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SAITHE TAGGING EXPERIMENTS ON THE NORWEGIAN COAST BETWEEN
62°N AND 67°N, 1971 - 74

by

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INTRODUCTION

From 1971 to 1974, 5222 saithe were tagged and released on the Norwegian coast between 62°N and 67°N. Previously, Sund (1925) had tagged 1000 saithe in summer 1921 at about 67°N. Both northward and southward migration was recorded, but only 12 recaptures were reported outside the tagging area. Saithe tagging experiments between 62°N and 63°30'N in the period 1954 - 1958 have been reported (Olsen 1959, Anon. 1965) indicating a basically northward trend in the migration pattern.

Reinsch (1969) tagged 56 saithe caught in trawl on the spawning grounds off the Norwegian coast between 62°N and 65°N from 1964 to 1968. The eight recaptures indicated that the migration basically was towards the southwest.

Results of the single experiment in 1971 have previously been reported in Jakobsen (1976a) which also includes the two experiments in 1972, one of which (20 June) also was presented in Jakobsen (1975). The experiments in 1973 were presented in Jakobsen (1976b). Subsequent recaptures from these experiments have not added much new information. Therefore, only results of the experiments in 1974 which were extended to cover also the coast north of 65°N, are presented in detail, whereas the results of the older experiments are included in summarizing the results up to 1976.

MATERIAL AND METHODS

In 1971, 499 saithe were tagged in one experiment, in 1972, 1100 saithe were tagged in two experiments in 1973, 1200 saithe were tagged in two experiments, and in 1974, 2423 saithe were tagged in four experiments. Hydrostatical tags of Lea's type were used, fastened to the fish with a nylon gut in front of the anterior dorsal fin. Details about each experiment are given in Table 1.

Table 1. Saithe tagging experiments on the Norwegian coast between 62°N and 67°N 1971 - 1974.

Date	Position	No. released	Size range (cm)	Recaptures						Tot.
				1971	1972	1973	1974	1975	1976	
1.6.71	N 63°13' E 07°36'	499	29-40	16	9	10	4	-	-	39
20.6.72	N 62°28' E 06°10'	600	27-42		39	17	8	-	1	65
21.6.72	N 63°05' E 07°30'	500	30-45		37	14	9	3	-	63
5.6.73	N 63°31' E 07°59'	600	32-51			143	27	6	1	177
4.6.73	N 64°20' E 10°26'	600	36-52			45	25	10	2	82
30.5.74	N 63°31' E 07°59'	600	29-47				101	26	2	129
4.6.74	N 64°20' E 10°28'	600	29-59				94	26	4	124
6.6.74	N 66°13' E 12°12'	600	33-58				25	43	8	76
6.6.74	N 66°52' E 13°43'	623	39-54				71	31	7	109

In all cases, the tagging was carried out in May or June. Nearly all the tagged saithe were of the age groups 2 - 4 years. Generally, the fish were on the average larger and older in the northernmost experiments. The saithe had been caught with purse seine and kept alive in a net for a period from a couple of days to a couple of weeks. The net had usually been towed from the fishing ground to a more sheltered area. Long towing and storage may have resulted in poor condition of the fish and are probably the chief reasons for relatively low recovery-rates in some of the experiments.

The data comprise all recaptures up to 1976. In all, 662 recaptures have been reported. In 55 (8.3 per cent) of the cases, the position of the recapture was not, or inadequately, reported and these recaptures are not included in the charts.

RESULTS AND DISCUSSION

Figs. 1 - 4 show the recaptures from the experiments in 1974. In the southernmost experiment (Fig. 1), there is a clear tendency that the migration is predominantly to the south, whereas the percentage of recaptures made north of the tagging locality increases as the experiments are moved northwards along the coast. In all four experiments, recaptures in the North Sea made up a large part of those that were reported south of the tagging locality.

The variation in migration pattern with latitude on this part of the coast is seen clearly on Figs. 5 - 7 where all the experiments in 1971 - 1974 are summarized according to their latitude. Thus, from the experiments between 62°N and 64°N , of all recaptures outside the area, 83.1 per cent had migrated to the south (Fig. 5), from the experiments between 64°N and 65°N , 59.2 per cent had migrated to the south (Fig. 6), and from the experiments between 66°N and 67°N , 43.2 per cent had migrated to the south (Fig. 7). Most saithe in Norwegian waters reach sexual maturity at 5 or 6 years of age (Reinsch 1976) and the fish recaptured from these experiments so far are therefore predominantly still immature. Although the three charts are not directly comparable because they cover varying numbers of years, they demonstrate the basic trends in the migration pattern of young saithe on this part of the Norwegian coast.

Olsen (1959) found on the basis of tagging experiments between 62°N and $63^{\circ}30'\text{N}$ in 1954 - 1958, that the migration was predominantly to the north. Although exploitation of saithe in the North Sea has increased considerably since then and obviously has increased the number of recaptures from that area, this does not explain the low number of recaptures north of the tagging area in the latest experiments and there is little doubt that there has been a change in the migration pattern from that area during the last 20 years.

The recaptures from the northernmost experiments (Fig. 7) are on the other hand in good accordance with the results of Sund (1925) in 1921.

On Fig. 8 all recaptures up to 1976 from the experiments in 1971 - 1974 are charted. The saithe in this area are generally considered as belonging to the North East Arctic stock of saithe, i.e. saithe along the Norwegian coast north of 62°N . However, there is obviously a substantial migration to the North Sea, increasing southwards along the coast. The experiments indicate that the latitude on the Norwegian coast where migration to the south equals migration to the north is located somewhere near 65°N . However, not all of the saithe migrating southwards from this latitude necessarily migrate beyond 62°N and even in the experiments in the southernmost part of the area, most of the saithe are still recaptured north of 62°N .

Two recaptures from Iceland and ten from Faroe were reported. The migration to Iceland seems negligible. Recaptures at Faroe amounted to only 13 per cent compared to the recaptures in the North Sea, but the Faroe stock is considerably smaller and the immigration of saithe from Norwegian waters may still be of some significance to the Faroe stock.

Unfortunately, the experiments give little information about the migration of spawning saithe and more detailed knowledge about the recruitment to and exchange of individuals between the different spawning stocks is necessary in order to define the saithe populations properly. For this purpose, tagging experiments with older saithe in different areas are needed, but the problems involved in obtaining sufficient numbers of live saithe from deeper waters have so far prevented large-scale experiments of this type in Norwegian waters.

SUMMARY

In 1971 - 1974, 5222 young saithe were tagged in 8 experiments on the Norwegian coast between 62°N and 67°N . The results show an increasing tendency of a southward migration as the experiments are moved to the south. A 50 - 50 per cent distribution of recaptures north and south of the tagging area seems normally to occur in experiments at about 65°N . There

is apparently a change in migration pattern since the mid - 1950ies when recaptures indicated a basically northward migration also from areas at around 63°N.

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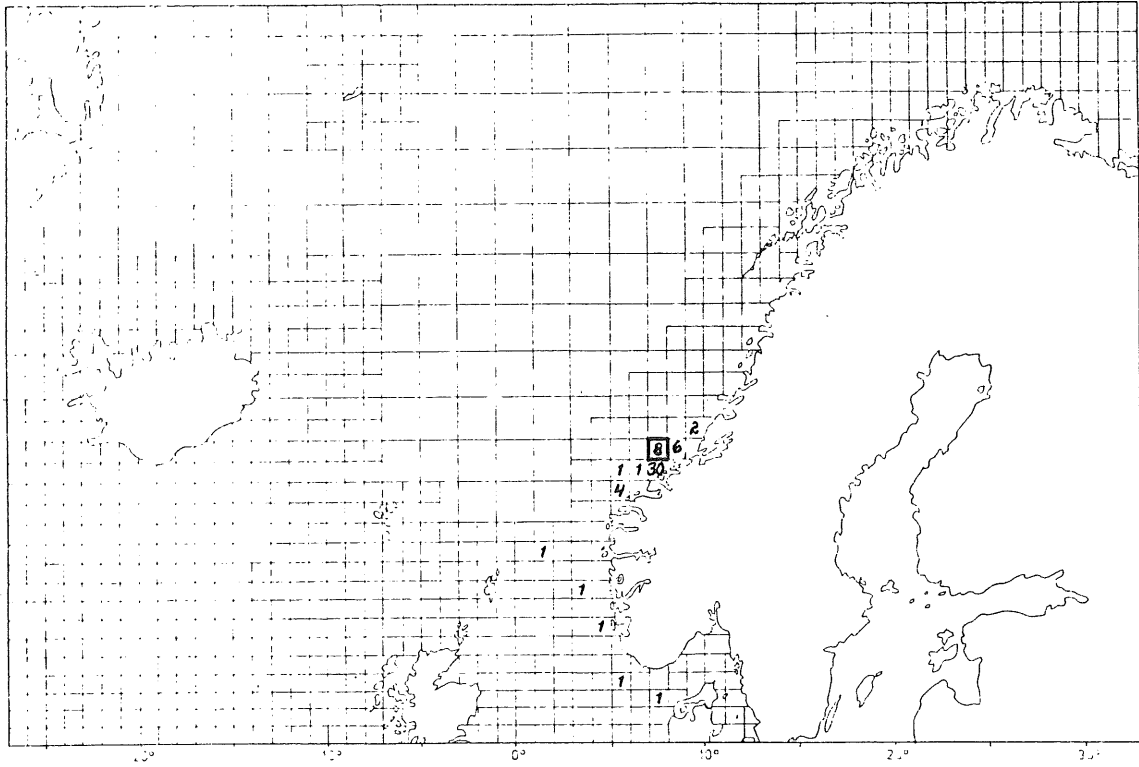


Fig. 1. Saithe tagging experiment 30 May 1974. 600 fish released inside the outlined area. Recaptures 1974 - 1976.

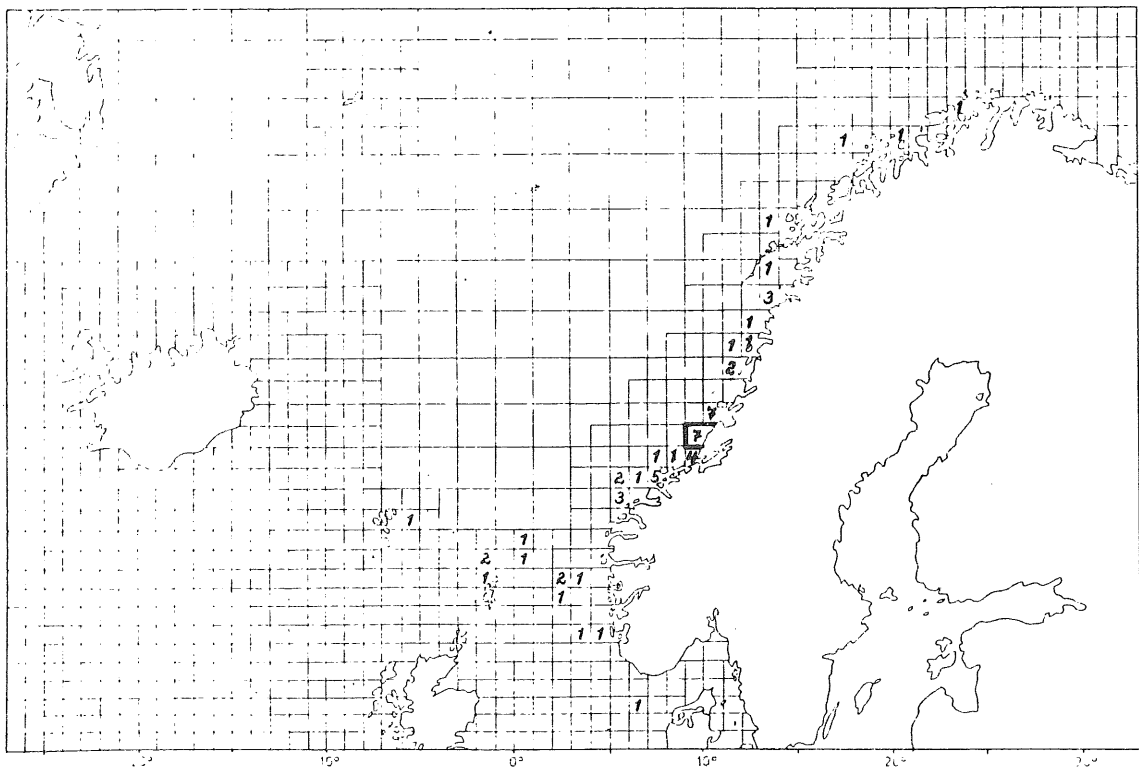


Fig. 2. Saithe tagging experiment 4 June 1974. 600 fish released inside the outlined area. Recaptures 1974 - 1976.

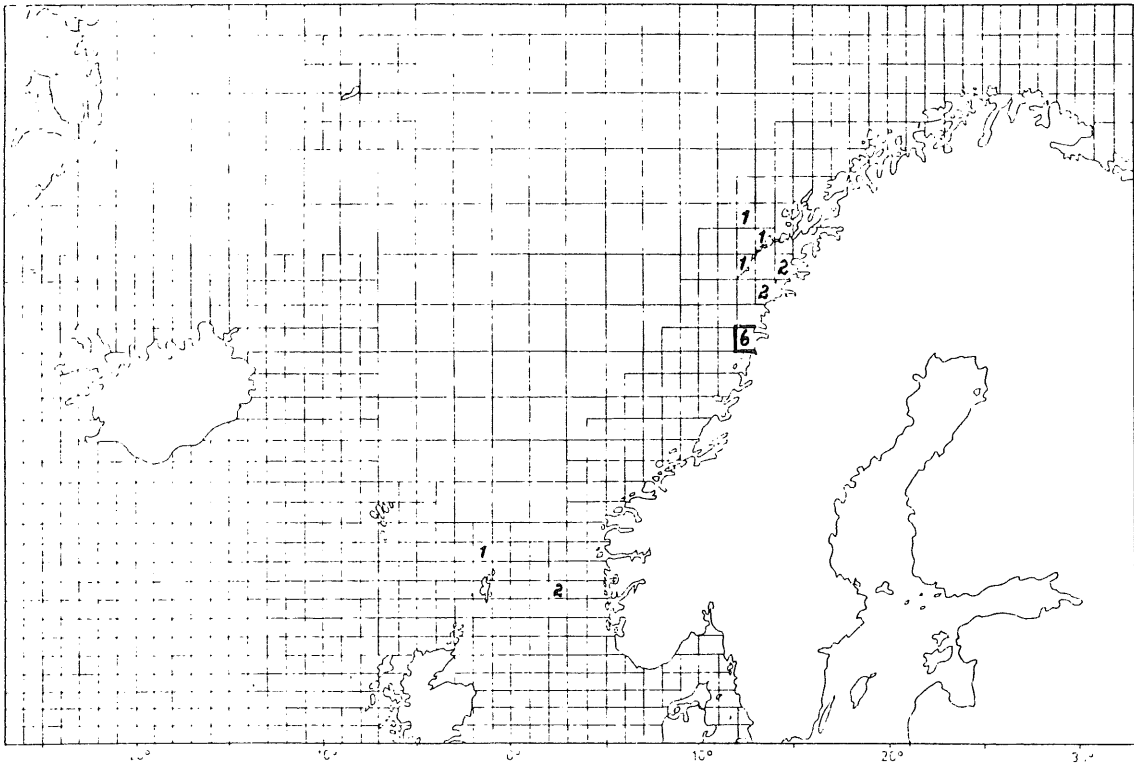


Fig. 3. Saithe tagging experiment 6 June 1974. 600 fish released inside the outlined area. Recaptures 1974 - 1976.

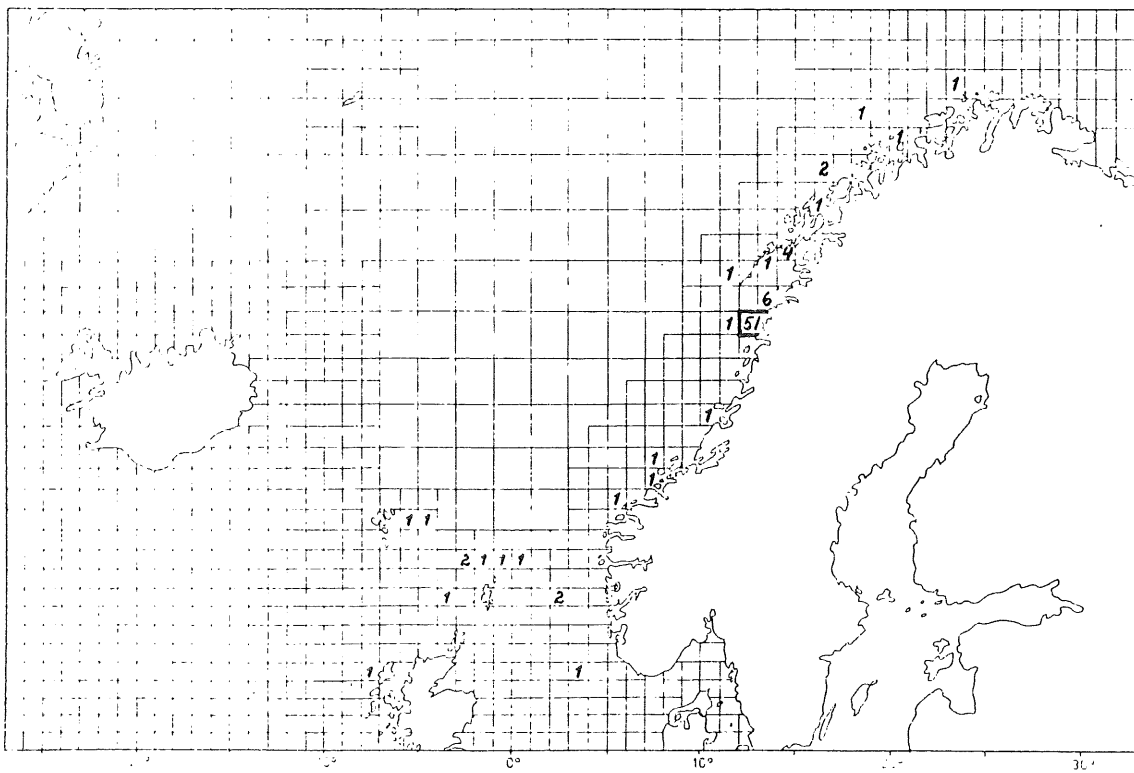


Fig. 4. Saithe tagging experiment 6 June 1974. 623 fish released inside the outlined area. Recaptures 1974 - 1976.

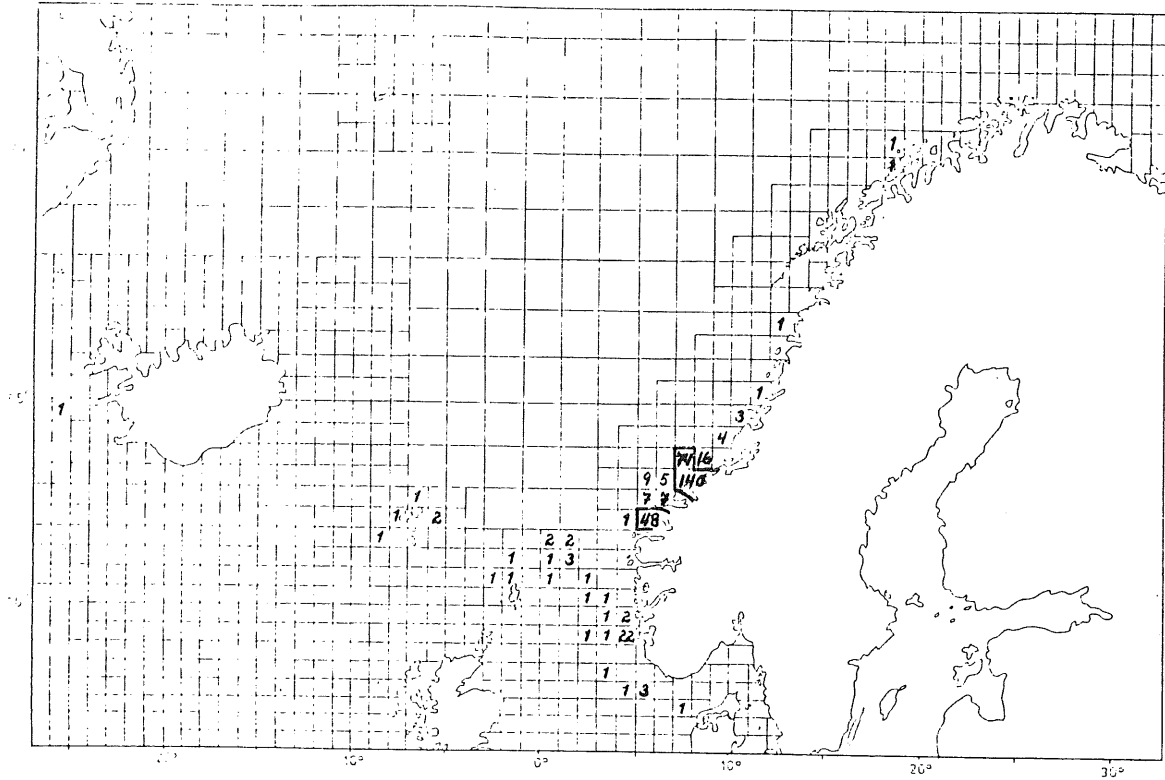


Fig. 5. Saithe tagging experiments on the Norwegian coast between 62°N and 64°N 1971 - 1974. 2799 fish released inside the outlined areas. Recaptures 1971 - 1976.

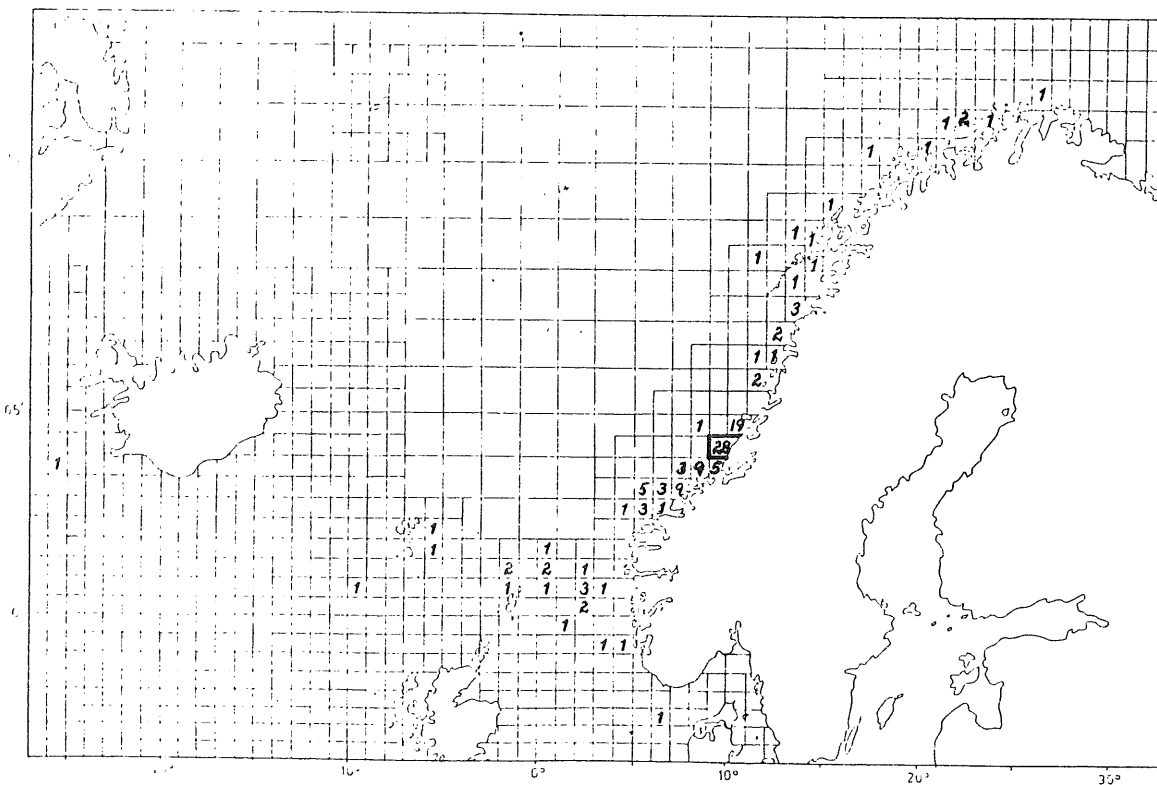


Fig. 6. Saithe tagging experiments on the Norwegian coast between 64°N and 65°N 1973 and 1974. 1200 fish released inside the outlined area. Recaptures 1973 - 1976.

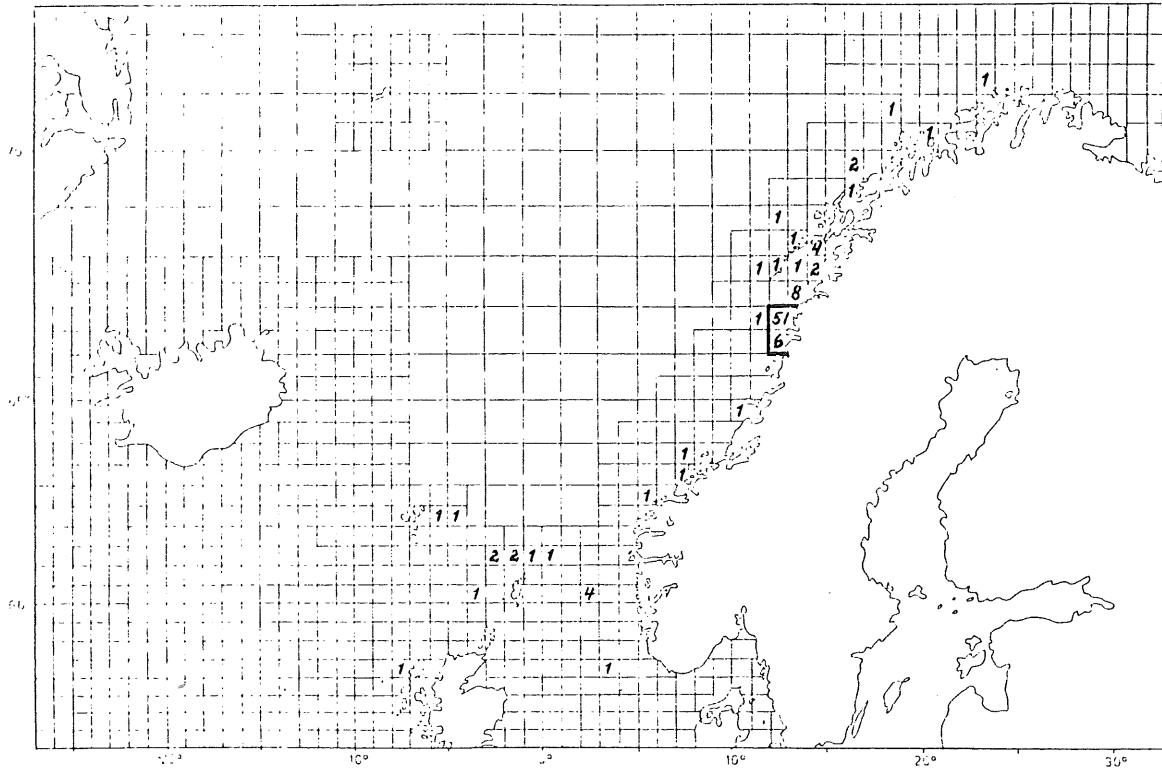


Fig. 7. Saithe tagging experiments on the Norwegian coast between 66°N and 67°N 1974. 1223 fish released inside the outlined area. Recaptures 1974 - 1976.

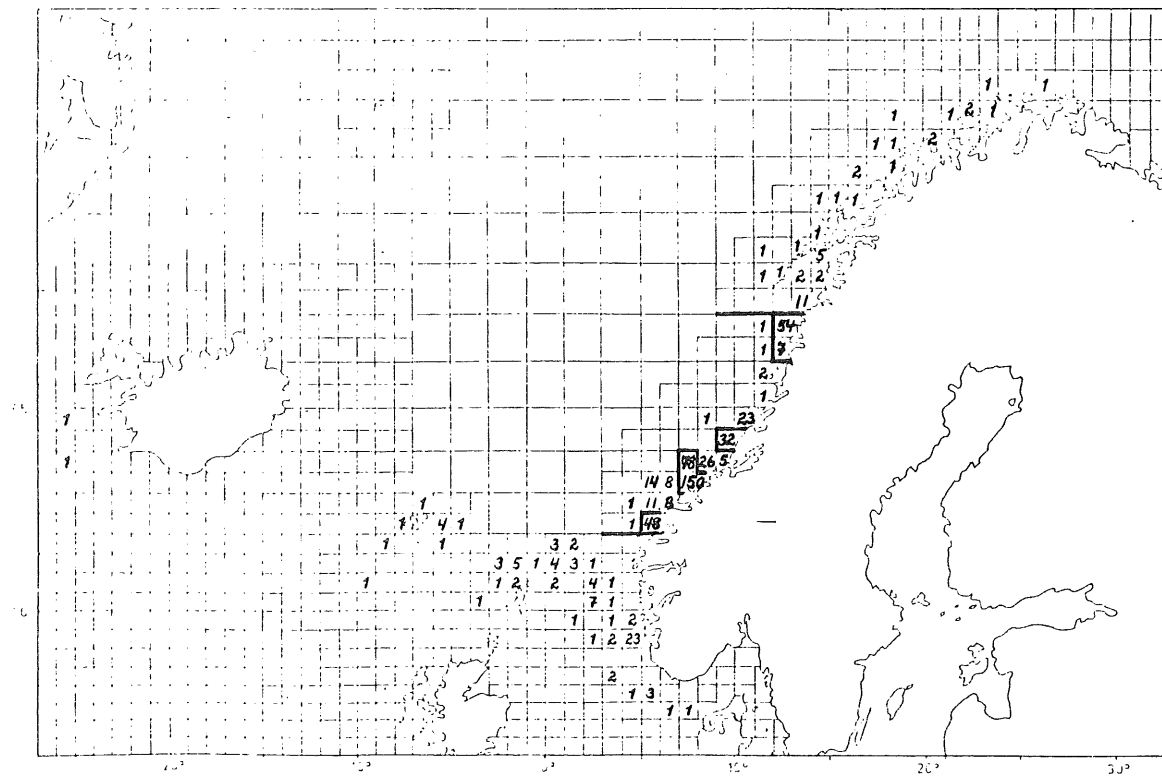


Fig. 8. Saithe tagging experiments on the Norwegian coast between 62°N and 67°N 1971 - 1974. 5222 fish released inside the outlined areas. Recaptures 1971 - 1976.