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Lobster (Homarus americanus) movement, as a
consideration in the planning of further
divisions of lobster district 7B1

by

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ABSTRACT

Totals of 4954 and 962 lobsters (Homarus americanus) were tagged with sphyrion spaghetti tags and released in 1982 at Beach Point, Prince Edward Island and in 1984 at Margaree, Nova Scotia, respectively. Of these, 380 lobsters (7.67% of number tagged) in Beach Point and 190 (19.75%) in Margaree were recovered one year after release. The majority (99%) of the lobsters recaptured from the Beach Point area remained on the Prince Edward Island coast with the 20 fathom contour. None of the lobsters released at Margaree were recaptured on the Prince Edward Island coast.

RÉSUMÉ

Des totaux de 4954 et 962 homards (Homarus americanus) ont été capturés et marqués (étiquettes spaghetti de type "sphyrion" dans les régions de Beach Point (Ile du Prince Edouard) en 1982 et de Margaree (Nouvelle-Ecosse) en 1984, respectivement). De ces homards, 380 (7,67% du nombre marqué) pour la région de Beach Point et de 190 (19,75% du nombre marqué) pour la région de Margaree ont été retournés un an après avoir été relâchés. La majorité des homards (99%) provenant de Beach Point ont resté près des côtes de l'Ile du Prince Edouard, à l'intérieur de l'isobathe de 20 brasses. Aucun des homards provenant de Margaree n'a été récapturé sur les côtes de l'Ile du Prince Edouard.

INTRODUCTION

One of the primary justifications for a lobster minimum legal size increase program would be to increase the yield per recruit of lobsters in commercial catches, thereafter eventually increasing yield in weight in the long term, (Anon. 1985). In effect, the fishermen return the smaller lobsters to the sea, where they have a chance to grow in size and weight, before being recaptured (Ricker, 1980). The assumption of this program is that the smaller lobster returned to the sea, would not migrate to other areas where the legal size would not have been increased. Assuming a low natural mortality, the fishermen who originally returned the lobsters to the sea as part of a size increase program would therefore experience a gain in revenue in the long term.

Several possible divisions of lobster district 7B1 were proposed at recent advisory meetings for fisheries management. Fishermen from certain areas are in favor of a legal size increase while those from other areas are not. This report summarizes the results of tagged lobster movement observed in Beach Point, Prince Edward Island, and Margaree, Nova Scotia, which may be pertinent to further divisions of District 7B1.

MATERIALS AND METHODS

The lobsters were captured with traps after the lobster fishing season in July 1982 (Beach Point) and July/August 1984 (Margaree), (Figure 1). An orange sphyrion spaghetti tag, (Scarratt and Elson, 1965), was attached to each lobster. Preconstructed tags were used in Beach Point. The tags used in Margaree were assembled at the research centre. In Beach Point, the tagged lobsters were released on the capture site immediately after tagging. In Margaree, the lobsters were tagged and held at sea in a holding cage overnight to facilitate sorting of weak or dead lobsters (6.89%). Totals of 4954 and 962 lobsters were tagged in Beach Point and Margaree respectively.

In 1983, 1984, and 1985 an extensive tag return campaign using posters, advertisement in the media and attendance of fishermen's meetings, was conducted in district 7B1 areas of Prince Edward Island and Nova Scotia. The objective was to obtain the maximum number of tag returns and information such as location, depth, sex and carapace size. Observers working in conjunction with the Prince Edward Island Department of Fisheries and Labour and the Nova Scotia Department of Fisheries were stationed on wharves in the study area to collect tags and information from fishermen as they landed their lobster catches.

The tagging and tag return data were entered and stored on the HP3000 at the Université de Moncton. Processing of the data and calculation of distance moved was performed on a HP9845 using a custom written program. A close approximation of the recapture sites was derived from the information received. The computer program calculated the straight line distance from release to recapture site by: $Distance = 60 \cdot [\cos^{-1} [\sin(LAT_{rc}) \cdot \sin(LAT_{re}) + \cos(LAT_{re}) \cdot \cos(LAT_{rc}) \cdot \cos(LNG_{rc} - (LNG_{re}))]]$ where re is the release site and rc is the recapture site, and LAT is the latitude and LNG is the longitude (Campbell et al., 1983).

RESULTS

Totals of 380 lobsters (7.67% of number tagged) in Beach Point and 190 (19.75%) in Margaree were recovered one year after release. The preassembled sphyrion tags used at Beach Point were poorly constructed. The tubing on which the tag number was printed would sometimes become detached from the filament leader and anchor, leaving only the unnumbered tag on the lobster. There were 59 unnumbered tag recoveries from Beach Point in the first year after release which represent 13.4% of the total tag returns. The sphyrion tags used in Margaree did not have this problem.

One year after release, 100% and 97% of the recovered lobsters were recaptured within 25 kilometers from the release sites, in Beach Point and Margaree respectively (Table 1).

The results of the Beach Point tagging show that 99% of the recaptured lobsters are restricted to the Prince Edward Island coast within the 20 fathom depth contour (Figure 2).

In Margaree, there were no lobsters that crossed the Northumberland Strait to Prince Edward Island or to mainland Nova Scotia. These lobsters recaptured were restricted to a coastal area within the 20 fathom contour, which is closer to the coast compared to Beach Point, (Figure 3).

DISCUSSION

The authors attribute the higher percentage of tag returns in Margaree to improved tag construction, sorting out of injured and dead tagged lobsters after a holding period, and an excellent working relation between the fishermen and the tag collector.

Preliminary data from short term lobster tagging projects in 1986 (Baie Verte, N.-B. and Borden, P.E.I.) suggest that lobsters in the central Northumberland Strait can disperse from coast to coast. Previous tagging studies, (Maynard and Chiasson, 1986; Wilder, 1963) indicate that lobsters in the western Northumberland Strait do not divide frequently cross the Strait. The depth (10 to 15 fathoms) and substrate topography are similar in the central and eastern Northumberland Strait to that of the western Northumberland Strait. Therefore, it is possible that the lobster throughout of central and western Northumberland Strait have similar patterns of movement. In the Beach Point area there appears to be a greater amount of distance moved in the first year after release as compared to Margaree (Table 1). It has been suggested that lobster movement in the eastern Northumberland Strait is restricted by the 20 fathom depth contour, (Maynard and Chiasson, 1986). This may not be directly related to depth but rather to the yearly low water temperatures at this depths in the area, (Trites, 1979). As noted by other authors, (Dadswell, 1979 and Davidson, pers. comm.), further investigation is required to fully understand the mechanisms that may initiate or restrict lobster movement.

Lobsters in the eastern area of Prince Edward Island (Beach Point) have limited movements. The majority of the lobsters tagged in the Beach Point area remained in that vicinity only 2% moved to the Nova Scotia coast and central Northumberland Strait. The lobsters along the western coast of Cape Breton Island (Margaree) are restricted to that coast. Preliminary results from tagging projects (Baie Verte, N.B., and Borden, P.E.I.) and previous trends in Egmont Bay, P.E.I., (Maynard and Chiasson, 1986), indicate that the lobsters probably mix from one coast to the other in the central Strait area.

If management considers further divisions in district 7B1 for a legal size increase program this information on lobster movement should be taken into consideration.

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Table 1. Range of movement and percentages of lobsters recovered after the first year at liberty for the Beach Point and Margaree areas.

Distance Moved (km)	Beach Point, P.E.I.	Margaree, N.S.
0 - 5	70.82%	83.67%
5.1 - 10	9.63%	9.52%
10.1 - 15	10.20%	4.08%
15.1 - 20	5.10%	2.04%
20.1 - 25	1.13%	.68%
25.1 - 30	0.00	0.00
30.1 - 35	0.57%	0.00
35.>	2.55%	0.00

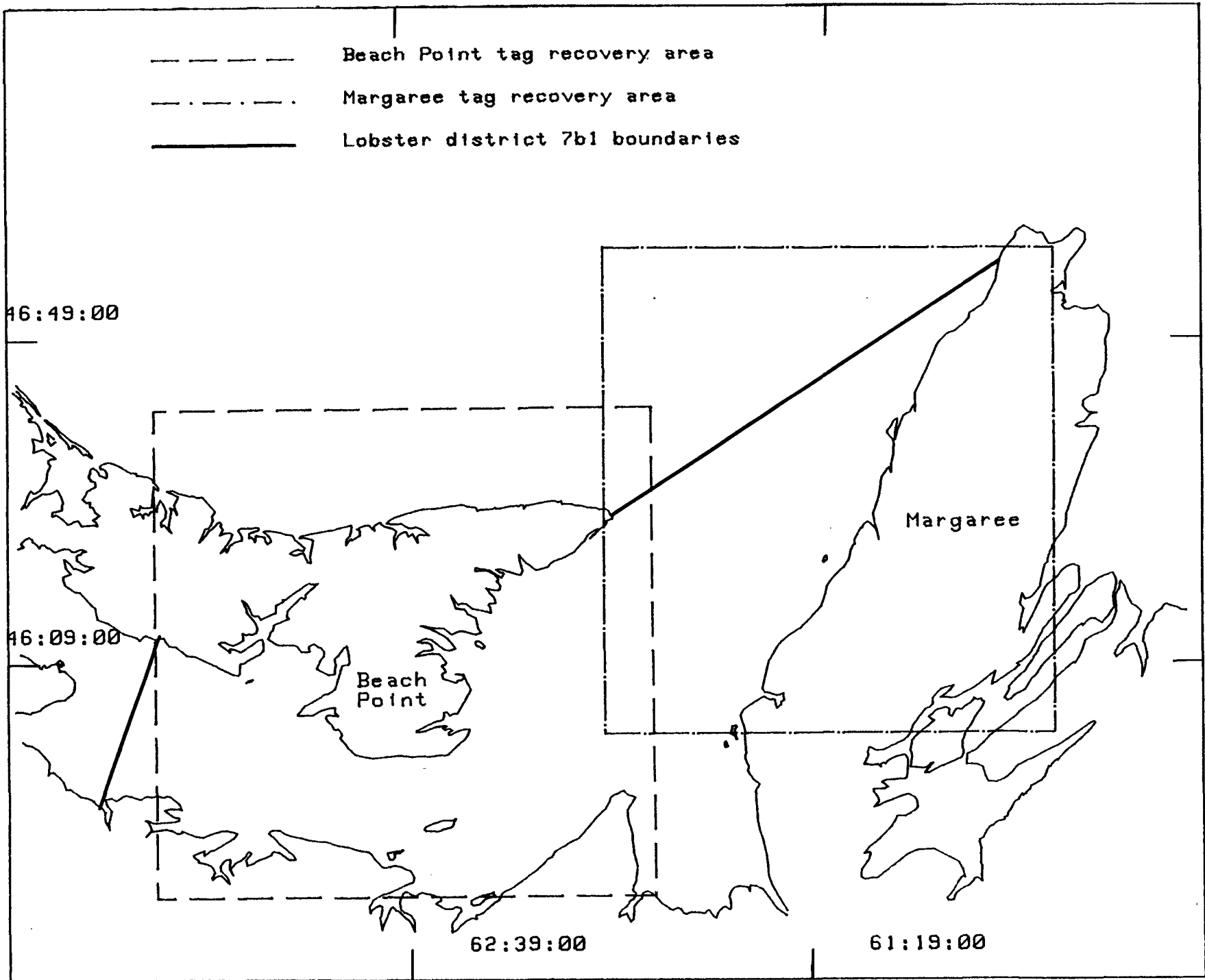


Figure 1. Areas of lobster tagging and recovery in lobster district 7B1.

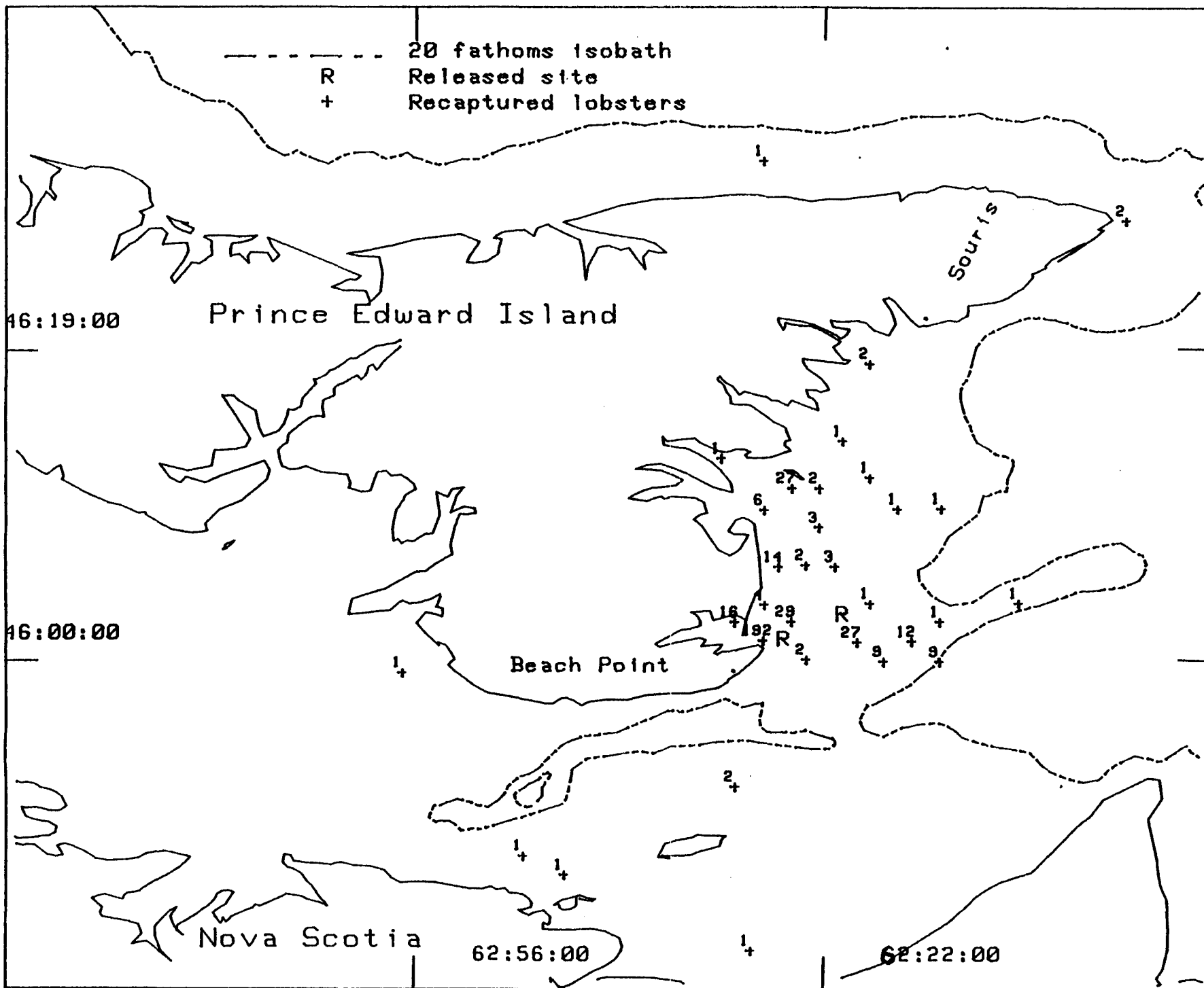


Figure 2. Recovery and release sites of lobsters tagged on 1982 Beach Point project. Each recovery site comprises the lobsters recaptured within a 3 minute by 3 minute area.

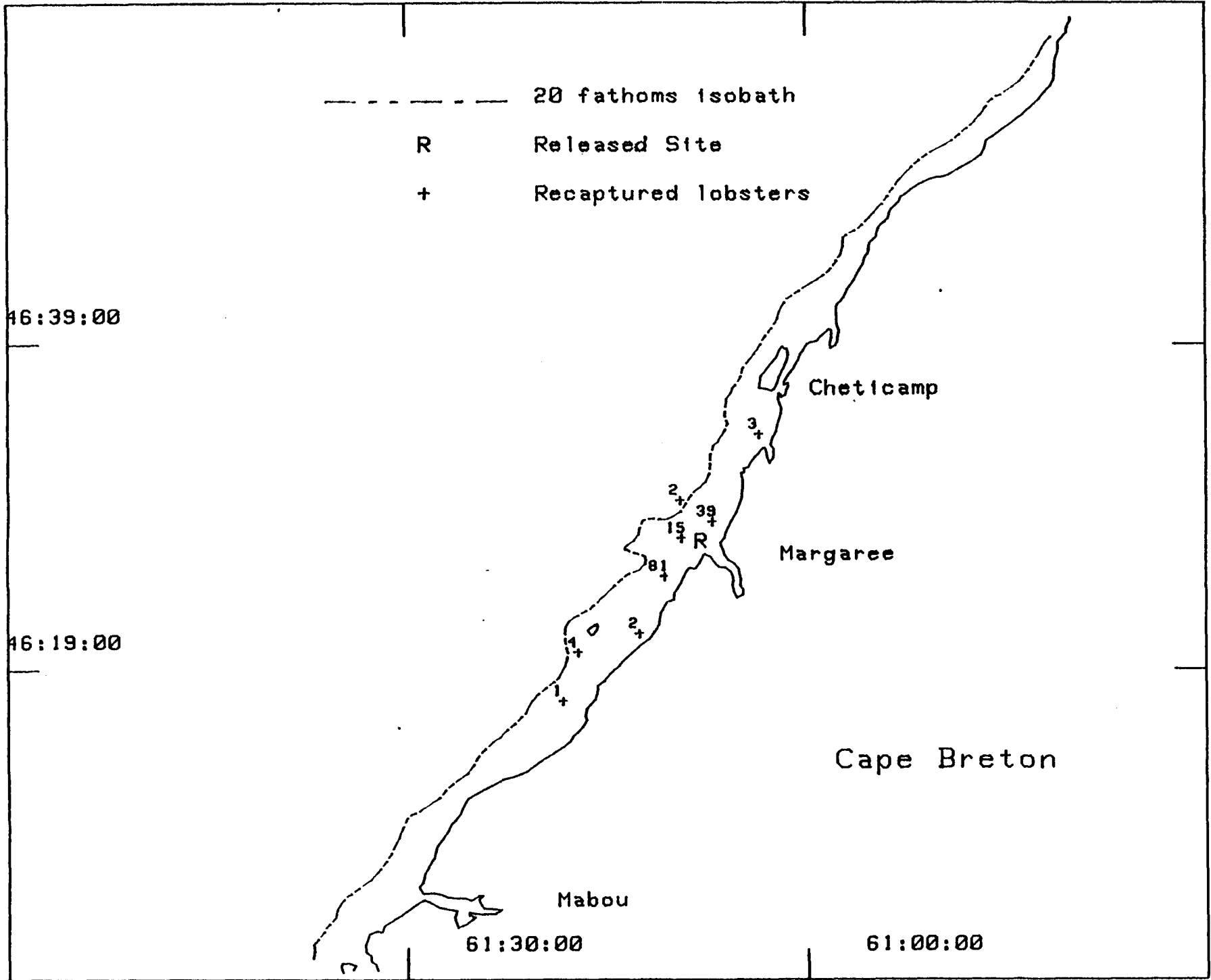


Figure 3. Recovery and release sites of lobsters tagged on 1984 Margaree project. Each recovery site comprises the lobsters recaptured within a 3 minute by 3 minute area.