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Review of the Cape Breton
Area 7 Snow Crab (Chionoecetes opilio) Fishery
in 1983

by

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ABSTRACT

The fishery in 1983 started in mid-August, after preseason sampling to determine if the abundance of soft shelled crabs was tolerable. Fishermen log records represent landings of 723 t, which is 88% of the official 822 t total landings. The Leslie analysis of catch and effort data estimated an exploitation rate of 45.7%.

RÉSUMÉ

La saison de pêche de 1983 débuta à la mi-août, après un échantillonnage visant à déterminer si l'abondance de crabe à carapace molle était suffisamment faible. La couverture des journaux de pêche remplis par les pêcheurs était de 88% des débarquements totaux, soit 723 t sur un total officiel de 822 t. Le taux d'exploitation estimé par l'analyse de Leslie est de 45.7%.

INTRODUCTION

The Cape Breton area 7 inshore fishery started as a supplementary fishery in 1979. There are approximately 25 licenced boats presently fishing the area with an individual quota of 80 000 pounds. A TAC of 519 t based on historical catch was advised by CAFSAC in 1981 (Adv. doc. 81/1). Opening the season in the fall has been a successful mean of avoiding soft-shelled crab in the last fishing season.

In the past, biomass estimates using the Leslie regression were rendered impractical because of the lack of information from the offshore fleet fishing area 7 and the generally stable CPUE during the season (Bailey and Cormier, 1983; Elner and Robichaud, 1981; Elner and Robichaud, 1980).

The following is an updated review of the area 7 fishery for 1983.

MATERIALS AND METHODS

Weekly catch, effort, CPUE and distribution of fishing effort were derived from fishermen log records. The Leslie analysis of catch and effort data was performed according to Ricker (1975).

Port samples of landed catch were taken in August and September. The carapace width of each individual was measured to the nearest mm.

RESULTS AND DISCUSSION

Weekly catch, effort and CPUE are presented in table 1. In 1983, a total of 822 t was officially landed in area 7. The catch reported in the logs was 723 t which is 88% of the total landings. In 1983, weekly CPUE were somewhat lower than in 1982 but followed a similar trend as observed in previous years (Figure 1). Most of the fishing effort was concentrated south-west of the boundary line between area 1 and 7 (Figure 2) at depths of 55-65 meters.

Length frequency distributions for 1982 and 1983 are presented in figure 3a and 3b. Two modes at 105-110 mm and 120-125 mm are present in August of both years. Only the mode at 120-125 mm remains evident in September. These modes may represent molt classes. From August to September, there may be a greater reduction in abundance of the smaller molt class (by migration or another reason), or a continued recruitment to the larger molt class (larger crabs molting later). This could be a good area for research into migration and/or molting processes in snow crab.

In 1983, periodical sea sampling was conducted to determine when the incidence of soft-shelled crab was low enough to open the fishing season. This suggests that recruitment was probably still entering the fishery at the start of the season. In addition to the fact that it takes a few trips before fishermen find adequate spots to fish, it could partly explain why CPUE has a tendency to increase during the first few weeks of the fishery (Figure 4).

Therefore, the first three weeks of the fishery were not included when attempting to estimate initial biomass using Leslie's analysis. The initial biomass present on the fourth week was estimated at 1 317 t (963-2 513 t) (Figure 5). Adding the amounts landed during the previous three weeks to this initial biomass, a total landing of 723 t would represent an exploitation rate of 45.7% (26.0-58.9%) on a total biomass of 1 577 t.

Referring to figures 6a to 6j, it can be observed that fishing effort is scattered in several squares at the start of the season and is gradually concentrated in a few key squares. This could be a possible source of bias on the Leslie analysis. Therefore, a Leslie analysis was attempted using the squares where effort was greater than 10% of the total (Figure 2). CPUE for the first three weeks of the season followed a similar trend as for the complete data set (Figure 4). The Leslie analysis was thus again performed omitting the first three weeks. The initial biomass was estimated at 1 007 t (757-1 705 t). Correcting for the amounts landed during the previous three weeks, a total landing for these squares of 522 t represents an exploitation rate of 43.6% (27.6-55.2%) (Figure 7), which is close to the estimated rate for the total area.

CONCLUSION

During the 1983 fall season of area 7, the Gulf based offshore fleet was not operating. Therefore, the data from the Cape Breton inshore fleet represent the total fishing activities in the area. Leslie's regression was found practical and used to estimate the fishable biomass at the start of the season.

Using all the data or those from selected squares for the Leslie analysis did not make any wide differences in the estimation of the exploitation rate (45.7% and 43.6%). In this case, the Leslie analysis seems to be very robust to a possible bias due to a migratory behavior of fishermen on the fishing ground.

REFERENCES

Bailey, R. and R. Cormier, 1983. Review of Snow Crab Resources in Western Cape Breton (area 1 and 7) for 1982. CAFSAC Res. Doc. 83/55.

CAFSAC 1982. Advice on some invertebrate and marine plant stocks (CAFSAC Advisory Document 81/1), in CAFSAC Annual Report, Volume 4, 1981: 33-38 p.

Elner, R.W. and D.A. Robichaud, 1980. Analysis of the Cape Breton Snow Crab Fishery, 1979. CAFSAC Res. Doc. 80/55.

Elner, R.W. and D.A. Robichaud, 1981. Assessment of the Cape Breton Inshore Fishery for Snow Crab 1980. CAFSC Res. Doc. 81/40.

Ricker, W.E., 1975. Computation and Interpretation of Biological Statistics of Fish Populations. Bull. Fish. Res. Board Can. 191: 382 p.

Table 1. Catch and effort statistics from log books for Cape Breton area 7 for 1983.

WEEK	DATES	NUMBER OF TRAP HAULS	CATCH (kg)	CATCH PER UNIT EFFORT (kg/trap haul)			
				Soak days			Total
				1	2	3	
5	Aug. 12-18	1 826	75 562	40.9	71.5	0.0	41.4
6	Aug. 19-25	1 814	64 078	35.9	26.7	30.5	35.3
7	Aug. 26 - Sept. 1	2 686	120 350	43.8	48.4	44.2	44.8
8	Sept. 2-8	2 733	136 349	43.1	57.7	54.4	49.9
9	Sept. 9-15	2 670	129 499	43.5	57.4	67.1	48.5
10	Sept. 16-22	2 567	107 164	38.1	49.1	92.3	41.7
11	Sept. 23-29	894	38 991	36.7	46.1	49.5	43.6
12	Sept. 30 - Oct. 6	651	21 982	27.0	33.7	29.1	33.8
13	Oct. 7-13	615	21 990	27.8	0.0	47.5	35.8
14	Oct. 14-20	187	6 366	25.0	39.3	31.8	34.0
16	Oct. 28 - Nov. 3	26	867	0.0	0.0	0.0	33.4
TOTAL		16 669	723 197	40.2	51.0	47.4	43.4

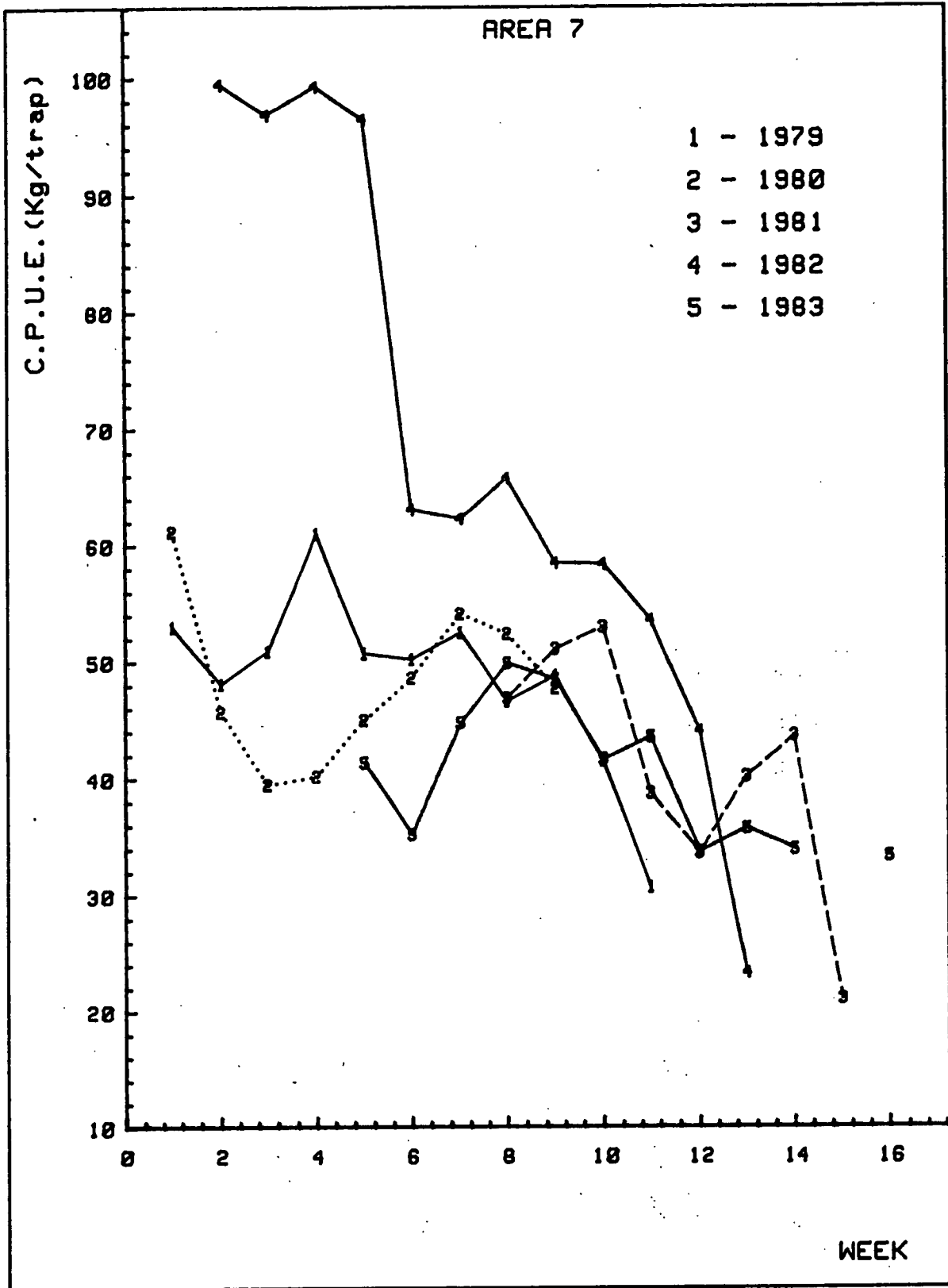


Figure 1. Catch per unit of effort (Kg/trap haul) trends for the past 5 years (Elner & Robichaud, 1980; Elner & Robichaud, 1981; Bailey & Cormier, 1983). The first week starts on July 15.

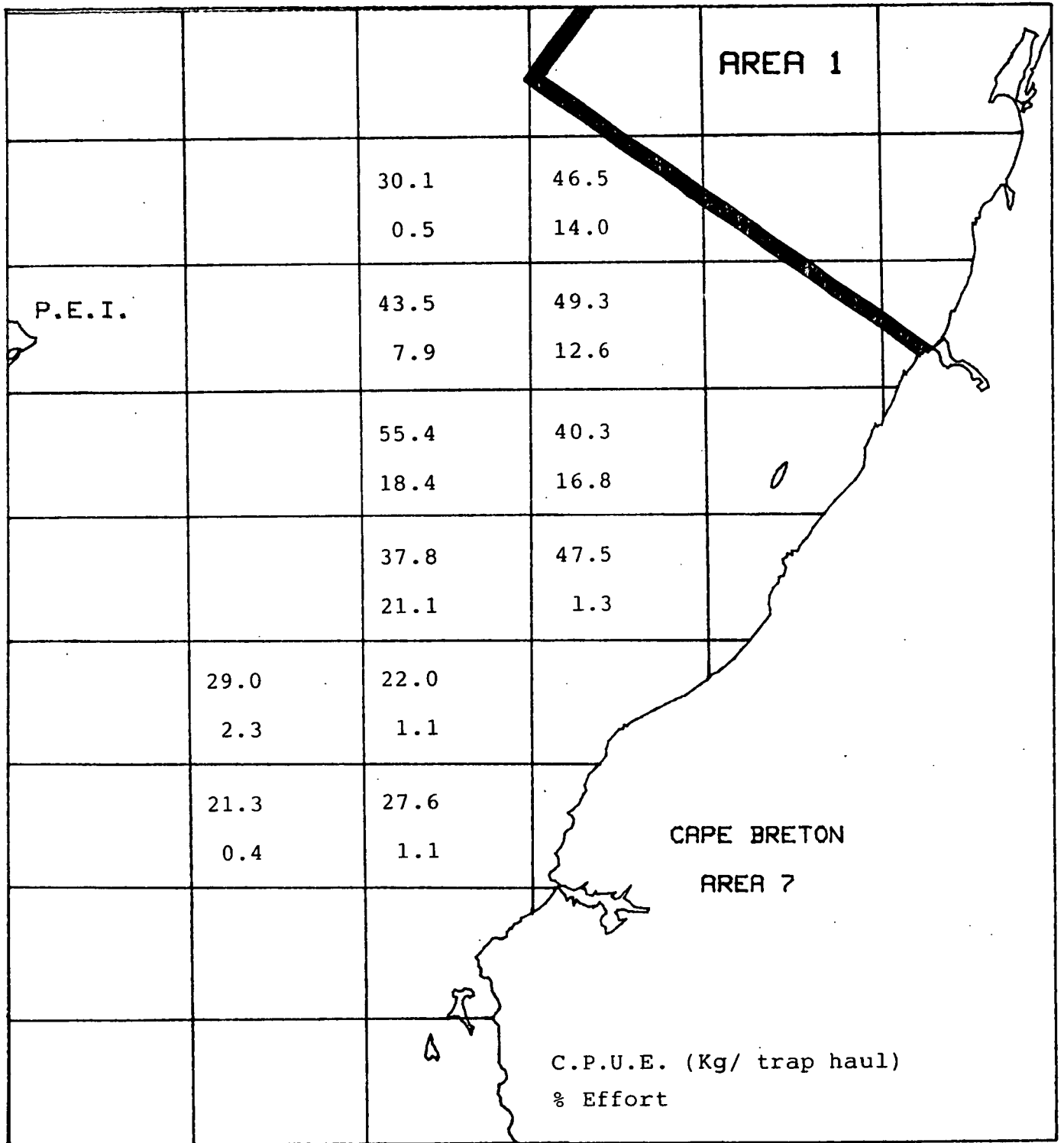


Figure 2. Distribution of fishing effort in area 7 - 1983.

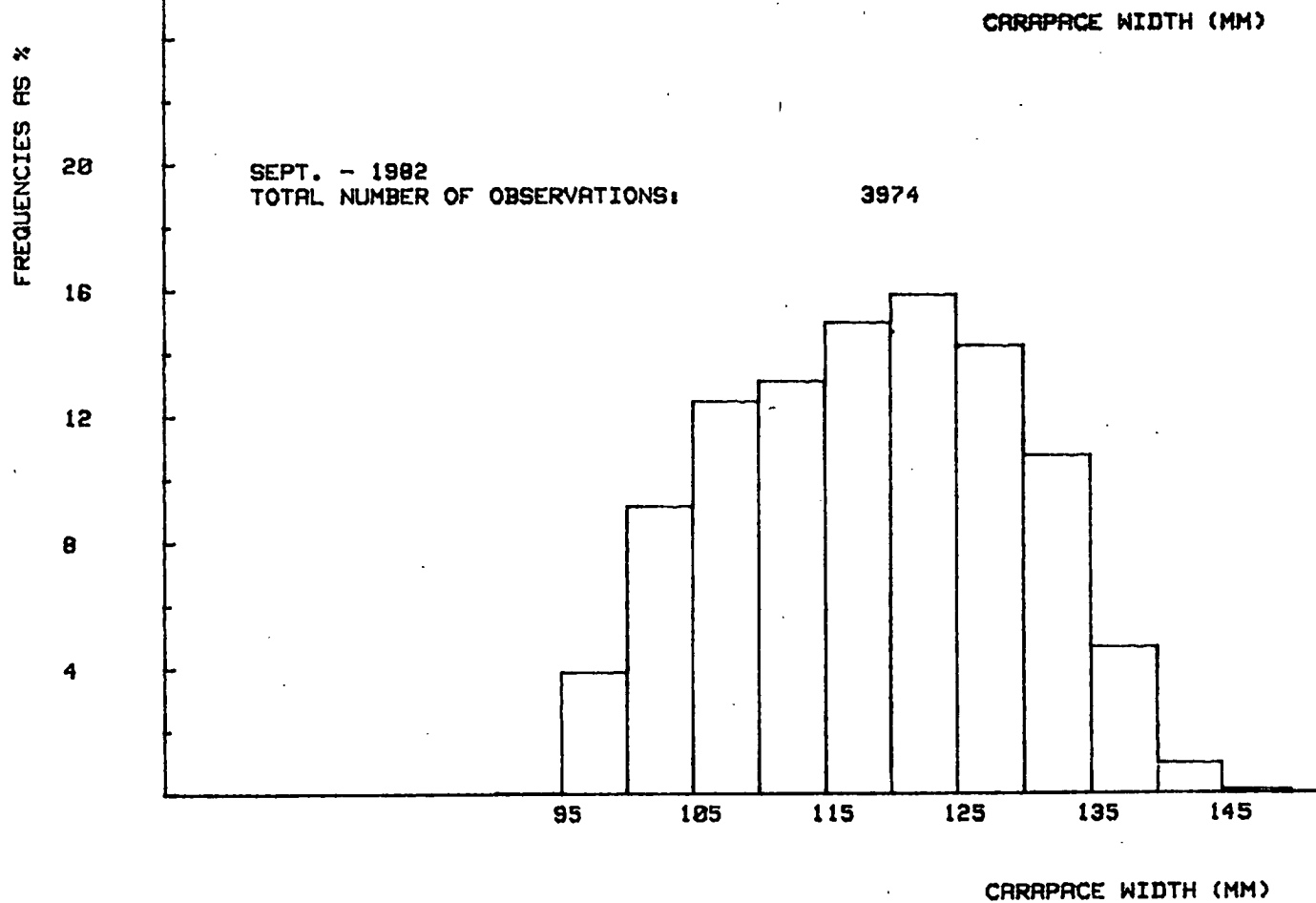
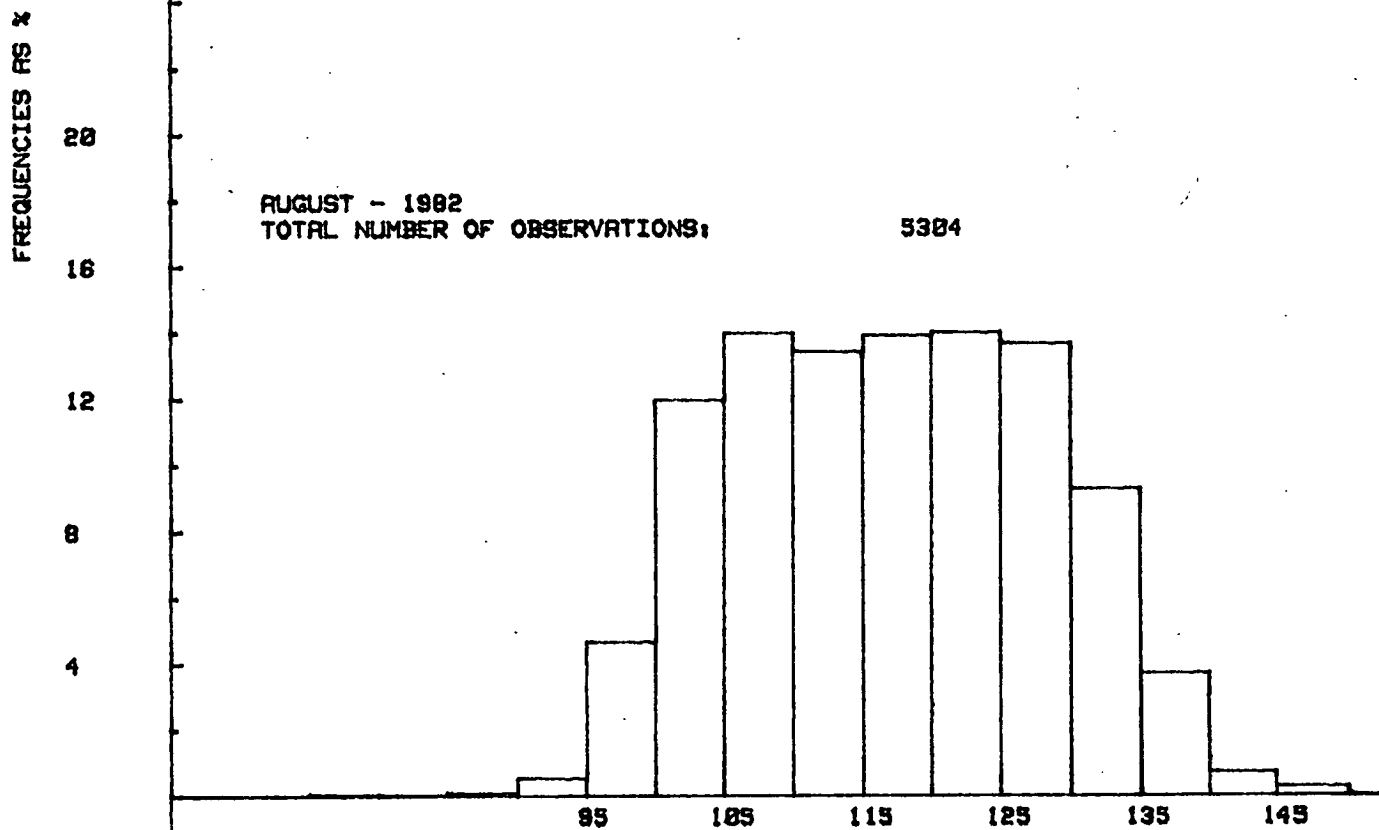


Figure 3a. Size frequency distributions for 1982 in Cape Breton area 7.

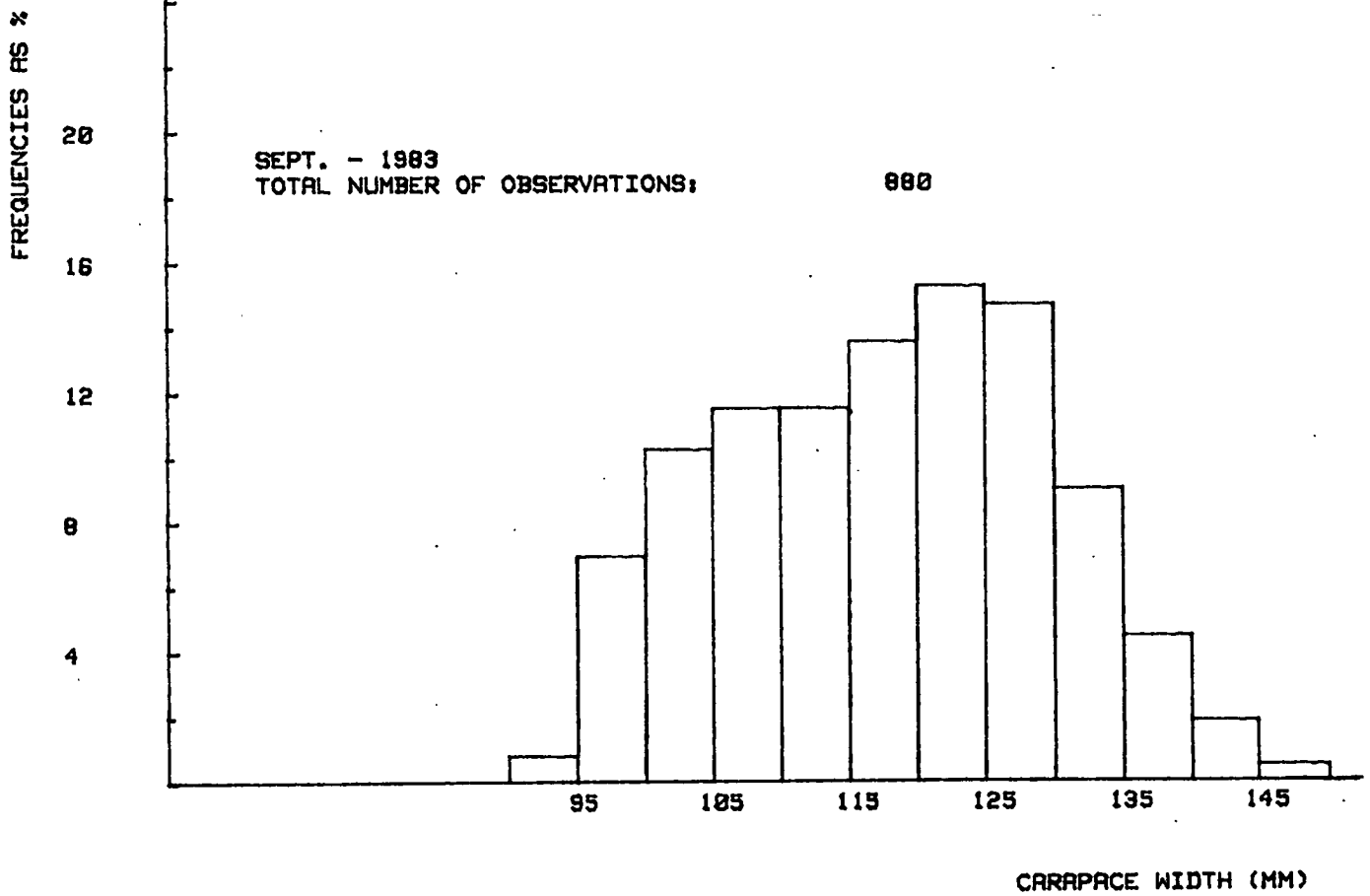
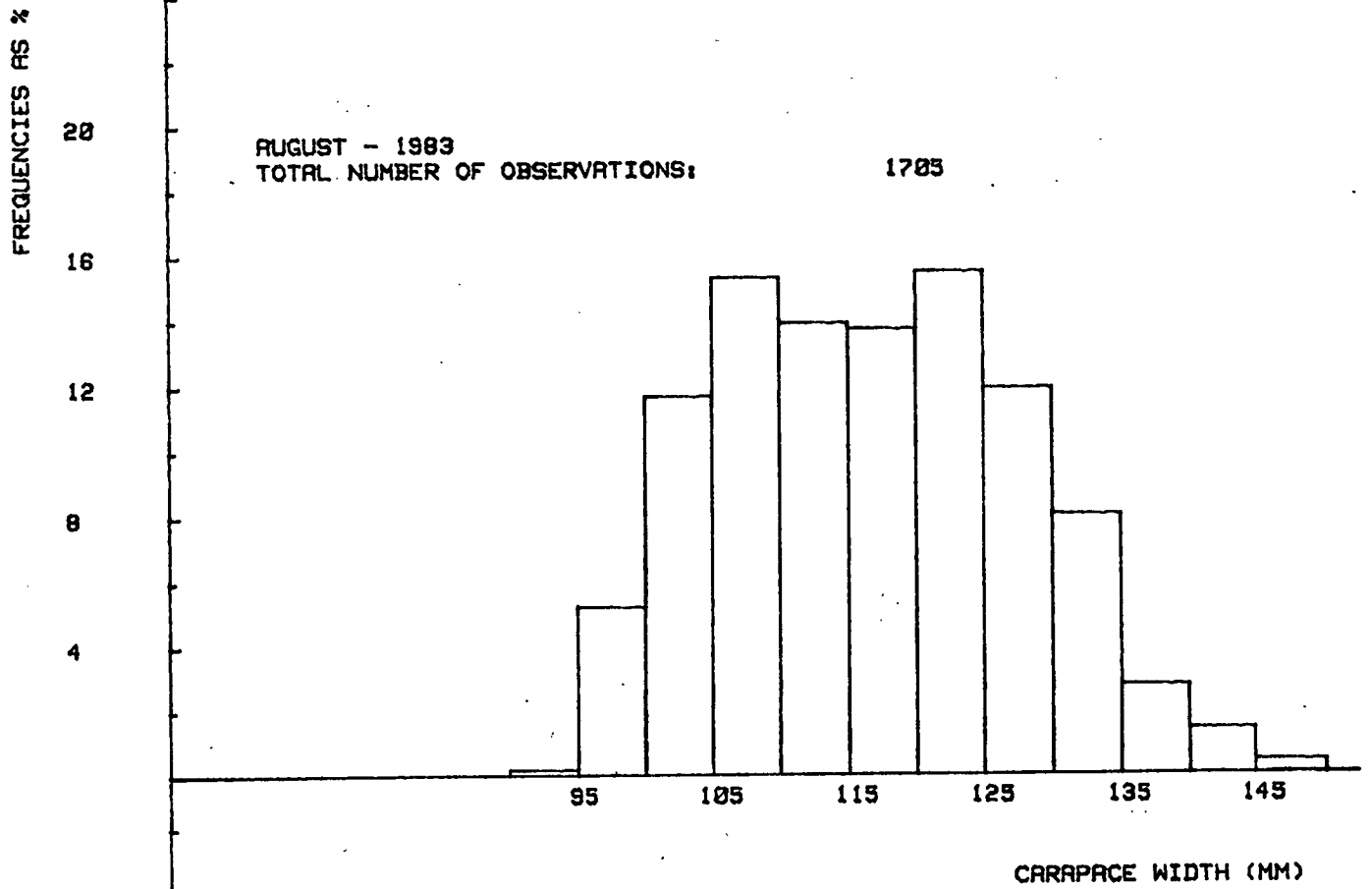


Figure 3b. Size frequency distributions for 1983 in Cape Breton area 7.

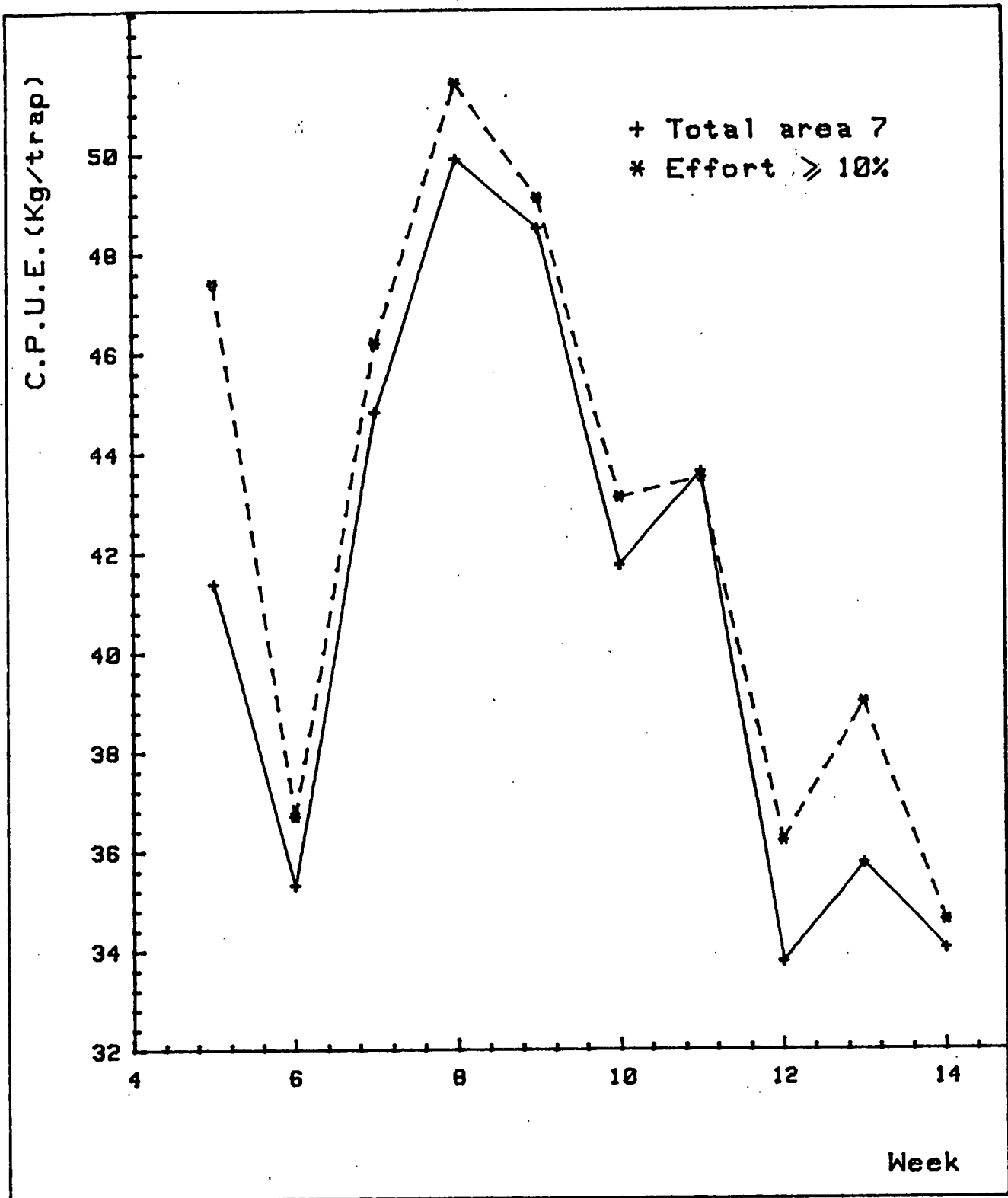


Figure 4. Catch per unit of effort (Kg/trap haul) trends for the total of area 7 and the squares with effort greater or equal to 10% of the total.

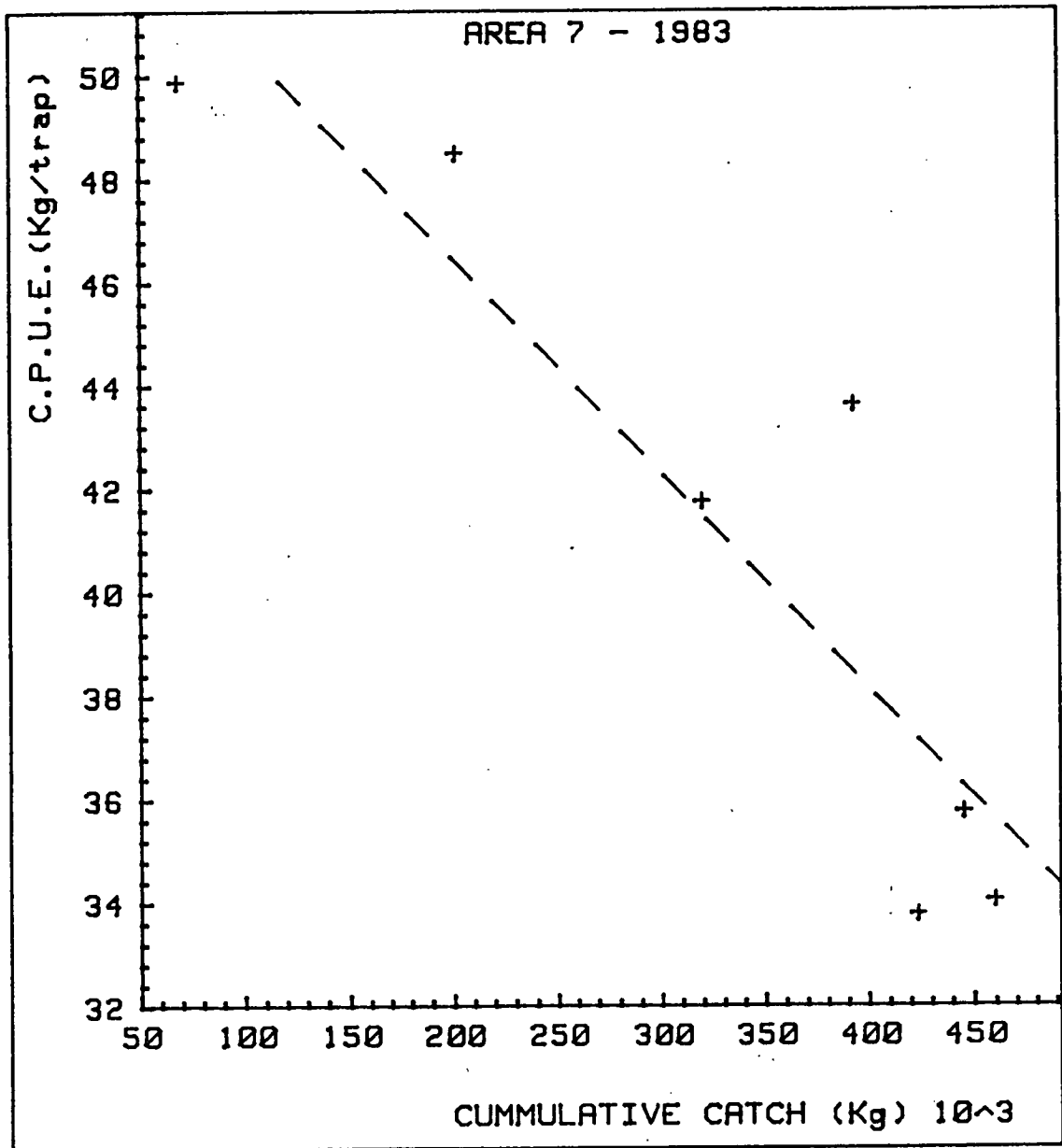


Figure 5. Leslie's regression for area 7

Initial biomass: 1317t (963-2513t)

Corr.Coefficient $r = -.90$

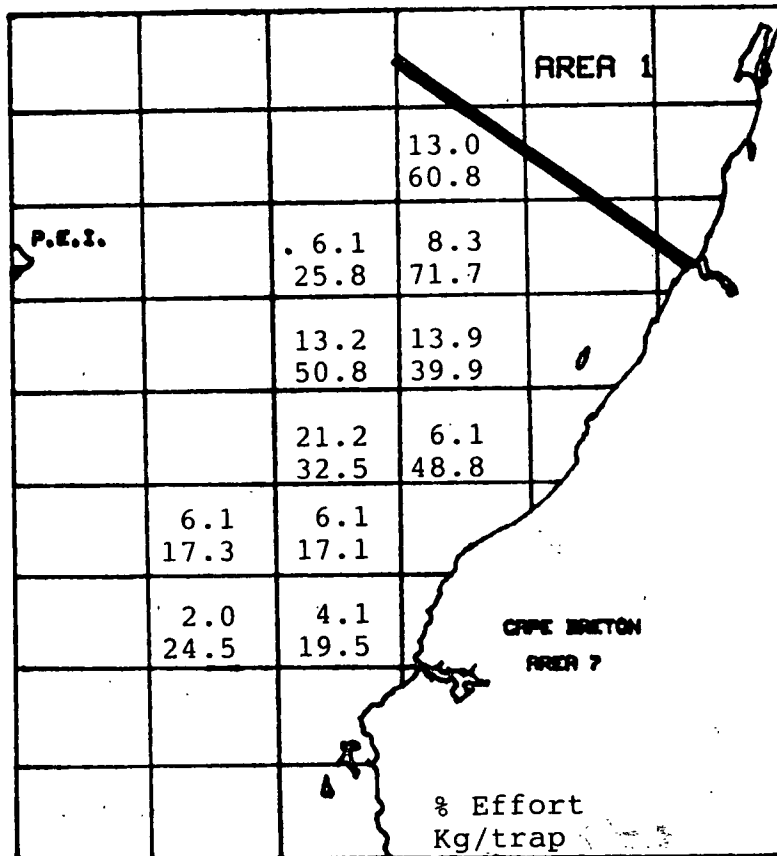


Figure 6a. Distribution of effort for the week of August 12-18.

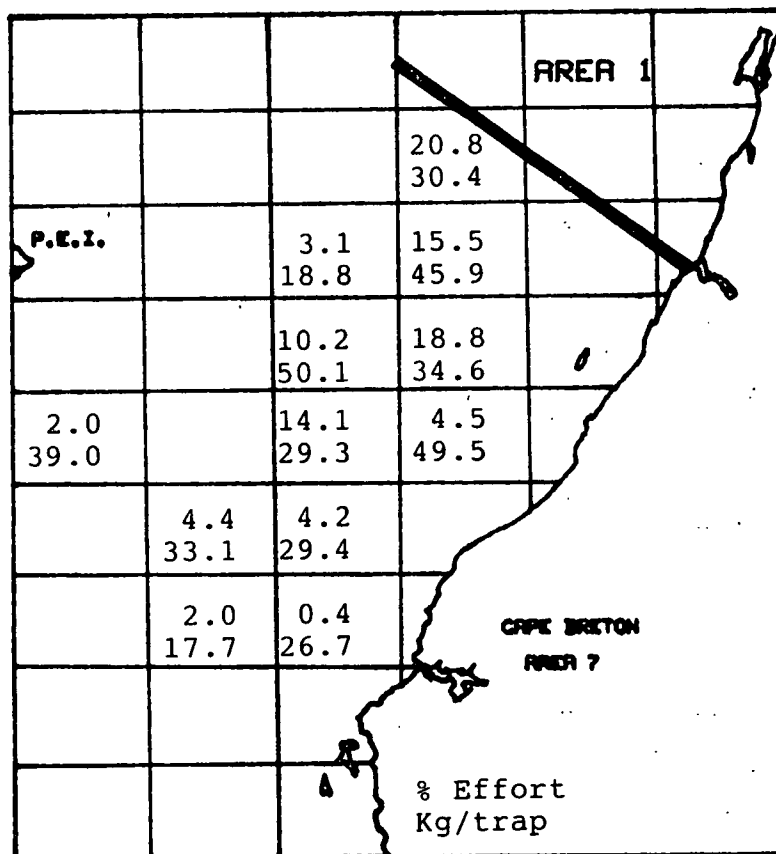


Figure 6b. Distribution of effort for the week of August 19-25.

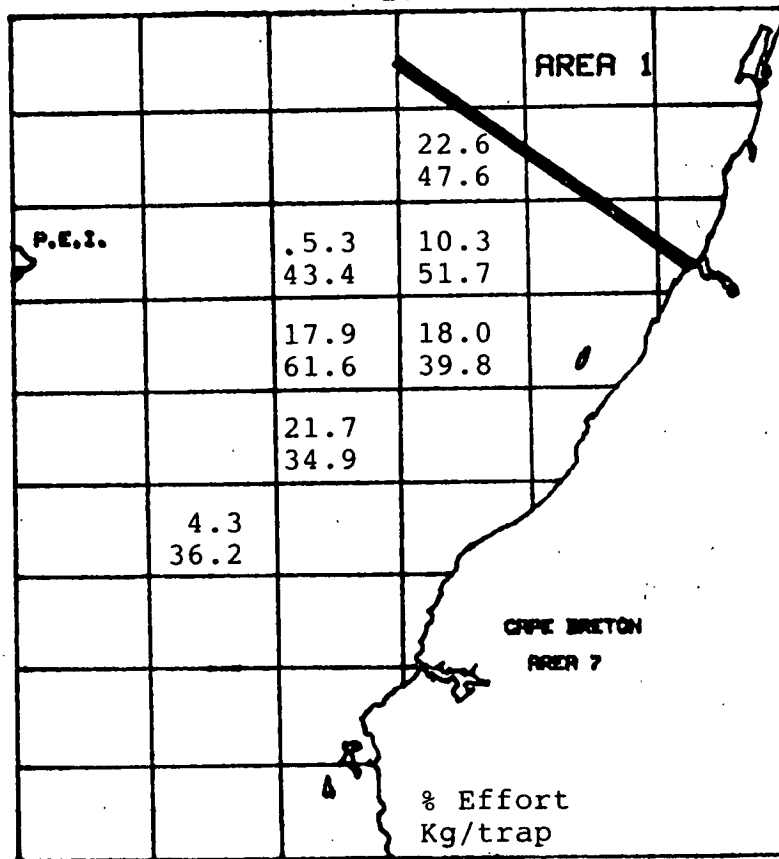


Figure 6c. Distribution of effort for the week of Aug. 26-Sept. 1.

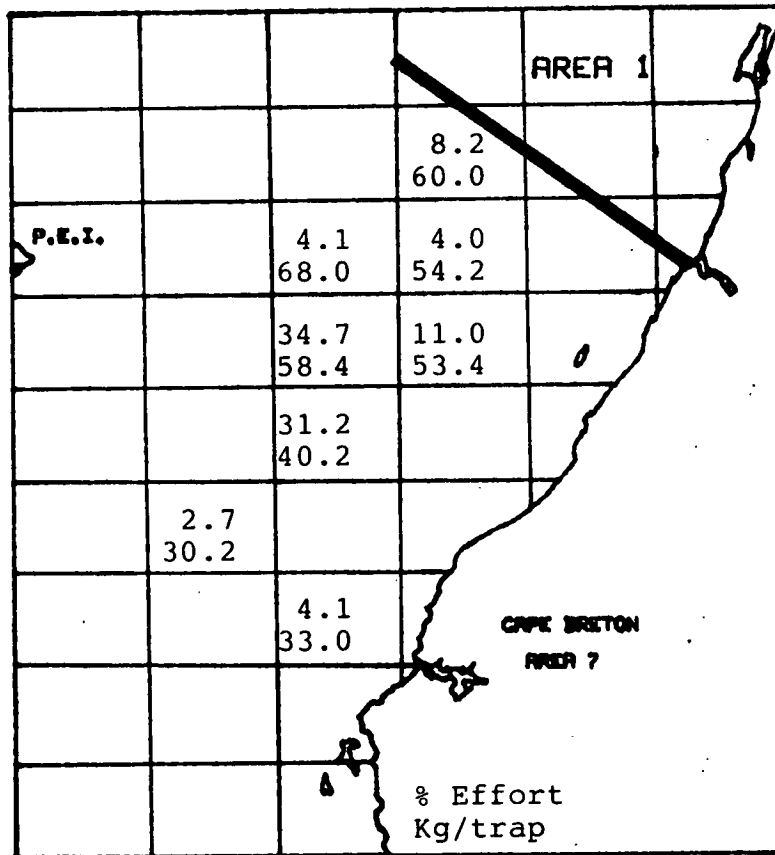


Figure 6d. Distribution of effort for the week of Sept. 2-8.

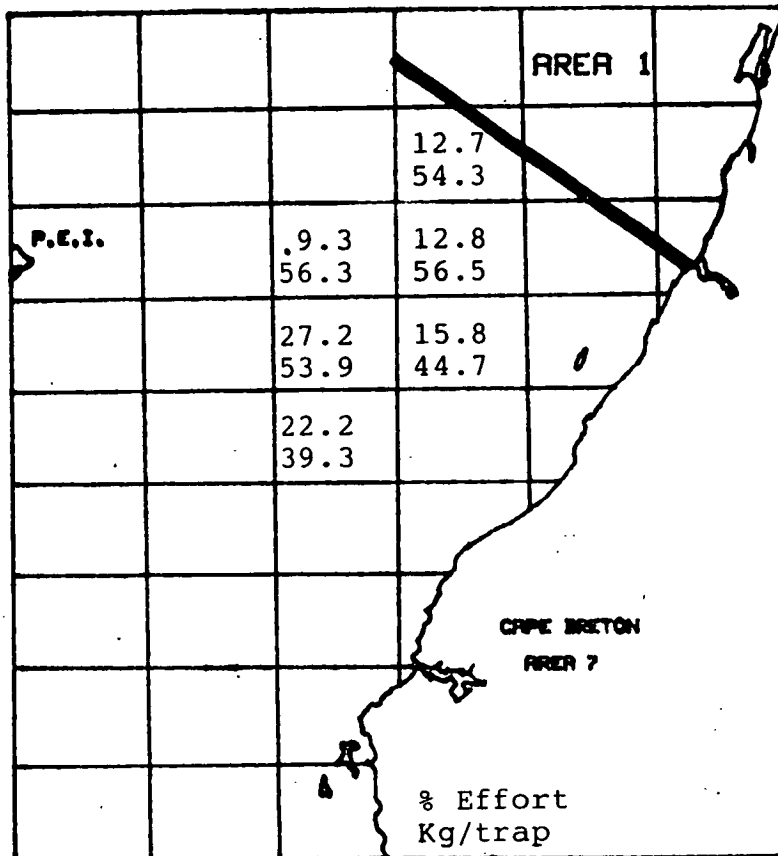


Figure 6e. Distribution of effort for the week of Sept. 9-15.

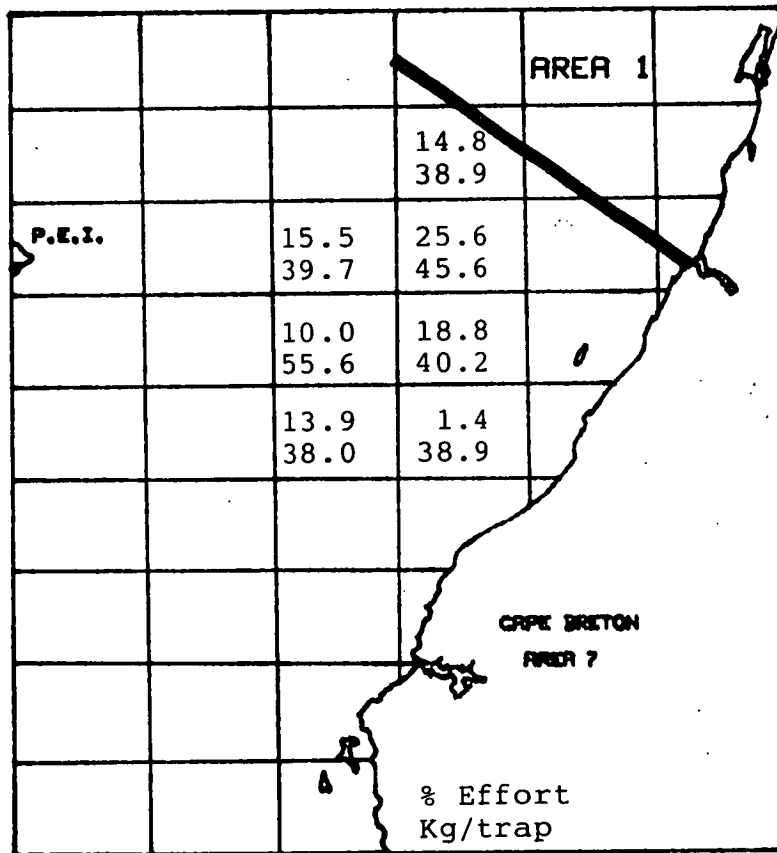


Figure 6f. Distribution of effort for the week of Sept. 16-22.

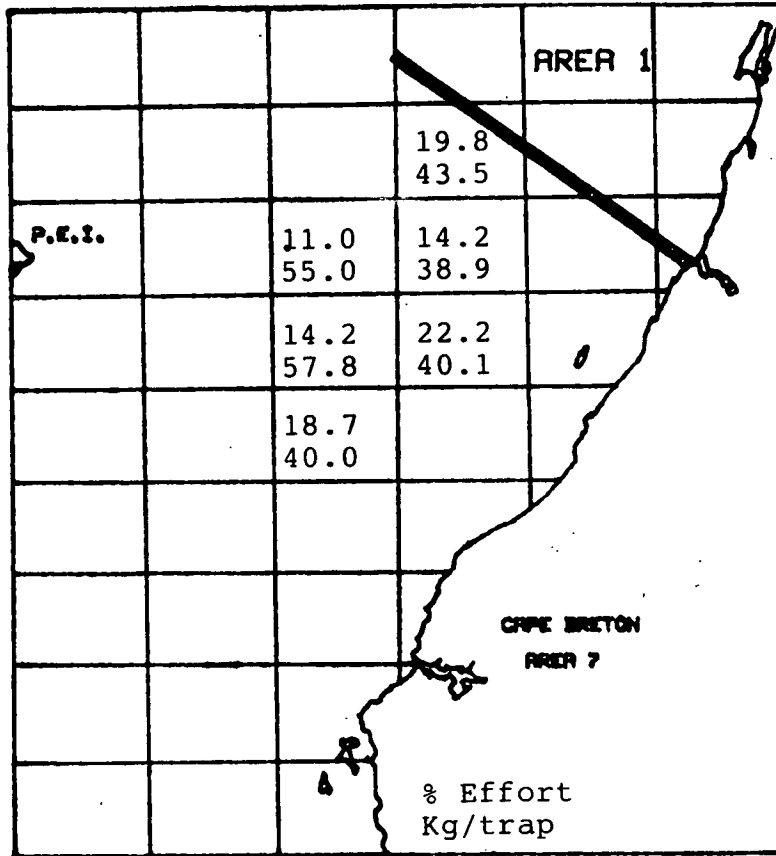


Figure 6g. Distribution of effort for the week of Sept. 23-29.

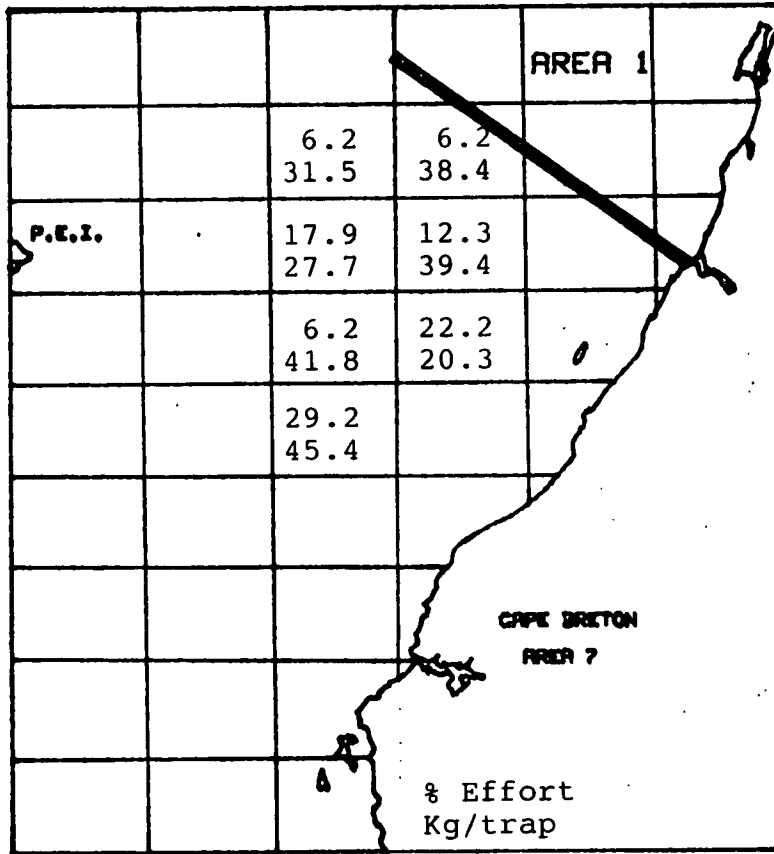


Figure 6h. Distribution of effort for the week of Sept. 30-Oct. 6.

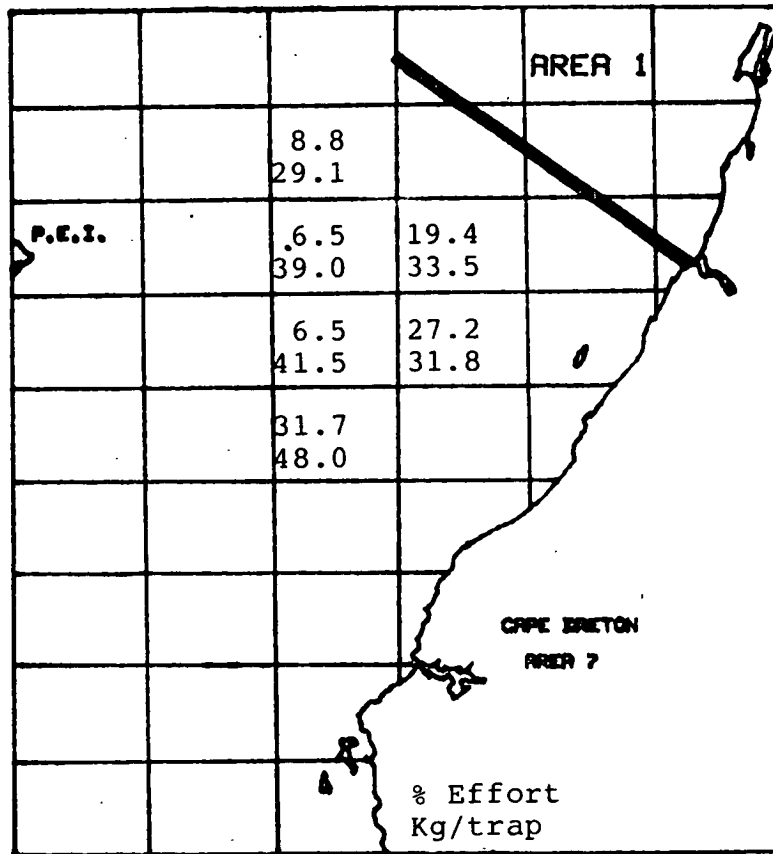


Figure 6i. Distribution of effort for the week of Oct. 7-13.

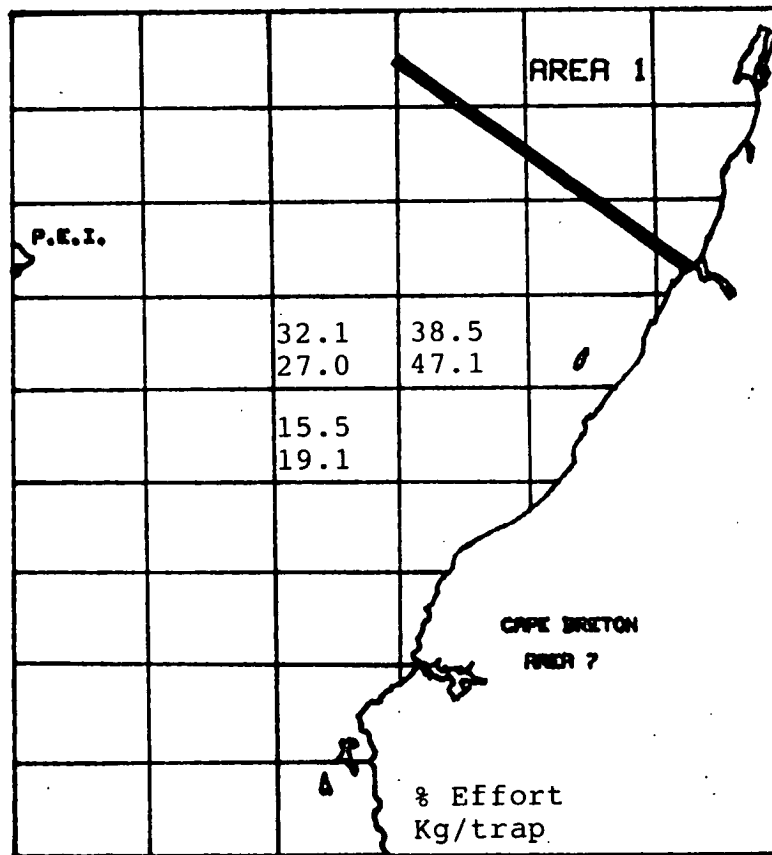


Figure 6j. Distribution of effort for the week of Oct. 14-20.

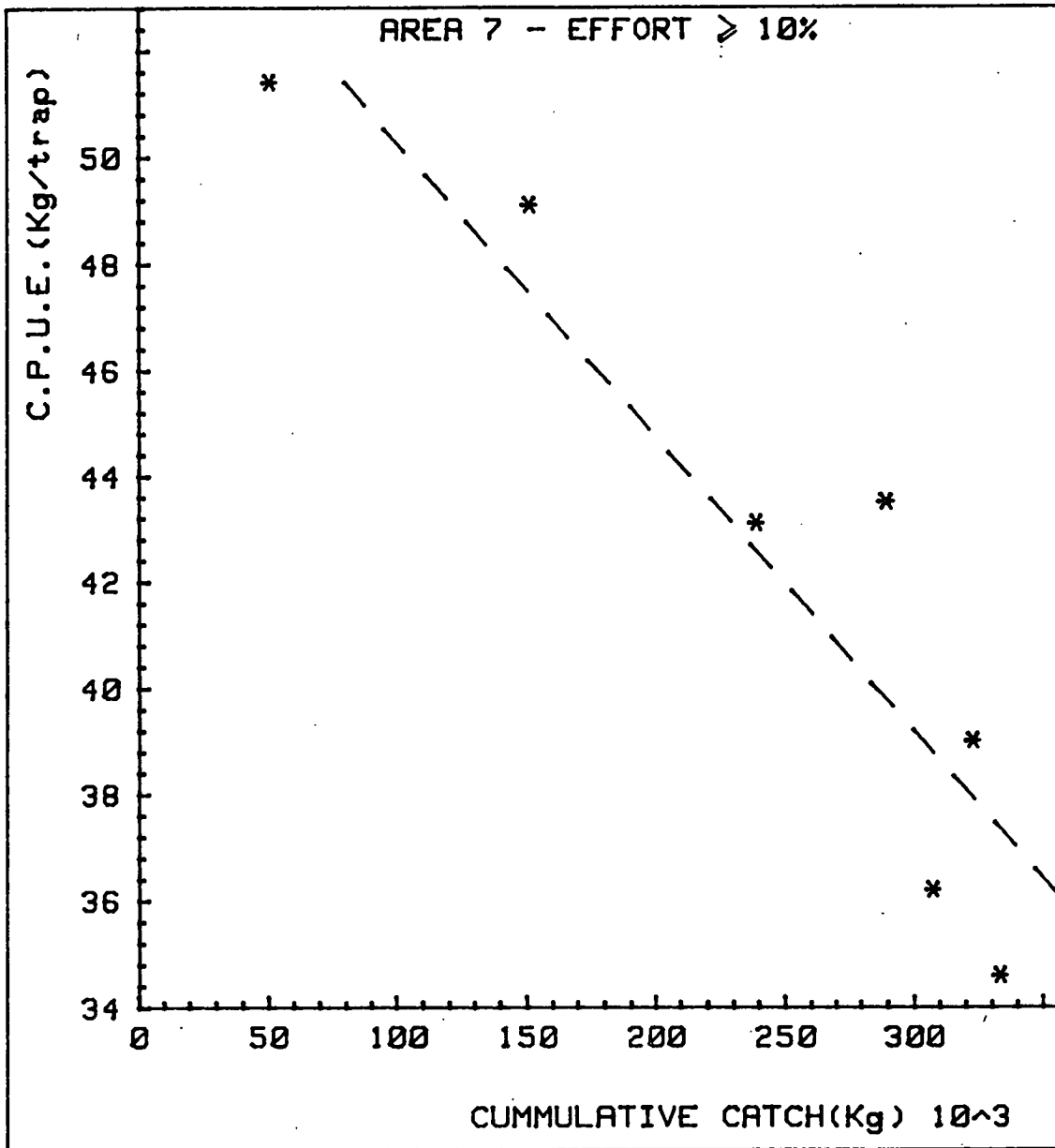


Figure 7. Leslie's regression using the squares where 10% and more of the total effort is found.

Initial biomass: 1007t (757-1705t)
Corr.Coefficient $r=-0.92$