

# Tracking Small Wildlife Using Nanotags

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# Nanotag Telemetry

- What are nanotags?
- Northeast Migration Monitoring Network
- Pilot study to track bats offshore
- Applications for ecological studies and wildlife management

# Nanotag Basics

- Coded VHF transmitters
- Small size (0.29 – ~3 g)
- Configurable burst interval (2 – 10 s)
- Battery life 10 – 33 days (0.29 g)
- Attachment using glue, “backpacks”, skin sutures
- Range dependent on application, antenna configuration



LOTEK  
FISH TAGGING MONITORING  
INFRARED TAG ACTIVATOR

START STOP TRIGGER

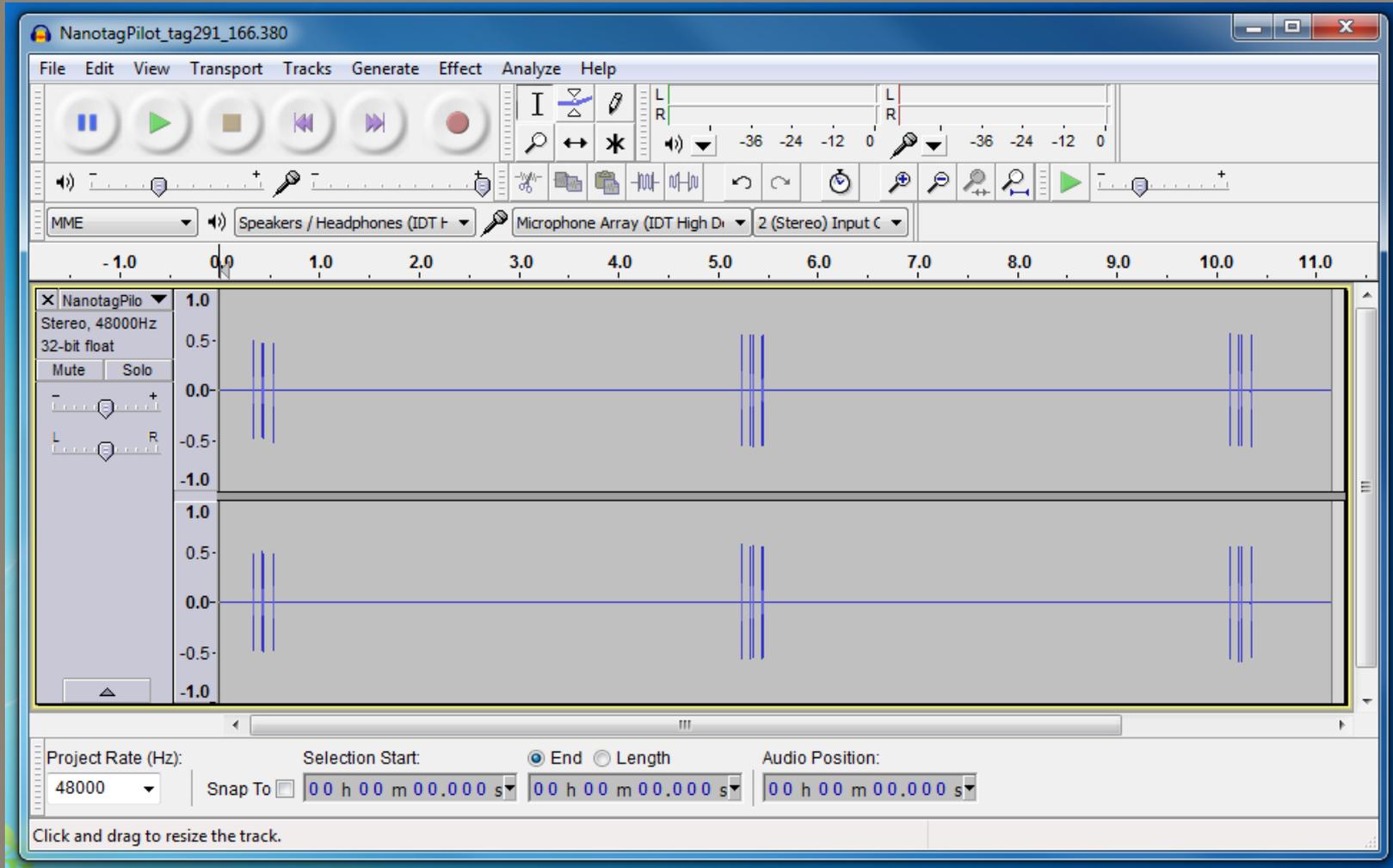
Label 1

change battery

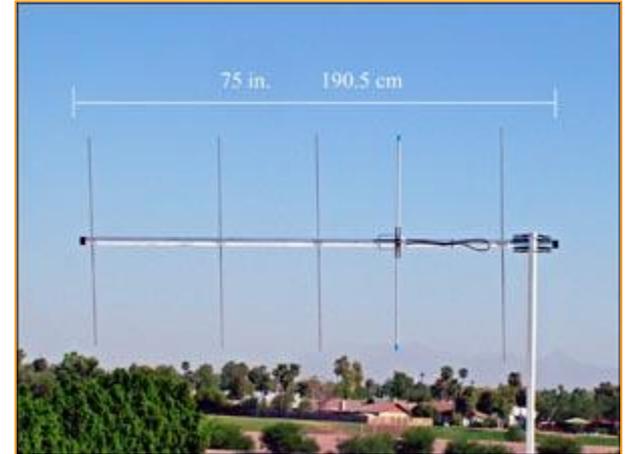
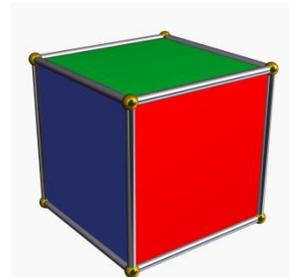
OK

LOTEK  
WIRELESS  
FISH TAGGING MONITORING

# Nanotag Signal



# Nanotag Receiver



5 – 9 element yagi

<https://sensorgnome.org/>

# Nanotag Receivers



**New**  
Logs both  
'beeper' and  
coded tags



[www.lotek.com](http://www.lotek.com)

# Northeast Migration Monitoring Network



- 19 Receivers in Gulf of Maine in 2013

# Northeast Migration Monitoring Network

- 50+ Receivers in  
Northeast, 2013

# Tracking Bats offshore with Nanotags – a Pilot Study



# Tracking Bats offshore with Nanotags – a Pilot Study

- Do passive recording arrays provide sufficient coverage?
- Detection/transmission range?
- Tag lifespan/attachment?

# Tracking Bats offshore with Nanotags – a Pilot Study

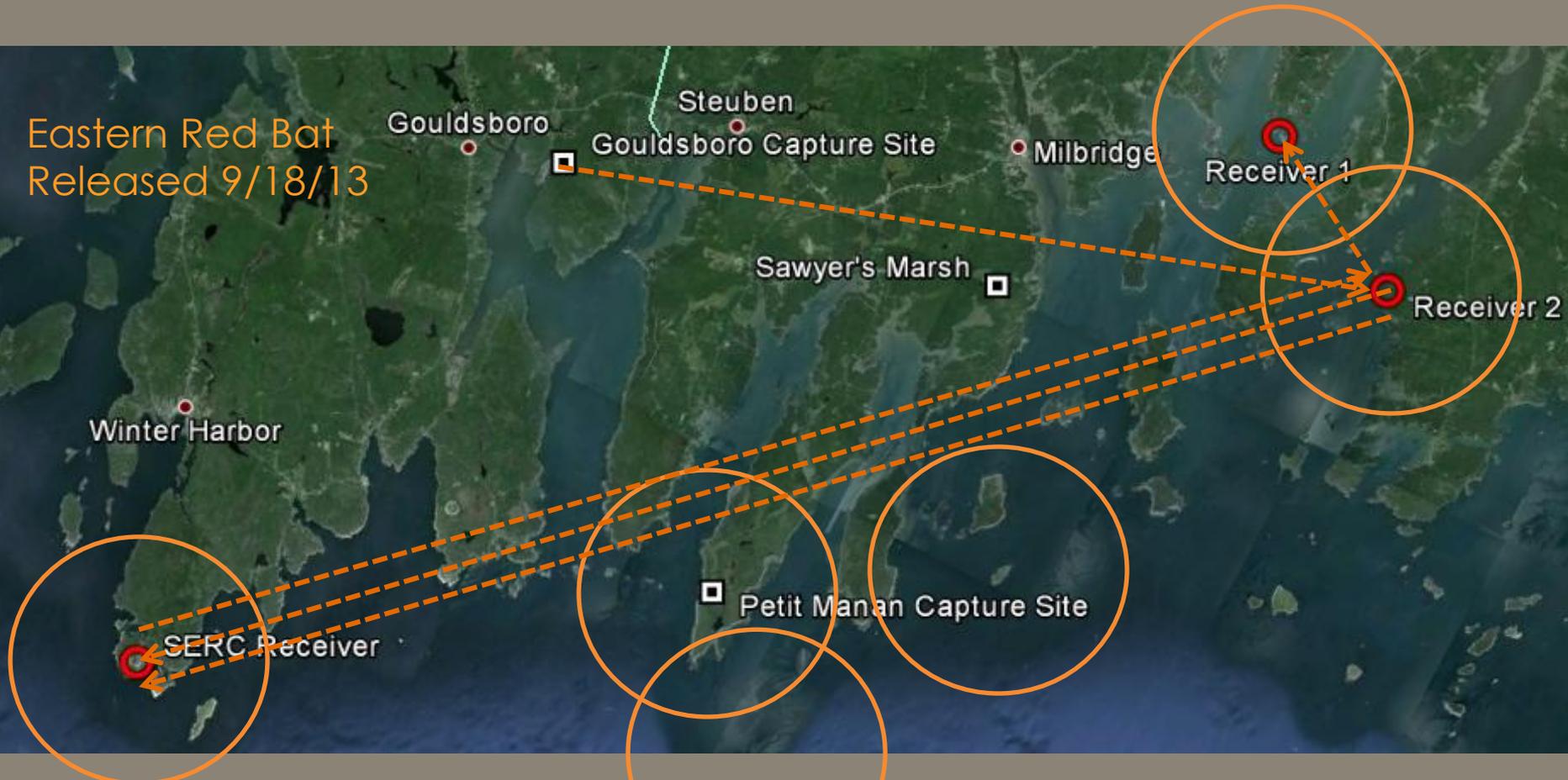
- Rate of migration?
- Timing of flight?
- Stopover behavior?

# Tracking Bats offshore – Preliminary results

- 8 bats tagged at Petit Manan Point
  - 3 eastern red bats (*Lasiurus borealis*)
  - 3 little brown bats (*Myotis lucifugus*)
  - 1 northern long-eared bat (*Myotis septentrionalis*)
  - 1 eastern small-footed bat (*Myotis leibii*)

# Tracking Bats offshore – Preliminary results

Eastern Red Bat  
Released 9/18/13



Last detected  
~10/1/13

# Tracking Bats offshore – Preliminary results

- 8 bats have been detected (100%)
  - 5 bats at 3+ stations
- Detections ~16 days past release
- Eastern red bats ranged up to ~33 km between sites
- Little brown bats ranged up to ~20 km between sites

# Casco Bay Receiver



# Casco Bay Receiver



Nanotag Test Tag 285 9-25

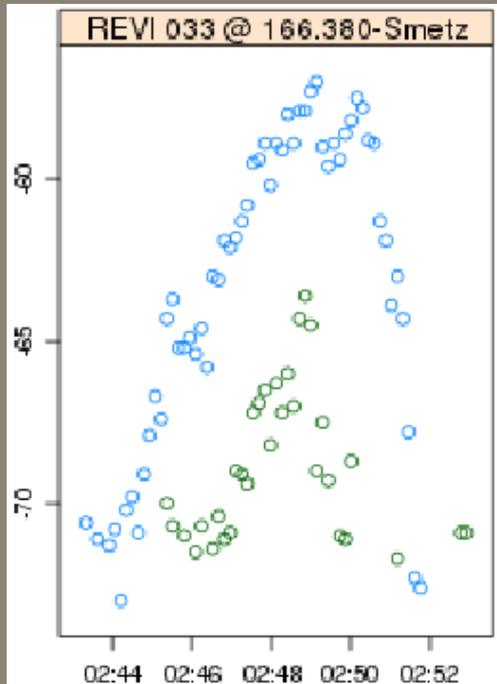
Long Island Receiver

# Casco Bay Receiver

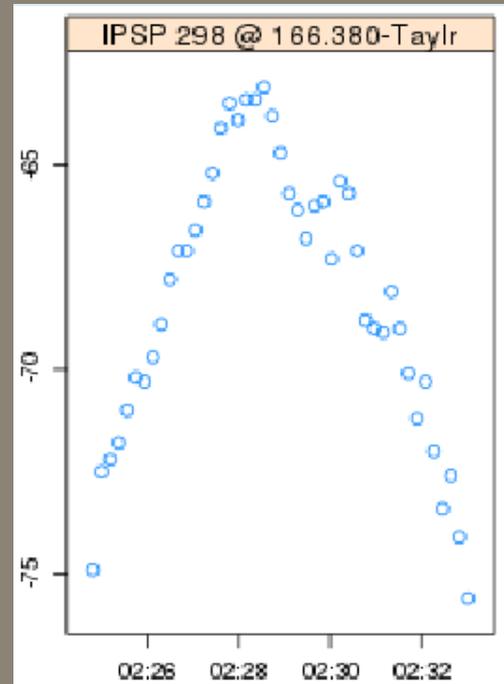


- 31 birds detected
  - 12 red-eyed vireos and 6 blackpoll warblers tagged at PMI
  - 10 Ipswich sparrows tagged at Sable Island, NS (~830 km east)
  - 1 black-backed gull
  - 2 semipalmated sandpipers
  - 2 REVI detected 1 day before at Jordan's Delight (~206 km northeast)
- Bats not detected in Casco Bay

# Casco Bay Receiver



- Red-eyed vireo
- October 3
- 10 minutes
- ~1 – 1.5 km
- Both antennas



- Ipswich sparrow
- October 10
- 8 minutes
- ~1.5 – 2 km
- South antenna

# Additional Applications?

- Regional migration monitoring
- Crossing structure monitoring
- Wind project impacts
- Wildlife exclusion
- Songbird/bat/insect migration

# Acknowledgements

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- Stantec Consulting