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Washington Pacific Sardine Fishery Review 2013

by Lorna Wargo and Carol Henry

Washington Department of
FISH AND WILDLIFE
Fish Program
Fish Management Division

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Washington
Pacific Sardine Fishery Review
2013

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Summary of the 2013 Commercial Purse Seine Fishery for Pacific Sardine (*Sardinops sagax*)

Introduction

Pacific sardines are the primary coastal pelagic species harvested in Washington waters. From 2000 through 2009, participation in the sardine fishery was managed under Washington's Emerging Commercial Fishery Act (ECFA), which provides for the harvest of a newly classified species or harvest of a classified species in a new area or by new means. The ECFA offers two choices for fishery-permit designations: trial, which does not limit the number of participants or experimental, which does limit participation and prohibits the transfer or sale of the permit. From 2000 through 2002, the Washington Department of Fish and Wildlife (WDFW) managed the purse seine fishery for sardine under the trial designation. Absent limited participation, the Washington fishery was managed to a state harvest guideline (HG) of 15,000 metric tons (mt).

The Pacific Northwest sardine fishery saw a rapid expansion of catch between the years 1999 to 2002 when landings increased from 771 mt to 15,820 mt. In response, WDFW engaged in an extensive public process to address management needs in the fishery. In 2003, following this public process, a formal Sardine Advisory Board (Board) was created, and the WDFW Director, in collaboration with the Board, advanced the sardine fishery designation from trial to experimental as provided for under the ECFA. The number of experimental fishery permits was capped at 25. The experimental fishery program continued through June 2009. Besides limiting participation, WDFW also restricted the amount of sardines sold for reduction to a 15 percent season cumulative total by weight by individual vessel.

Effective July 2009, legislation to establish a commercial license limitation program specifically for the harvest and delivery of Pacific sardines into the state was passed into law. The new law established 16 permanent licenses which can be transferred or sold. In addition, the law provided criteria for the issuance of temporary annual permits at the discretion of the WDFW Director. The total number of permanent and temporary annual licenses cannot exceed 25.

Since 2012, the Quinault Indian Nation has conducted a sardine purse-seine fishery. The process for tribal allocation (set-aside) requests is managed by the National Marine Fisheries Service as described by the Pacific Fishery Management Council's Coastal Pelagic Species Fishery Management Plan (CPS FMP Amendment 9) and National Marine Fisheries Service regulations (50 CFR 660.518). The Quinault fishery operates within their usual and accustomed fishing area (U & A), directly off Westport/Grays Harbor, Washington, or that portion of the Marine

Fish/Shellfish Fishery Management Area between 47°40.10' N. lat. (Destruction Island) and 46°53.30' N. lat. (Point Chehalis). Catches from the Quinault sardine fishery are not reported here, but are included in the CPS SAFE report (SAFE 2014).

Fishery Management and Description

Pacific sardines are managed by the Pacific Fishery Management Council (Council) under the Coastal Pelagic Species (CPS) fishery management plan. Through the Council process, scientists conduct an annual coastwide stock assessment that incorporates survey and fishery data. The Council's Scientific and Statistical Committee reviews that assessment and recommends an annual coastwide overfishing limit (OFL) to the Council. Each year, after considering the information presented through its advisory bodies and public comment, the Council adopts the OFL, an acceptable biological catch (ABC), harvest guideline (HG), and research set aside (EFP). The harvest guideline is allocated by seasonal periods, with releases on January 1st, July 1st, and September 15th. The fishery year begins January 1 and ends December 31; if the period allocation is not attained it and any remaining incidental fishery set aside is rolled to the next period, but not to the next year.

By state regulation, Washington license holders can commence landing sardines beginning April 1. However, in some years the first period allocation is achieved by the California fishery before April 1 and active fishing in Washington thus cannot begin until the second period which commences July 1st. Weather and sardine presence/accessibility are also factors affecting when active fishing begins. There were no first period landings into Washington in five of the 14 years since 2000.

The initial 2013 coastwide harvest specifications and harvest guideline are presented in Table 1; actual period guidelines will vary due to rollovers and releases from the Quinault Indian Nation set aside into the non-treaty fishery. The 2013 HG of 66,495 mt represents a decrease of 64% from 2000, the first year with a coastwide harvest guideline. The harvest guideline has declined for the last 13 years due to decreases in biomass estimates (Table 2). In contrast, Washington annual catch has been generally trending upward. In 2013, sufficient first period allocation remained and conditions were such that Washington vessels began fishing mid-June. The 2013 landed catch represents a six-fold increase from the original state harvest in 2000 and is 48% of the total coastwide landed catch.

A total of 29,381 mt of sardines were landed in the non-treaty directed fishery in 2013. Of 456 landings, 5, 45 and 29 percent were made in June, July and August, respectively. Each landing averaged about 66 mt. All landings were made into Westport or Ilwaco with the majority of the

catch (76%) occurring in waters adjacent to Washington (Figure 1). A total of 582 sets were made with 546 (94%) of them successful. Average catch per successful set was about 56 mt.

Monthly distribution of landings varies depending on period allocation availability, sardine presence, and ocean/weather conditions. Typically, the majority of catch is landed during the second management period. Prior to 2008, sardine landings were distributed throughout June, July, August, September, and occasionally October and November. Since then, due to decreasing harvest guideline and the more rapid attainment of period allocations, landings have been largely limited to July and September. The 2013 fishery was somewhat of an exception, despite the decrease in HG (66,495 mt) sardine were landed June through October. This is attributed to market conditions and low landings elsewhere. The Washington fishery concluded on October 17th due to the influx of cooler water and inclement weather. The coastwide 2013 HG was not attained.

The total direct value[1] of the Washington sardine fishery has varied as a function of price, effort, and harvest guideline availability. Total direct value has averaged $2.2 million, peaking at $7.7 million in 2012 (Figure 2). Vessels based at Ilwaco and Westport sometimes use spotter planes to locate sardines. In general, pilots receive about 10% of the landing revenue.

Since the inception of the Washington fishery in 2000 the price per pound for sardine has doubled. Direct value price to the fisher ranged from $0.04 to $0.07 per pound from 2000 to 2007, and between $0.09 and $0.13 per pound from 2008 to 2012. In 2013, the direct price per pound averaged $0.10 per pound for sardines processed either for bait or for human consumption markets. Rendered sardines averaged $0.05 per pound.

The number of vessels participating during each phase: trial, experimental and limited entry averaged 17, 7, and 9 respectively. In 2013, twelve vessels participated in the non-treaty fishery.

During the trial phase, direct value per vessel averaged $66,300 (Figure 3). After transitioning to an experimental fishery (i.e. limited entry), the direct value per vessel averaged $128,800 from 2003 through 2009. With the permanent limited-entry licensed fishery, average per vessel value rose to $473,000. Per vessel direct value peaked in 2012 at $702,100 and declined to $548,400 in 2013.

[1] Direct value, also known as ex-vessel value, is the price or total value paid to the fisherman.

Table 1. 2013 annual specifications and harvest guideline by allocation period (mt).

OFL	103,284			
ABC	94,281			
HG	66,495			
EFP Set Aside	3,000			
Tribal Set Aside	6,000			
	Total	**Period 1 JAN 1 – JUN 30**	**Period 2 JUL 1 – SEP 14**	**Period 3 SEP 15 – DEC 30**
Adjusted HG	**57,495**	20,123	22,998	14,374
Incidental Fishery Set Aside	3,000	1,000	1,000	1,000
Directed Fishery HG	54,495	19,123	21,998	13,374

Table 2. Annual coastwide harvest guideline from 2000 through 2013.

Year	Biomass (1+) Metric Tons	Coastwide Harvest Guideline (mt)	Total Coastwide Landings (mt)	Washington Landings (mt) (Non-tribal only)	Washington Non-tribal Landings as Percent of Coastwide Landings
2000	1,581,346	186,791	72,496	4,842	7%
2001	1,182,465	134,737	78,520	11,121	14%
2002	1,057,599	118,442	101,367	15,820	16%
2003	999,871	110,908	74,599	11,920	16%
2004	1,090,587	122,747	92,613	8,907	10%
2005	1,193,515	136,179	90,130	6,714	7%
2006	1,061,391	118,937	90,776	4,364	5%
2007	1,319,072	151,654	127,695	4,663	4%
2008	832,706	89,093	87,175	6,432	7%
2009	662,886	66,932	67,083	8,009	12%
2010	702,024	72,039	66,891	12,389	19%
2011	537,173	50,526	46,745	8,009	17%
2012	988,385	109,409	101,103	34,655	34%
2013	659,539	66,495	61,646	29,381	48%

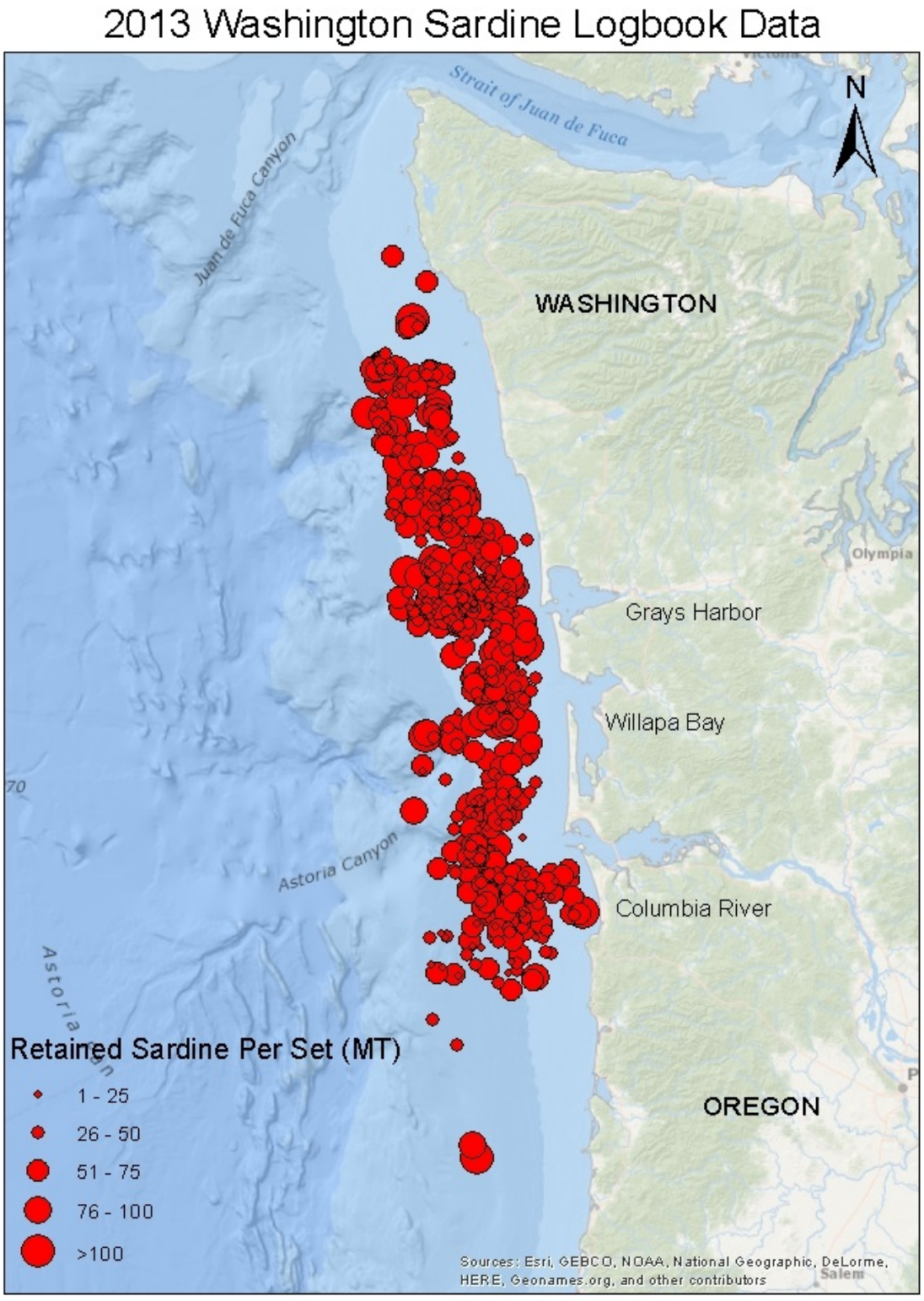


Figure 1. 2013 sardine fishery set locations as reported in Washington logbooks.

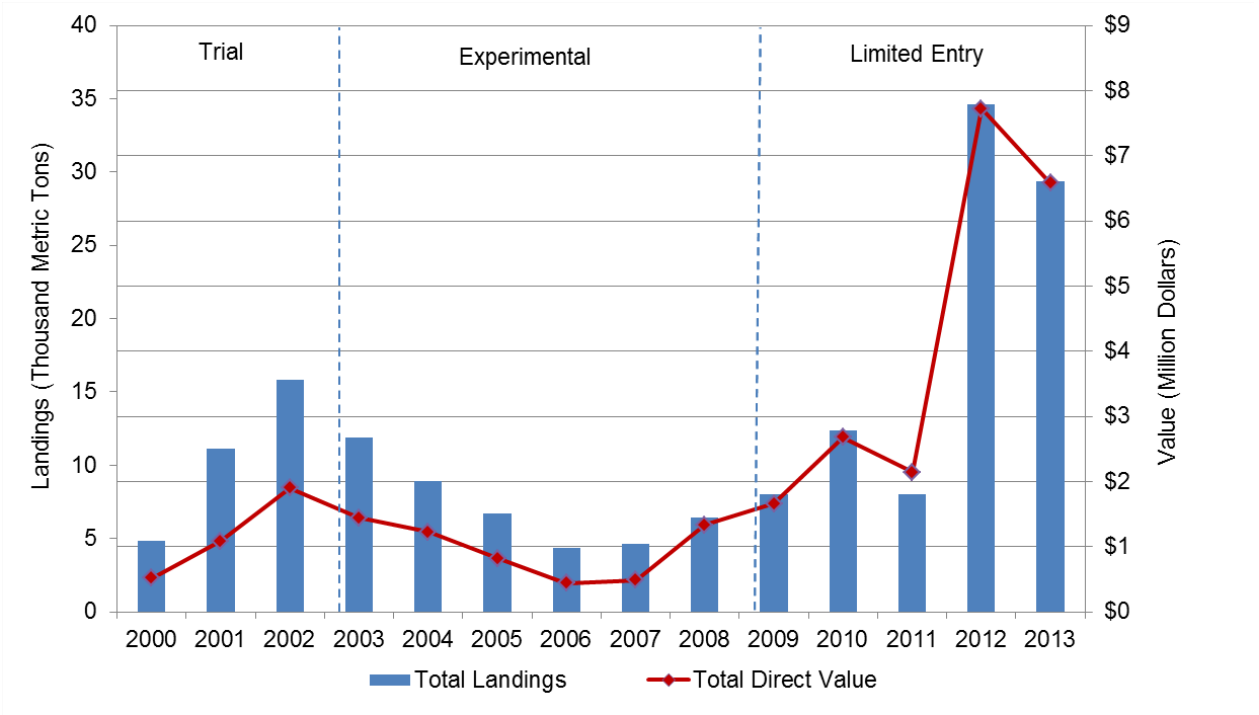


Figure 2. Washington total annual landings (mt) and total fishery direct value, 2000-2013.

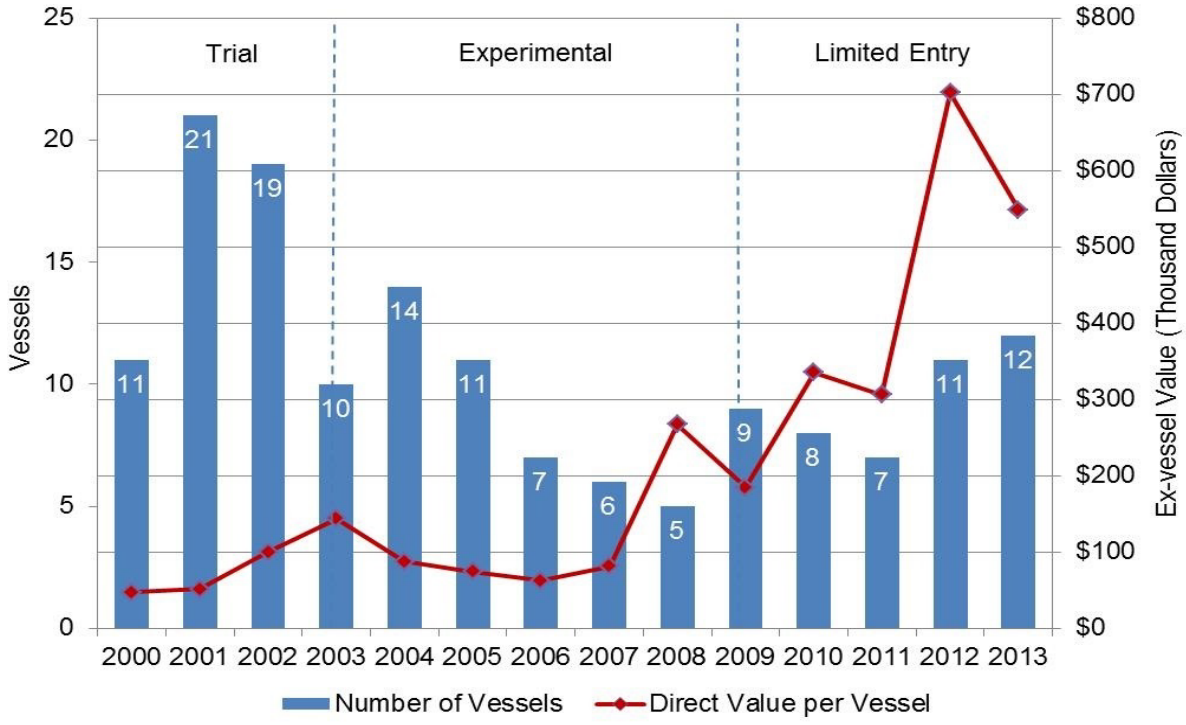


Figure 3. Number of Washington vessels and per vessel direct value, 2000-2013.

Fishery Monitoring and Sampling

WDFW conducts routine port sampling, biological analyses and produces daily or weekly landing estimates depending on need. Weekly estimates were distributed to National Marine Fisheries Service, state agencies, and industry members to track attainment of the harvest guideline in-season.

Landings are randomly sampled during directed fishery periods. The sampling goal is three samples of 25 individual fish per 1,000 mt sardines landed into Washington ports. Weight, sex, and maturity are recorded and otoliths are extracted for age-reading.

A mandatory Washington state logbook program has been in place since the fishery began in 2000 (Appendix A). Data are maintained in electronic format at the WDFW Regional 6 office and are used to plot catch distribution, catch per unit of effort and estimate bycatch.

Incidental Catch and Bycatch Estimation

Pacific sardines are the targeted catch in the Washington fishery, but anchovy, mackerel, and squid may be retained and landed. In 2013, mackerel, totaling 196 mt, comprised the only incidentally landed coastal pelagic species documented on fish receiving tickets. Otherwise, eight non-target species were landed; of these the largest amount, other than mackerel, was chinook (Table 3).

To document bycatch levels, in the Pacific sardine fishery WDFW conducted a five-year observer program from 2000 through 2004. Overall observer coverage in this program was in excess of 25 percent and results showed bycatch of non-targeted species in the Washington sardine fishery to be relatively low. Salmon bycatch in the Washington sardine fishery for years subsequent to the observer program is calculated by multiplying total sardine catch and the observed five-year average bycatch rates. Based on the total sardine catch for 2013, the estimated bycatch of salmon is 1,794 fish: 890 Chinook and 904 Coho (Table 4).

Biological Sampling

The collection of biological samples is coordinated with Oregon Department of Fish and Wildlife (ODFW) staff to ensure sample coverage is similarly distributed across the Pacific Northwest fishery. WDFW collected 69 biological samples of twenty-five sardines each (1,725 individual sardines) during the 2013 sardine season. WDFW did not reach the sampling goal of three samples per 1,000 mt landed but did sample proportionally to monthly landings (Table 5).

Table 3. Directed sardine fishery incidental catch from fish tickets (mt).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Arrowtooth Flounder														0.02
American Shad			0.2						*				0.01	0.02
Chinook		*		*									0.03	0.12
Chum													*	
Coho	*												0.3	0.08
Mackerel	4.0	272	259	52.4	22.3	19.0	40.6	35.7	6.3	4.5	2.0	0.4	636	196
Misc				0.3			1.4			2.3				0.01
Northern Anchovy						1.8					5.4			
Pacific Herring			0.02						4.7				*	*
Pink Salmon													*	*
General Shark	0.1	0.01								0.01				
Sole Rex														*
Spiny Dogfish									*				*	*
Starry Flounder	*													

* < 0.01

Table 4. Estimated 2013 salmon bycatch based on 2000-2004 observer catch rates.

Salmon Species	Bycatch Rate	Estimated Catch
Chinook, Live	0.007	207
Chinook, Dead	0.023	683
Coho, Live	0.004	125
Coho, Dead	0.026	779

A total of 1,725 sardines were sampled for length (standard), weight (grams), sex, maturity, and age. Sardine standard length ranged from 191 mm to 241 mm and weight ranged between 117 g and 289 g. Average sardine length in 2013 was 211 mm while the fourteen year average is 212 mm (Figure 4). The average weight in 2013 was 174 g and the thirteen-year[2] average was 157 g.

Of the 1,725 sardines sampled, 1,634 sardines were successfully aged. All samples were sent to the WDFW laboratory in Olympia, Washington for age reading. In 2013, 56% of sampled sardine were three year olds (Figure 5). In 2012, the majority (37%) of sardine sampled were two year olds. In contrast, from 2009 through 2011 sardine age four to six years were the predominate age classes. A complete table of sardine age distribution can be found in Appendix B.

Table 5. Washington 2013 samples by month.

Month	Sardine Landed (mt)	Sampling Goal	Samples Collected	Number of Individual Sardine sampled
June	1,421	4	3	75
July	13,121	39	26	650
August	8,931	27	26	650
September	3,540	11	9	225
October	2,367	7	5	125

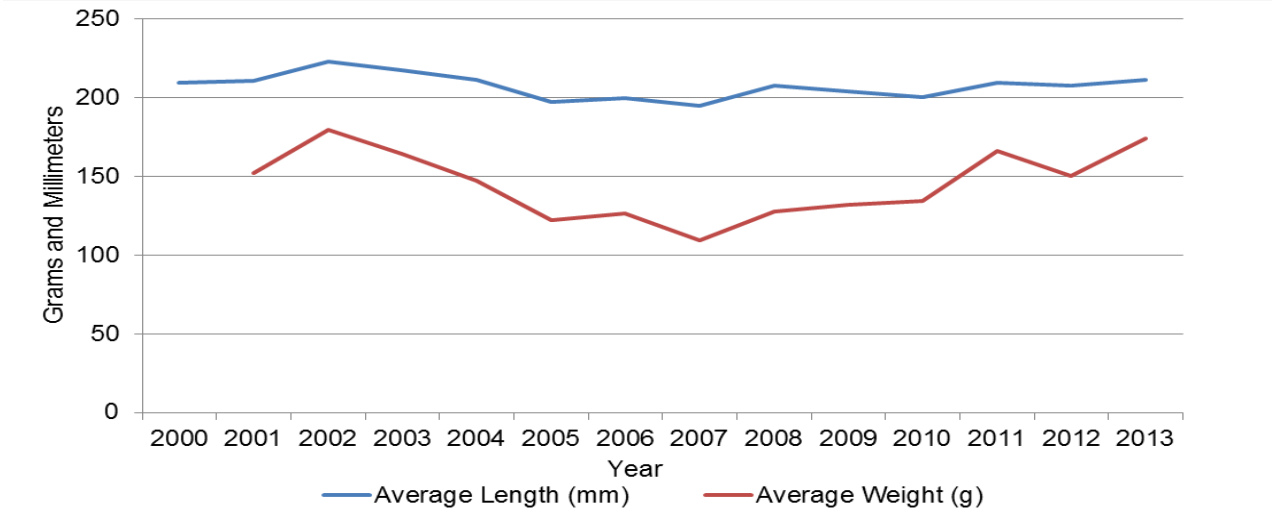


Figure 4. Average lengths and weights of sardine samples by year.

[2] Individual weights of sardine were not collected during the 2000 season.

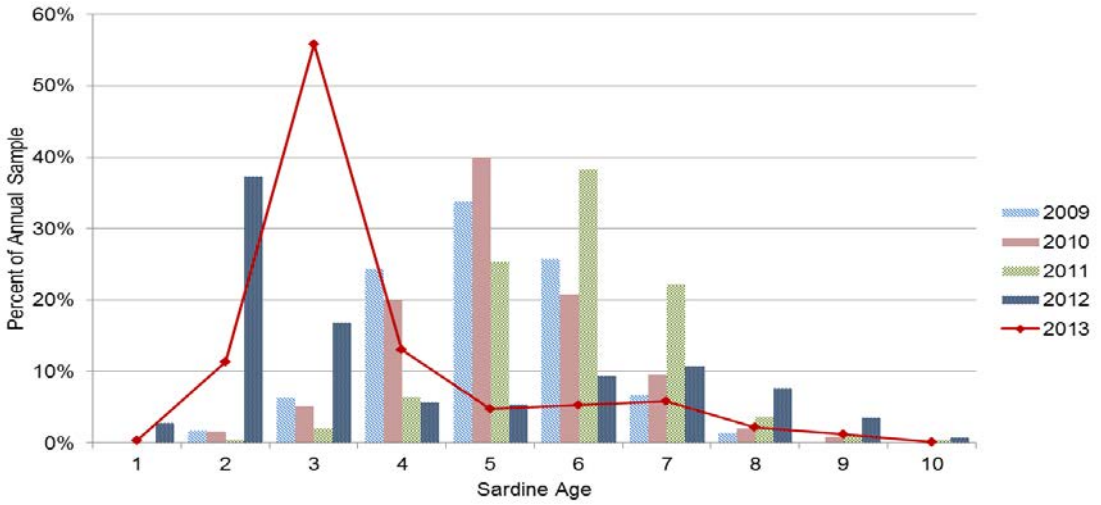
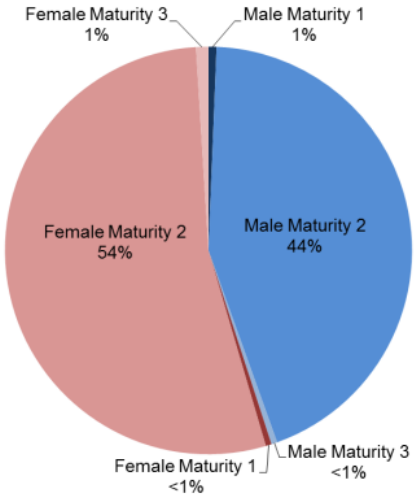


Figure 5. Age distribution of sardine samples, 2009-2013. The current year, 2013, is depicted by the line; previous years are depicted as bars.

Sex and maturity were determined by using the California Department of Fish and Game (CDFG) Standard Maturity Guide for Wetfish, which is based on Hjort, J. (1914) State of Sexual Organs. The majority of sardine analyzed in 2013 were females (54%) and the majority of both sexes had a sexual maturity of 2 (97%; Figure 6). To date, no maturity level 4 has been identified from Washington landings.



Sexual maturity code description:
(1) Virgin individuals.
(2) Maturing virgins or recovering spent. Males intermediate; no milt present.
(3) Yoked oocytes visible. Milt is present and oozing in males.
(4) Hydrated oocytes present.

Figure 6. Sex and maturity of sardine collected in 2013 samples.

Literature Cited

PFMC. 2014. Pacific Fishery Management Council. Status of the Pacific Coast Coastal Pelagic Species Fishery and Recommended Acceptable Biological Catches; Stock Assessment and Fishery Evaluation. http://www.pcouncil.org/coastal-pelagic-species/stock-assessment-and-fishery-evaluation-safe-documents/

Hjort, J. 1914. State of Sexual Organs. Publications de Circonstance No. 53. Cons. Perm. Int. P. L; Expl. Mer. p. 35.

Washington Department of FISH and WILDLIFE

COASTAL SARDINE FISHERY LOGBOOK

(Complete a log sheet for each fishing trip; more than 1 sheet per day may be used)

Vessel Name_____ Skipper Name_____

Gear Length_____ Gear Depth_____ Mesh Size_____ Grate Used? Yes___ No___ Mesh size_____

Departure Date_____ Return Date_____ Date on which fishing occurred_____

Fish Ticket No._____

Time Set	Latitude	Longitude	Retained Catch (weight)					OTHER SPECIES			
			Sardines	Mackerel	Anchovy	Squid		Chinook	Coho		
							Live				
							Dead				
							Live				
							Dead				
							Live				
							Dead				
							Live				
							Dead				
							Live				
							Dead				
							Live				
							Dead				
							Live				
							Dead				
							Live				
							Dead				
							Live				
							Dead				

Contact: Lorna Wargo, WDFW, at (360) 249-1221

Skipper's Signature_____

Send Logbooks To: WDFW Sardine Program
48 Devonshire Road
Montesano, WA 98563

Notes:

Logbooks are due by the 15th day of the following month.

Appendix B

Sardine Age Distribution From Washington Sardine Samples, 2000-2013

Age	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	1%	1%	1%	2%	24%	3%							3%	<1%
2	16%	8%	5%	19%	15%	49%	1%	<1%		2%	2%	<1%	37%	11%
3	37%	44%	15%	16%	16%	10%	70%	33%	6%	6%	5%	2%	17%	56%
4	23%	29%	34%	13%	10%	7%	19%	52%	34%	24%	20%	6%	6%	13%
5	13%	10%	21%	19%	12%	6%	6%	12%	44%	34%	40%	25%	5%	5%
6	7%	5%	12%	13%	11%	5%	1%	2%	14%	26%	21%	38%	9%	5%
7	2%	2%	7%	7%	5%	5%	2%	<1%	2%	7%	10%	22%	11%	6%
8	1%	<1%	4%	5%	3%	5%	1%		<1%	1%	2%	4%	8%	2%
9	<1%	<1%	1%	3%	2%	4%	<1%		1%		1%	1%	4%	1%
10			<1%	1%	1%	1%						<1%	1%	<1%
11			<1%	1%	<1%	2%								
12			<1%	<1%	<1%	2%								
13			<1%	<1%		1%								
14				<1%		<1%								
15						<1%								

% Key

<1% - 9%	10% - 19%	20% - 29%	30% - 39%
40% - 49%	50% - 59%	> 59%	

This program receives Federal financial assistance from the U.S. Fish and Wildlife Service Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972. The U.S. Department of the Interior and its bureaus prohibit discrimination on the bases of race, color, national origin, age, disability and sex (in educational programs). If you believe that you have been discriminated against in any program, activity or facility, please write to:

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