LOBSTER RESEARCH PROJECT

MAINE DEPARTMENT OF MARINE RESOURCES

Historical Review of Lobster Tagging Studies in American Waters (1898-1980)

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Lobster Informational Leaflet No. 7

June 1980

Introduction

Historically, the first known American lobster tagging study in U.S. waters was conducted by Hermon Bumpus of the U.S. Fish Commission, who in the summer of 1898 released about 500 tagged mature females near Woods Hole, Massachusetts. A few years later (1902-3), A. Mead and L. Williams of Brown University tagged about 400 lobsters in Narragansett Bay near Wickford, Rhode Island. Although these early attempts to define lobster movement were not conclusive, information obtained from about 110 recaptures indicated to these early researchers that lobsters can move considerable distances, as several recaptures had moved 10-16 miles, and that lobster movement may be directed as most recaptures, from both study areas, had followed a south to southwesterly course.

I believe it is interesting to note that on the basis of the relatively high recovery rate of his study, Bumpus concluded that "the chances of continued life for a lobster that has reached a marketable size are extremely slight." He further stated "it is therefore evident that, unless the supply of any one locality is replenished, either by immigration or by artifical propagation, the lobster will be exterminated; indeed elimination has actually occurred at certain localities, and there is every indication that before long an industry which has yielded many millions of dollars will have perished through the inexcusable abuses of our fishing privileges." Considering that these observations were made 80 years ago and today the very same abuses of fishing privileges

remain essentially unchecked, it is apparent that effective lobster management has been a longtime coming. Hopefully, this situation will be corrected in the near future.

U.S. Lobster Tagging After 1950

Surprisingly, since the initial tagging experiments of the early 1900's nearly half a century passed before more lobster tagging work was done in the 1950's. Since that time to the present there have been several lobster tagging studies along the eastern U.S. seaboard from Maine south to North Carolina (see Figure 1).

Beginning with the tagging work done along the Maine coast and then proceeding southerly, I have briefly summarized each study. Although many investigators have produced valuable information on lobster growth and mortality, my discussion of each study's results has been limited to lobster movement.

The first lobster tagging study along the Maine coast was conducted by Donald Harriman, Department of Marine Resources (DMR), from 1950-51 in waters off Monhegan Island. Monhegan Island is the only area in Maine with a closed season (lobstering is permitted January through June). Of 1,093 trap caught lobsters (sizes are not known) tagged with a plastic disc tag (see Figure 2) on the middle flipper of the tail, 24% were returned over a two year period. Movement was extremely minimal as only 10 recaptures moved 2 or more miles and what movement occurred appeared to be random.

In another project at Monhegan from 1965-66, Richard Cooper, National Marine Fisheries Service, marked 1,776 legal-sized lobsters with either a sphyrion tag inserted between the carapace and tail, a dart tag implanted in the elbow of the claw, or a brand made on the top of the carapace (see Figure 2). On the basis of laboratory and field experiments the sphyrion tag was judged to be the most suitable mark because of its capability of remaining attached after molting and its negligible effect on behavior. Because of the favorable results with the sphyrion tag in this study and the earlier work of two Canadian scientists, the sphyrion tag has become the most frequently used American lobster tag. Regarding movement, Cooper concluded as did Harriman that Monhegan lobsters are generally nonmigratory. Ninety-nine percent of the recaptured lobsters were caught within 2 miles of Monhegan, while 20 lobsters had moved 4 to 21 miles NE to NW of the island before being caught.

In 1957 and 1958 Robert Dow of DMR had several Maine commercial fishermen attach Petersen disc tags (see Figure 2) to the middle tail flipper of 162 illegal lobsters. These lobsters were considered illegal because they were: 1) eggers, 2) shorts, 3) oversize, or 4) V-notched females. Even though only 14% of the tagged lobsters were recaptured, an interesting movement pattern was revealed. Four oversize lobsters and one V-notched female traveled 75 to 138 nautical miles in a southwesterly direction, resulting in four recoveries off the

Massachusetts coast.

More recently, during the spring of 1975 Jay Krouse, DMR, tagged and released 2,882 legal-sized lobsters near Kennebunkport, Boothbay Harbor and Jonesport, Maine. Recoveries varied from 67 to 85% by area. Most recaptures were caught within 5 miles of the release site and only 1% of the recaptures had moved more than 10 miles. Similar to the southwesterly movement of the migrants of Dow's study, the distant travelers in this study (only 8 lobsters moved more than 15 miles) followed a southwesterly course. Thus, available data indicates that lobster migrants move in the direction of the counter clockwise currents which prevail along the Maine coast. This southwesterly movement pattern is further supported by recent catches of several Canadian tagged lobsters (released off Grand Manan, N.B.) along the Maine coast. In fact, some of these Canadian lobsters have been caught as far south as Cape Cod.

From 1971 through 1974 Ted Spurr of New Hampshire Fish and Game tagged and released 10,823 lobsters in coastal waters of New Hampshire. Most of these lobsters were recaptured near the release site. Mature females appeared to move farther.

Along the Massachusetts coast, Thomas Morrissey, formerly with Massachusetts Marine Fisheries Division, has shown directional movement of berried lobsters tagged in summers of 1964-5 near Nauset Light on the east side of Cape Cod. Of 350 lobsters released in 1964, all but 3 of

39 recaptures were caught to the north of the release area within 3 miles of shore in Cape Cod Bay. These recaptures moved an average of 19 miles. Lobsters released in the summer of 1965 also showed a directed northerly movement.

Ten years after Morrissey's study, James Fair tagged 2,000 legal-sized lobsters in the western inshore section of Cape Cod Bay. About 70% of the releases were recaptured and only 8 lobsters wandered outside the study area. A female caught on the east shore of Cape Cod might have entered the migration route described by Morrissey.

In the spring of 1965 Saul Saila and John Flowers of the University of Rhode Island undertook an interesting experiment in which 1,258 berried lobsters caught near Veatch Canyon were tagged and released in Narragansett Bay (about 140 miles from Veatch Canyon). The relocated berried females did not show any appreciable movement until the eggs were hatched. At which time many of the females left Narragansett Bay and traveled toward Veatch Canyon.

From 1968 through 1971 Joe Uzmann, Richard Cooper, and Ken Pecci of the National Marine Fisheries Service conducted an extensive offshore lobster tagging program. A total of 7,326 lobsters were marked with sphyrion tags and released along the outer edge of the continental shelf from Corsair Canyon southwest to Baltimore Canyon. Results of this study indicate that at least 20% of the offshore lobster population takes part in a seasonal inshore-offshore migration which seems to be controlled by

temperature. In the spring, movement is toward the warmer nearshore waters and when these shoaler areas begin to cool in the fall, the lobsters move back to the warmer deeper waters. Recaptured tagged lobsters also showed considerable movement from one canyon area to another.

Returning once again to inshore tagging work, during 1974-75, Michael Fogarty, David Borden, and Howard Russell of the Rhode Island Department of Environmental Management tagged 3,063 lobsters along the R.I. coast and on Cox Ledge (about 20 miles offshore). Returns from the inshore releases indicated random localized movement, whereas, many of the Cox Ledge releases migrated toward the outer continental shelf in the fall and winter. These findings agree with those of the offshore work by NMFS.

Further south, University of Connecticut researchers William Lund and Lance Stewart have revealed some interesting movement trends of 4,000 lobsters tagged at three locations in Long Island Sound from 1966-1972. Lobsters released in the western portion of the Sound moved very little. Similar observations were made by Philip Briggs of New York State Department of Environmental Conservation, who tagged lobsters in western L.I. Sound in 1978. In contrast, lobsters released in eastern L.I. Sound have shown considerable movement. Some of these releases were recaptured off Block Island, Montauk Point and as far as the edge of the continental shelf.

Tagging studies in the offshore waters of the Mid-Atlantic coast by B. Holland and Scott Keefe of the North Carolina Department of Natural and Economic Resources in 1969 and by Willard Van Engel and Robert Harris of the Virginia Institute of Marine Science in 1977 have not shown the extensive movements of those lobsters tagged in offshore New England waters. In the North Carolina study 40% of the recaptures traveled less than 5 nautical miles, while 80% of the total moved less than 16 nautical miles. Likewise, the Virginia investigation indicated that most lobsters were recaptured less than 10 miles from the release site and only 20% of the recaptures had moved more than 10 miles.

Summary

If we consider the results of all the U.S. lobster tagging studies to date, certain movement trends become apparent (see Figure 3). The most notable patterns are: 1) south to southwesterly movement of predominantly large mature lobsters along the Maine coast, 2) directed movement of egg-bearing lobsters along the eastern shore of Cape Cod into Cape Cod Bay during the summer months, 3) seasonal inshore-offshore migration of lobsters inhabiting Corsair Canyon southwest to Baltimore Canyon, 4) intermixing of lobsters between canyon areas, and 5) apparent seasonal movement of some lobsters from eastern Long Island Sound and southern Rhode Island to the middle and outer margin of the continental shelf.

Although some studies have shown rather extensive lobster movement, there have been several investigations where the majority of tagged lobsters remained near the area of release. Even though many of these studies have been in areas where intense fishing pressure has removed tagged lobsters from the population before they had a chance to move, there is still sufficient information to show that certain size lobsters (generally the smaller, sexually immature individuals) are basically nonmigratory. Furthermore, most of the lobsters showing migratory behavior have been the larger, sexually mature individuals.

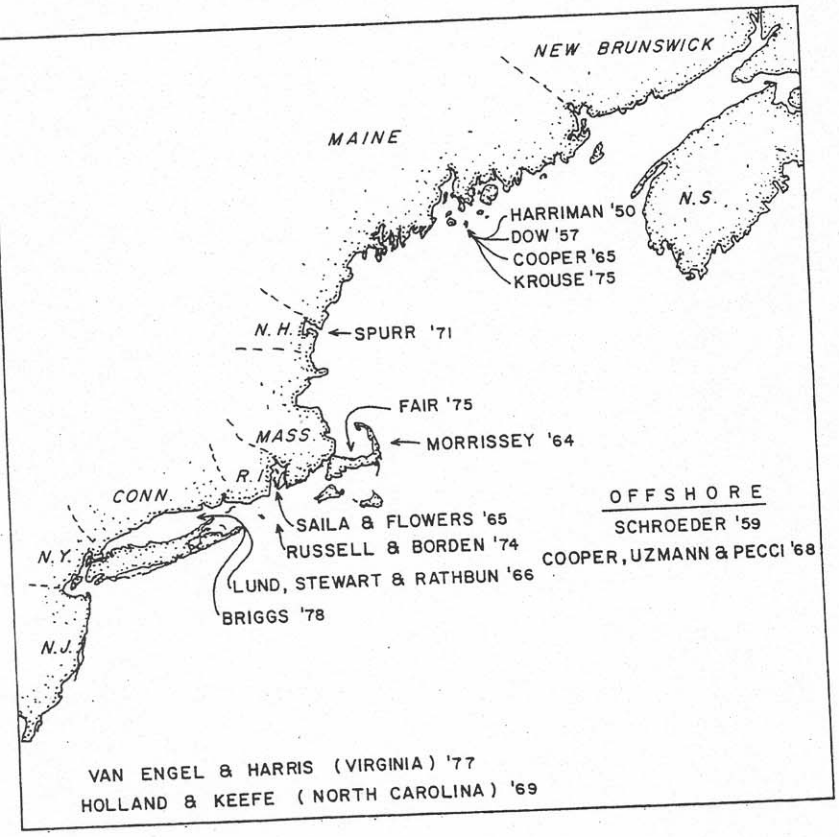

Figure 1. Chart showing approximate locations of the American lobster tagging studies conducted in waters of the United States. Year following name(s) of investigator(s) refers to when the study was initiated.

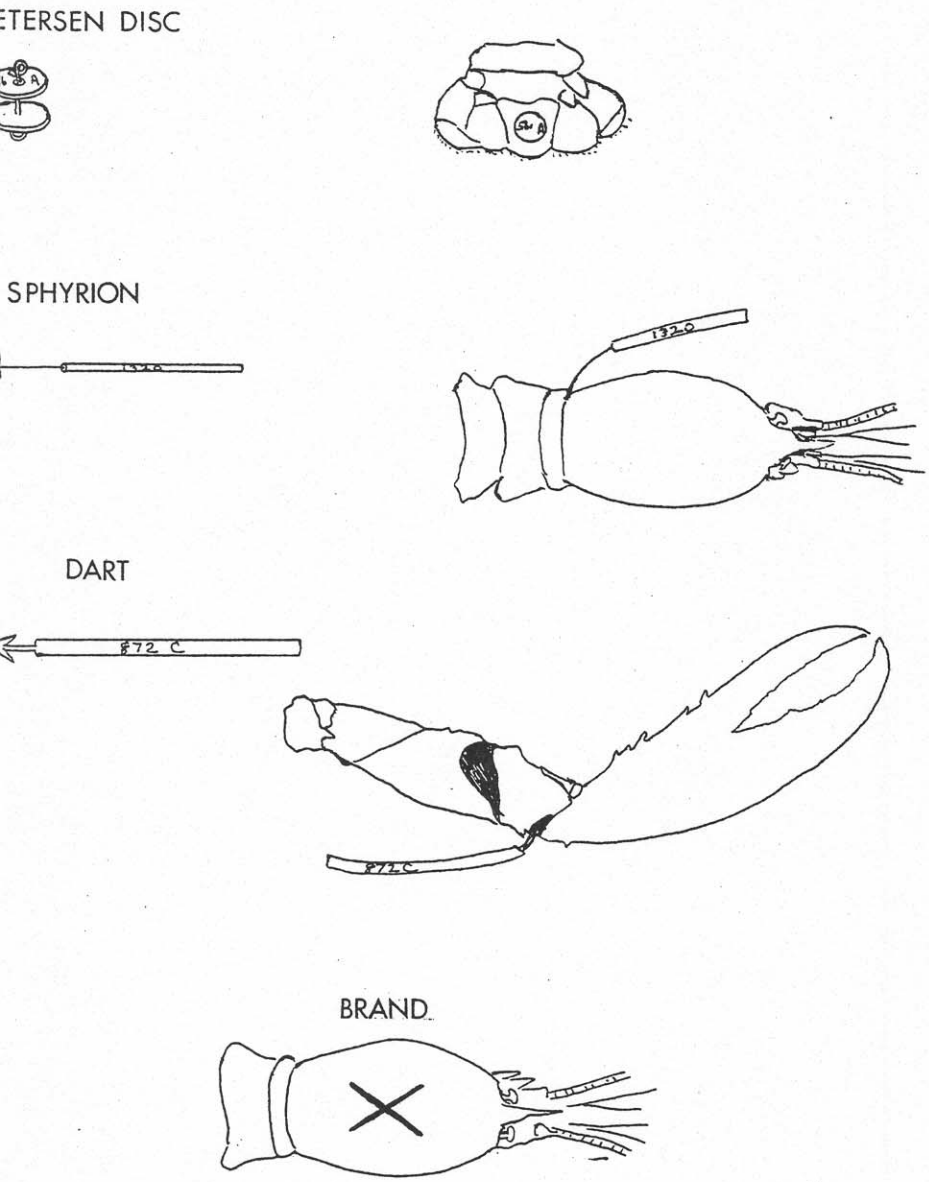

Figure 2. Different types of marks used to identify lobsters.

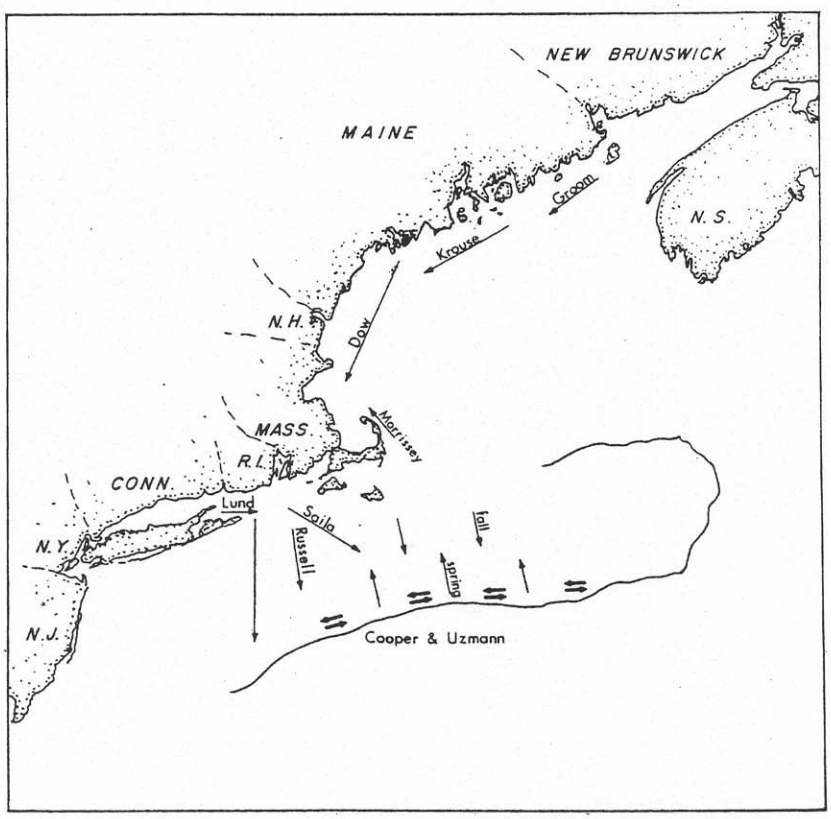

Figure 3. Movement patterns of American lobsters recovered from various tagging studies along the coast of northeastern United States.