

This report is provided as background information for the November 25 hearing. The staff will be providing a review of the status of the clam resource at that time.

# INFORMATIONAL REPORT

## STATUS OF OREGON'S CLAM STOCKS

### INTRODUCTION

Razor clams occur along most of the Oregon coast, but about 90% of the fishery is located on the 18-mile Clatsop Beach between Tillamook Head near Seaside and the Columbia River. South of Clatsop Beach the fishery is sporadic with clams available only during some years. Both recreational and commercial fisheries are active on Clatsop Beach.

One to five species of bay clams are dug from 12 of Oregon's estuaries. Landing statistics are available for the commercial fishery, but data for the sport fishery is limited to the 1971 estuary use survey and some special studies in specific areas.

This report briefly reviews clam life histories, regulations, research, and status of the resource.

### RAZOR CLAMS

#### Life History

The sexes in razor clams are separate; that is, clams are male or female. The clams are sexually mature in their second year of life at 3½ to 4 inches in length. A female clam has the spawning potential of 6-10 million eggs at each spawning. The sex products are released free into the water where the egg and sperm unite by chance. The resulting larvae drift with the ocean currents for about 8 weeks. When the shell begins to form the clams settle onto and dig into the bottom.

Tagging studies have shown that razor clams move up and down, but not laterally through the sand. However, wave action frequently washes the small clams out of the top layer of sand only to deposit them in another location.

The staff has maintained for several years that the bulk of the spawning stock lies close offshore beyond the reach of the diggers. In 1975 an independent diver dug razor clams offshore at Seaside. Department of Fish and Wildlife divers determined that razor clams are numerous off Newport in 12 to 20 feet of water.

This is the first verification of an offshore population by our staff.

Razor clams grow rapidly. Spawning usually occurs in May or June and the clams reach one inch in length by their first winter. These clams will average 3-3/4 inches in length by their second winter and 4½ inches by their third winter. The life span of razor clams is 5 or 6 years in Oregon.

### Research

Razor clam studies began in 1949. The Clatsop Beach fishery has been monitored continuously since 1955. Recreational and commercial diggers are sampled systematically for area dug, number of clams dug, and age composition of the catch. Mark and recovery studies were done to determine age, growth, rate of harvest, and natural mortality in 1952-54 and in 1974-75. The physical parameters of the razor clams' habitat were studied in 1965 and changes in beach elevation were monitored from 1966-70. A drift bottle study in 1963-64 provided data on the nearshore ocean currents and their relationship to the distribution of razor clams.

### Regulations

Prior to 1954 the recreational bag limit for razor clams was 36 clams per digger per day. In 1954 this was reduced to 24 clams per person per day regardless of size and no more than 48 clams in any 7 consecutive days. In 1967 a summer closure from July 15 through August 31 was enacted for Clatsop Beach to reduce the harvest of small clams. This included the commercial fishery also.

The size limit on clams taken by commercial diggers was 3½ inches prior to 1954. In 1954, the size limit was increased to 4½ inches which eliminated small clams from the catch and provided increased utilization of the resource by allowing the fast growing clams to reach a larger size and giving them a chance to spawn at least once before harvest.

In 1972 the commercial size limit was reduced to 3-3/4 inches, at the request

of the commercial industry. A certificate of sanitation from the State Health Division was required in 1972.

### Catch and Effort

Figure 1 shows the sport and commercial take of razor clams from 1946. The commercial catch once dominated the fishery, but the 4¼ inch size limit and dramatic increase in competition with sport diggers greatly reduced the catch. It is significant that in some years wastage by sport diggers exceeds the commercial harvest. The commercial catch over the past 15 years has amounted to 6-10% of the total catch.

The number of sport digger-trips from 1955 is shown in Figure 2. There has been a general increase in the number of diggers with moderate fluctuation. The sudden decrease in 1974 coincided with the gasoline crisis.

The number of commercial licenses issued annually is also shown in Figure 2. The number of diggers reflects the relative abundance of clams. As the strong yearclasses move into the fishery, more diggers enter it. However, few diggers are able to dig enough clams to pay for their \$40 license. About 10 diggers take 75% of the commercial catch.

### Age Composition

The age of razor clams is determined by counting the dark rings on the shell. The data show that prior to the 1967 closure, up to 58% of the clams dug by sport diggers were in their first year of life. These clams are 1 to 3 inches in length. The harvest of first year clams was reduced an average of 13% following the closure.

The razor clam fishery consists mostly of second year clams with clams older than their third year making up only 15% of the harvest.

The age composition of the commercial catch shows that the 4¼-inch size limit eliminated nearly all of the first year clams from the fishery.

### Status of the Razor Clam Resource

The intense fishery on razor clams removes a large portion of the population annually. Yet, the high spawning potential of razor clams and their rapid growth are adequate to sustain sport and commercial fisheries. Razor clams spawn annually and the resulting larvae are distributed by the ocean currents. The 1963-64 drift bottle study indicated that the nearshore currents are southerly toward the shore during the spawning and setting times of razor clams. Hence, a continuous supply of razor clams is available to Oregon beaches with some of the larvae perhaps originating in Washington. The summer closure (also in Washington) and commercial size limit has reduced the take of small clams, increasing effective utilization of the resource. The commercial fishery is of little consequence, taking only up to 10% of the harvest, and yet providing supplemental income for a few people and clams for many Oregon restaurants and people who do not or cannot dig their own clams.

### BAY CLAMS

#### Life Histories

Five species of bay clams are dug in Oregon estuaries: Cockle, gaper, softshell, littleneck, and butter. Our knowledge of their life histories is limited. The gaper clam spawns during the winter while all the others spawn during the spring or summer. Growth rates vary between species, between estuaries and within estuaries. There is some indication that the gaper clam does not spawn every year, as some age groups are missing in the age composition. Determining the age of bay clams is a problem in itself and we are only now establishing reliable criteria for aging.

#### Research

The studies done on bay clams prior to 1972 were short term, designed to answer specific questions about specific areas. The one exception was work done in the 1950's to determine the identification, distribution, and relative abundance of bay

clams in Oregon's estuaries. Some work was also done on the age and growth of cockles and gapers in Yaquina Bay and to a lesser extent in Coos and Tillamook bays. Clam surveys were conducted annually from 1953-69. Transects 2 x 50 feet were laid out across heavily dug tideflats in 7 estuaries and the number of clams determined by sight and feel. This method had limited value because only adult clams were detected.

In 1972 a systematic survey of all estuaries was begun. These surveys include both intertidal and subtidal clams. The first phase of the study was to determine the distribution and relative abundance of the clams, substrate composition, and vegetation. The information was plotted on maps and the area of the clam beds determined. In the second phase of the study a hydraulic dredge was used to determine species composition of clams and population estimates. Clams taken in the samples are aged, weighed, and measured. To date Yaquina, Alsea, and Siletz surveys are complete. Surveys have begun on Tillamook, Netarts, Nestucca, Nehalem, Siuslaw, and Coos bays. We have determined that the subtidal clam populations are much greater than the intertidal populations. One 15-acre subtidal bed in Yaquina Bay has an estimated population of one million clams of a harvestable size. Clam density in another Yaquina subtidal bed is 150 adult clams per two square feet.

These surveys will continue until all estuaries are completed. Sea Grant funds are helping to continue this work and other studies to determine substrate-clam density relationships, current patterns in the estuaries, and the relationship between subtidal and intertidal clams.

#### Catch and Effort

The 1971 resource use survey provides the only comprehensive data on sport use of Oregon's estuaries. A separate report has been published for each estuary, but to summarize, 500,000 users spent 1,205,000 hours to take 2,951,000 marine fish, crabs, clams, and miscellaneous invertebrates. Clams made up 55% of the total catch with, Tillamook, Netarts, Yaquina, and Coos being the most important clamming bays.

Only the Rogue and Chetco estuaries have no records of clams.

The commercial harvest of clams is shown in Figure 3. A once important fishery has dwindled to near extinction. In 1962 and 1972 subtidal clam fishing increased the total commercial clam catch. This effort has been sporadic.

#### Status of the Bay Clam Stocks

The foremost problem in our bay clam management was lack of data. The surveys begun in 1973 are providing us with a data base from which to work. Catch and effort data were taken in 1975 in Yaquina, Netarts, and Tillamook bays. Preliminary analysis indicates that some regulation changes are needed. The subtidal commercial fishery is a new fishery and provides an opportunity to manage a fishery before unwanted or poor practices cause management problems. The staff has developed criteria to manage the fishery and protect the resource.

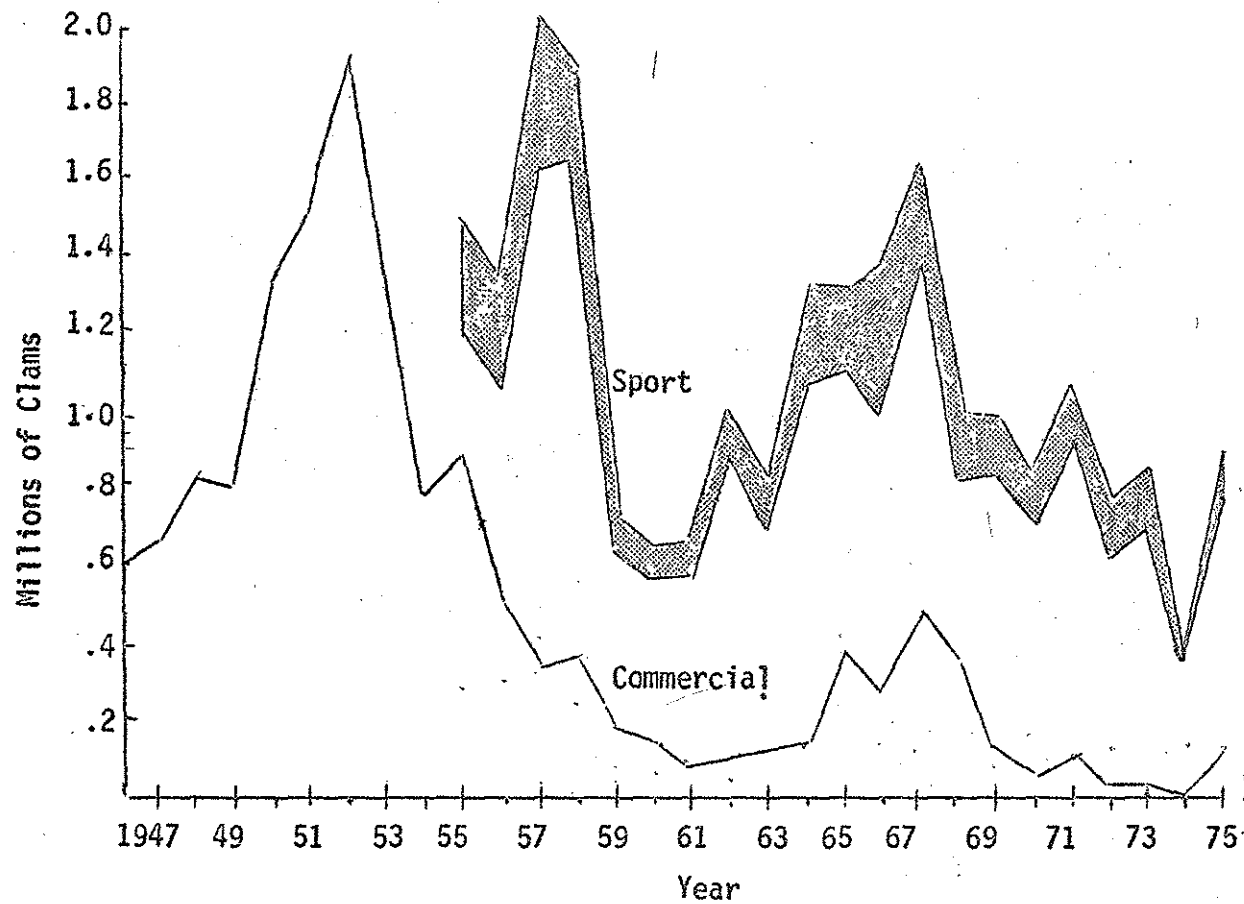


Figure 1. Annual Number of Clams Dug from 1946 to Present, Shaded Areas Indicate Number of Clams Wasted.



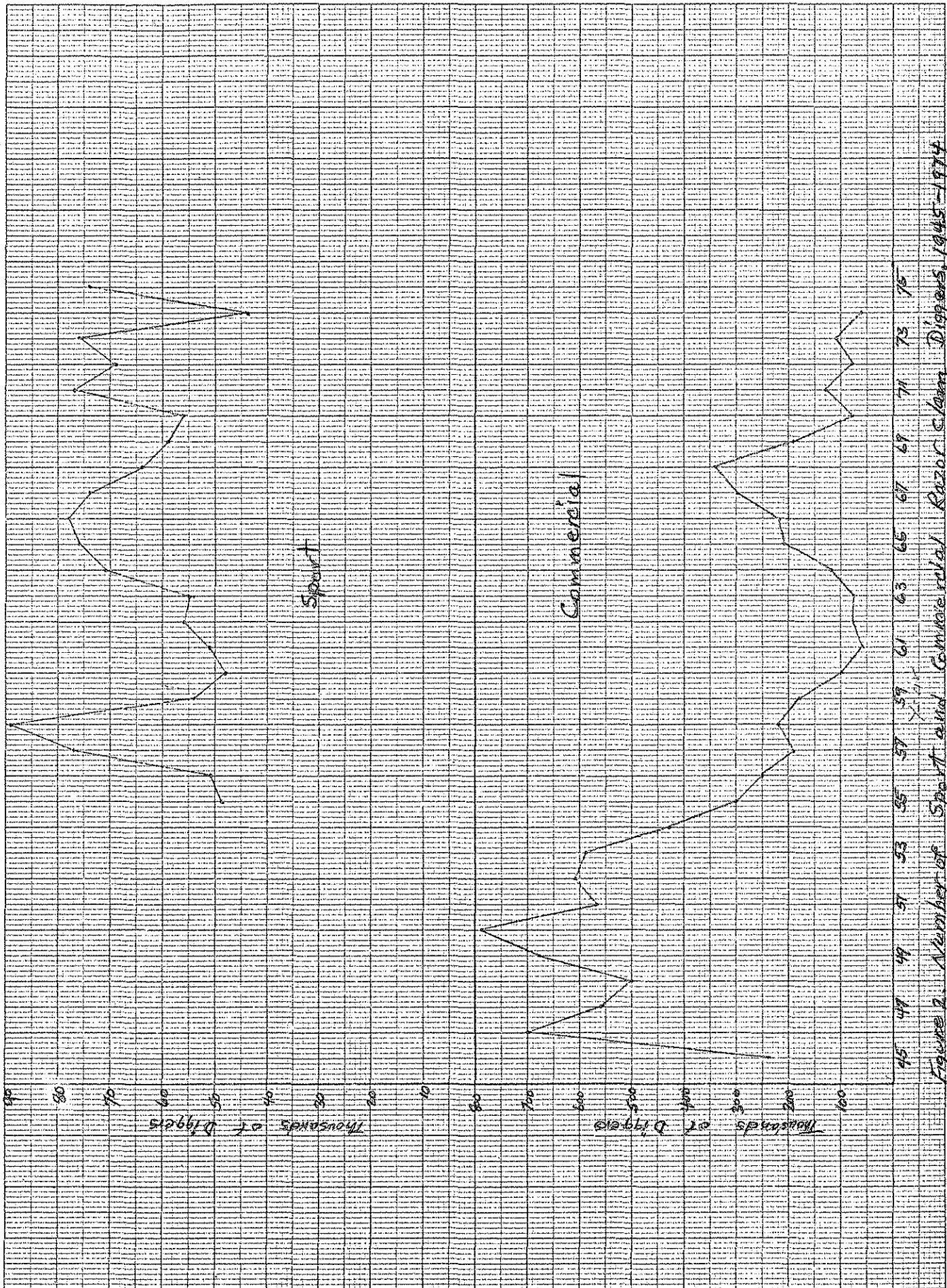
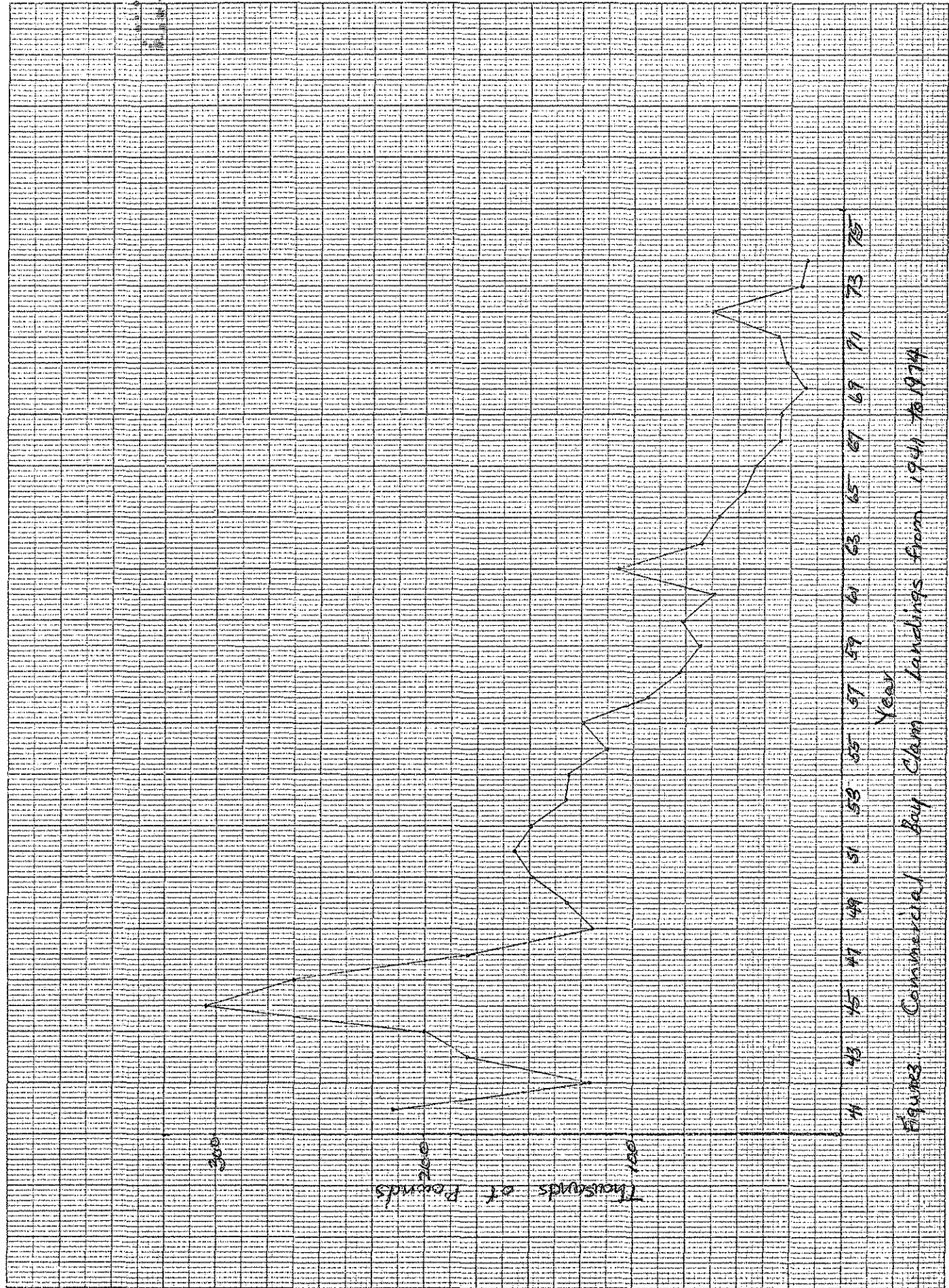


Figure 2. Number of Digits for Commercial and Sport Categories, 1954-1975



Figures Commercial Bay Class Landings from 1941 to 1974