Oregon's Sardine Fishery
2003 Summary

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INTRODUCTION

Background

Sardines are managed under the Pacific Fishery Management Council's Coastal Pelagic Species Fishery Management Plan (FMP). Under the FMP, the biomass of sardines is estimated each year and a coast-wide harvest guideline is established. In 2002, the Council adopted an interim allocation system for the 2003-2004 and possibly 2005 seasons. Discussions to design a new allocation system will take place in 2004. Under the interim allocation system, the harvest guideline is allocated 2/3 to the California fishery and 1/3 to the Oregon and Washington fisheries. Any portion of the harvest guideline that is unused by September 1 may be re-allocated 80/20 between the southern and northern areas. For 2003, the coast-wide harvest guideline was 110,908 mt (down from 118,442 mt for 2002) and the initial northern allocation was 36,969 mt.

Except for the coast-wide harvest guideline, management of sardines north of 39° N (approximately Point Arena) continues under state management as long as the management measures are consistent with the FMP. In Oregon, sardines are managed under the Developmental Fishery Program which limits the number of harvest permits. Prior to 2001, 15 permits were allowed and all were issued in 1999 and 2000. In 2001, five additional permits were added (for a total of 20) to encourage an increase in processing capabilities.

Goals and Objectives

The goals for this year's work were to continue to gather information on sardines off Oregon to improve the coast-wide stock assessment of sardines and document the extent of by-catch in the fishery.
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, amount, and condition. Recommend management measures to reduce by-catch if necessary.
- Document harvest methods, distribution of harvest, and catch per unit of effort.

FISHERY DESCRIPTION

Landings / Effort

The first directed landings of sardines into Oregon since 1948 occurred in 1999 for a total of 1.7 million pounds (775.7 mt) by three vessels. In 2000, just over 21 million pounds (9,524 mt) were landed by 14 vessels. In 2001, over 28.2 million pounds (12,798 mt) were landed by 18 vessels. In 2002, over 50 million pounds (22,711 mt) were landed by 17 vessels.

In 2003, almost 56 million pounds (25,258 mt) were landed. Seventeen vessels targeted sardines using seine gear, two vessels landed small amounts as incidental catch in the whiting fishery with

trawl gear. A small amount was also harvested from Winchester Bay for a local bait fishery. The seine vessels made 712 landings averaging 78,207 lb (35.5 mt) per landing. Individual landings ranged from 2,005 lb (0.9 mt) to over 163,000 lb (74 mt) (Figure 1). Table 1 compares details for the 1999 through 2003 fisheries.

This year, more vessels participated in the fishery for longer periods than in past years. Of the 17 vessels targeting sardines, nine made >80 % of the landings (Figure 2). Eleven vessels worked during 9 - 15 weeks of the fishery. Four vessels worked during 6 -7 weeks of the fishery. Two vessels made only enough landing to qualify their permit for renewal.

In the first four years of the fishery, landings began in early to mid-June and continued through mid-September through mid-October (Table 2, Figure 3). In 2003, industry members requested Oregon and Washington institute a later starting date in order to prevent any closure in the middle of the season, before the re-allocation date. Oregon and Washington agreed on a starting date of June 22. July and August continue to be the peak months of harvest with 28% and 41% of the total harvest in each month, respectively. This year, with favorable ocean conditions, 23% of the landings came in September. Final landings were made in early October. The National Marine Fisheries Service officially closed the northern area on October 17 because the allocation had been reached.

Seven processors bought sardines in 2003. Average ex-vessel price was $0.05 per pound ($106 per mt).

Table 1. Comparison of 1999 through 2003 Oregon sardine fisheries.

	1999	2000	2001	2002	2003
initial northern allocation, mt		62,264	44,912	39,481	36,969
pounds landed (metric tons)	1,709,686 (776)	21,005,311 (9,528)	28,214,988 (12,798)	50,068,717 (22,711)	55,683,476 (25,258)
permits issued	15	15	20	20	20
vessels targeting sardines	3	14	18	17	17
landings by target vessels	23	349	453	657	712
average landing (lb)	74,306	60,183	62,260	76,208	78,207
start date	6/21	6/14	6/4	6/10	6/22
end date	9/15	10/12	10/5	10/14*	10/2
buyers	1	3	5	7	7
average ex-vessel price	$0.05	$0.05	$0.06	$0.05	$0.05

*closure from 9/14-9/20

Table 2. Landings (mt) of sardines into Oregon, by month, 1999-2003.

	1999	2000	2001	2002	2003
May	0.1				
June	50	205	2,288	2,724	503
July	238	2,457	4,898	7,677	6,991
August	383	3,960	3,393	8,650	10,263
September	104	2,599	1,993	3,258	7,006
October		303	208	402	495
November		3			
December		2			

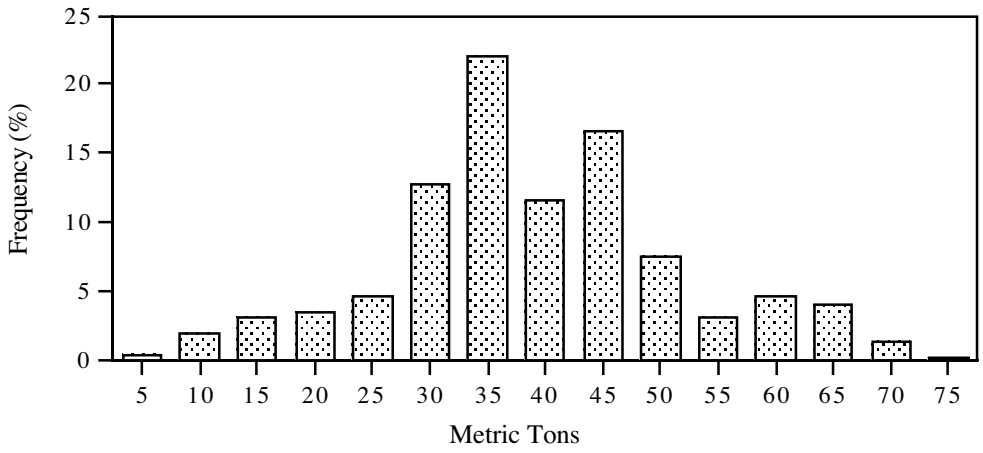

Figure 1. Frequency (%) of sardine landings (mt) per ticket, 2003.

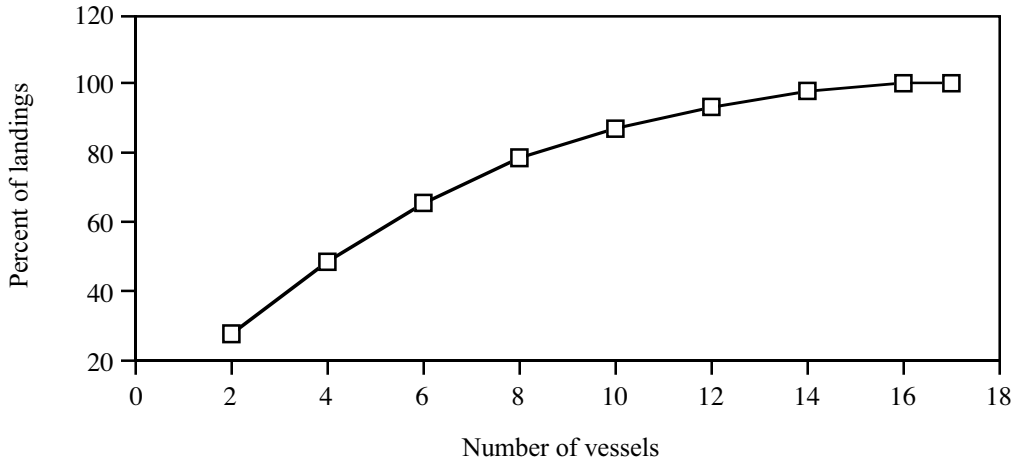

Figure 2. Cumulative percent of landings, by vessel onto Oregon, 2003.

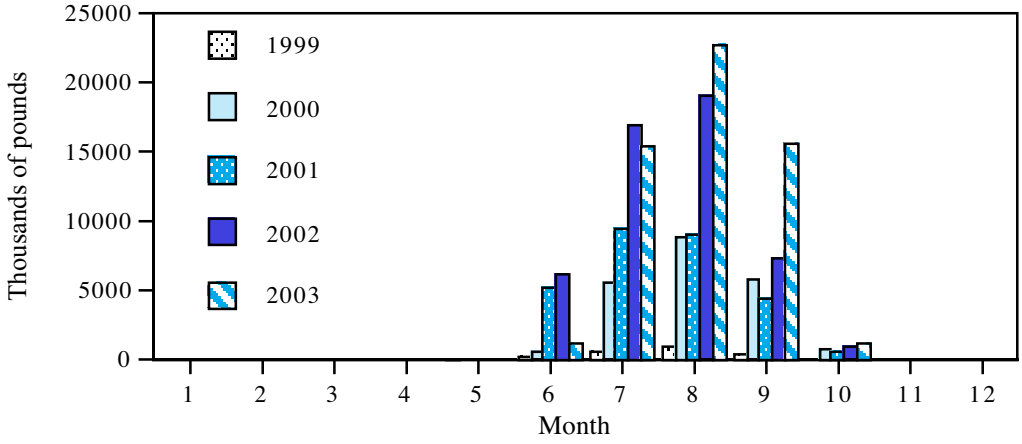

Figure 3. Monthly landings of sardines into Oregon, 1999-2003.

Area of catch

Logbooks are required as a provision of the permit. Logs turned in by November 1st accounted for 92 % of the landings. The area of catch in 2003 was approximately 45 nm north and 30 nm south of the Columbia River and out to approximately 25 nm off shore (Figure 4). This area is much farther to the north than in past years. In past years, harvest activity did not go as far north as the mouth of Willapa Bay. Depths in the harvest area ranged from 7 fm to over 400 fm, with an average of 54 fm. Based on log data, 65 % of the pounds landed were taken off Oregon and 35 % off Washington.

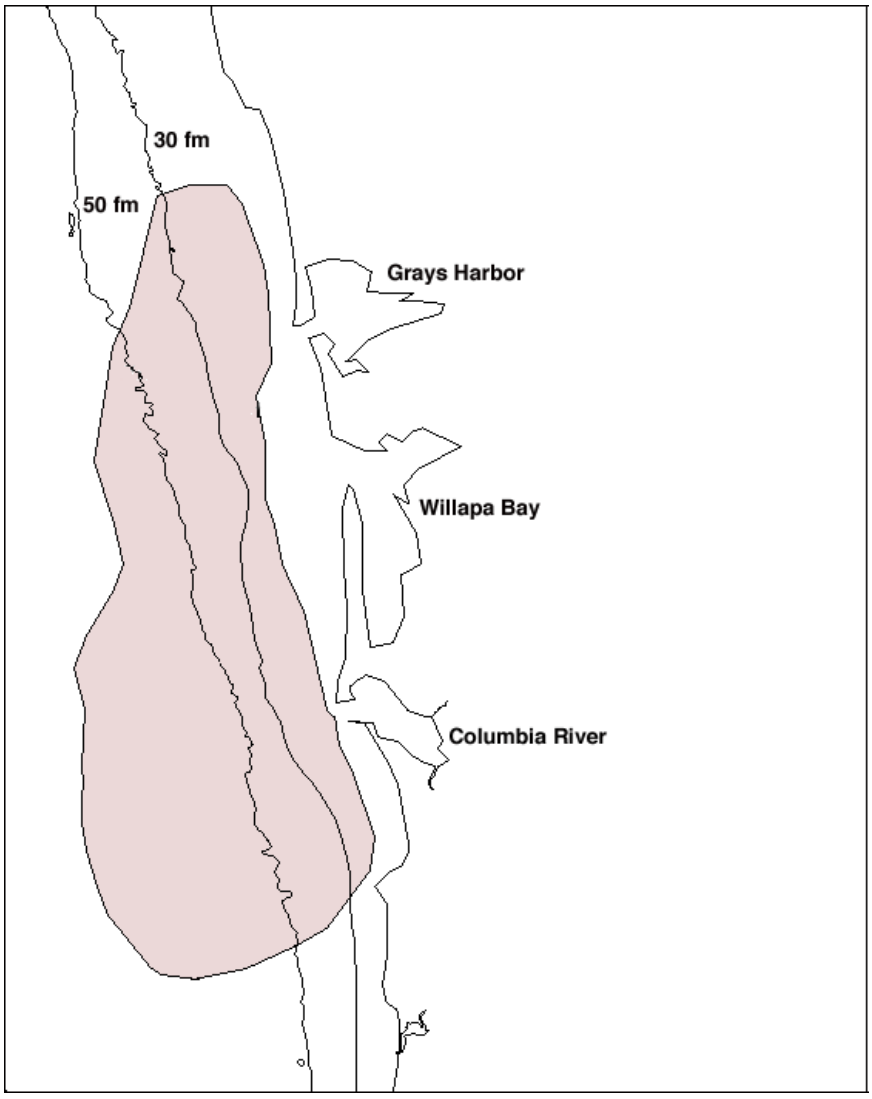

Figure 4. Area of harvest for Oregon's sardine fishery, 2003.

NON-TARGET SPECIES

Bycatch

Due to budget restrictions, we did not hire a seasonal employee to ride along on sardine vessels and observe bycatch of non-target species**.** Available staff was able to observe three trips. Vessel skippers also were required to record all species caught in the logbook**.** Logs turned in by November 1 accounted for 92 % of the landings.

Based on both observer and logbook data, bycatch continues to be low. Bycatch (species caught but not landed) included salmon, and sharks. (Table 3). Numerous jellyfish were also observed in the net and pumped into the hold but not quantified. Salmon was the major species of concern. Based on log records, salmon catch averaged 0.8 per trip, with 63 % released alive. The estimated total catch of salmon for the fishery, based on log data, is 500 salmon (0.020 salmon/mt) (Table 4).

Table 3. Observed and reported catches of non-target species caught in Oregon sardine fishery, 2003.

Species	Logbook data	Observer data
	# Caught	# Caught
Blue shark Thresher shark Dogfish shark unknown shark	1 5 75 lb 3	
Salmonids	460 (63% alive; 37% dead)	4 (75% alive; 25% dead)
Mackerel Anchovy Jelly fish	225,007 lb 500 lb	750 lb present

Table 4. Estimated salmon caught in sardine fishery, 2000-2003. For 2000 and 2001, estimate is based on salmon/trip from observer data. For 2002 & 2003, estimate is based on log data.

Year	Salmon	Salmon / mt
2000	663	0.070
2001	491	0.038
2002	280	0.012
2003	500	0.020

Incidental catch

Incidental catch (landed non-target species) in 2003 was similar to past years (Table 5). In addition to the usual mackerel, whiting and thresher shark were also recorded on fish tickets.

Table 5. Recorded incidental catch (mt) in Oregon sardine fishery, 2000-2003 (from fish ticket data).

Species	2000		2001		2002		2003	
	mt landed	percent of catch	mt landed	percent of catch	mt landed	percent of catch	mt landed	percent of catch
Pacific mackerel	27.3	0.3	52.8	0.4	126.3	0.6	158.3	0.6
Jack mackerel	18.2	0.2	1.2	<0.1	0.3	<0.1	3.2	<0.1
Pacific herring	-	-	-	-	3.3	<0.1		
anchovy	-	-	-	-	0.2	<0.1		
shad	-	-	-	-	0.3	<0.1		
whiting	-	-	-	-	-	-	0.1	<0.1
thresher shark	-	-	-	-	-	-	0.3	<0.1

BIOLOGICAL SAMPLES

Staff collected 44 biological samples of 25 sardines. Data collected from each fish included weight (gm), standard length (mm), sex, and maturity. Otoliths were extracted and sent to Washington Department of Fish and Wildlife (WDFW) 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 maturity codes developed at the aging and maturing workshop in April, 2003 (Table 6).

Table 6. Sex and maturity stages of Pacific sardine (abbreviated).

Code	Description	
	Females	Males
1	Clearly immature - ovary is very small	Clearly immature - testis is very small
2	Not clearly immature - individual oocytes not visible	No milt evident and is not a clear immature
3	Yolked oocytes visible	Milt is present;.
4	Hydrated oocytes present	

The weight of individual fish ranged from 29 gm to 279 gm, with an overall average of 175 gm. Standard length ranged from 70 mm to 300 mm, with an overall average of 217 mm (Table 7).

Industry had problems marketing the large size of the fish harvested in 2003. This larger size is not reflected in the overall average because there was also more smaller fish. For example, in 2002, there was very few fish less than 200 mm in length. In 2003, 15% were smaller than 200 mm (Figure 5). The average length has shown no trend over the season. Except, in 2000 there was a general decrease in length over time (Figure 6).

Age composition continues to show an increase in average age from mostly 3-5 year olds in 2002 to a peak at 5-6 years of age in 2003, with a secondary peak at 2-3 years of age (Figure 7). Average length at age in 2003 was similar to past years for most ages, but slightly less in younger ages (Figure 8).

Table 7. Average and range of weight (gm) and length (mm) of sardines sampled from Oregon sardine fishery, 2000-2003.

		2000	2001	2002	2003
Weight (gm)	average	153.4	153.8	183.1	174.6
	range	79.9 - 273.3	46.4 - 241.0	83.2 - 301.6	29.0 - 279.0
Length (mm)	average	209	212	222	217
	range	118 - 257	145 - 256	116 - 260	70 - 300

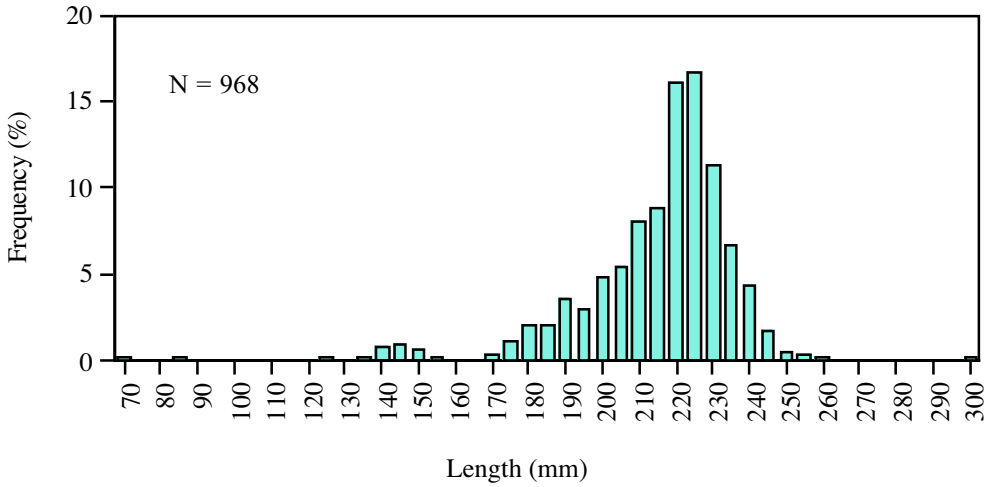

Figure 5. Length frequency (%) of sardines sampled in 2003.

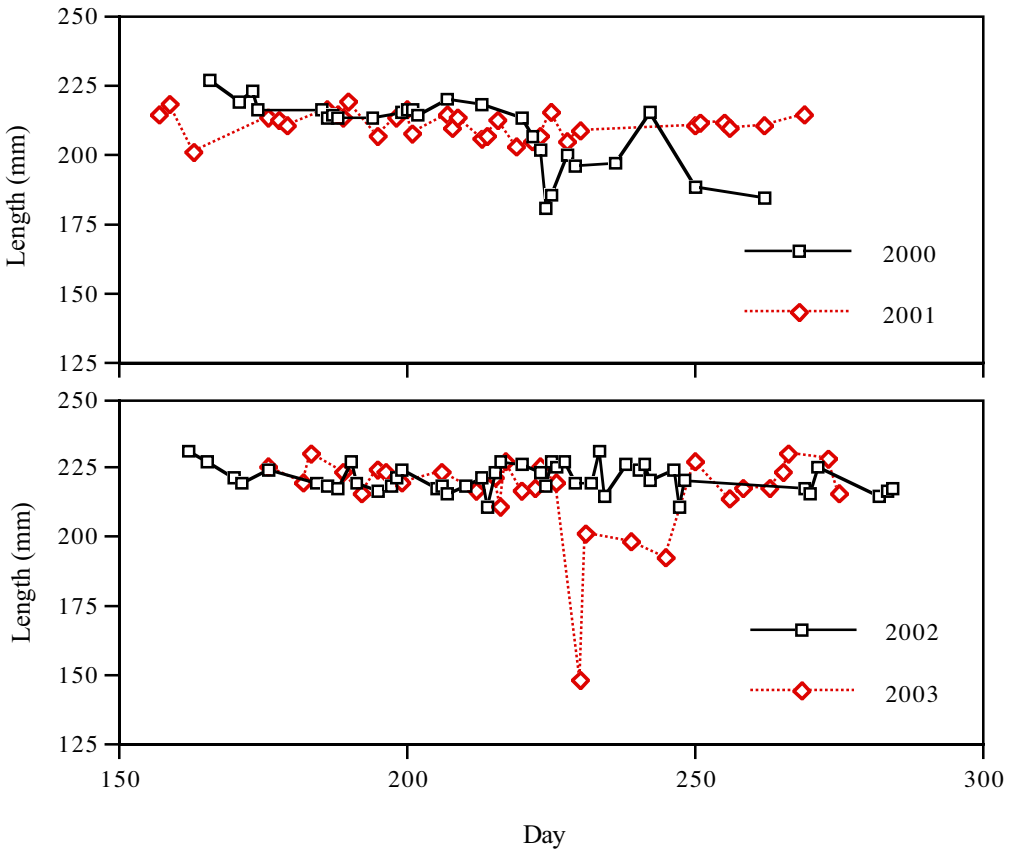

Figure 6. Average standard length (mm) of sardines, over time, 2000-2003.

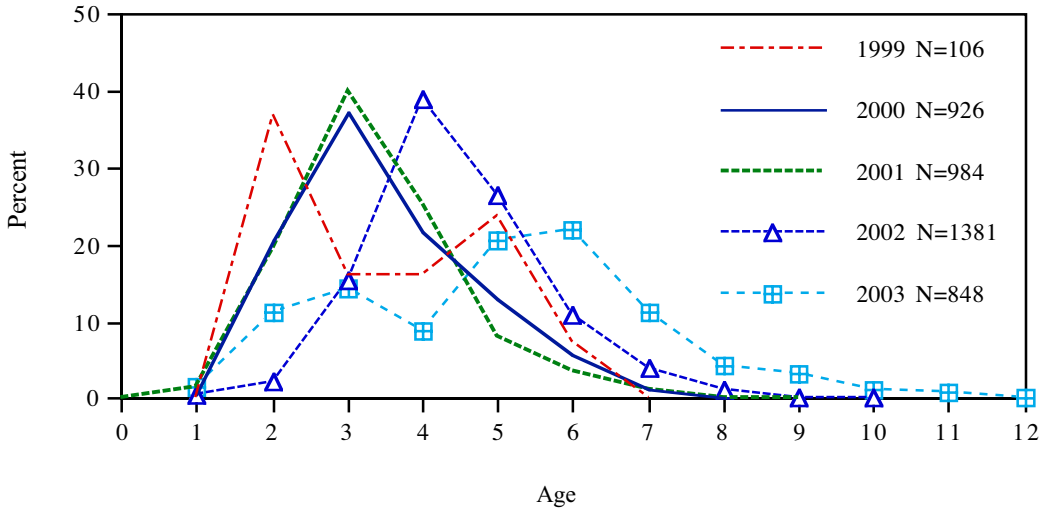

Figure 7. Age composition (%) of sardines sampled in Oregon, 1999 - 2003.

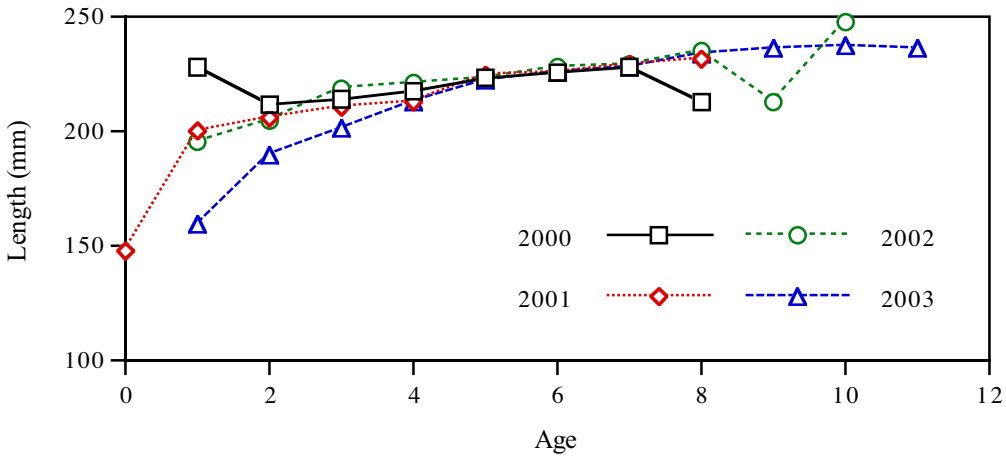

Figure 8. Length at age of Oregon sardines, 2000-2003.

ACKNOWLEDGMENTS

Many big thanks go to: Jill Smith and Tiffany Hughes for their at-sea observations, and collecting and working up biological samples and logs; Washington Department of Fish and Wildlife for aging otoliths; and all the vessel skippers and crew members for their cooperation.

Appendix Table A. Data summary for 2003 Oregon sardine biological samples.

Sample date	Julian day	No. of males	No. of females	Ave. wt (gm)	Ave.len (mm)	% Maturity code				
						1	2	3	4	5
6/25/03	176	14	11	172.7	225		92	8		
7/1/03	182	14	11	191.2	220		76	24		
7/2/03	183	10	10	209.1	233		90	10		
7/2/03	183	13	10	188	227		95.7	4.3		
7/8/03	189	15	10	184.1	223	4	92	4		
7/11/03	192	15	10	185.3	216		80	20		
7/14/03	195	11	14	196.8	224		80	16	4	
7/15/03	196	14	11	177.4	222		92	8		
7/15/03	196	8	16	186.8	225	4	83	13		
7/18/03	199	7	18	175.7	220		75	24		
7/25/03	206	9	16	185.2	223		88	12		
7/31/03	212	6	17	174.4	218		91.3	4.3	4.3	
8/3/03	215	12	13	181.6	222	4	92	4		
8/4/03	216	11	14	175.2	221	8	92			
8/5/03	217	9	16	199.6	227		88	12		
8/8/03	220	10	15	169.7	213		100			
8/8/03	220	9	16	178	222		100			
8/10/03	222	13	12	171.3	218	40	60			
8/11/03	223	10	15	182.3	226		92	8		
8/11/03	223	14	11	197.5	225		100			
8/14/03	226	13	12	174.9	220	8	88	4		
8/18/03	230			47.3	148					
8/19/03	231	11	14	135.8	201	48	48	4		
8/27/03	239	15	25	121.7	198	48	52			
9/2/03	245	9	16	116.9	193	80	20			
9/7/03	250	9	16	191.7	227	44	52	4		
9/13/03	256	7	17	181.6	218	4.1	95.8			
9/13/03	256	14	11	167.5	212		100			
9/13/03	256	15	10	178.2	213		100			
9/15/03	258	11	14	197	218	4	96			
9/20/03	263	11	14	138.9	212	56	44			
9/20/03	263	14	11	183.2	221	4	96			
9/20/03	263	13	12	182.8	221	16	84			
9/22/03	265	14	11	171.4	221	24	79			
9/22/03	265	11	14	191.2	226	28	72			
9/23/03	266	14	11	198.9	230	40	60			
9/30/03	273	11	14	196.6	228	8	88	4		
10/2/03	275	11	14	181.3	214	8	92			
10/2/03	275	19	16	180.6	217		100			
total		446	518	174.6	217	24	82.3	9.87	4.15	