Tracking Conservation Focal Species in Southern New England Using Nanotags



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Satellite Telemetry



Lightest satellite tag = 5 grams (too heavy for terns and plovers)



What about those Light Level Geolocators?



2 locations/day, accuracy ~200 km...good for tracking long distance movements, not so good for tracking regional movements

Nanotags – a solution?

- Light-weight (0.25+ g), coded VHF transmitters
- Becoming widely used, highly collaborative
- Automated receiving stations: around-the-clock monitoring within range







Constitution of the second

>250 receiving stations in 2015



Pilot Studies in Northwest Atlantic





Common Terns (2013present)

American Oystercatchers (2013)

2015 Expansion – Listed Species



Roseate Terns

Piping Plovers

Objectives

- Quantify flight patterns
- Estimate exposure to wind energy areas

- What factors influence movements?
 - Weather wind speed, precip, visibility
 - Temporal time of day, seasonality
 - Demographic age, sex, caring for young?





Automated Radio Telemetry Tower

- 6 antennas on 40 ft. mast
- Solar-powered
 data logger runs
 continuously
- Detection range
 varies with altitude
 of bird



Roseate Terns

Nest on offshore islands in colonies Both adults care for young, bring back forage fish Chicks ~25 days to fledge (fly) Adults care for young, teach how to fish Migrate to S. America in the fall





Nano-tag transmitter (weight = 1.5 g)

Antenna (pings every 5 seconds for 4 months)

24 Hour Movements – Adult F ROST, Chick Rearing

09-Jul-15 22:00:00 to 10-Jul-15 00:00:00

km

Total dist traveled >200 km!

Daily Site Use of Roseate Terns – Chick Rearing Period

Temporal Distribution During Chick Rearing: Roseate Terns, Great Gull Island

Temporal Distribution During Chick Rearing: Roseate Terns, Plum Is

Temporal Distribution During Chick Rearing: Roseate Terns, Napatree Point



Temporal Distribution During Chick Rearing: Roseate Terns, Montauk Point



Temporal Distribution During Chick Rearing: Roseate Terns, Block Island



Seasonal Movements Roseate Tern – adult F, chick rearing & post breeding





























Piping Plovers Beach nesting shorebirds Chicks ~25 days to fledge (fly) Migrate to SE US & Caribbean



Trapped birds at nest sites during incubation period (May & June)

Nano-tag transmitter (weight = 1.0 g)

> Antenna (pings every 5 seconds for 4 months)

Breeding Season



Piping Plover Breeding Season Movements - Nest TP-11, NanoTag ID 337





Piping Plover Breeding Season Movements - Nest TP-04, NanoTag ID 341



Migration









ID 433 ASY Male Nested on Monomoy NWR Jun 23: Fledged 4 chicks Jul 13: Initiated migration







ID 346 ASY F Nested on Aquidneck Is, RI Jun 23: Fledged 2 chicks Jul 4: Initiated migration









2015 Loring waqt() All Tag Hits (runLen > 2 & freqsd < 0.1 kHz)


Next Steps

- Movement modeling probabilistic flight paths
- Exposure to wind energy areas
- Weather effects (wind speed, visibility, precipitation)



Movement Model Example – Common Tern crossing Nantucket Sound











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