of Maine study (2009-2011)
- Provide information on observed trends in offshore bat activity patterns and species composition to date

# Study Objectives

- Test effectiveness of acoustic equipment/methods
- Assess bat presence at various offshore sites
- Assess offshore seasonal migration/activity patterns
  - Activity levels (May-November)
  - Species composition
  - Seasonal / Nightly activity trends
- Assess annual variability

# Historic Mariner Observations

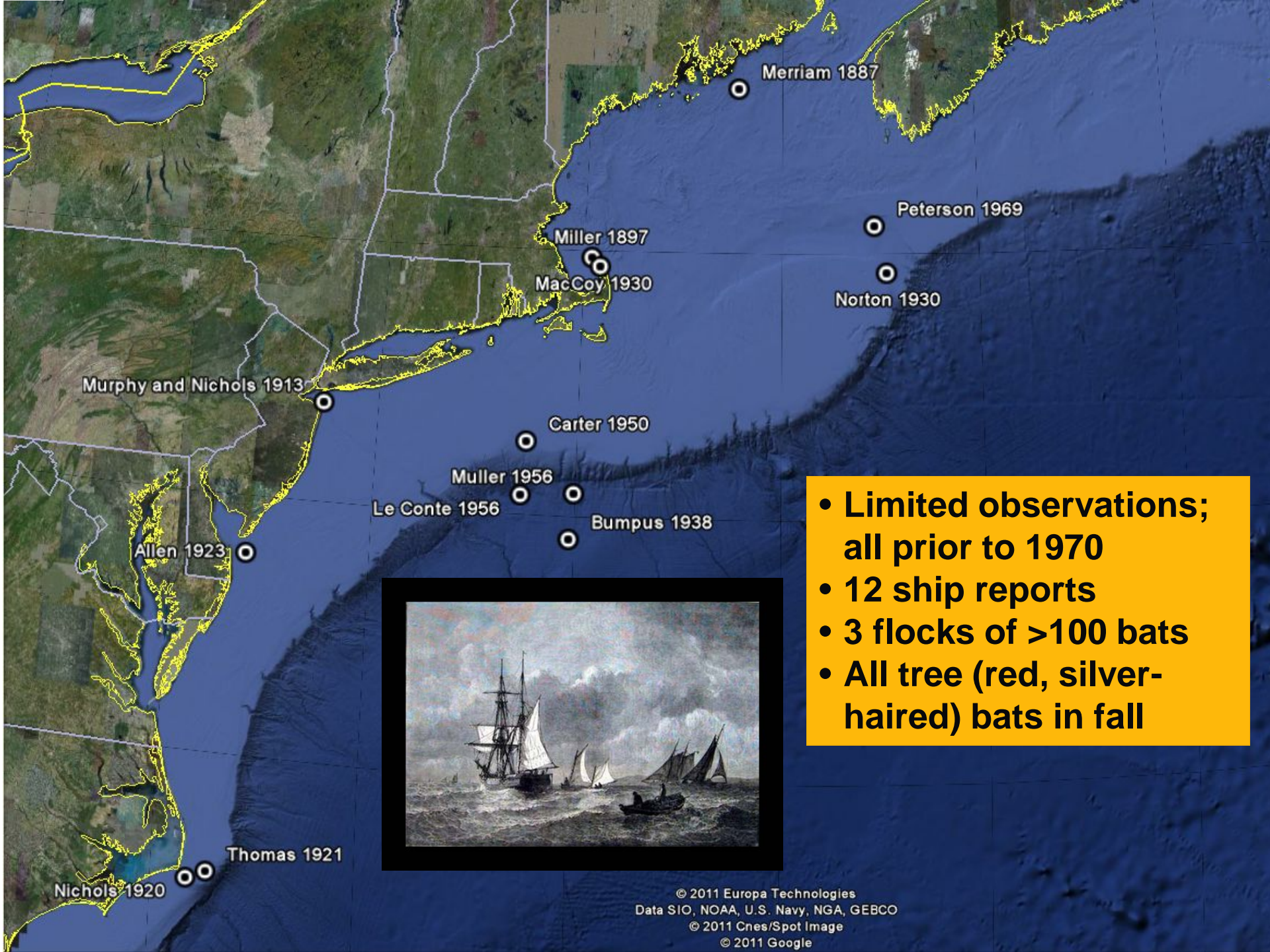
**Griffin 1940** summarizes multiple observations aboard ships at sea.

*“A flock of unidentified bats alighted on a ship 10 miles off the Delaware River”*  
– Allen 1923

*“a red bat taken aboard a ship 240 miles east of Cape Cod”*  
– Nichols 1913

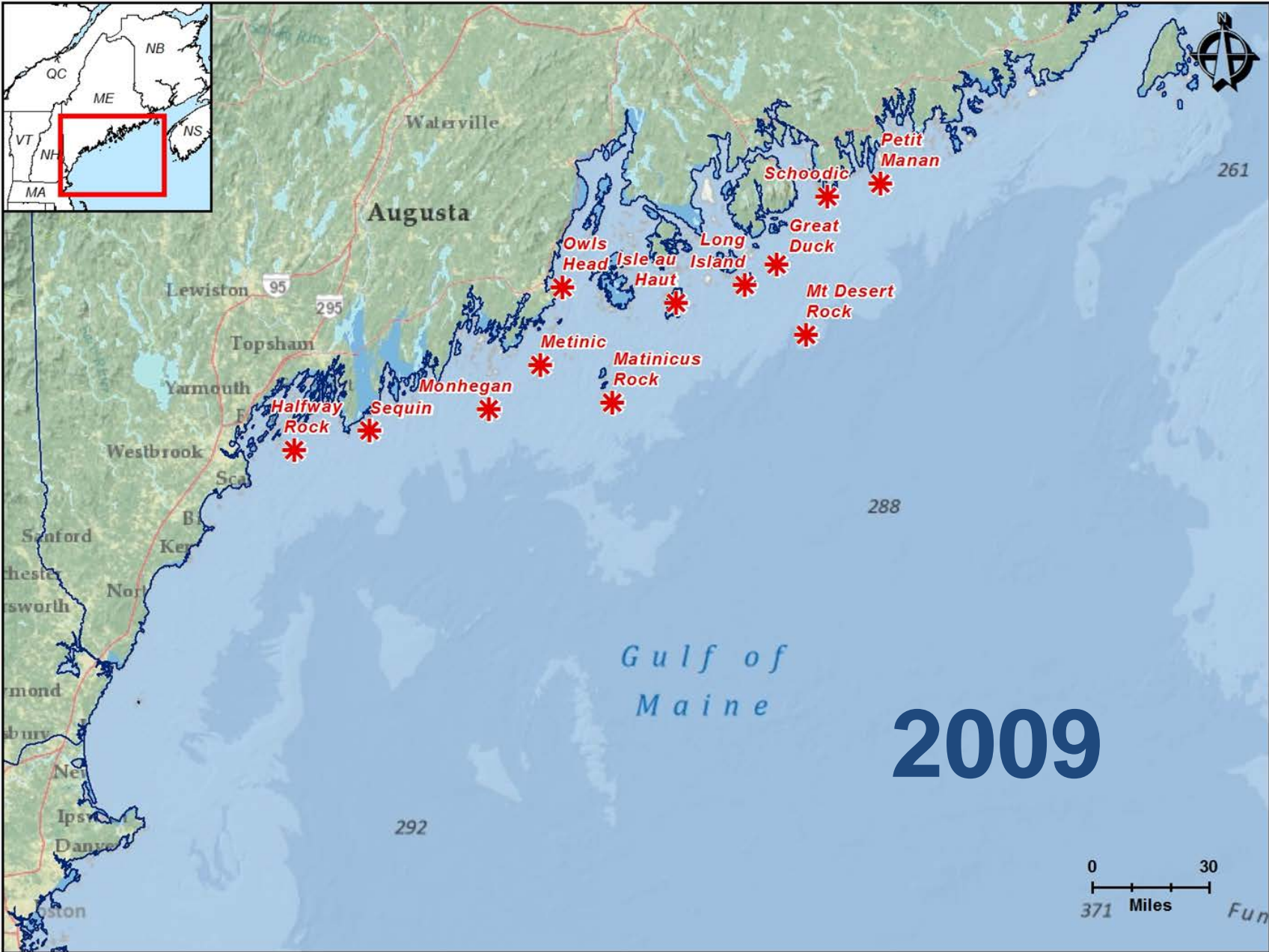
*“large number of bats, estimated at 200, was seen flying about the ship”*  
– Carter 1950

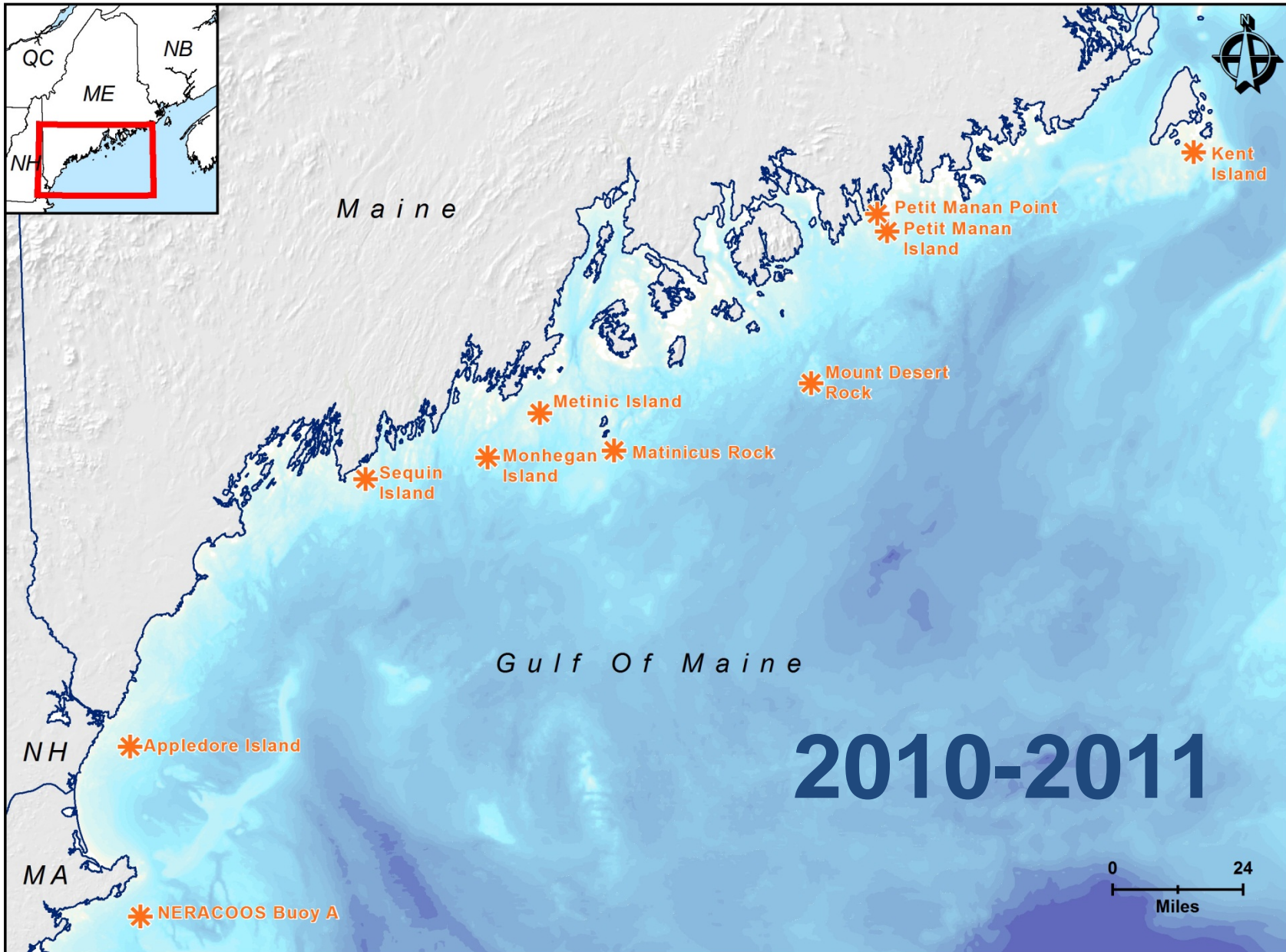
*“4-5 miles offshore of Sandy Hook [Long Island] in search of Petrels, observed a number of small bats flying near the surface headed for shore. Believed to be Silver-haired bats.”*  
– Murphy and Nichols 1950



- Limited observations; all prior to 1970
- 12 ship reports
- 3 flocks of >100 bats
- All tree (red, silver-haired) bats in fall





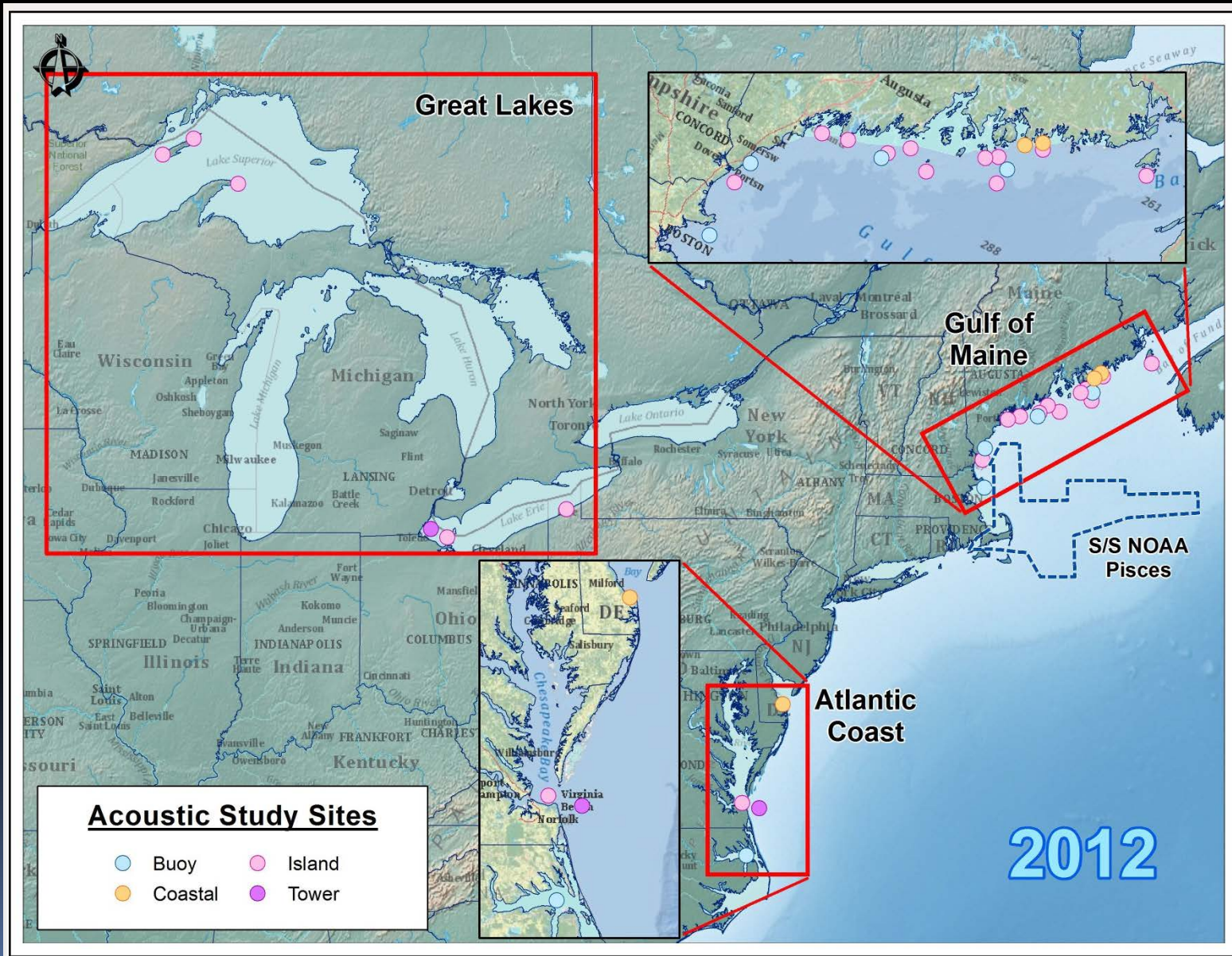


# 2012 Survey Sites





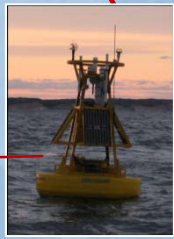
# 2012 Survey Sites



# 2009 – 2012 Acoustic Bat Surveys



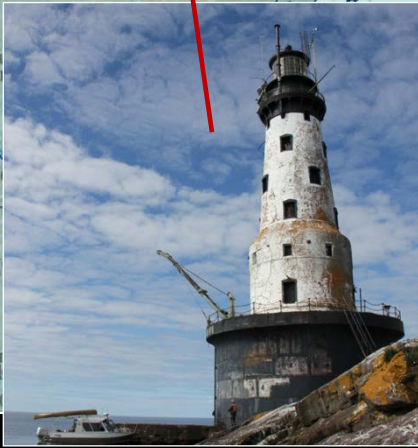
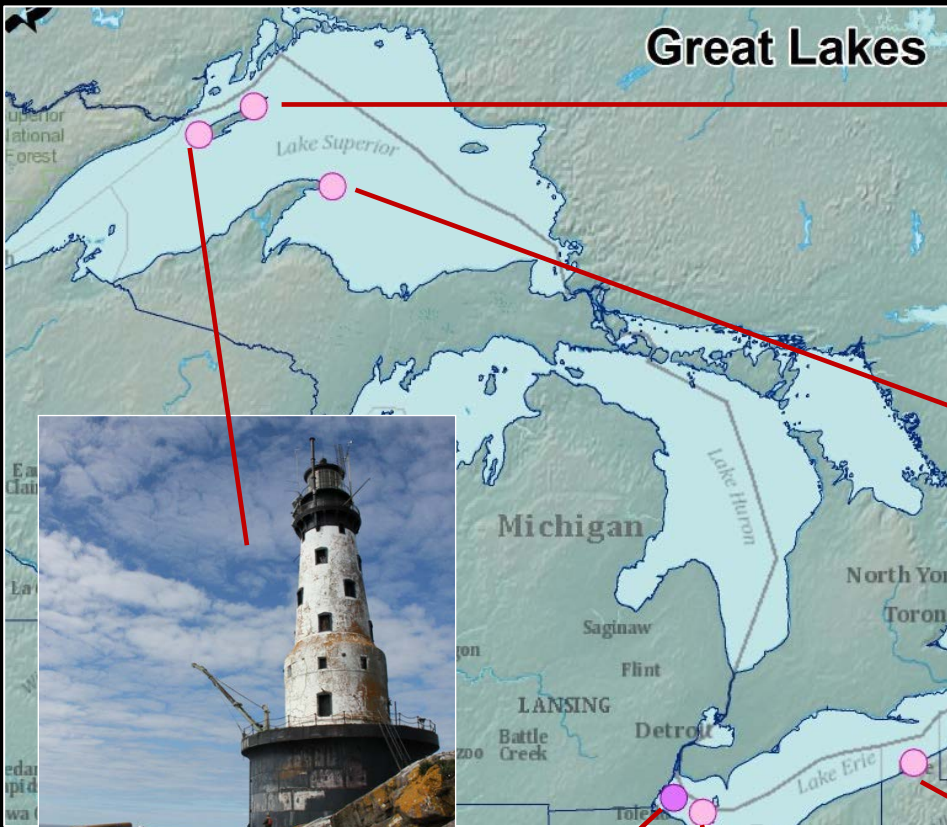
# Gulf of Maine



30



# Great Lakes



# 2009-2012 Survey Effort

Year	2009	2010	2011	2012
Survey Sites	12	9	6	15*
Geographic Area	Gulf of Maine (GOM)	GOM	GOM	GOM, mid-Atlantic, Great Lakes
Survey Period	7/28-11/30	7/15-11/30	4/1-11/30	4/1-12/11
Survey Nights	948	801	600	2,625
Calendar Nights	126	139	244	254
# Call Sequences	26,187	27,423	21,994	150,277

\* Ten additional sites monitored in 2012 but have not been recovered to date.

# Activity Indices

- **Activity level**  
(# call sequences /  
detector-night)
- **Frequency of presence**  
(% nights w/ activity)
- **Timing of activity**  
(# hrs/night w/ activity)
- **Species composition**
- **Confounding factors of  
passive acoustic data**



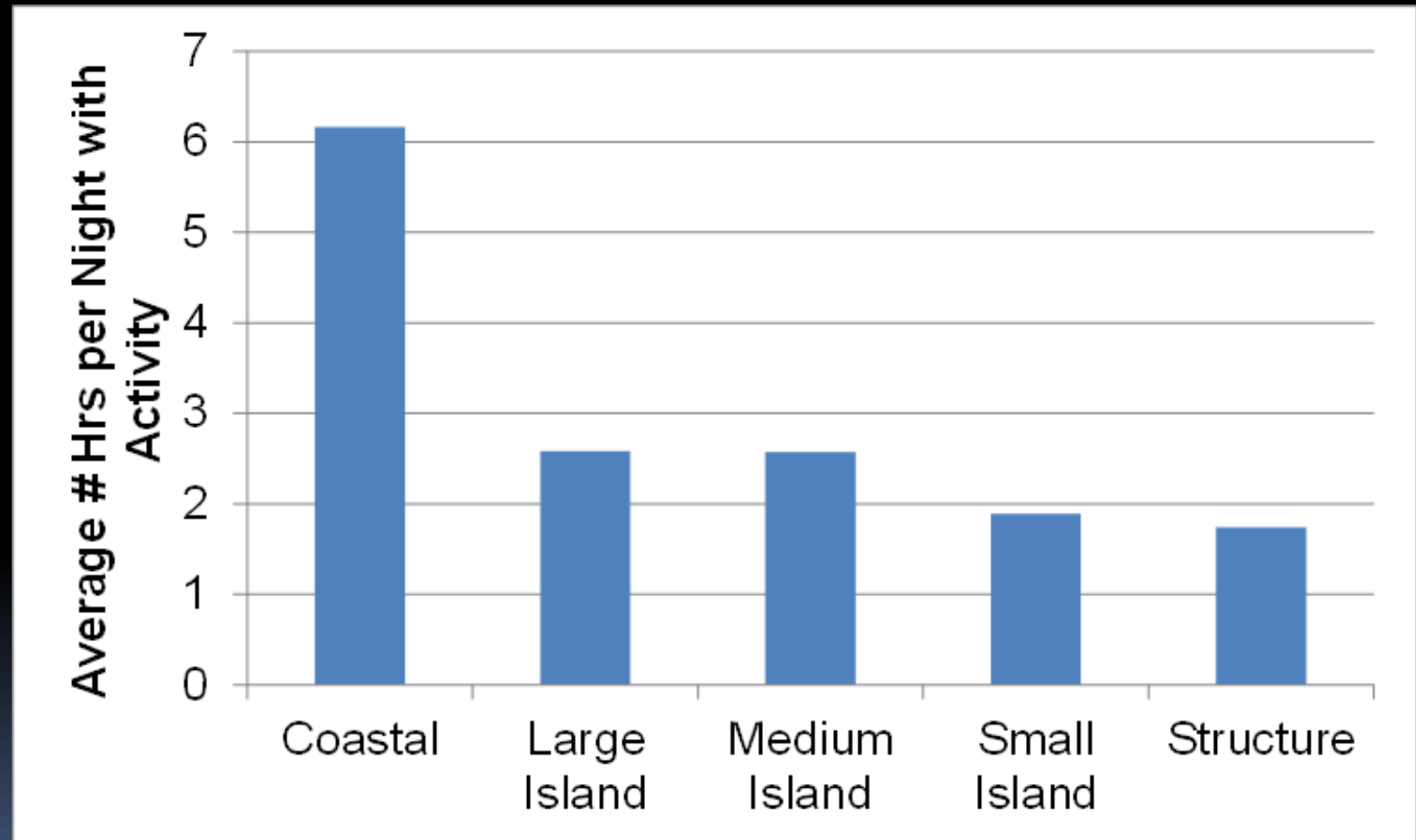
# 2009-2012 Results

- **Passive acoustic surveys can document offshore bat activity patterns on a regional level**
- **Bats detected at every site during each year of monitoring**
- **Resident and migratory bat activity noted at most sites**
- **Activity indices highest in September**
- **Bats generally present during >20% of surveyed nights**

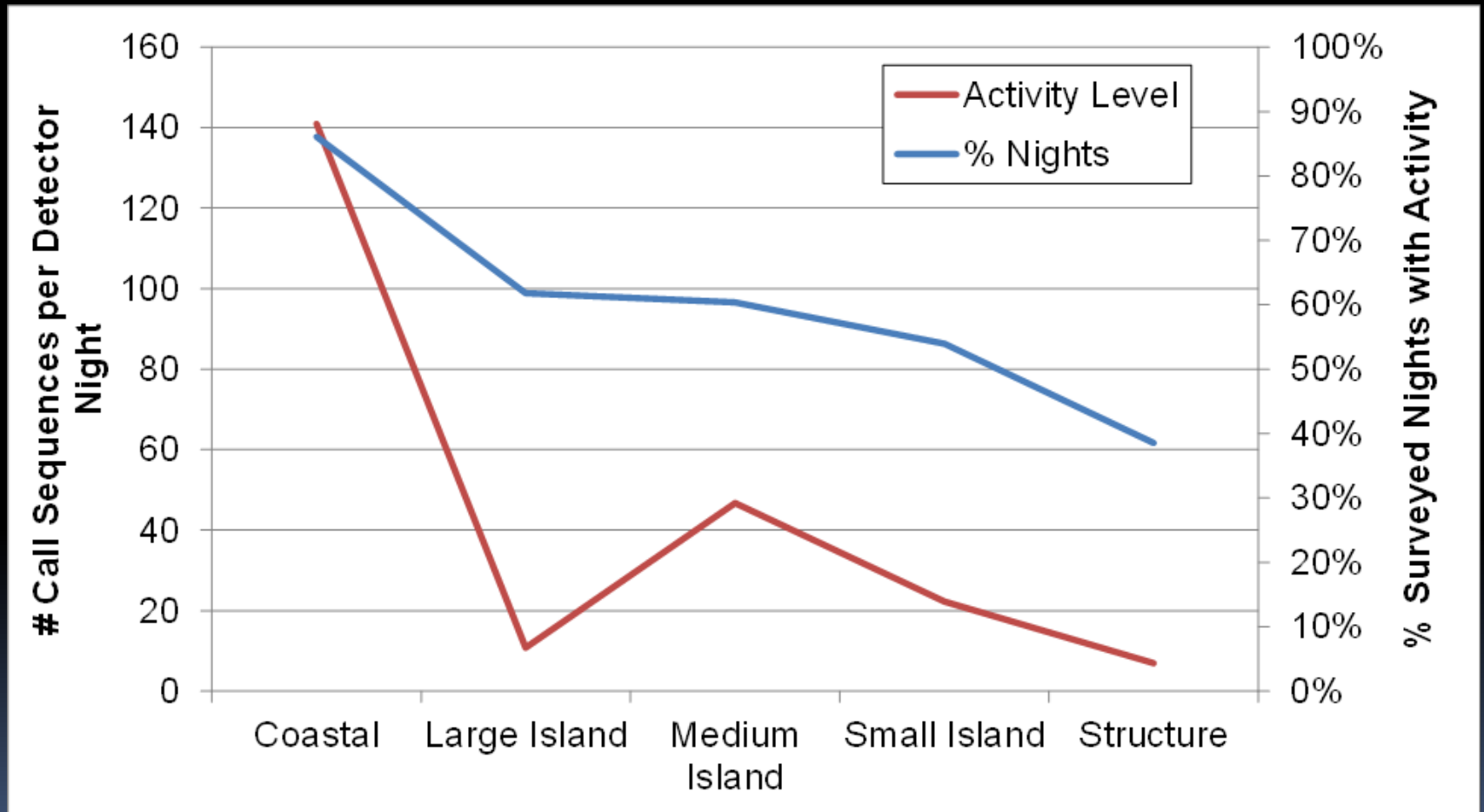




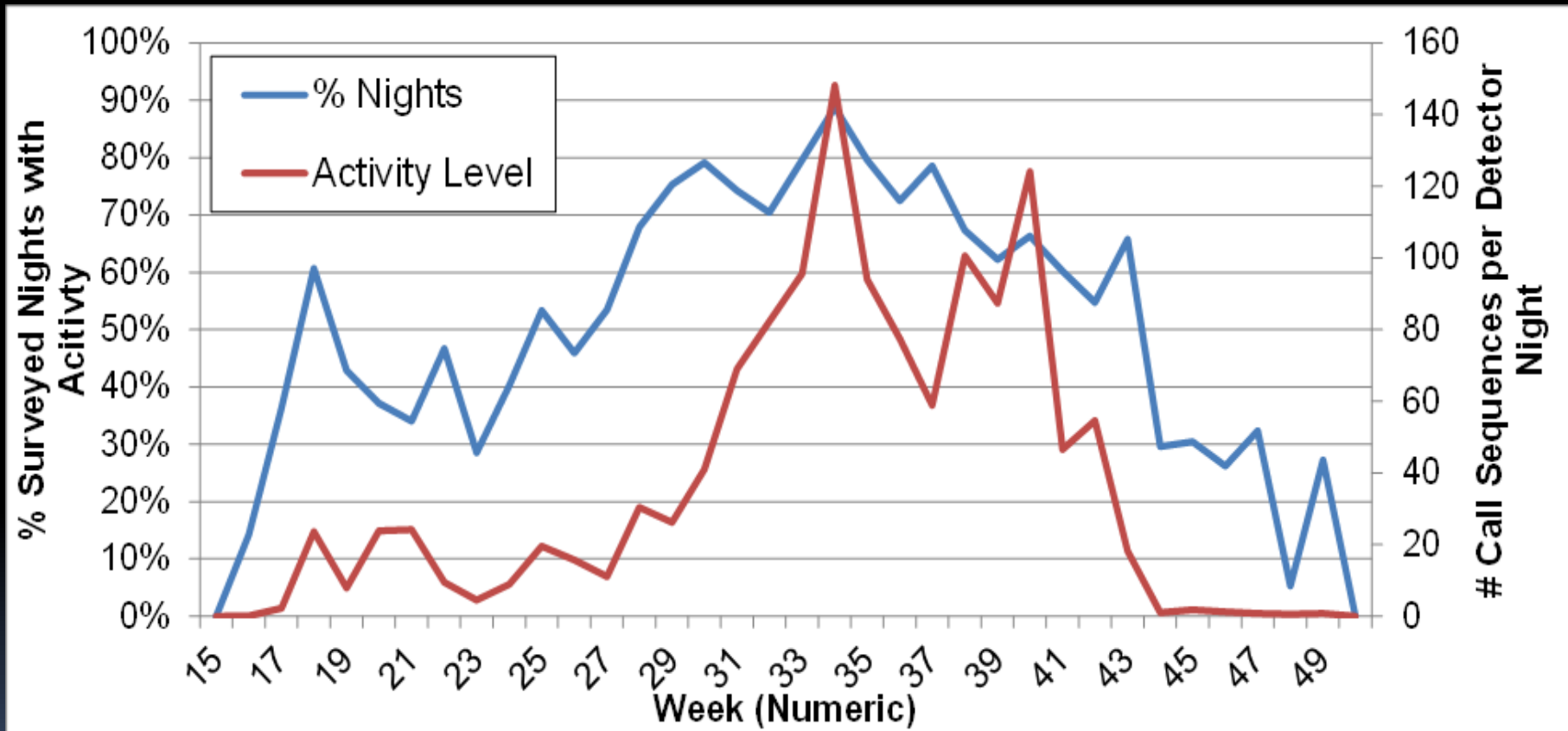
# 2012 Activity Level by Site



# 2012 Activity Level by Site

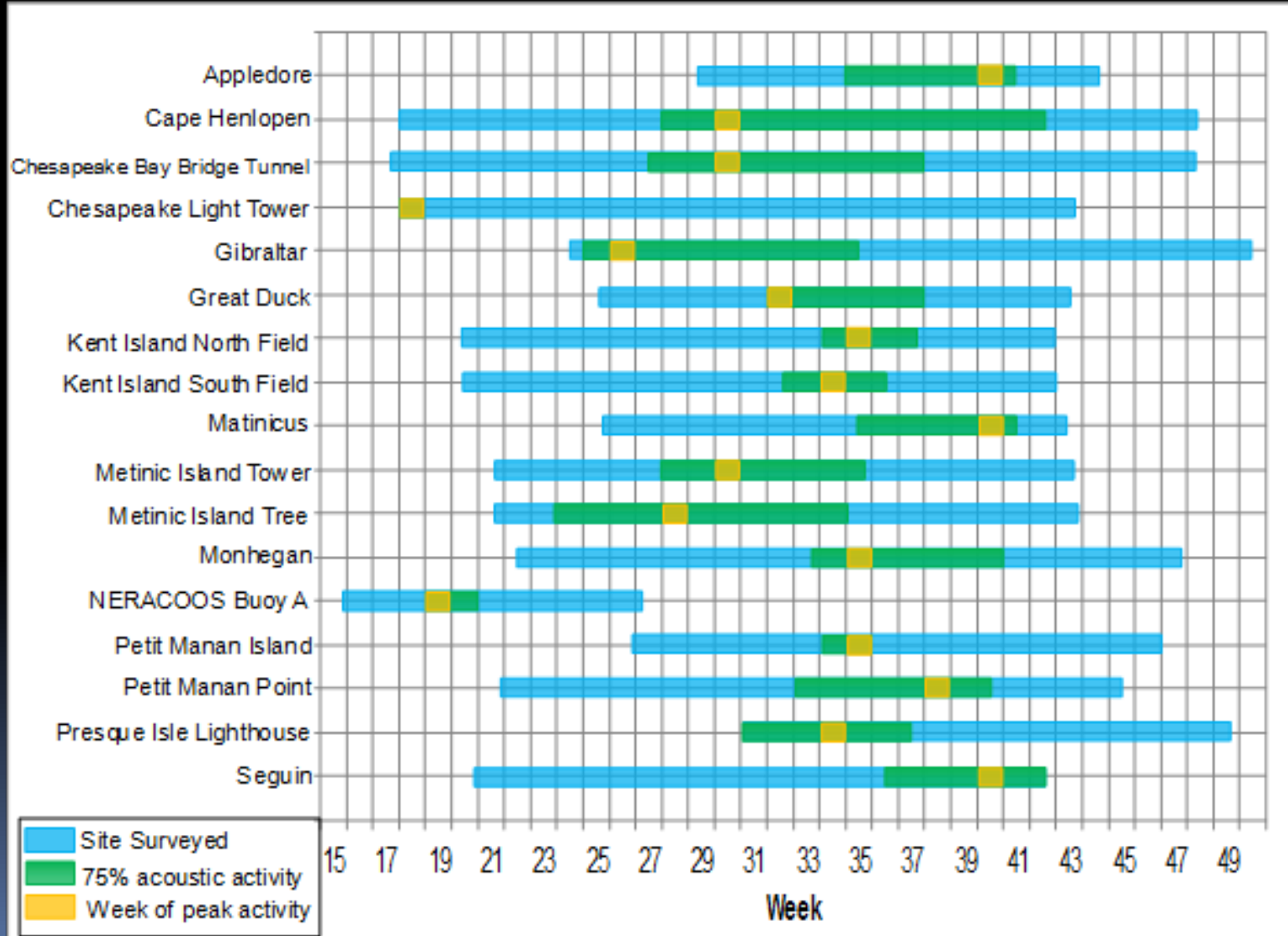


# 2012 Weekly Activity Levels



Bat activity level (red line) & frequency of detection (blue line) by week

# 2012 Effort & Patterns



# Long-Distance Migrants

**LABO**



**Eastern red bat**  
(*Lasiurus borealis*)

**LANO**



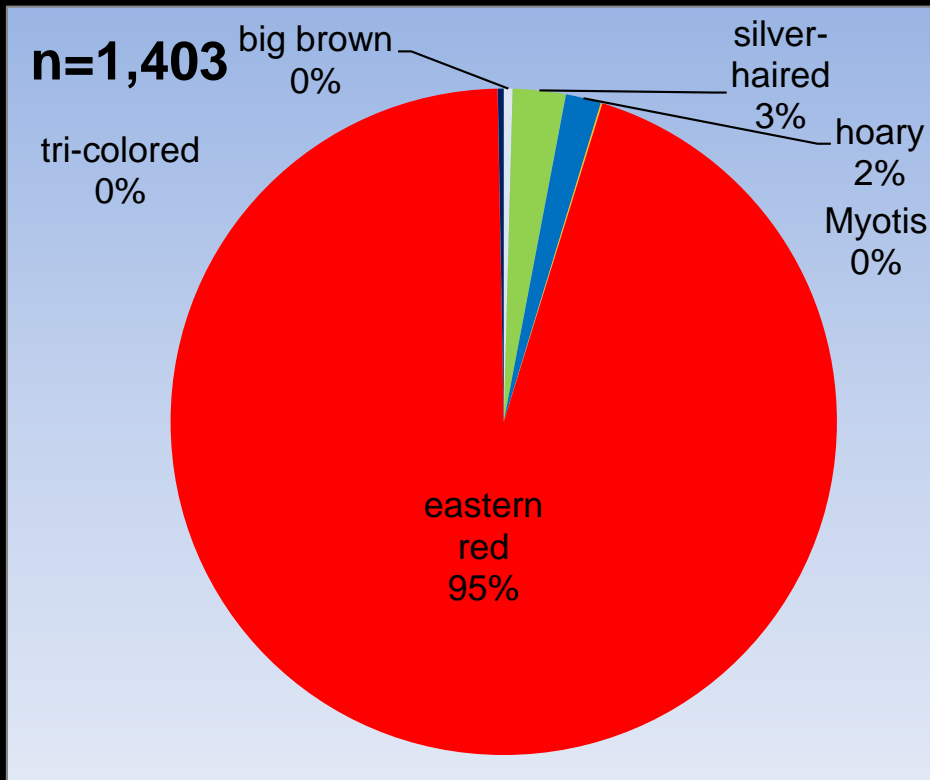
**Silver-haired bat**  
(*Lasionycteris noctivagans*)

**LACI**



**Hoary bat**  
(*Lasiurus cinereus*)

# Offshore Structures 2009-2012



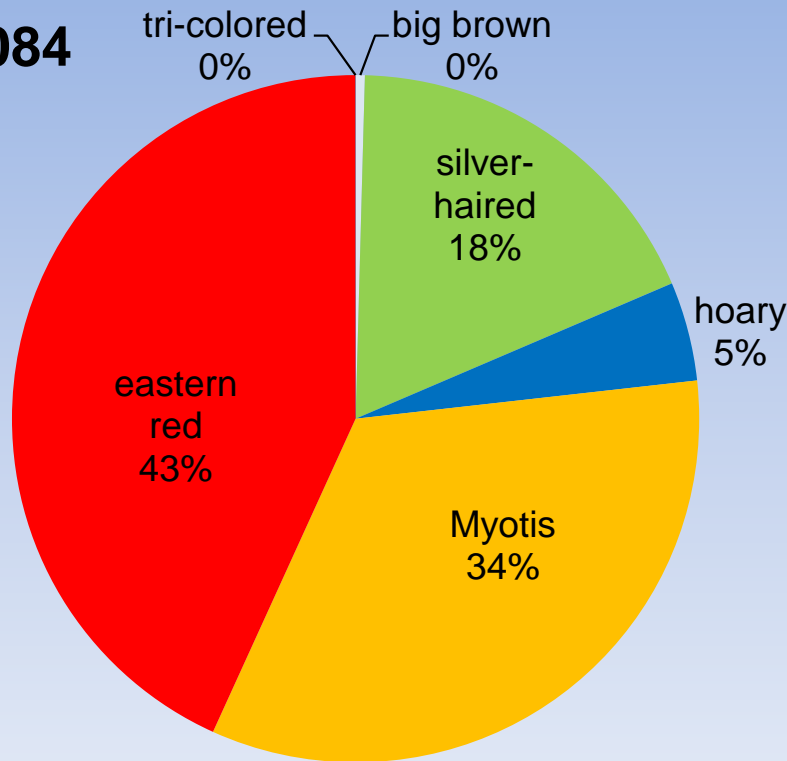
[n=3]



[n=4]

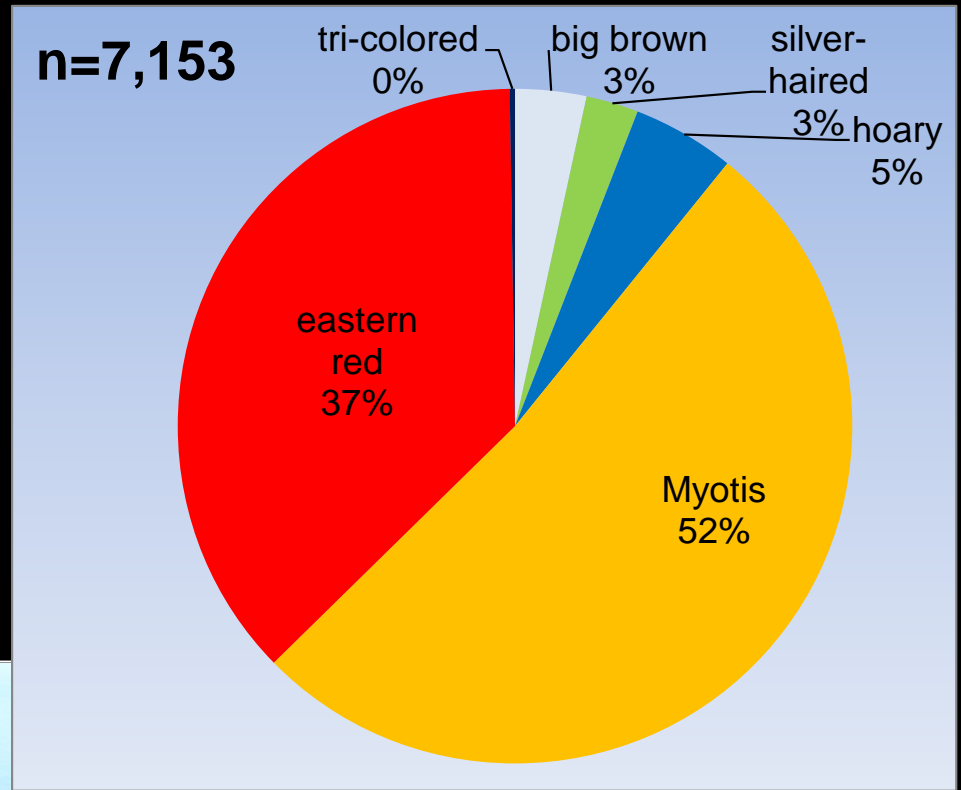


n=2,084



**Small (rock)  
Island Sites  
2009-2012**

# Medium Island Sites 2009-2012



[n=7\*]

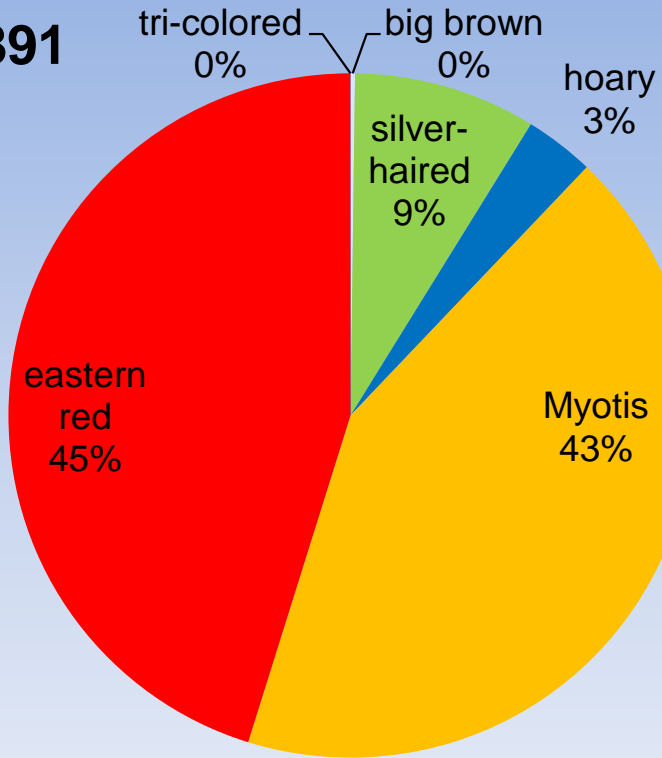
\* Seguin Island excluded from species summary



# Large Island Sites 2009-2012

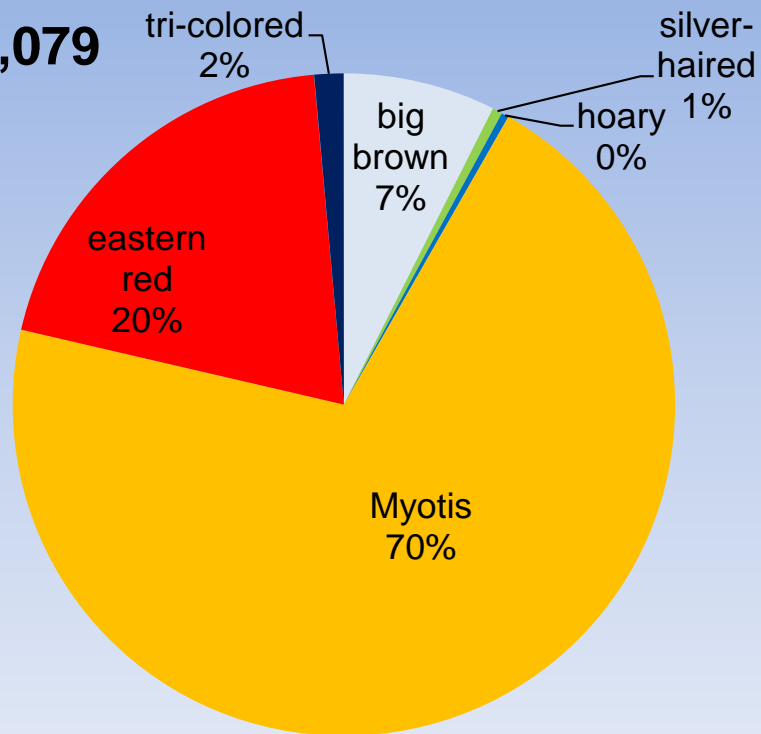


n=1,891



[n=3]

n=39,079



# Coastal Sites 2009-2012

[n=5]



# Migratory Activity

- **Pulses in activity levels interspersed w/ periods of low activity**
- **Synchronized presence of migratory species across multiple sites**
- **Concentration of activity for migratory species during apparent migratory periods**

# Mt. Desert Rock

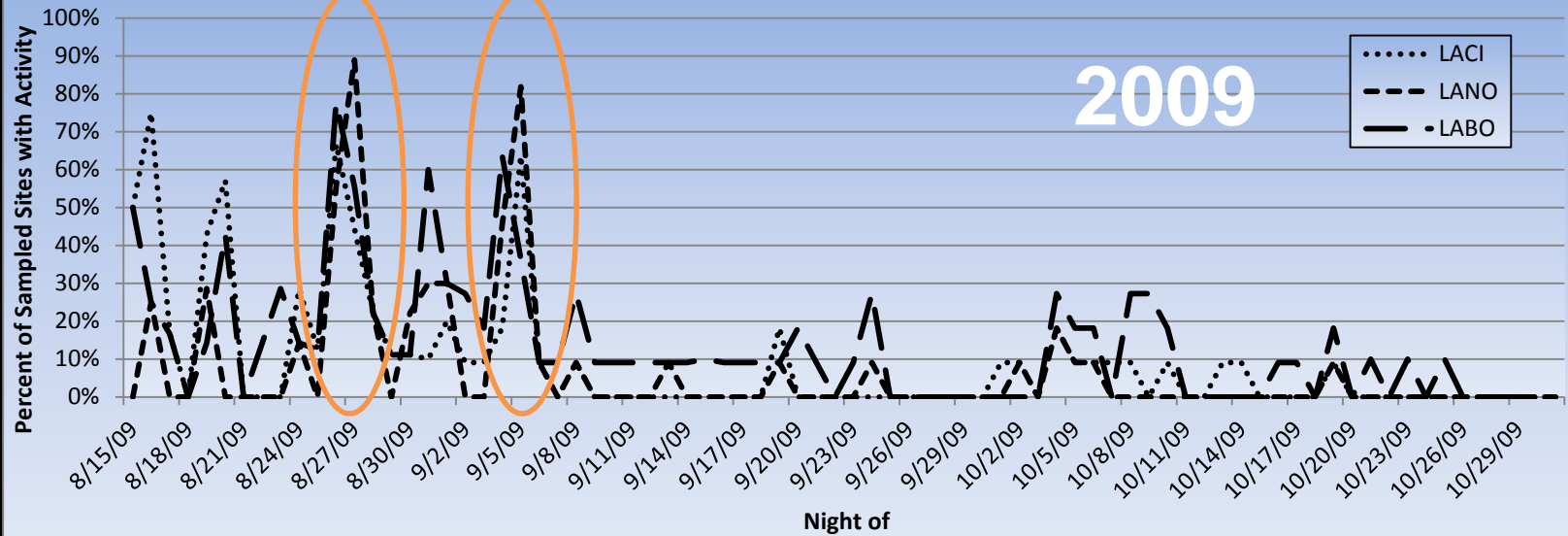


# Mt. Desert Rock - Fall 2009

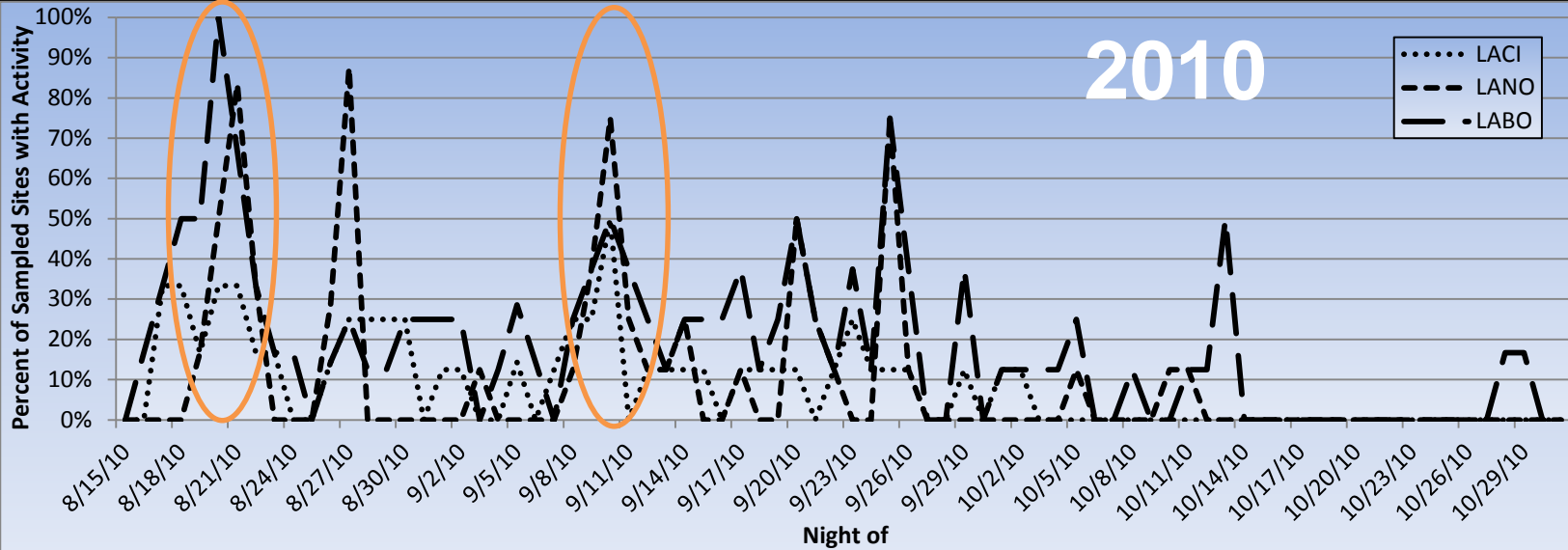
- No bat activity detected between 6/10 & 7/26/2009
- 62% of total bat activity detected b/ 8/ 2-4 /2009
- 143 *Myotis* call sequences (93% of *Myotis* activity at MDR) identified in first 3 hours of 9/15/2009
- No bat activity detected during previous 5 nights or subsequent 13 nights
- 87% of silver-haired activity (n=201 call sequences) documented b/n 8/ 26-31 /2009

# Synchronized Presence

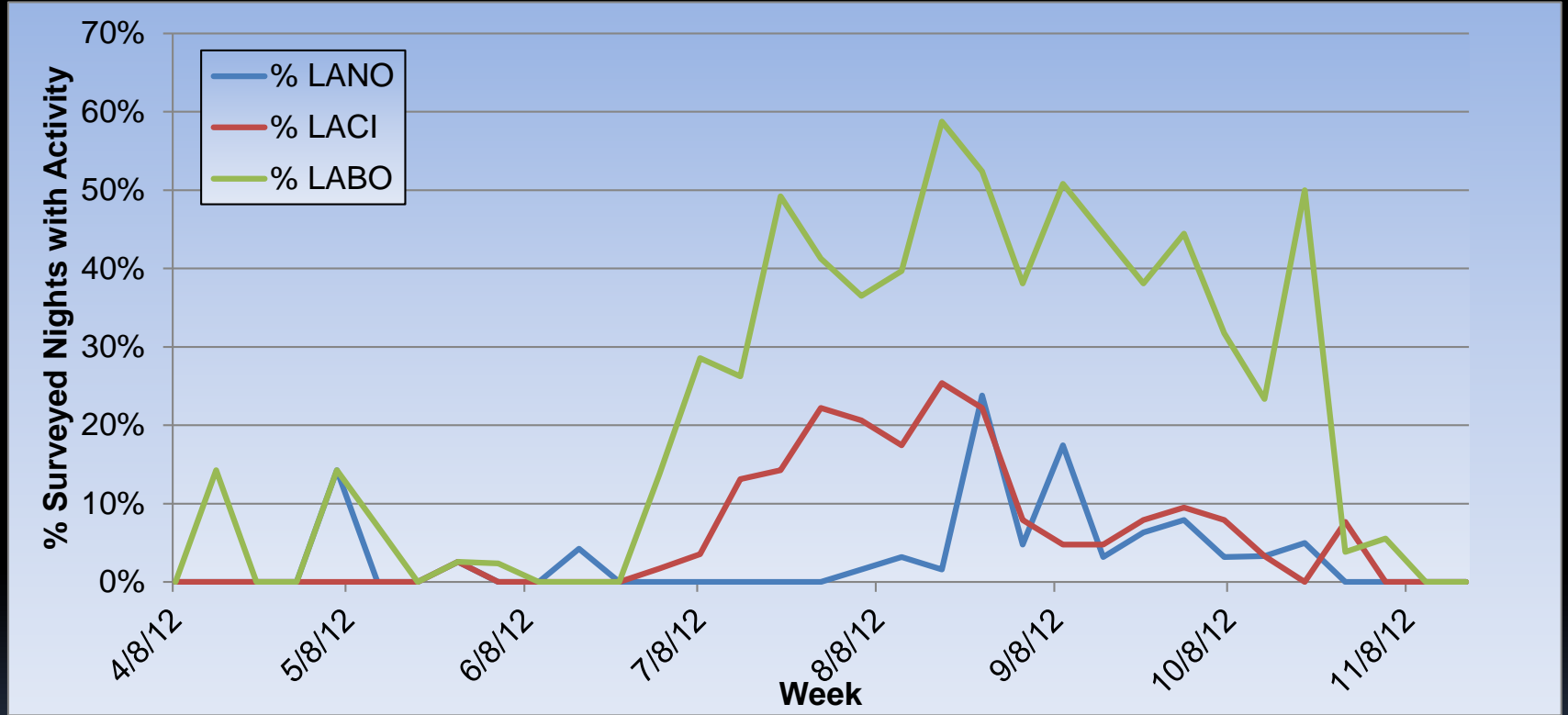
2009



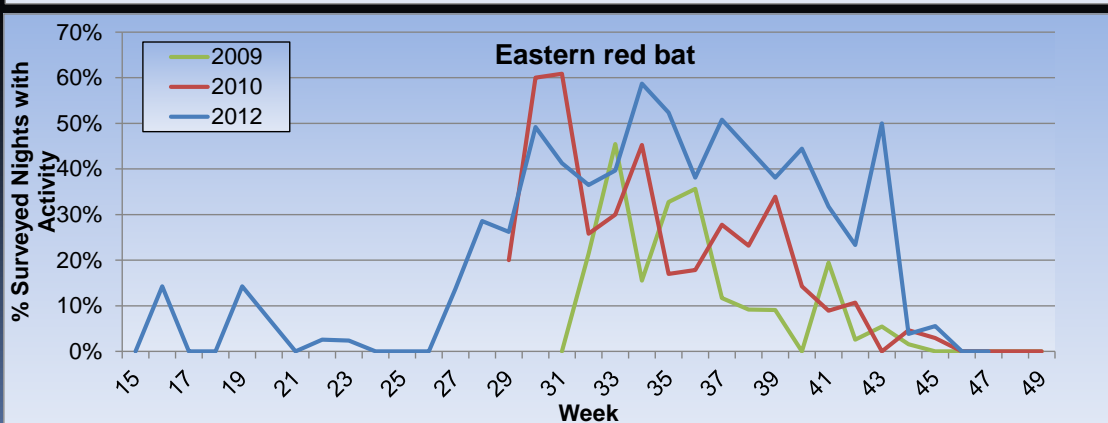
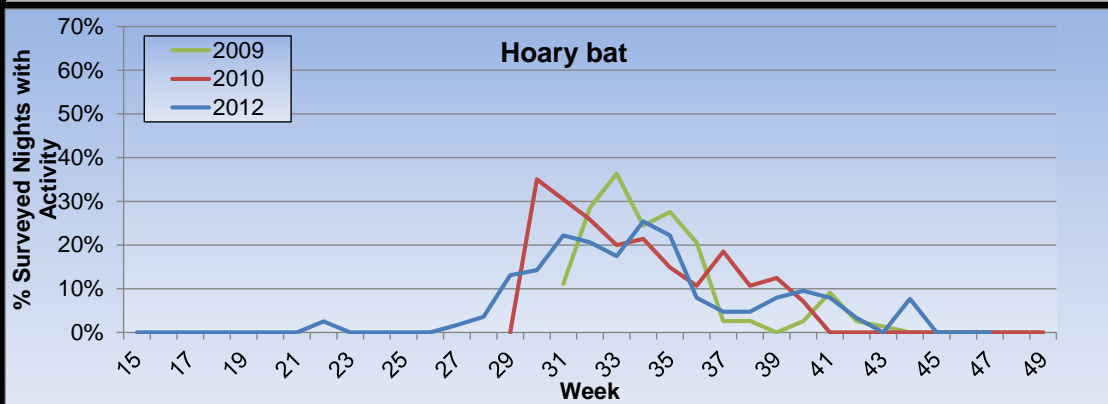
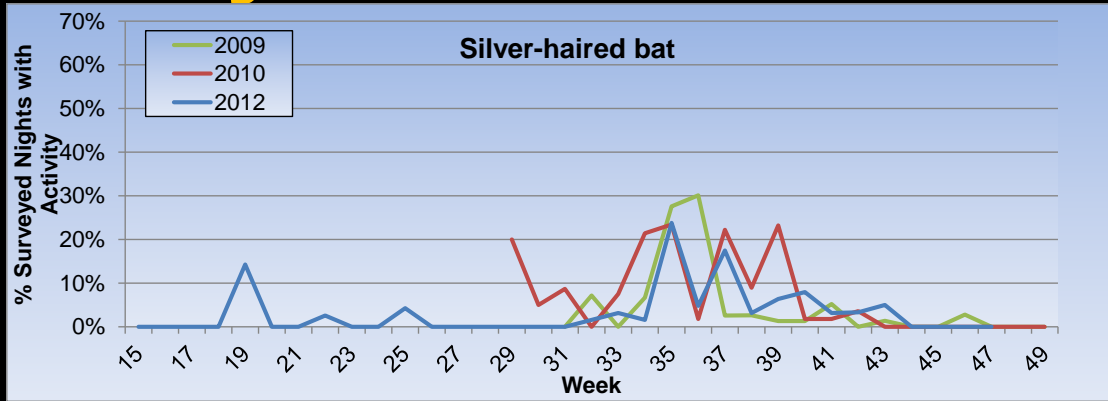
2010



# Synchronized Presence



# Synchronized Presence





# Concentration of Activity

- Matinicus Rock:

- 56% of 2012 silver-haired activity documented on one night in 2012
- 56% of total 2012 bat activity detected on 4 nights (9/11 & 29, 10/ 3 & 4)

- Halfway Rock:

- 75% of year 2009 silver-haired bat activity detected on 9/5/2009

# Concentration of Activity

- Petit Manan Island 2012:

- 93% of *Myotis* activity (n=421) and 66% of total bat activity (n=746) documented on 9/1

- Chesapeake Light Tower 2012:

- 87% of bat activity (mostly eastern red bat) occurred on 5/2

# Conclusions

- **Consistency of bat activity patterns decreases with island size & increased distance from shore**
- **Bats present at remote offshore sites during an unexpectedly high percent of surveyed nights**
- **Certain species (eastern red bat) more likely to be documented offshore than others (big brown bat, tri-colored bat)**
- **Regional differences in *Myotis* abundance, possibly related to White Nose Syndrome (WNS)**

# Conclusions

- **Offshore bat activity not limited to migratory species**
- **Bats appear to use offshore islands and other structures as stopover habitat during migration**
- **Migratory activity appears concentrated in early September though apparent migration “events” noted between mid-August & mid-October**

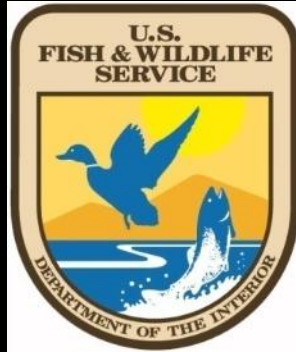
# Future Directions

- Continuation (w/ some expansion) of acoustic surveys in 2013-2014 in Gulf of Maine, Great Lakes, and mid-Atlantic coastal states regions
- Expanded survey effort on offshore structures (buoys, etc.) and ships (e.g., NOAA R/V *Pisces*, R/V *Henry Bigelow*, and R/V *Gordon Gunter*)
- Expanded quantitative analysis of offshore acoustic data from multiple survey years and regions

# Future Directions

- **Quantitative analysis of influence of weather variables on bat activity patterns offshore**
- **Provide key regional and temporal data to better assess trends, influence, and regional effects of WNS**
- **Provide essential information on strategic mitigation options that may avoid and minimize potential impacts associated with offshore wind energy development**

# Collaborating Organizations



# Thank You

Questions/Comments:

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Stantec Consulting





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