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# American Lobster Tagging Project

by Bryan Morse

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## Introduction:

My name is Bryan Morse and I am a PhD student at the University of New Brunswick, Saint John Campus, supervised by Dr. Rémy Rochette. I am a student within the 'Lobster Node' of the NSERC funded Canadian Fisheries Research Network (CFRN). My PhD research is focused on determining how movement of juvenile and adult American lobsters influences their population ecology.

(<http://www.cfrn-rcrp.ca/Bryan+Morse+student+profile>).

I am currently undertaking an interesting project, which I would like to share an update from today.



## The Project:

It is well known that many animals undergo annual migrations. For example, birds fly south for the winter, and wildebeest migrate to the best feeding grounds available. But did you know that the American lobster (*Homarus americanus*) also migrates seasonally? This migration is one from shallow water to deep water, with the lobsters spending their summers in warm shallow waters along the coast, and then moving to deeper waters in the winter. While we know that lobsters in different parts of the species range undertake a seasonal migration, it is not known for certain why they migrate.

This project focuses on large egg-bearing (berried) female lobsters from Grand Manan, New Brunswick, Canada, and asks two main questions:

(1) Why do female lobsters incubating their embryos undertake this migration (i.e., what benefit does it bring them or their offspring)? (2) What does this migration look like in terms of distance travelled and water temperatures experienced? When do the lobsters leave the shallow water in the fall, and when do they return in the spring?

We hypothesize that berried female lobsters migrate in order to stay in the warmest water available year round, thus keeping their embryos in the most favorable water temperatures available for development. This warm water around Grand Manan would occur at the surface in the summer and in deeper waters in the winter, and the change in the location of the warm water between seasons would provide the incentive for the lobsters to undertake this migration. Although previous mark and recapture studies in collaboration with the local lobster fishery show that a seasonal migration occurs in the area, new technology utilized in this study will describe the migration in much more detail than ever before!

## The Project's Technology:

In order to record information about the lobster's seasonal migration at a high enough resolution to test our hypothesis, some interesting technology that had never before been used on American lobsters was used; Pop-up Satellite Archival Tags (or PSATs for short). The theory behind these tags is that you attach it to the animal, it records information for a period of time, then separates itself at a set time from the animal and floats to the surface, and transmits the data back via satellite to the researcher. This ultimately means that the tagged animals never need to be re-caught; if the lobsters wander off to an area where lobster harvesting does not occur, we will still get the data from their migration. That is amazing!

The tags we used were manufactured by Desert Star Systems based in California, USA



(<http://www.desertstar.com/>). We used their SeaTag MOD PSAT tags, which are pictured here. Note: although the tags are fairly sizable (26cm long, not including the antenna), they are not super huge, that is a netbook, not a laptop computer 😊



### The Funding Sources of this Project:

At this point I would like to interrupt this project description and acknowledge its funding support. As you may have guessed strapping cutting-edge technology to lobsters is not the cheapest research being conducted in the world today . . .

Primary support came from The Atlantic Lobster Sustainability Foundation (<http://www.lobstersustainability.ca/>). Other financial and student support for Bryan Morse came from:

NSERC/CRSNG

CFRN/RCRP

NBIF/FINB

UNB Saint John

### The Study:

This seasonal migration study will be broken up into two years. As this technology has never been used on lobsters before, 2013-2014 is being used as a pilot study, while 2014-2015 will expand upon the project with more animals tagged. For the pilot study, 2 lobsters were tagged and released on October 1, 2013. Also, since we currently do not have a sufficient bottom temperature model for the area surrounding Grand Manan, the pilot study will also include collaboration with Department of Fisheries and Oceans scientists to measure temperature to develop a spatial model to be used in our study. The 2014-2015 portion of the study will see the release of 8-10 lobsters from two coves on Grand Manan, and will also include more temperature measurements. Below are some of the highlights of the events leading up to and including the pilot study deployment:



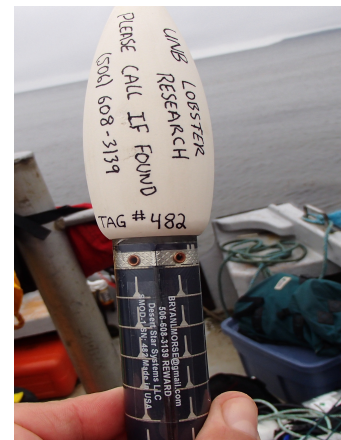
### The Mini Mission

This was the first time I got to play with the tags. The purpose was to (1) make sure the tags worked, (2) make sure I entered the ARGOS Satellite IDs correctly, and (3) make sure my tag programming was correct. The tags were set up at UNBSJ, floating in a small recycling bin outside, and were allowed to transmit data for the afternoon. Once I got data received from the satellite system, I concluded it was a success!



### Programming the Tags

As Desert Star System's PSAT tags are used on a wide variety of marine animals to investigate all sorts of questions, each researcher programs their own tags to suit their needs. The two tags deployed for the pilot study will be recording temperature, depth and approximate location every 15 minutes over the 304 day study period. Only daily averages of temperature, depth, and location will be transmitted back via satellite because it is too expensive to transmit all of the data this way. However, we can get all of the data back if the tags are found and returned. So if you see one of these after July 31 2014, be sure to pick it up and call me!



## Deployment

The 2013 pilot study deployment occurred on October 1, 2013 in Flag Cove, Grand Manan, New Brunswick, Canada. The tagging team consisted of myself, Guðjón Már Sigurðsson (PhD Student, CFRN Lobster Node), Kristen LeGault (MSc student, UNBSJ) and Marie-Josée Maltais (Research Technician, Dr. Rémy Rochette Lab). I would also like to thank Keith Morse (Grand Manan Lobster Harvester, CFRN member) for the use of his skiff for the tagging day.



The lobsters were collected by SCUBA diving. After swimming around for 15 minutes measuring lobsters (including a monster lobster >180 mm carapace length (CL), but no eggs), two were chosen and hauled aboard the boat for tagging. The two lobsters chosen were 159 mm CL females with new stage 1 eggs. Over the next 10 – 15 minutes Guðjón and myself glued on the tag attachment plates and fixed the tags to the lobsters, thereby creating the two most valuable lobsters in the sea! After ensuring the superglue was dry and the tags were well secured, the tagged lobsters were released back into the ocean by divers. They looked great, seemed unaffected by the tags or tagging process, and even tried to attack me!



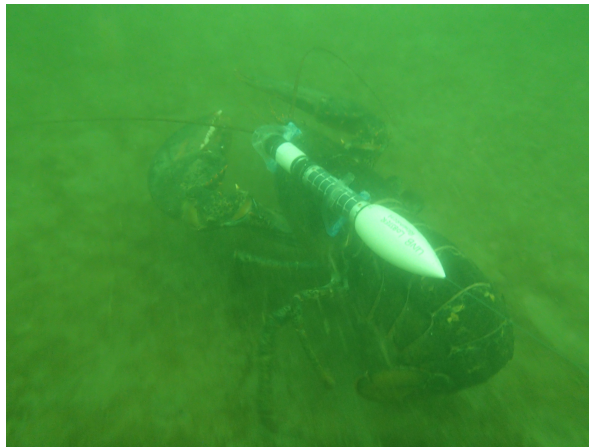
Later that day, I noticed that I received a position from each of the tags during the tagging period, confirming that the tags were working great. I look forward to hearing from the tags again in July 2014!

Thanks for reading,



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The Tagging Team for 2013: (L to R)

Guðjón Már Sigurðsson, Marie- Josée Maltais, Kristen LeGault

Source: <https://www.facebook.com/media/set/?set=a.219654438208618.1073741835.100004921901766&type=1&l=bf382a7381>