# Estimates of immediate losses as a result of an increase in the legal carapace size limit for lobsters (Homarus americanus) in District 7B1

by

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## ABSTRACT

The immediate weight losses resulting from a legal carapace size increase were calculated for ports in lobster district 7B1. Estimates of weight loss were extrapolated from the 1984 lobster sea sampling data. The average percentages of weight loss for 1.59 mm (1/16") and 3.17 mm (1/8") carapace increase is 8.31% and 19.63% respectively.

## RESUME

La perte de poids résultant d'une augmentation de taille de carapace a été calculée pour des ports dans le district de pêche aux homards 7B1. L'estimation de la perte de poids a été extrapolée à l'aide de résultats d'un échantillon de homard effectué en 1984. Les pourcentages moyen de perte de poids pour une augmentation de 1.59 mm (1/16") et 3.17 mm (1/8") de taille de carapace ont été de 8.31% et 19.63% respectivement.

## INTRODUCTION

Fishery managers have recently reviewed the basis and implications of a legal carapace size increase for lobsters in district 7B1, Anon. (1985). It has been suggested that during the first year of a carapace size increase, the fishermen would experience an immediate loss in weight of landings as they would return to the sea a certain number of undersized lobsters that they would have previously retained. As the carapace increase program progressses over the years the initial weight loss would decrease as the mean size of the commercially landed lobsters would be shifted towards larger sizes, through growth of the stock, and would eventually result in an increase of yield in weight (Roach, pers. comm.).

Taking into consideration this type of program, managers requested an estimate of the immediate weight losses that would occur in the first year of an increased legal carapace size. Hence, the effects of an increase of 1.59 mm (1/16") and 3.17 mm (1/8") in the legal carapace size were estimated.

## MATERIALS AND METHODS

Carapace size frequency data from the 1984 sea sampling in district 7B1 were used for the calculations. The data were collected by observers on board commercial lobster fishing vessels. As the lobsters were removed from each trap, they were sexed and the

carapace length measured. These samples were collected throughout the fishing season while on various vessels fishing in different areas on the fishing grounds. The data from all trips was combined in male and female carapace size frequency distributions. Ovigerous females which have to be returned to the sea in the commercial fishery were not included in the analysis.

The following length/weight relationships for the western Northumberland Strait (Moriyasu, 1984) were used to convert the length information to weight using a custom made program on a HP9845. The regessions are:

(Males) $W = 0.0014 \cdot L^{2.8675}$ ($r = 0.9848$) ($N = 185$)
(Females) $W = 0.0031 \cdot L^{2.6838}$ ($r = 0.9828$) ($N = 202$)

where L = carapace length (mm), W = weight (g), r = correlation, and N = sample number. The percentage weight loss of a 1.59 mm (1/16") and 3.17 mm (1/8") for the data from each port was calculated.

## RESULTS

The information obtained from the ports sampled along with the percentage of weight loss and 95% confidence limits based on "replicate sampling[1]" is provided in Table 1. The confidence intervals between replicate samples are large for some ports. The average estimated percentages of weight loss for 1.59 mm (1/16") and 3.17 mm (1/8")carapace increase is 8.31% and 19.63% respectively. Location of the ports and the estimated immediate weight loss for 1.59 mm (1/16") and 3.17 (1/8") carapace increase are presented in Figures 1 and 2, respectively.

## DISCUSSION

The dispersion of the immediate weight loss values among "replicate samples" may be affected by number of replicates, number of samples in each replicate, by trends in catches over the fishing season, the different fishermen's equipment strategies and the fishing grounds that were encountered during the sea sampling. Since these factors may not be treated as simple random sources of variability, the confidence limits have very little meaning. The weight loss figures presented here, should be considered as rough averages indicating immediate losses of about 10% for an increase in 1/16" and about 20% for an increase of 1/8".

[1]Replicate sampling is used to describe a series of samples taken from the same port over a certain time period.

The small scale variations in immediate losses, over geographic locations, may be related to biological factors such as size specific distributions as a function of the substrate or other physical parameters. The fishing and/or natural mortalities in the stock probably are not the cause of size specific distributions since tagging studies (Maynard and Chiasson, 1986) in the 7B1 area show that lobsters are capable of moving over distances of this magnitude i.e. from one fishing area to another. Variations may also be caused by port specific types of gear and fishing strategy.

## ACKNOWLEGMENTS

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## REFERENCES

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Table 1. Estimates of percentages of immediate weight loss with the minimum carapace size increased by 1/16" or 1/8", with 95% confidence limits.

| Location | Number of replicates | Number of lobsters measured | Percent weight losses ± 95% confidence limits | |
|---|---|---|---|---|
| | | | 1/16" increase | 1/8" increase |
| Arisaig | 2 | 778 | 5.65 ± 4.29 | 15.73 ± 23.49 |
| Beach Point | 5 | 866 | 10.70 ± 3.88 | 24.02 ± 5.86 |
| Ballantynes Cove | 5 | 433 | 14.92 ± 12.98 | 23.78 ± 12.26 |
| Cheticamp | 2 | 889 | 9.08 ± 10.61 | 21.05 ± 5.43 |
| Caribou | 7 | 2107 | 6.48 ± 3.05 | 16.50 ± 8.31 |
| Livingstone Cove | 2 | 542 | 9.02 ± 25.82 | 19.76 ± 43.44 |
| Lismore | 7 | 2197 | 10.36 ± 2.10 | 23.52 ± 4.33 |
| Pugwash | 3 | 1347 | 4.23 ± 6.60 | 11.95 ± 15.77 |
| Toney River | 3 | 513 | 9.92 ± 5.87 | 22.30 ± 4.91 |
| Wallace | 2 | 834 | 5.04 ± 5.43 | 10.69 ± 17.67 |
| Souris | 1 | 150 | 9.32 | 32.74 |
| Bayfield | 1 | 377 | 4.98 | 13.51 |

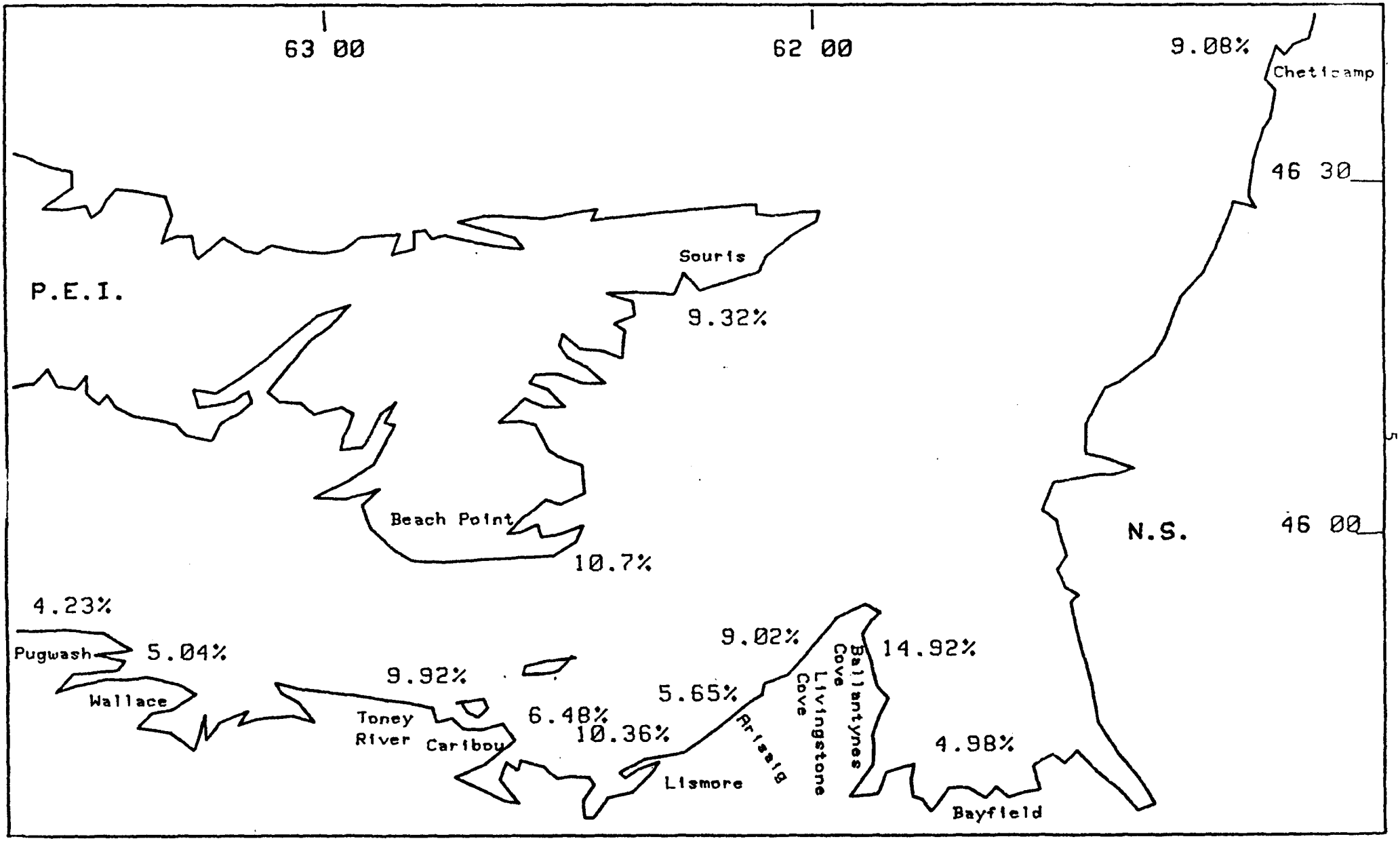


Figure 1. Estimates of immediate losses of percent of landed lobster weight, with a legal carapace size increase of 1/16" (1.59 mm), taking the minimum size up to 2 9/16" (65.09 mm). Percentages as calculated from 1984 sea samples conducted from each port shown.

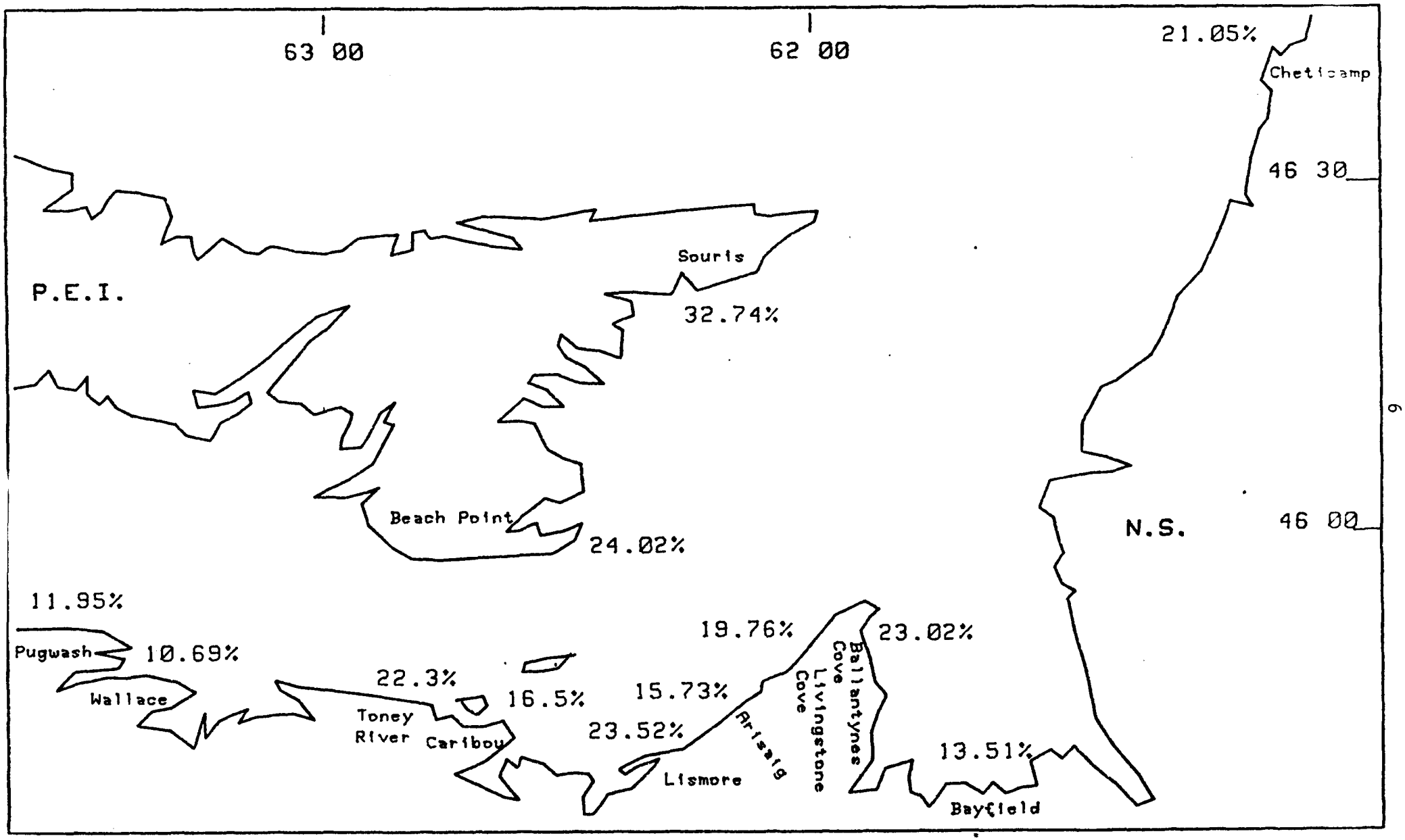


Figure 2. Estimates of immediate losses of percent of landed lobster weight, with a legal carapace size increase of 1/8" (3.17 mm), taking the minimum size up to 2 5/8" (66.67 mm). Percentages as calculated from 1984 sea samples conducted from each port shown.