

# Mapping Spawning and Hatching Grounds of the American Lobster Tagging Data: tracking data from F/V Maureen R NEC-DC2002-1 in the Muscongus Bay, Maine from 2002-2005 (NEC-CoopRes project)

**Website:** <https://www.bco-dmo.org/dataset/2781>

**Version:** 1

**Version Date:** 2005-11-01

## Project

» [Northeast Consortium: Cooperative Research](#) (NEC-CoopRes)

## Program

» [NorthEast Consortium](#) (NEC)

Contributors	Affiliation	Role
<a href="#">Cowan, Diane</a>		Principal Investigator

---

## Table of Contents

- [Dataset Description](#)
    - [Methods & Sampling](#)
    - [Data Processing Description](#)
  - [Data Files](#)
  - [Related Publications](#)
  - [Related Datasets](#)
  - [Parameters](#)
  - [Deployments](#)
  - [Project Information](#)
  - [Program Information](#)
- 

## Dataset Description

### Mapping Spawning and Hatching Grounds of the American Lobster Tagging Data

**Project Leader:** Diane Cowan, The Lobster Conservancy

**Additional Participants:** *Mathew Thomson*, F/V Shearwater

*Win Watson*, University of New Hampshire

*Matthew Weber*

*Andrew Solow*, Woods Hole Oceanographic Institution

*Mark Wallace*, F/V Pamela B

*Tim Thompson*, F/V Haley & Amy

*Bill Rourke*, F/V A-Bill

*Michael Reny*

*Richard Nelson*, F/V Pescadero

*Peter Murphy*

*Jon Murphy*, F/V Redeemed

*Steve Lash*, F/V Streaker II

*Troy Hayes*, F/V Gray Ghost

*Mark Havener*, F/V Sarah Ashley

*Philip Genthner*, F/V Melinda Kay

*Darrell Brazier*, F/V Amy Sue

*Nick Caloyianis*, Caloyianis Productions, Inc.

*Clarita Berger*, Caloyianis Productions, Inc.

*Richard Barter, F/V Tammy Jeane II*  
*Kevin Benner, F/V Wanda Marie*  
*Rex Benner, F/V Sydni & Erik*  
*Denny Benner, F/V Maureen R*  
*Jim Bolen, F/V Finest Kind*  
*Philip Bramhall, F/V Amanda Kate*

The Lobster Sonar Tracking Project was launched in late summer 2002, and was implemented for 2 tracking seasons. In September and October of the first season (2002) a total of 191 egg-bearing females were tagged: lobster IDs: 001 - 193. These lobsters were then tracked over the subsequent 13 months. In August and September of 2004 - the second season of the project - 45 egg-bearing females AND 41 males were tagged, a total of 86 lobsters: lobster IDs: 300 - 400.

Each lobster was tagged with three pieces of equipment: a sonar transmitter that emits a unique frequency/code combination, a temperature datalogger ("Tidbit") that records the ambient water temperature every hour, and a ribbon tag with the lobster's ID and The Lobster Conservancy (TLC) phone number to identify the lobster in the event of recapture. Participants were equipped with vessel-based hydrophones to periodically "listen" for sonar signals throughout their fishing territory. Frequency and code were recorded from each observed signal and the lobster ID was subsequently looked up. Hence, the tagged lobsters could be tracked any one of three ways: via hydrophone, trap recapture, or SCUBA dive recapture (using an underwater dive receiver). Information on lobster egg state could only be collected upon recapture. Likewise, temperature data collected by the Tidbit was only useful if the logger was recovered upon recapture and the information downloaded. Temperature data on 30 lobsters from the 2002-2003 season and 18 lobsters from the 2003-2004 season were downloaded as well as data from stationery loggers. Each lobster ID in that data object corresponds to lobster IDs in the associated data objects.

Project website: <http://www.lobsters.org>

Associated data: [water temperature](#), [lobster tracking data](#) and [lobster recapture data](#)

#### **Lobster Tag Data:**

South missing

4=dbl crusher

5=dbl seizer 0 if lobster is missing no appendages;

If appendages are missing (other than antennae), this is the number of missing claws,  
plus legs, plus maxillipeds, plus uropods.

(see 'comments' for which appendages are missing) 4= hatching explanation of the use of this code)

#### **Validity code:**

There is obviously room for human error in the collection of these data, and potential equipment errors as well. Incorrect sonar codes can be recorded, data can be incorrectly entered into the database, and sonar tags can and have fallen off lobsters without the investigators' knowledge (they will continue beeping away on the ocean floor). Therefore, the most confident tracking data was collected on a lobster that was subsequently recaptured (with the sonar tag still visibly attached). Slightly less confidence was awarded to tracking data on a lobster that showed movement, but has not been subsequently recaptured to verify sonar tag presence. Least confidence and most suspicion exists for tracking data that indicates a sonar tag has not moved for some time, and the lobster has not been subsequently recaptured. This indicates a good possibility that the tag has fallen off. Furthermore, through spatial analysis of most of the individual lobster tracks in GIS mapping software, a number of specific data points were noted that were either highly suspicious or downright impossibilities.

If a recapture showed that the sonar tag was missing, then every prior tracking record for that lobster received a "transmitter detached" reflecting uncertainty as to when the tag was lost. "Disappeared" means the lobster was never tracked or recaptured. Based upon spatial analysis we were able to determine that some of the tracking entries were "invalid", while others were "suspect". These validity descriptions are complete for every lobster tracked during the first year of the project, but not yet complete for the second year.

*Revised Sept 05, 2006; gfh*

## **Methods & Sampling**

It was found that although small female lobsters were abundant in Muscongus Bay, most were not ovigerous. Small ovigerous lobsters tended to spawn and remain inside the bay where they brooded at lower winter, but higher spring and summer temperatures than large ovigerous lobsters. In contrast, large ovigerous lobsters (>size at 50% maturity) were relatively rare, but most were ovigerous. They tended to spawn at greater distances from shore and while many stayed near where they spawned, others achieved a maximum displacement of up to 240 km. Large ovigerous lobsters were at more moderate temperatures throughout the year regardless of how far they traveled. Both small and large ovigerous lobsters experienced (1) sufficiently low winter temperatures for successful ovarian maturation, and (2) approximately the same number of degree days for egg development. These findings suggest that known thermal requirements of optimal cold temperature for successful ovarian maturation are balanced with sufficient numbers of degree-days for egg development via two distinct behaviors. Small ovigerous lobsters remain in shallow water where they experience colder winter but warmer spring and summer temperatures than large ovigerous lobsters that move to deeper water with warmer winter but colder spring and summer temperatures."

## Data Processing Description

"The purpose of this study was to investigate the relationship between temperature, movements, and body size for ovigerous (egg-bearing) lobsters tagged recently after spawning and tracked throughout the 9-13 month brooding period. We made predictions about where and under what temperature conditions small (< size at 50% maturity) versus large (> size at 50% maturity) lobsters would brood. An "echo" is heard when there is more than one lobster on the same frequency in the same location. When this happens one can't tell who is who or which is which. It's beeping that can't be deciphered into the code that allows the lobster to be identified. So, when there is an echo, there is usually no lobster id - except sometimes there could be if one lobster were louder than the other and we could make out the code. In that case an echo could give an id and therefore a TRUE. This may not have ever happened, but it is possible. There is obviously room for human error in the collection of these data, and potential equipment errors as well. Incorrect sonar codes can be recorded, data can be incorrectly entered into the database, and sonar tags can and have fallen off lobsters without the investigators' knowledge (they will continue beeping away on the ocean floor). Therefore, the most confident tracking data was collected on a lobster that was subsequently recaptured (with the sonar tag still visibly attached). Slightly less confidence was awarded to tracking data on a lobster that showed movement, but has not been subsequently recaptured to verify sonar tag presence. Least confidence and most suspicion exists for tracking data that indicates a sonar tag has not moved for some time, and the lobster has not been subsequently recaptured. This indicates a good possibility that the tag has fallen off. Furthermore, through spatial analysis of most of the individual lobster tracks in GIS mapping software, a number of specific data points were noted that were either highly suspicious or downright impossibilities. If a recapture showed that the sonar tag was missing, then every prior tracking record for that lobster received a "transmitter detached" reflecting uncertainty as to when the tag was lost. "Disappeared" means the lobster was never tracked or recaptured. Based upon spatial analysis we were able to determine that some of the tracking entries were "invalid", while others were "suspect". These validity descriptions are complete for every lobster tracked during the first year of the project, but not yet complete for the second year.

[ [table of contents](#) | [back to top](#) ]

---

## Data Files

File
<b>lobster_track.csv</b> (Comma Separated Values (.csv), 288.02 KB) MD5:ae4aea3b3b34277174d741a8390e9de7
Primary data file for dataset ID 2781

[ [table of contents](#) | [back to top](#) ]

---

## Related Publications

Cowan, D. F., Watson, W. H., III, Solow, A. R., & Mountcastle, A. M. (2006). Thermal histories of brooding lobsters, *Homarus americanus*, in the Gulf of Maine. *Marine Biology*, 150(3), 463–470.  
<https://doi.org/10.1007/s00227-006-0358-5> <https://doi.org/10.1007/s00227006-0358-5>

## Related Datasets

### IsRelatedTo

---

Cowan, D. (2005) **Mapping Spawning and Hatching Grounds of the American Lobster Tagging Data from F/V Maureen R NEC-DC2002-1 in the Muscongus Bay, Maine from 2002-2005 (NEC-CoopRes project)**. Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version final) Version Date 2005-11-01 <http://lod.bco-dmo.org/id/dataset/2780> [[view at BCO-DMO](#)]

Cowan, D. (2005) **Mapping Spawning and Hatching Grounds of the American Lobster Tagging Data: detailed lobster recapture data from F/V Maureen R NEC-DC2002-1 in the Muscongus Bay, Maine from 2002-2005 (NEC-CoopRes project)**. Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version final) Version Date 2005-11-01 <http://lod.bco-dmo.org/id/dataset/2782> [[view at BCO-DMO](#)]

Cowan, D. (2005) **Mapping spawning and hatching grounds of the American lobster: individual lobster temperature data from F/V Maureen R NEC-DC2002-1 in the Muscongus Bay, Maine from 2002-2005 (NEC-CoopRes project)**. Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version final) Version Date 2005-11-28 <http://lod.bco-dmo.org/id/dataset/3560> [[view at BCO-DMO](#)]

## Parameters

Parameter	Description	Units
year	year in which lobster was tracked	
yrday_local	day of the year, Julian Day, local time	
day_local	day of the month, local time	
month_local	month of the year, local time	
lob_id	external lobster identification, on sphyrion tag and duct tape	
lat	latitude at which signal was heard, decimal degrees	
lon	longitude at which signal was heard, decimal degrees, negative = West	
depth_w	depth of the water where signal was heard, in meters	
bottom_type	brief description of the bottom	
location_desc	more information about where lobsters were tracked	
echo	(see below)	
signal_strength		
validity_code	NSR = not subsequently recaptured; SR = Subsequently recaptured; (see below for an expanded explanation of the use of this code)	
comments	Comments by trackers or comments related to the signal reception	

[ [table of contents](#) | [back to top](#) ]

## Deployments

**NEC-DC2002-1**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/57757">https://www.bco-dmo.org/deployment/57757</a>
<b>Platform</b>	F/V Maureen R
<b>Report</b>	<a href="http://northeastconsortium.org/ProjectFileDownload.pm?report_id=450&amp;table=project_report">http://northeastconsortium.org/ProjectFileDownload.pm?report_id=450&amp;table=project_report</a>
<b>Start Date</b>	2002-09-05
<b>End Date</b>	2005-05-20
<b>Description</b>	<p>Many fishing vessels were used for this dataset. Others include: F/V Finest Kind, F/V Amanda Kate, F/V Sarah Ashley, F/V Steacker, F/V Redeemed, F/V A-Bill, F/V Haley &amp; Amy, F/V Pamela B. Most of these are based in Friendship, Maine, with the exception of F/V Maureen R, which is based in Waldoboro. See Deployment Report for details.</p> <p><b>Methods &amp; Sampling</b></p> <p>It was found that although small female lobsters were abundant in Muscongus Bay, most were not ovigerous. Small ovigerous lobsters tended to spawn and remain inside the bay where they brooded at lower winter, but higher spring and summer temperatures than large ovigerous lobsters. In contrast, large ovigerous lobsters (&gt;size at 50% maturity) were relatively rare, but most were ovigerous. They tended to spawn at greater distances from shore and while many stayed near where they spawned, others achieved a maximum displacement of up to 240 km. Large ovigerous lobsters were at more moderate temperatures throughout the year regardless of how far they traveled. Both small and large ovigerous lobsters experienced (1) sufficiently low winter temperatures for successful ovarian maturation, and (2) approximately the same number of degree days for egg development. These findings suggest that known thermal requirements of optimal cold temperature for successful ovarian maturation are balanced with sufficient numbers of degree-days for egg development via two distinct behaviors. Small ovigerous lobsters remain in shallow water where they experience colder winter but warmer spring and summer temperatures than large ovigerous lobsters that move to deeper water with warmer winter but colder spring and summer temperatures."</p> <p><b>Processing Description</b></p> <p>"The purpose of this study was to investigate the relationship between temperature, movements, and body size for ovigerous (egg-bearing) lobsters tagged recently after spawning and tracked throughout the 9-13 month brooding period. We made predictions about where and under what temperature conditions small (&lt; size at 50% maturity) versus large (&gt; size at 50% maturity) lobsters would brood. An "echo" is heard when there is more than one lobster on the same frequency in the same location. When this happens one can't tell who is who or which is which. It's beeping that can't be deciphered into the code that allows the lobster to be identified. So, when there is an echo, there is usually no lobster id - except sometimes there could be if one lobster were louder than the other and we could make out the code. In that case an echo could give an id and therefore a TRUE. This may not have ever happened, but it is possible. There is obviously room for human error in the collection of these data, and potential equipment errors as well. Incorrect sonar codes can be recorded, data can be incorrectly entered into the database, and sonar tags can and have fallen off lobsters without the investigators' knowledge (they will continue beeping away on the ocean floor). Therefore, the most confident tracking data was collected on a lobster that was subsequently recaptured (with the sonar tag still visibly attached). Slightly less confidence was awarded to tracking data on a lobster that showed movement, but has not been subsequently recaptured to verify sonar tag presence. Least confidence and most suspicion exists for tracking data that indicates a sonar tag has not moved for some time, and the lobster has not been subsequently recaptured. This indicates a good possibility that the tag has fallen off. Furthermore, through spatial analysis of most of the individual lobster tracks in GIS mapping software, a number of specific data points were noted that were either highly suspicious or downright impossibilities. If a recapture showed that the sonar tag was missing, then every prior tracking record for that lobster received a "transmitter detached" reflecting uncertainty as to when the tag was lost. "Disappeared" means the lobster was never tracked or recaptured. Based upon spatial analysis we were able to determine that some of the tracking entries were "invalid", while others were "suspect". These validity descriptions are complete for every lobster tracked during the first year of the project, but not yet complete for the second year.</p>

## Lobster Sonar Tracking Project cruises

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/987387">https://www.bco-dmo.org/deployment/987387</a>
<b>Platform</b>	Multiple Vessels
<b>Start Date</b>	2002-08-15
<b>Description</b>	The Lobster Sonar Tracking Project was launched in late summer 2002, and was implemented for 2 tracking seasons. Many people (lobstermen, researchers) and various fishing vessels made this possible. Most of these fishing vessels are based in Friendship, Maine, with the exception of F/V Maureen R, which is based in Waldoboro. F/V A-Bill (Bill Rourke) F/V Amanda Kate (Philip Bramhall) F/V Amy Sue (Darrell Brazier) F/V Finest Kind (Jim Bolen) F/V Gray Ghost (Troy Hayes) F/V Haley & Amy (Tim Thompson) F/V Maureen R (Denny Benner) F/V Melinda Kay (Philip Genthner) F/V Pamela B (Mark Wallace) F/V Pescadero (Richard Nelson) F/V Redeemed (Jon Murphy) F/V Sarah Ashley (Mark Havener) F/V Shearwater (Mathew Thomson) F/V Streaker II (Steve Lash) F/V Sydni & Erik (Rex Benner) F/V Tammy Jeane II (Richard Barter) F/V Wanda Marie (Kevin Benner)

[ [table of contents](#) | [back to top](#) ]

---

## Project Information

### Northeast Consortium: Cooperative Research (NEC-CoopRes)

**Website:** <http://northeastconsortium.org/>

**Coverage:** Georges Bank, Gulf of Maine

The Northeast Consortium encourages and funds cooperative research and monitoring projects in the Gulf of Maine and Georges Bank that have effective, equal partnerships among fishermen, scientists, educators, and marine resource managers.

The Northeast Consortium seeks to fund projects that will be conducted in a responsible manner. Cooperative research projects are designed to minimize any negative impacts to ecosystems or marine organisms, and be consistent with accepted ethical research practices, including the use of animals and human subjects in research, scrutiny of research protocols by an institutional board of review, etc.

[ [table of contents](#) | [back to top](#) ]

---

## Program Information

### NorthEast Consortium (NEC)

**Website:** <http://northeastconsortium.org/>

**Coverage:** Georges Bank, Gulf of Maine

The Northeast Consortium encourages and funds **cooperative research** and monitoring projects in the Gulf of Maine and Georges Bank that have effective, **equal partnerships** among fishermen, scientists, educators, and marine resource managers.

At the 2008 Maine Fishermen's Forum, the Northeast Consortium organized a session on data collection and availability. Participants included several key organizations in the Gulf of Maine area, sharing what data are out there and how you can find them.

**The Northeast Consortium has joined the Gulf of Maine Ocean Data Partnership.** The purpose of

the GoMODP is to promote and coordinate the sharing, linking, electronic dissemination, and use of data on the Gulf of Maine region.

The Northeast Consortium was created in 1999 to encourage and fund effective, equal partnerships among commercial fishermen, scientists, and other stakeholders to engage in cooperative research and monitoring projects in the Gulf of Maine and Georges Bank. The Northeast Consortium consists of four research institutions (University of New Hampshire, University of Maine, Massachusetts Institute of Technology, and Woods Hole Oceanographic Institution), which are working together to foster this initiative.

The Northeast Consortium administers nearly \$5M annually from the National Oceanic and Atmospheric Administration for cooperative research on a broad range of topics including gear selectivity, fish habitat, stock assessments, and socioeconomics. The funding is appropriated to the National Marine Fisheries Service and administered by the University of New Hampshire on behalf of the Northeast Consortium. Funds are distributed through an annual open competition, which is announced via a Request for Proposals (RFP). All projects must involve partnership between commercial fishermen and scientists.

The Northeast Consortium seeks to fund projects that will be conducted in a responsible manner. Cooperative research projects should be designed to minimize any negative impacts to ecosystems or marine organisms, and be consistent with accepted ethical research practices, including the use of animals and human subjects in research, scrutiny of research protocols by an institutional board of review, etc.

[ [table of contents](#) | [back to top](#) ]