



## Oregon's Sardine Fishery, 2000

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## Introduction

The first major landings of sardines (*Sardinops sagax*) into Oregon in over fifty years occurred in 1999. Three vessels made directed landings of just over 1.7 million pounds (775.7 mt). Prior to 2000, sardines were managed by the individual states. In 1999, Amendment 8 to the Pacific Fishery Management Council's Northern Anchovy Fishery Management Plan (FMP) was approved, to take effect in 2000. The plan is now the Coastal Pelagic Species Fishery Management Plan, and includes sardines. Under the FMP, the biomass of sardines is estimated each year and a coast-wide harvest guideline is established. The harvest guideline is then allocated 2/3 to the southern California fishery and 1/3 to the northern California, Oregon, and, Washington fisheries. The division between northern and southern areas is Point Piedreas Blancas (35°40'N). Any portion of the harvest guideline that is unused by October is then re-allocated 50/50 between the northern and southern areas. Except for the coast-wide harvest guideline, the fisheries off of Oregon and Washington continue under state management.

Even though the area north of California is figured into the biomass estimate, there is little data from this area that is used in the model. There is a need for data from outside the areas of the traditional California fisheries to improve stock assessment since these areas are now taken into account to calculate the biomass estimate.

There has traditionally been little by-catch in the sardine fishery because of the harvest methods used. Most of the harvest is with seine gear and fish are pumped from the net onto the vessel without being sorted. However, the portion of the FMP that deals with by-catch in the sardine fishery was initially disallowed because of a lack of data. There are also concerns with by-catch of salmon, particularly with a fishery located just off the mouth of the Columbia River.

### Goals and Objectives

The goals for this year's work was to gather information on sardines off Oregon to improve the coast-wide stock assessment of sardines; to document the extent of by-catch; and to monitor the size and age composition of the population.

Objectives include:

- Collect size, age, and distribution data of adult sardines off Oregon, from both the harvest areas and outside harvest areas.
- Document bycatch, in terms of species and amount. Recommend management measures to reduce by-catch if necessary.
- Document harvest methods, distribution of harvest, and catch per unit of effort.

## Management

Except for the coast-wide harvest guideline, management of sardines north of 39°N is under each state's authority. In Oregon, sardines are managed under the Developmental Fishery Program which limits the number of harvest permits to 15. In 1999, all 15 permits were issued by mid-August. In 2000, ten permits were renewed from 1999. We received 35 applications for the remaining five permits which were issued through a lottery in February.

## Permits

Permits are issued on a calendar-year basis. Before applying for a permit, an Oregon commercial vessel license must be obtained. Permits are subject to the following conditions:

- The permit is not transferable and must be carried on the fishing vessel during harvest and sale of catch.
- A legible log of catch (target and incidental), effort, area of catch, and other information as required in the instructions must be recorded on the logbook provided by the Department.
- Two ODFW observers shall have the opportunity to be on board the harvest vessel at the option of the Department for the purposes of collecting scientific data on the catch.
- The Department shall have the opportunity to collect biological data from the harvest done under the permit.
- Gear restrictions: Vessels using seine gear must place a grate over the intake of the hold to sort out larger species of fish. Trawl gear requires a fish excluding device, such as a semi-rigid panel, installed in the net to sort out larger species of fish.
- All “groundfish” (federally managed finfish) and salmon must be returned to the water immediately.
- Renewal of the permit is subject to meeting the minimum annual landing requirements of 5 landings of Pacific sardine and Pacific saury from the Pacific Ocean, of at least 500 pounds each, or 1 landing of at least 5000 pounds.

## **Fishery Description**

### Landings / Effort

The first directed landings of sardines into Oregon since 1948 occurred in 1999. Ten vessels made 31 landings for a total of 1.7 million pounds (775.7 mt). Three vessels using seine gear made more than 99% of the landings. A small amount (<300 lb) was landed as incidental catch in the whiting fishery (by six vessels) and a small amount (<500 lb) was also harvested from Winchester Bay for a local bait market.

In 2000, 18 vessels landed 21 million pounds (9,524 mt). Fourteen vessels made 327 landings with seine gear, averaging over 65,000 pounds per trip. Four vessels landed less than 1,000 pounds as incidental catch with trawl gear. Of the 14 vessels targeting sardines with seine gear, 8 vessels made over 98% of the landings (Figure 1).

In 1999 and 2000, landings began in mid-June and continued through mid-September and mid-October, respectively (Figure 2). Based on comments by fishers, fish were seen before and after the harvest season. A main factor in starting and ending fishing activity appears to be ocean conditions and weather that will allow effective operation of the gear.

A second factor effecting landings in 2000 was the readiness and capacities of the processing plants. The first processor started buying in late June, the second started the second week of July, and the third in August. Also, several times, at least one plant put their vessels on daily limits because of freezing capabilities. In other words, the active vessels had the ability to land more fish than the plants had capacity to process.

Logbooks are required as a provision of the permit. Logs turned in by October 31 accounted for 91 % of the landings. Fishing for sardines appears to be an all-or-nothing activity: 63 % of the trips were completed with only one set of the gear (Figure 3). Of the trips that used more than one set of the gear, 55 % caught all the fish in one set. In other words, if the gear was set three times during one trip, two sets usually produced no fish and all the fish were usually captured in one set. The amount of sardines harvested from a successful set of the gear ranged from 3 mt to over 55 mt with an average of 26 mt (Figure 4).

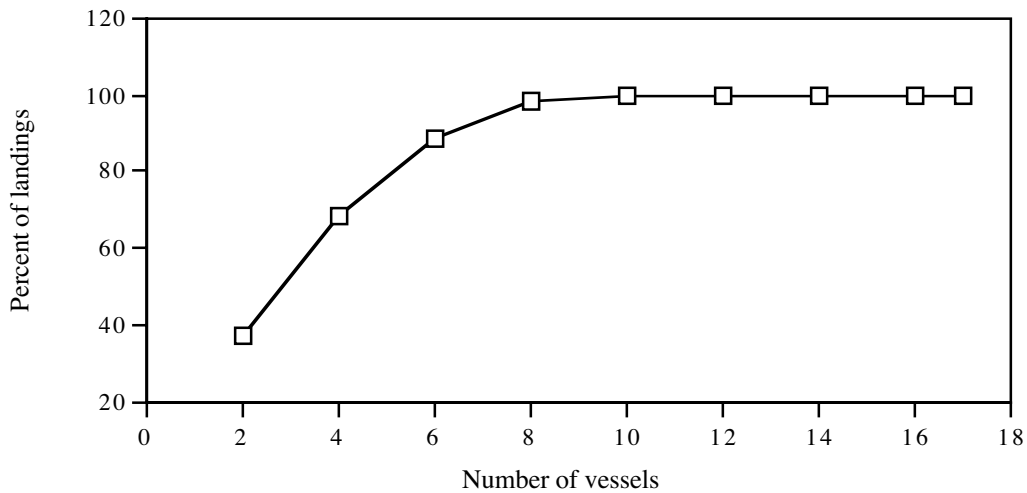


Figure 1. Cumulative percent of landings of sardines into Oregon, 2000.

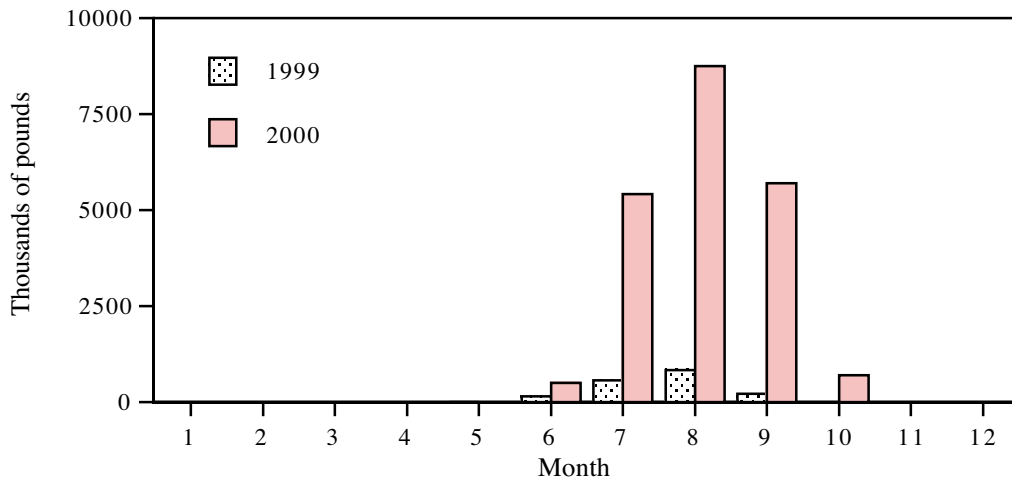


Figure 2. Monthly landings of sardines into Oregon, 1999-2000.

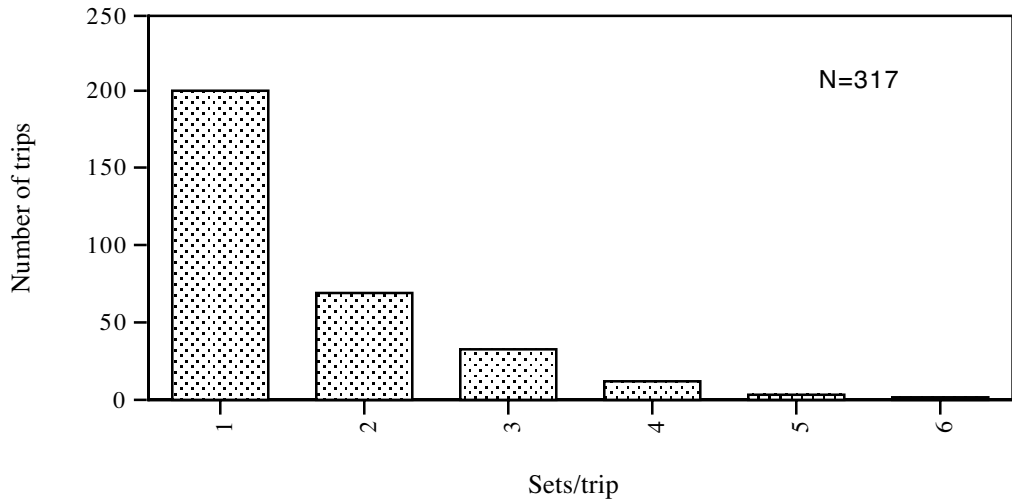


Figure 3. Number of sets of the gear, per trip, for the Oregon sardine fishery, 2000.

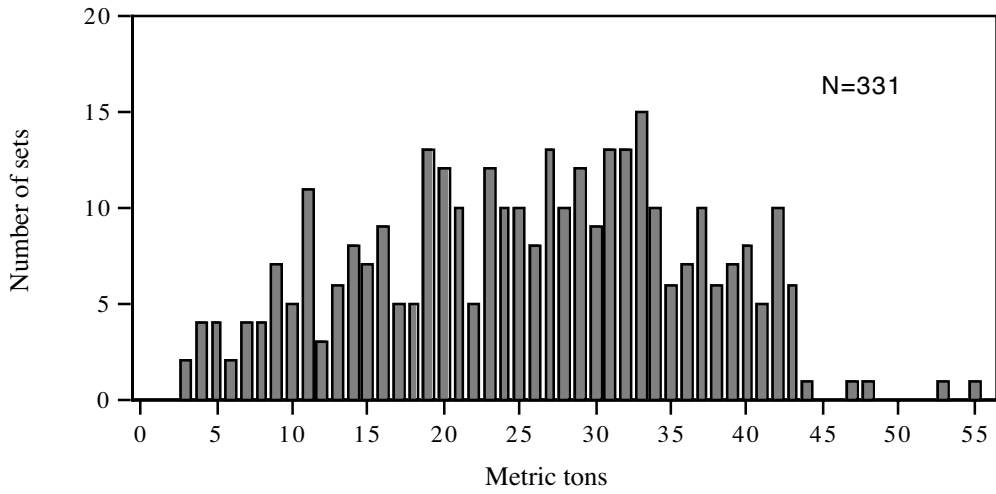


Figure 4. Metric tons of sardines per successful set, 2000.

Area of catch

The area of catch was approximately 15 nm north and 20 nm south of the Columbia River and out to approximately 25 nm off shore (Figure 5). Depths in the harvest area ranged from 8 fm to over 400 fm, with an average of 41 fm. Based on log data, 75 % of the trips occurred and pounds were taken off Oregon and 25 % off Washington. Based on comments by the fishers, numerous schools of fish were located outside the harvest area, but as long as a sufficient quantity was located close to the mouth of the Columbia River, there was no reason to look elsewhere.

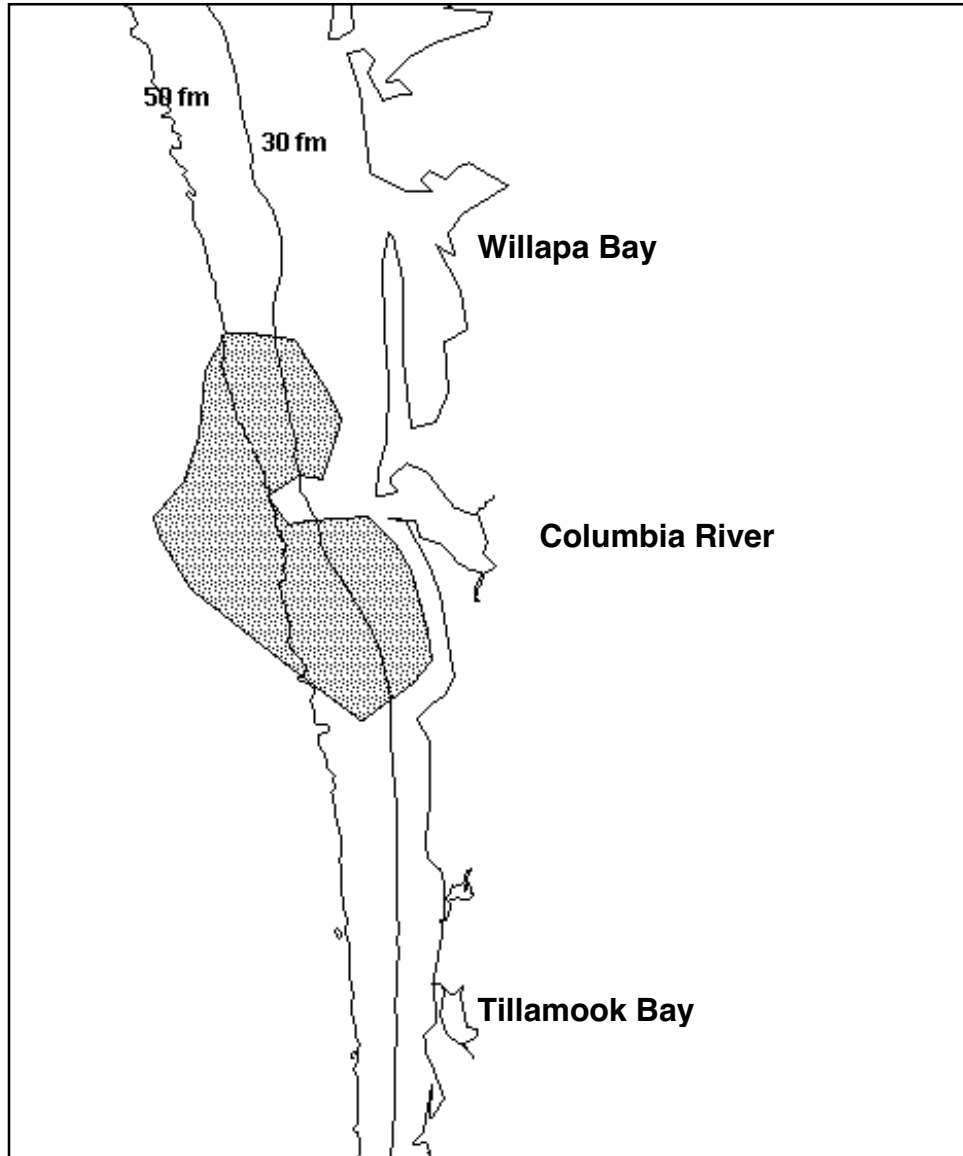


Figure 5. Area of harvest for Oregon's sardine fishery, 2000.

## Gear

Vessels ranged in size from 48-76 ft in length. Seine nets ranged from 200-270 fm long and 16-25 fm deep. Most nets had a mesh size of 1.25 in. The spacing of the grates used to sort out larger fish ranged from 1.625-3 in.

## Markets

One processor bought the majority of the fish in 1999. Three plants, located in Astoria, processed sardines in 2000. In both years, most of the landings were made into Astoria and processed as bait for a Japanese longline fishery. Average ex-vessel price was \$0.05 per pound (\$200 per ton).

## **Non-target species**

### Bycatch

A seasonal employee was hired for the main purpose of riding along on sardine vessels and observing bycatch of non-target species. Twenty-two trips and 45 sets of the gear were observed (7 % of the total trips landed in Oregon). Vessel skippers also were required to record all species caught in the logbook. Logs turned in by October 31 accounted for 91 % of the landings.

Based on both observer and logbook data, bycatch was low. Bycatch (species caught but not landed) included chinook and coho salmon, dogfish, soupfin and salmon sharks, herring, hake, flatfish, and a sunfish (Table 1). One sea lion was encircled by a set of the gear, but was released unharmed. Numerous jellyfish were also observed in the net and pumped into the hold but not quantified. Salmon was the major species of concern. The species of salmon was usually not recorded on the log sheets and they were often released before the observers could determine the species. Observed salmon averaged 2.1 salmon per trip or 1.0 salmon per set of gear, with 76 % being released alive. The estimated total catch of salmon for the fishery, based on observer data, is 518 - 663 salmon (Table 2).

Table 1. Observed and reported catches of non-target species caught in Oregon sardine fishery, 2000.

Species	Logbook data	Observer data	
	# Caught	# Released Alive	# Dead
Dogfish shark	2		
Soupfin shark	2		
Salmon shark			1
Herring			~500 lb
Chinook salmon		3	5
Coho salmon		11	3
Salmon (unknown)	206	21	3
Hake		2	
Mackerel	96,672 lb		26,500 lb
Starry flounder			1
Sanddab			1
Unknown flatfish	54 lb		
Sunfish	1		
Jellyfish			undetermined
Sea lion	1	1	



Table 2. Observed and expanded total number of salmon caught in sardine fishery, 2000.

	Chinook		Coho		Unknown		Total		Grand total
	alive	dead	alive	dead	alive	dead	alive	dead	
observed	3	5	11	3	21	3	35	11	46
expanded total based on salmon/trip	43	72	159	43	303	43	504	159	663
expanded total based on salmon/set	34	56	124	34	237	34	394	124	518

### Incidental catch

In addition to observing bycatch species, species composition data was collected on the vessels as fish were being pumped into the holds and at the dock as the vessels were off-loading. A total of 32 species composition samples were taken. Twenty-seven samples (84 %) were 100 % sardines. The other five samples ranged from 87-99 % sardines. Observed incidental catch (landed non-target species) consisted of Pacific mackerel, jack mackerel, and herring, for an overall average of 0.6 % of the landings (Table 3). Incidental catch recorded on fish tickets consisted of 27.3 mt of Pacific mackerel and 18.2 mt of jack mackerel, for a total of 0.5 % of the total catch.

Table 3. Observed and recorded incidental catch in Oregon sardine fishery, 2000.

Species	Fish ticket data		Observer data
	mt landed	percent of catch	percent of catch
Pacific mackerel	27.3	0.3	0.1
Jack mackerel	18.2	0.2	0.4
Herring	-	-	0.1

### **Biological samples**

Staff collected 31 biological samples of at least 25 sardines, each for a total of 941 fish. Data collected from each fish included weight (gm), standard length (mm), sex, and maturity. Otoliths were extracted and sent to California Department of Fish and Game (CDFG) for age-reading. Other data included on the data sheets were vessel, date, and location and depth of catch. Sex and maturity were determined using the CDFG Standard Maturity Guide for Wetfish.

The weight of individual fish ranged from 80 gm to 273 gm, with an overall average of 153 gm. Standard length ranged from 125 mm to 257 mm, with an overall average of 208 mm. In general, females were larger than males (Table 4). Average length and weight generally decreased over the season (Figure 6).

The sex composition of samples ranged from 20 % males to 60 % males, with an over all M/F ratio of 45/55. The majority of fish samples were of maturity condition 2. Most condition 3's and 4's were seen at the beginning of the season (Figure 7). Because of our inexperience in determining

maturity condition, the precision of the data may be somewhat questionable. But, the general trend is probably reasonably depicted.

Age data returned from CDFG for samples taken in 1999 and 2000 show a high percent of young fish. (Figure 8). The average length-at-age shows a general increase, but there is also a high degree of overlap. (Figure 9).

Table 4. Average and range of weight (gm) and length (mm) of sardines sampled from Oregon sardine fishery, 2000.

		Males	Females	Total
Weight (gm)	average	153.6	155.2	153.4
	range	80.7-218.5	79.9-273.3	79.9-273.3
Length (mm)	average	210	210	209
	range	166-243	118-257	118-257

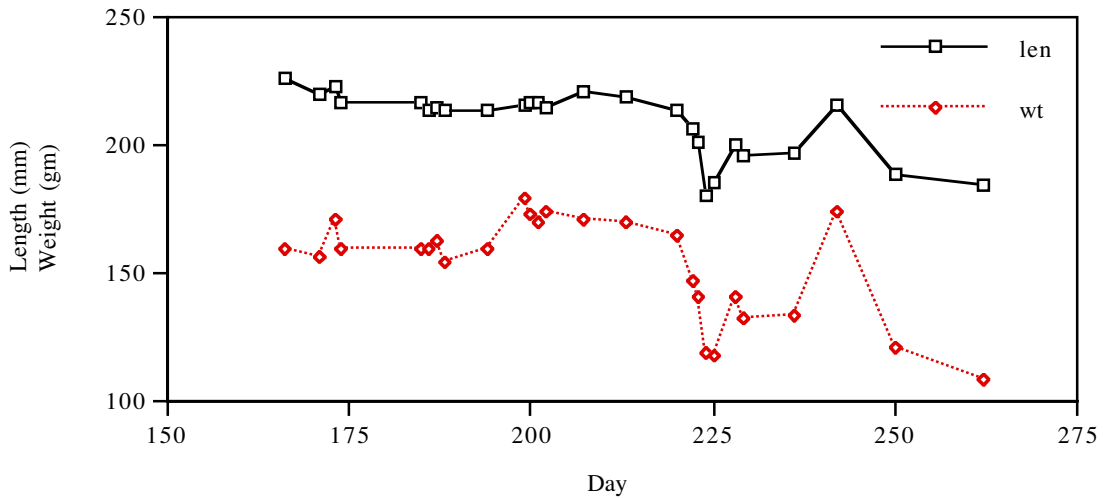


Figure 6. Average standard length (mm), and weight (gm) of sardines, over time, 2000.

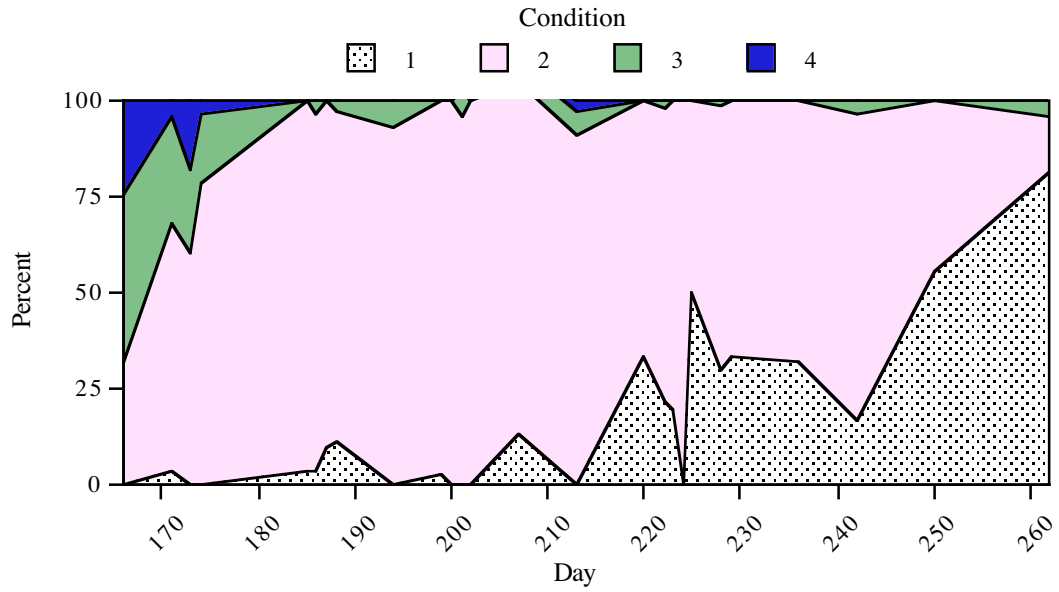


Figure 7. Maturity condition composition (%) of sardines, over time, 2000.

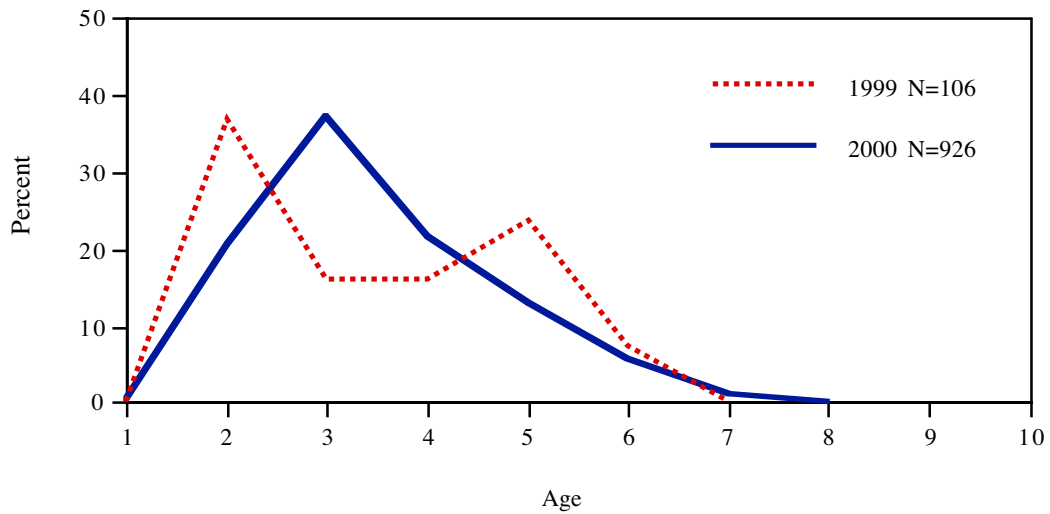


Figure 8. Age composition (%) of sardines samples in Oregon, 1999 and 2000.

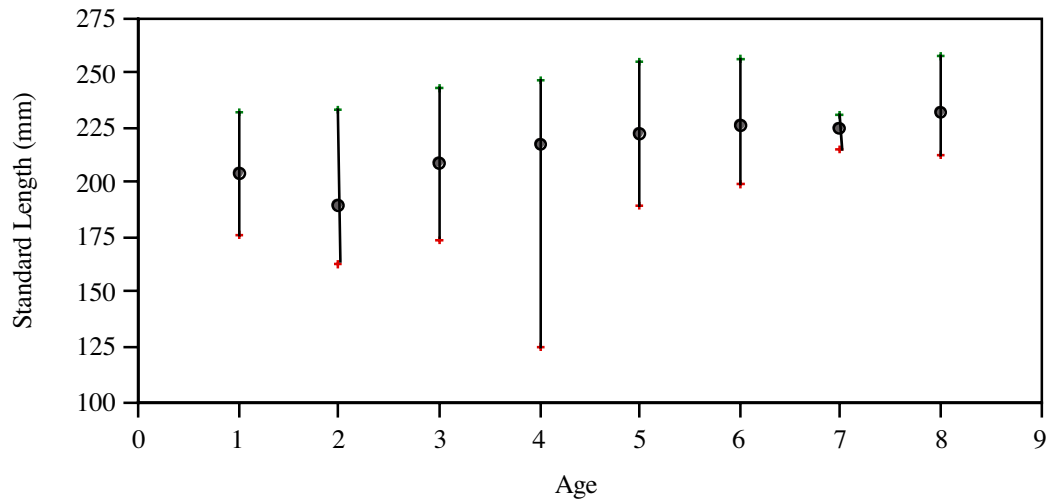


Figure 9. Average, minimum, and maximum standard length (mm) by age of sardines sampled in 2000. N=922.

### Future Issues / Recommendations

From a management perspective, the sardine fishery in 2000 went smoothly. Bycatch was low and no major conflicts arose. For 2001, we plan to continue the at-sea observations for bycatch and a similar biological sampling program.

There is a good global market for sardines and there appears to be a healthy resource, at least for the short term. Long term availability of sardines is still a major question. If processing capacity is increased (and sardines remain available), there could be higher landings for 2001.

Presently, the landing requirement to renew permits is low compared to an average daily landing. With the high degree of interest in obtaining permits, there is interest in increasing the renewal requirements to make them more representative of average landings and to allow some turn-over in the permits.

Also, because of the intense interest in permits, there is interest in increasing the number of available permits. If sardine remain available, there appear to be an adequate resource to allow more permits. However, the limiting factor is presently processing capabilities. If there isn't an increase in processing, allowing more vessels won't necessarily result in more landings.