

Crab Tagging Experiment in  
Yaquina Bay 1955

During February and March, 1955 a crab tagging experiment was carried out in Yaquina Bay, by personnel of the Oregon Fish Commission Shellfish laboratory.

PURPOSE

The purpose of the experiment was to determine a proper release pattern of tagged crabs and the random distribution of bay crabs. Several other objectives were also in mind at the beginning of the experiment, such as population estimates and fishery intensity. The latter objectives were only partially carried out.

Yaquina Bay is a long narrow bay shaped somewhat like an inverted "S" (Fig. 1) and extends about eight miles inland to the city of Toledo. Four to five commercial crab fishermen fish the bay regularly the year around as weather permits. This fishery is conducted mainly along the the main channel from the Southbeach area just above the highway bridge at Newport to a short distance above Oneatta point or light 22, a distance of approximately 4.1 miles. The commercial bay crab fishermen are allowed to use only crab rings in their harvesting of this resource with no closed season. Their fishing over this area seems to fluctuate with each individual's whims in regards to where he believes the crabs are most abundant, fishing off of Yaquina today and perhaps off of Southbeach tomorrow.

The release point of all tagged crabs was from the boat dock at the Oregon State College Fish and Game Laboratory. The laboratory is located on the North shore of Yaquina Bay 2.9 miles above the highway bridge in Newport and 1.25 miles below light 22 <sup>which is the bay</sup> across from Oneatta point.

During the winter and early spring of 1955 quite an extensive crab fishery was conducted to the North and South of Yaquina Bay in the waters of the Pacific Ocean. An estimated 2000 crab pots were fishing between Yaquina Head and Seal Rocks giving ample opportunity for recapture of tagged crabs moving out of the bay.

## MATERIALS

The materials used were Peterson disc tags and 10 crab pots of commercial design but built lighter to facilitate pulling by hand. The pots were handled from the Shellfish Laboratory's sixteen foot skiff which has a built in davit base and removable davit.

## METHODS

Between February 16 and March 4, 1955, a period of 16 days, 525 male crabs (Cancer magister) of legal size (5.75 inches and over) were captured in Oregon Fish Commission crab pots, tagged and all released from the Oregon State College Fish and Game Laboratory boat dock. Shoulder width, shell condition, and missing appendages of these crabs were all recorded and in most cases tagged with Peterson disc tags secured through the carapace at the base of the tenth antero-lateral spine. In a few instances where this location was impractical because of damaged shells the tags were placed at the base of the left antero-lateral spine. Shell conditions were recorded as I and II. Crabs in shell condition I were crabs with hard shells and had obviously not shed recently. Shell condition II were crabs with springy clean shells and were obviously recent shedders.

Tags were collected by nearly daily contact with fishermen working the bay in the early portion of the tagging experiment. Some tags were brought in by sports fishermen and others were left at various sports docks to be turned over to the laboratory by the sports dock operator. Some were left at the Oregon State College Fish and Game Laboratory by students down for the week end. All tagged crabs recaptured in Oregon Fish Commission pots were brought back to the shellfish laboratory and placed in the aquaria for observation.

## RESULTS

Of the 525 crabs tagged and released 339\* tags were recovered or 65

\* In some of the following totals an obvious difference will be noted. This is due to a lack of data for some of the recoveries and were therefore not valid data for certain calculations.

per cent of the total release. Of these 339 crabs 9 per cent were re-captured in Oregon Fish Commission pots, while 6 per cent were captured by sports fishermen and 85 per cent by commercial crab fishermen. Of the 525 crabs released 330 were 146-158 mm in shoulder width and could be legally taken only inside the bay. Of this group 200 were recovered or 61 per cent. The rest of the tagged crabs ranged from 159-198 mm in shoulder width. This group contained 195 individuals with 135 being returned or 69 per cent, which indicated the larger crabs were recovered in slightly greater numbers than the smaller ones. <sup>(Fig. 2+7)</sup> The crabs released were all checked for shell condition and of these crabs 309 were in shell condition I or 59 per cent. <sup>one hundred thirty eight</sup> 198 of these individuals were recaptured or 64 per cent, while 215 crabs were in shell condition II or 41 per cent. One hundred thirty seven of this group were recaptured or 64 per cent, which indicated the recovery of hard and soft shell crabs was about equal. Crabs with missing appendages were divided into two groups; those with two or less appendages missing and those with three or more appendages missing. There were 508 or 97 per cent of the crabs with two or less missing appendages and of this group 323 were recaptured or 64 per cent of those out. The group with three or more appendages missing contained only 16 individuals or 3 per cent of the total release. Eleven of these crabs were recaptured or 69 per cent. Because of the small number of crabs in the latter group it is difficult to draw any conclusions as to the effect of missing appendages.

Fishermen were asked to keep track of the locality in the bay where recoveries were made and the date of recapture so that we could determine miles traveled and the days at liberty before recapture. The days at liberty for the recaptured crabs ranged from 0 (caught the same day released) to 211 days with an average of 27.8 days at liberty (Fig. 3). Of the 339 tags returned only 271 were considered valid for determining the days:

at liberty. Of this group 58 per cent were recaptured within 19 days and 73 per cent were recaptured within 29 days. Ninety-four per cent were recaptured within 69 days or just a little over two months, while 99 per cent were recaptured within 129 days (Fig. 4). Of the tags returned 270 were considered to be of value for determining distance traveled. The 270 crabs returned from the bay made movements before recapture ranging from a few hundred feet to 1.9 miles. One individual not included in this group was recaptured in the ocean off of Big Stump Beach south of Newport, having traveled a distance of 20.5 miles from the release point in 131 days. Considering any movement within a half mile radius of the release point as being non-directional movement and any movement over this being directional reveals that the greatest movement was down bay. One hundred twenty six crabs moved over one half mile and of this group 86 per cent moved down bay with only 14 per cent moving up bay. Of the 270 released 53 percent moved less than one half mile and were considered to have made non-directional movements. Thirty one per cent of the released crabs moved ~~one~~ <sup>1</sup> mile or less, 12 per cent moved 1.5 miles or less and 4 per cent moved 2 miles or less (Fig. 5). Figure six would seem to reveal that it took 10 days or more for the released crabs to move more than one half mile in any great numbers before being captured after release. The first 10 days at liberty shows a much higher percentage of crabs moving less than one half mile than any other group for that period of time. The crabs out 10-19 days shows a marked increase in crabs moving over one half mile (Fig. 6).

#### CONCLUSIONS

The number of conclusions that can be drawn from this experiment are limited in number; however, some may be drawn. 1- The crab fishery in Yaquina Bay would appear to be fairly intense. Fishery intensity is probably reflected by the days at liberty with 94 per cent of the returns being in within 69 days, also this would seem true in distance traveled

where 53 per cent of the crabs traveled less than one half mile before recapture. 2- It would seem from a limited number of samples that the larger crabs were removed more heavily than the smaller crabs (Figs 2 & 7). 3- Shell condition did not seem to be a factor in the number of returns as 64 per cent of each available group was recaptured. 4- Missing appendages did not seem to hinder recapture of crabs, although the numbers of crabs with missing appendages was so small that one should be careful in drawing definite conclusions. Sixty nine per cent of the group with 3 or more missing appendages were returned compared to 64 per cent with 2 or less missing appendages. 5- With all movement of less than one half mile considered as non-directional and all movement over that as directional. The greatest directional movement was down bay with 86 per cent going that way and only 14 per cent going up bay. This is very possibly a reflection of salinity. 6- It would seem from the distances traveled and days at liberty (Figs. 3 & 6) that 10 days or more are needed for the crabs to distribute themselves to any extent. 7- All evidence would seem to indicate that this was not the proper release pattern (one fixed point) to determine random distribution under the circumstances of the present fishery intensity. The crabs were neither out long enough nor did they have a chance to go far enough to become randomly distributed.

May 7, 1956 "Mickey" Fogarty brought in a tagged crab taken off the Alsea outside in pots tagged 2-21-55 and released at O.S.C. Fish & game lab. soft shell when tagged - no growth - At liberty - 437 days.

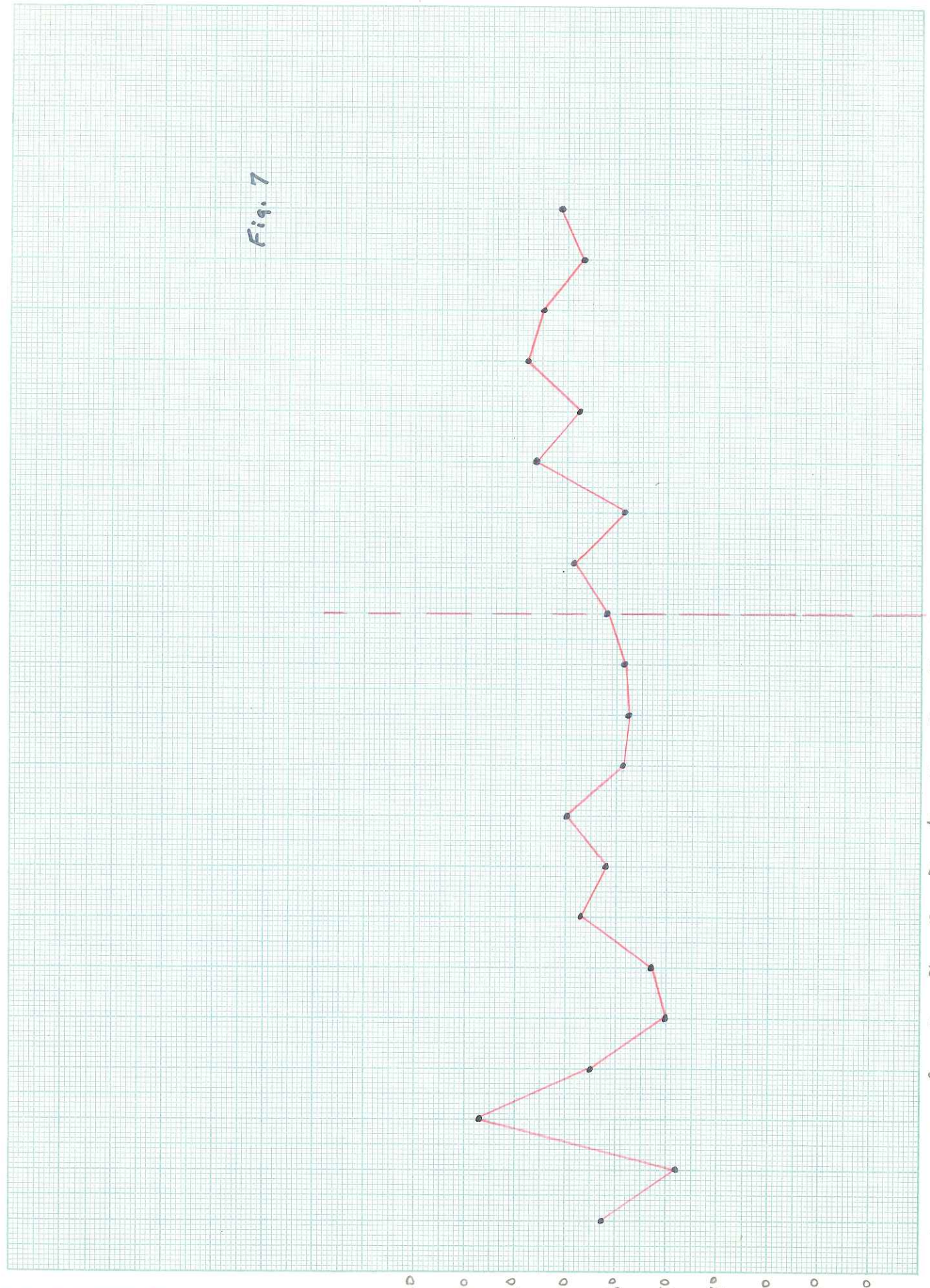
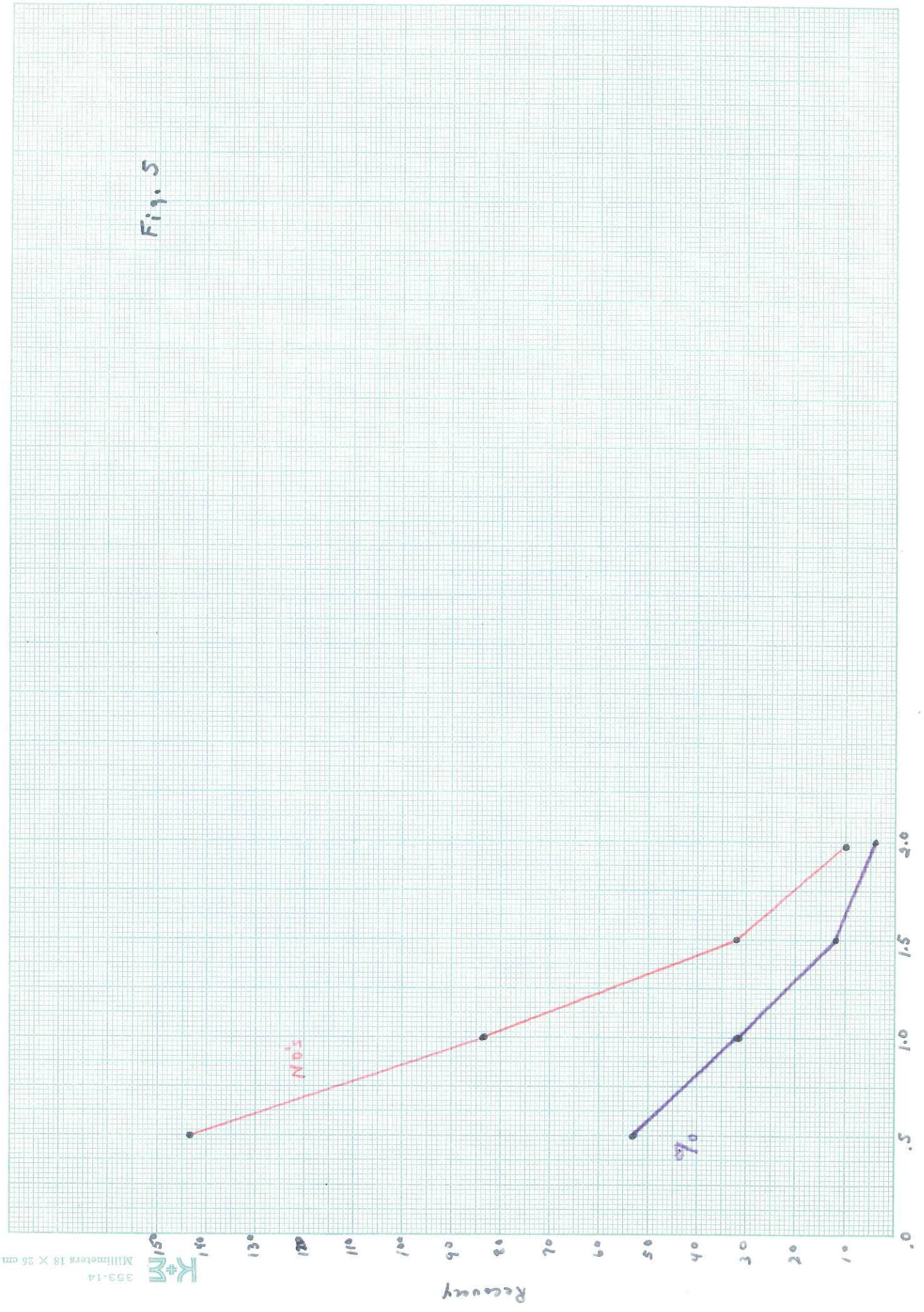


Fig. 7

Fig. 5



M.T.

Recovery

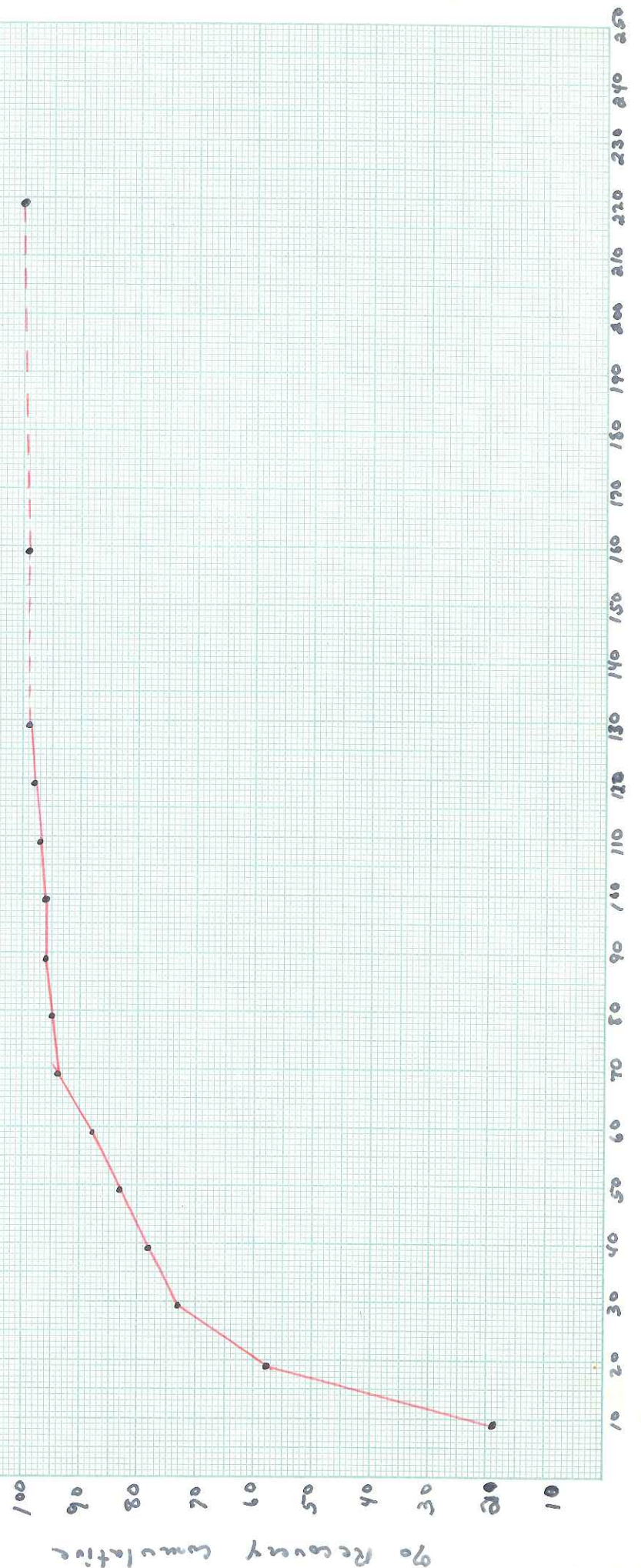
Fig 6

0-1 miles } colors indicate  
 1.1-1.6 " } distance traveled  
 1.6-2.0 " }





Fig. 4

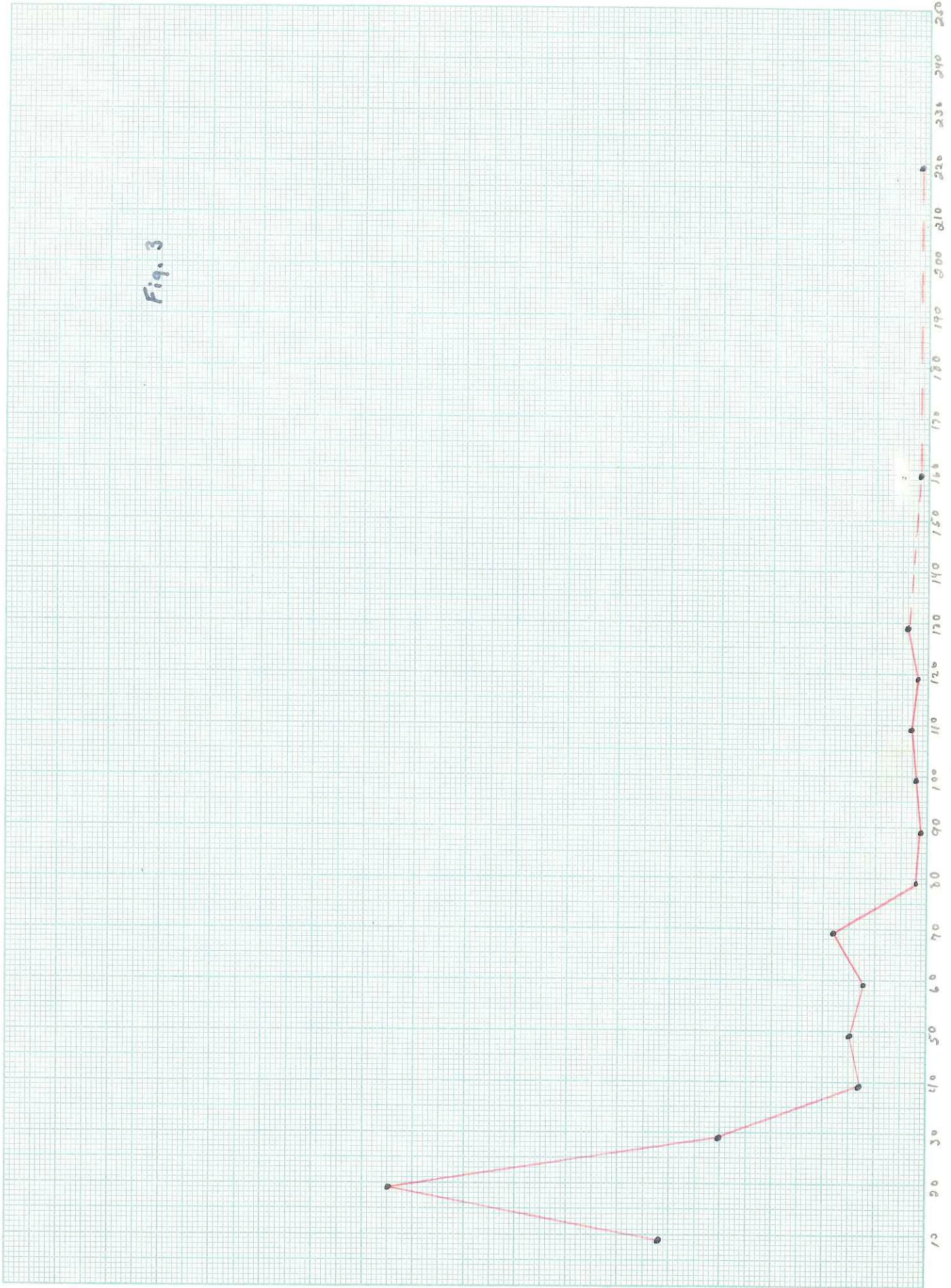


D.A.L.

Fig. 3

No's captured

Days At Liberty



Numbers Released Red line  
 Numbers Released Purple line

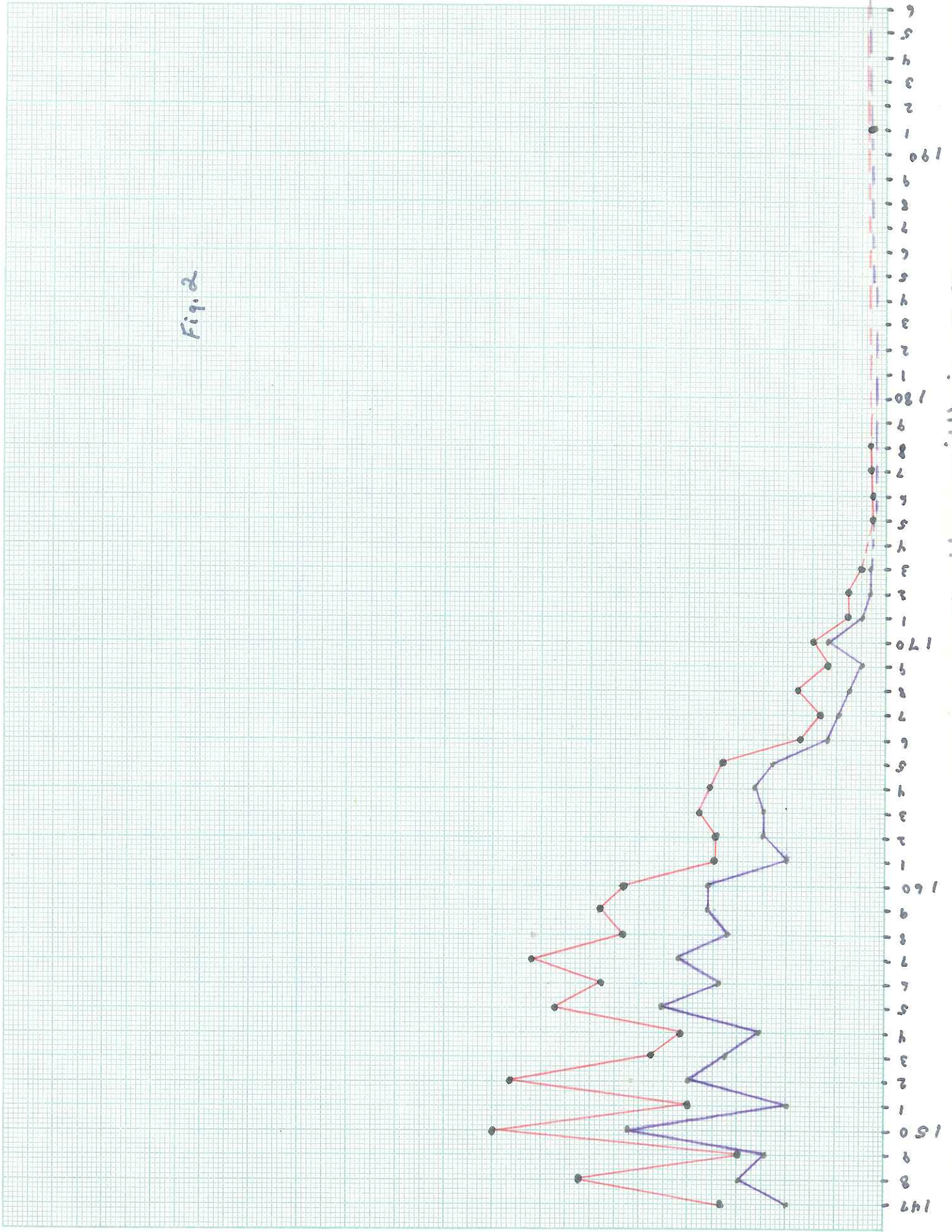


Fig. 2

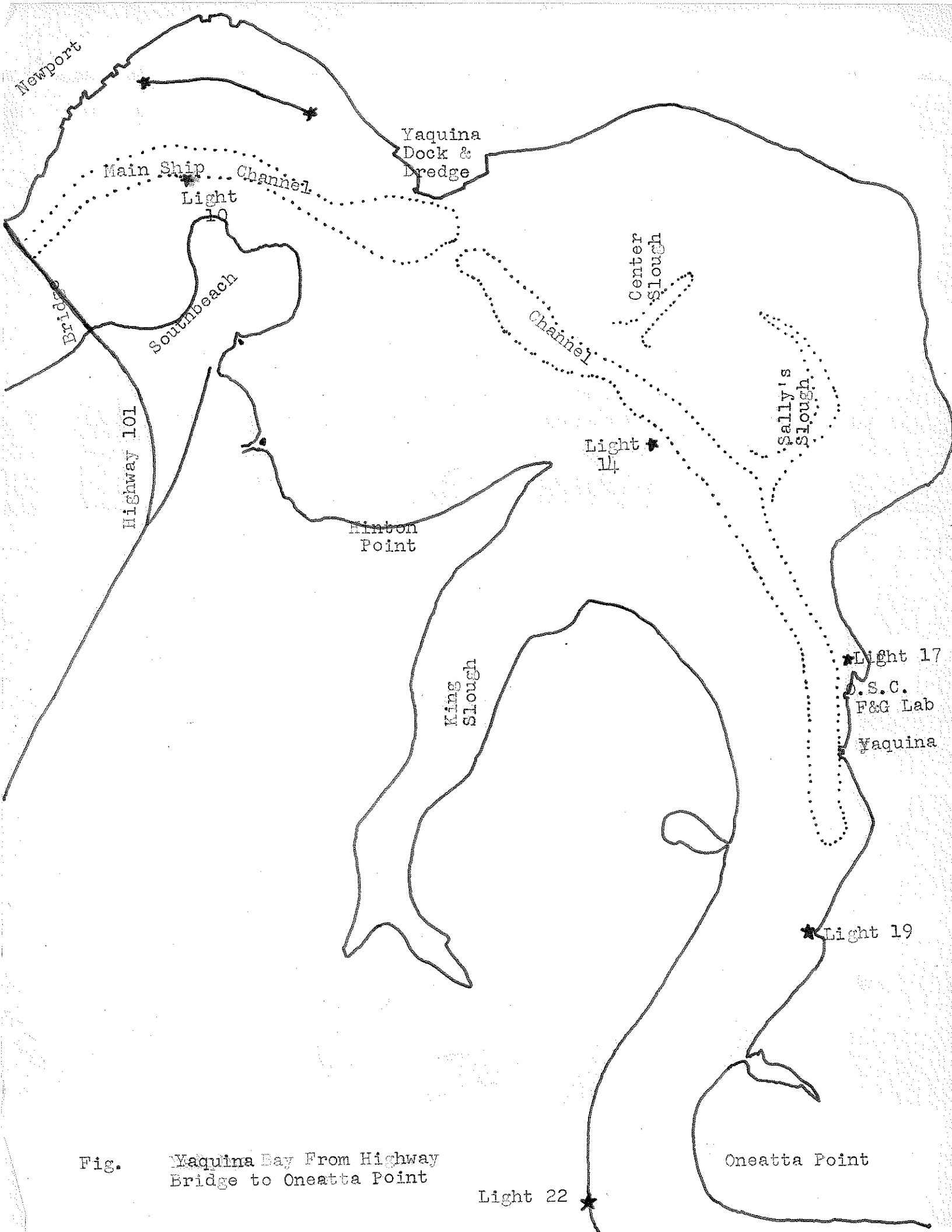


Fig. Yaquina Bay From Highway Bridge to Oneatta Point

Light 22

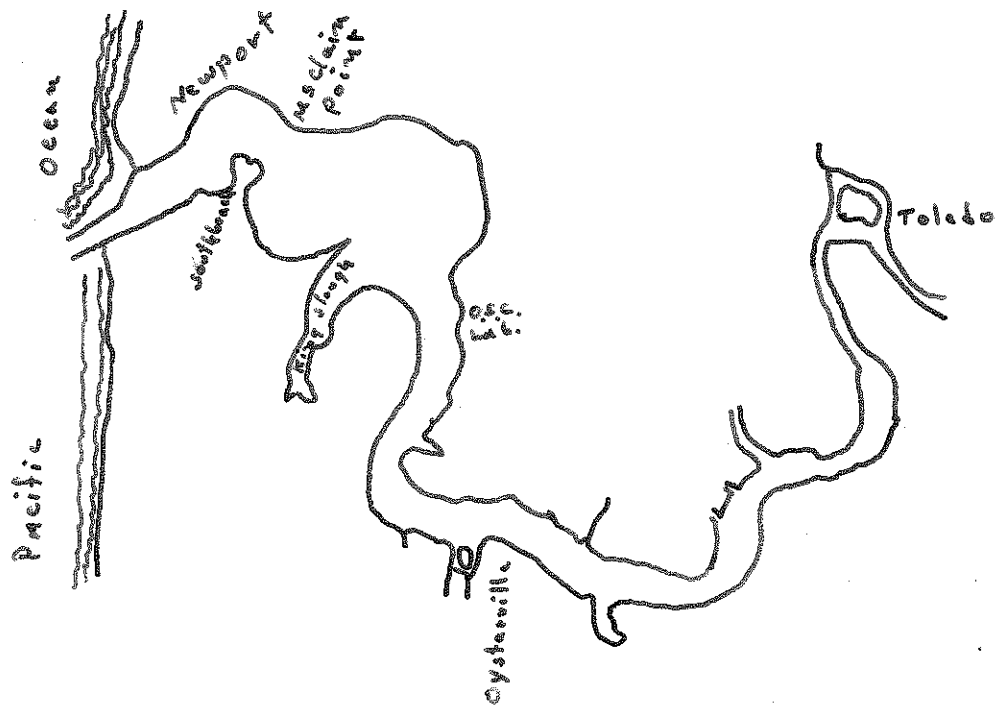


Fig. 1 Yaquina Bay