

**Developmental Fisheries Program
Annual Review of Activities**

**Prepared for Oregon Fish and Wildlife Commission
January 11, 2008 Portland, Oregon**

Introduction

This report constitutes the annual review of the Developmental Fisheries Program for 2007. The Developmental Fisheries Program and Developmental Fisheries Board were created by the 1993 Legislature to make recommendations to the Fish and Wildlife Commission on developmental fisheries. State policy requires the Commission to institute a management system for developmental fishery resources that addresses both long term commercial and biological values and that protects the long term sustainability of those resources through planned commercial development when appropriate (ORS 506.455).

List of Species

Table 1 is a current list of developmental species. Those species requiring permits for harvest in 2007 are listed in Category A.

Permits

Table 2 lists the current number of permits issued and available in 2007. ODFW staff issued 49 permits (through October 17, 2007) for the harvest of developmental fisheries species. Of the 49 permits issued in 2006, 7 were renewed for 2007. Currently no permits are available for spot prawns, coonstriped shrimp/sidestripe shrimp and flat abalone. In the past 6 years all available permits for spot prawns and abalone have been issued each year. Seven spot prawn permits were issued through a lottery in 2007.

Landings

Landings of developmental fisheries species through September 2007 are summarized in Table 1. Compared to 2006 similar harvest levels have occurred and the majority of the landings of developmental species were taken as incidental catch in other fisheries, with the exception of hagfish.

Budget

Fund totals from developmental fishery landing tax revenues were dramatically reduced in 2006 due to the removal of Pacific sardines and bay clams. In the past these fisheries contributed approximately 30% of all funds to the budget. The landing fees for species in all categories have generated approximately \$12,048 into the developmental fisheries fund for 2007 (through September).

Research

Spot Prawns

Staff collected logbooks and samples of spot prawns from the commercial harvest and began analysis for size, sex, and maturity. *Please see appendix A for further information.*

Abalone

Staff collected logbooks and samples of flat abalone from the commercial harvest that was analyzed for size, and sex. Also, some genetic samples have been taken for future analyses. *Please see appendix B for further information.*

Pacific Fishery Management Council Activity

Over the past seven years, staff has participated in development of the Pacific Fishery Management Council's (Council) fishery management plan for highly migratory species (which includes tunas, sharks, and billfish). The plan was adopted by the Council in 2002 and approved by NMFS in February, 2004, but not fully implemented until spring of 2005. The only major change for Oregon fisheries are requirements of permits and logbooks. Staff continues to participate in management team meetings to represent Oregon fisheries. Staff also participated in Coastal Pelagic Management Team meetings to prepare the 2007 stock assessment and fishery evaluation document for coastal pelagic species (sardine, mackerel, anchovies, squid). The Council implemented the new allocation system for the sardine harvest guideline and the 2006 fishery which significantly affected the Oregon fishery.

Table 1. Landings of developmental fisheries species, by category, through September, 29 2007.

Category A	Pounds	Category B	Pounds	Category C	Pounds
Pacific hagfish	685,677	black hagfish	0	spiny dogfish	14,088
blue shark	856	salmon shark	0	soupin shark	223
swordfish	-	smelt	4,334	skate	1,340,719
northern anchovy	10,601	carp	0	American shad	66,612
Pacific herring	13,906	northern squawfish		Pacific cod	41,973
		brown bullhead	13	Pacific flatnose	0
box crab	2,281	eelpouts	0	Pacific grenadier	49,757
Oregon hair crab	0	Pacific saury	0	jack mackerel	27,365
scarlet king crab	0	yellow perch	0	Pacific mackerel	1,544,833
grooved tanner crab	0	Pacific pomfret	0	redstripe rockfish	
spot prawn	3,426	Pacific sandfish	0	greenstriped	
coonstriped shrimp	8	skilfish	0	rockfish	
sidestripe shrimp	0	slender sole	0	shortbelly rockfish	
flat abalone	2680			sharpchin rockfish	
giant octopus	6,095	Pacific sand crab	0	splitnose rockfish	
		freshwater mussels	0	Pacific sanddab	257,307
marine snails	0	squid	7,277	butter sole	0
				English sole	699,389
		fragile urchin	0	rex sole	586,781
		sea cucumber	0	rock sole	865
				sand sole	30,327
				curlfin sole	1,014
				spotted ratfish	22
				wolf-eel	420
				walleye pollock	0
				red rock crab	876
				purple sea urchins	0
				crayfish	54,449
				total	5,452,098

Table 2. 2007 Developmental Fishery Permits (as of 10/17/07).

	Permits Allowed	Permits Issued	Renewals from 2006
Pacific hagfish	25	4	1
blue shark	10	2	
swordfish	10 other (gillnet)	0	
	20 longline	0	
northern anchovy & Pacific herring	15	3	
box crab	25	11	
Oregon hair crab & scarlet king crab & tanner crab	10	3	1
spot prawns	10 pot	10*	3
coonstriped shrimp & sidestripe shrimp	10	10*	
Giant octopus	10	2	1
marine snails	10	1	
flat abalone	1	1*	1

total 47

* all available permits issued

Appendix A

Spot prawn 2006-2007



Photo: Scott Groth, ODFW

Introduction

In 2006 and 2007 spot prawn (*Pandalus platyceros*) were sampled from a single vessel landing in Charleston. The fisherman used longlines of modified pots of a few different varieties based on Canadian and Washington designs. A total number of between 300 and 500 pots were used and were generally strung in 60 to 80 pot sets.

Background

Historically, spot prawn (or spot shrimp) had been harvested by “prawn trawl”. This method was disallowed in 2004, to be consistent with other West Coast regulations which were changed due to concern of trawl gears bottom contact within essential fish habitat. Since that time, landings have been exclusively attributed to pot fishing.

Commercially harvestable spot prawn habitats are confined to a limited number of small, well-defined areas. These sites are located in depths of 80 to 140 fathoms on rocky areas such as Rogue canyon, off Cape Blanco, and off Nehalem Bay. Most historical commercial fishing has occurred in these areas, but many exploratory efforts indicate that prawns occur throughout the coast in sparse numbers.

Market Conditions

The primary market for spot prawn is live prawns advertised as being 6-8 prawns per pound. They are sold both direct to customers and as a specialty product for area restaurants. Roughly, a minimum carapace length of 38 mm (1½”) is used to assure desired count per pound. Smaller prawns are sorted out and released alive.

Life History, Reproduction, and Habitats

Life history timing and life span is variable by area. In Canada, they are believed to mature as males at age 2 (27-35 mm) and transition to females at age 3 (33-41), living a maximum of 5-6 years with a maximum size of 61mm (Butler, 1980). Oregon stocks more likely closely resemble coastal California and Washington stocks which live a similar number of years to Canadian prawns but grow faster resulting in a larger average size in commercial landings.

Spot prawn, similar to other pandalid shrimp are protandrous hermaphrodites, meaning they generally mature as males first and then transition to female. Spot prawn generally mature as males in their 2nd year and transition to females in their 3rd year, they remain females until they die.

Spot prawn in Oregon become gravid (egg –bearing) in the fall months. They develop unfertilized eggs in their carapace (late summer), fertilize the eggs internally, and then extrude fertilized eggs (early fall) to their abdomen where they are carried as eggs until they hatch in the spring. Spot prawn hatch as plankton in the adult grounds where they become free swimming and are adrift. After a few months they settle to shallow areas (<150 feet) such as estuaries and nearshore areas. As spot prawn mature they settle back to deep rocky habitats (400-1000 feet).

Prawns Size

From sample data in 2006 and 2007 it appears that the fishery has mostly the largest year classes to fish on in the summer months while in the fall, the next year class enters the fishery.

In both summer samples (July 2007 and June 2006) the size grade of prawns was dominated by larger (≥ 47 mm carapace length) prawns. In the fall months (September 2006 and 2007) an additional year class was retained (37-47 mm carapace length prawns).

This data is an example of how further sampling may enhance biological knowledge.

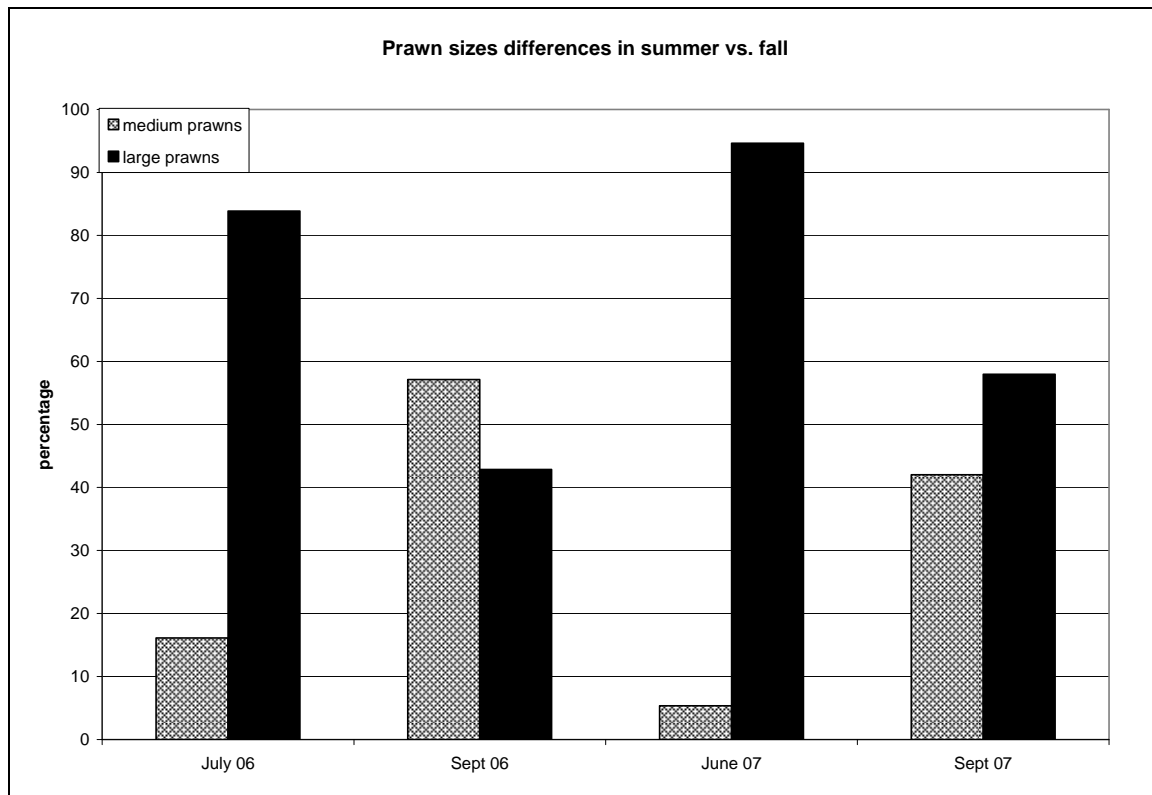


Figure 1. Spot prawn size differences by time of year.

Sorting

Spot prawn are marketed as “6-8 count” therefore they are sorted to a rough minimum size of 38 millimeter (1 ½”) carapace length. The two following graphs show the sizes of landed prawns compared to all prawns caught in pots. “Age breaks” can be seen in both these graphs. Future sampling efforts will provide a timeline of these age classes so that actual age numbers can be confidently attached to the groups. Using the available information on the biology of spot prawn from other areas on the west coast it is likely that the first age peak seen below is either 1½ and 2½ years from hatch (which occurs in spring).

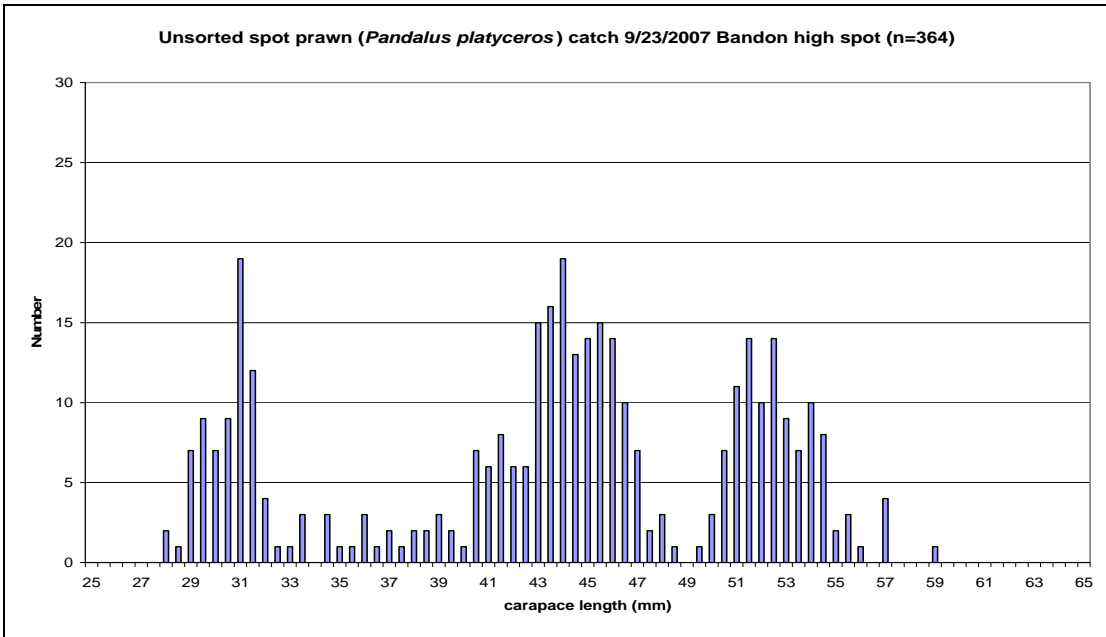


Figure 2. Unsorted landing sample.

In the sorted sample below it shows the first apparent age class not being retained in the fishery.

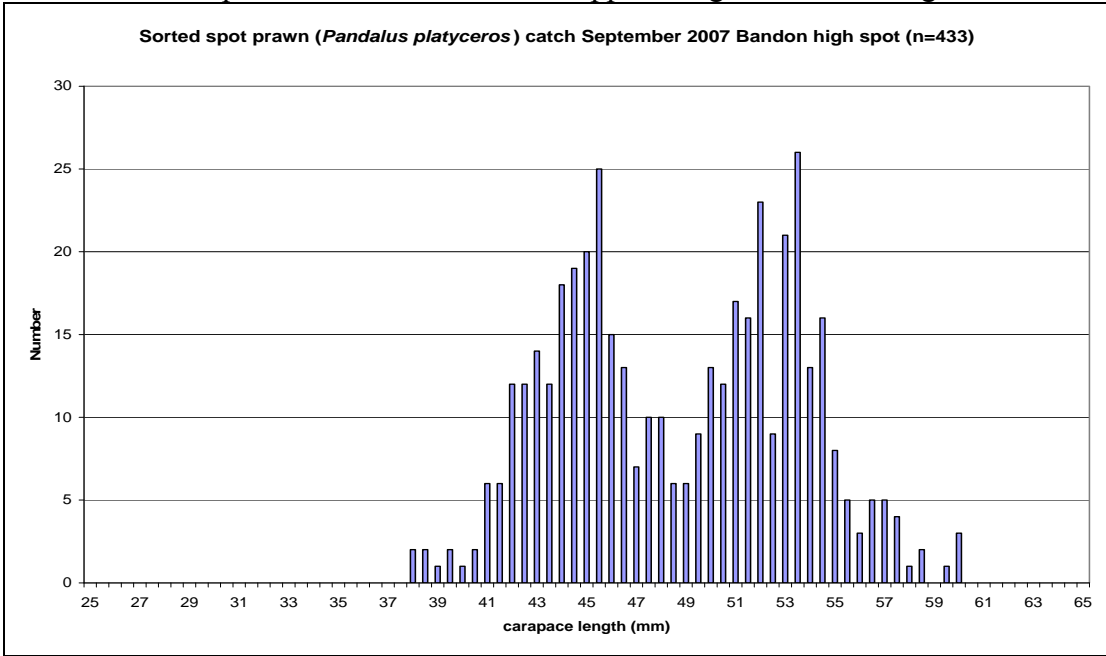


Figure 3. Sorted spot prawn landing sample.

Non Target Species

In other areas where this fishery is more closely monitored it is considered a low bycatch fishery. Results from a quick assessment of 2007 Oregon data seem to agree.

Bycatch from one set of 80 pots (Rogue canyon 06/10/2007) was collected (by fisher) to give a rough idea of bycatch diversity.

Species	Number
Brown Box crab (<i>Lopholithodes foraminatus</i>) juveniles (~50-70 mm carapace length)	4
Longhorn decorator crab (<i>Chorilia longpipes</i>) adults (30-45 mm carapace length)	2
Spiny lithode crab (<i>Acantholithodes hispidus</i>) adults (30-50 mm carapace length)	2
Sea stars (<i>Asteroidea</i> sp.)	17
Fragile urchins (<i>Allocentrotus fragilis</i>) (~50-80mm test diameter)	33

Other bycatch common to this fishery (found when sampling or described by fisher in 2006-07), but not in sample:

Species	Comment
Horned shrimp (<i>Paracrangon echinata</i>)	Found occasionally
Bladed shrimp (<i>Spirontocaris</i> sp.)	Found infrequently
Pink shrimp (<i>Pandalus jordani</i>)	Found once, much larger than commonly seen in commercial fishery (24-27mm)
Yellow legged pandalid shrimp (<i>Pandalus tridens</i>)	Found frequently (not in commercial quantity)
Squat lobster (<i>Munida hispida</i>)	Found frequently
Oregon Triton (<i>Fusitriton oregonensis</i>)	Found frequently
Hermit crabs (<i>Paguidae</i> sp.)	Found frequently
Moon snails (<i>Naticidae</i> sp.)	Found frequently

Species	Comment
Octopus unid.	Found often, would be landed if market existed.
Pacific hagfish (<i>Eptatretus stouti</i>)	Found often
Rockfish (juvenile red rockfish)	Some juvenile red rockfish are reported as common bycatch.

Appendix B

Oregon flat abalone fishery summary 2001-2007



Background

In the past no commercial harvest of flat abalone was allowed in Oregon waters. Beginning in 2001, flat abalone (*Haliotis walallensis*) has been harvested by one permit holder under the Developmental Fisheries Program (DEVO) with an annual harvest quota of 3,000 lbs per year and a minimum shell length of 4½ inches (114 millimeters). Harvest occurs in rocky, vegetated areas in depths of 20-70 feet. All harvest from inception to present has occurred in the temperate reefs of the South coast, the four most primary areas being Rogue reef, Nellie's cove, Orford reef, and Simpson's reef.

Logbooks have been kept for the flat abalone detailing harvest information such as: harvest location, depth, dive down time, and pounds harvested. Fish ticket information includes: port of harvest, pounds harvested, price and harvester information.

Other Commercial Abalone Fisheries

Oregon's flat abalone fishery is the only current wild abalone commercial fishery in the United States, and is the only one historically attempted on this species of abalone. Commercial abalone fisheries have existed in the past in California (Red, white, black, green, pink, and threaded abalone), as well as commercial fisheries in Washington, British Columbia, and Alaska (Pinto abalone). Briefly, and soon after their discovery, red abalone (*Haliotis rufescens*) were commercially fished in Oregon. This red

abalone commercial fishery began in 1958 and closed in 1962 after survey work combined with public process deemed that red abalone were not in sufficient commercial quantities. A small number of red abalone were harvested under this permit (<300 individuals).

Market Conditions

A range of markets have been explored by the fisher. The value and demand for flat abalone is high, ex-vessel price (monies paid to the fisher) has been around \$17/ pound whole. Current markets include local restaurants and California live fish markets.

Life History and Habitats

Life history of flat abalone is not well described. Age and size at maturity is not well defined, however through Oregon survey data samples have revealed sexual maturity at the smallest sizes recovered. As in other abalone it may be assumed that reproductive capability increases with size. Very little age information is available for natural abalone stocks and none for flat abalone.

Adult flat abalone diet consists entirely of drift algae (e.g. bull kelp), and therefore generally only found in areas where algae is in good supply. Flat abalone inhabits rocky areas that allow physical protection from predators, as well as good adhesion surfaces for its muscular foot, which combined with shell provides further protection.

Reproduction

Flat abalones, like other abalone, are broadcast spawners. Sexes are separate and remain that way throughout their life. Spawning occurs when males and females are cued by temperature and other conditions to simultaneously release gametes. Eggs are fertilized and hatch in the water column forming larvae. These larvae have a short, free swimming, larval period (5-8 days in similar species (*Haliotis kamtschatkana*)). This larval period is very short given the narrow habitat needs of abalone.

Successful spawning requires a high density of abalone and ideal ocean condition. The Allee effect describes a situation where a decrease in population size, decreases the reproduction and survival of individuals. This effect is most commonly associated with nearshore broadcast spawners, such as urchins and abalone that require close proximity (in the case of abalone < 3 feet) and high densities to successfully reproduce.

Sampling from this fishery indicates spring months as peak “ripeness” for spawning.

Fishery sampling

Samples of commercial landings were taken on a few occasions at the inception of the fishery (2001) and then slightly more often from 2004 to present.

Length Sampling by Year 2001, 2004-2007

Unsorted length samples (maximum shell length) were taken periodically from a variety of areas in 2001 and then again from 2004-2007. The below graphs show the results of that data grouped to the nearest lowest 5mm increment. Percent frequency of occurrence for the shell length is displayed in the market sample charts below.

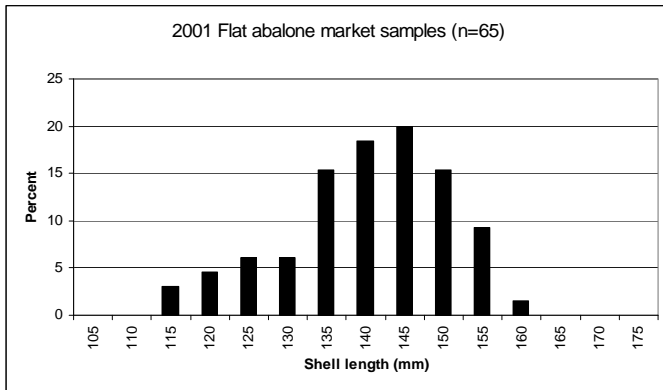


Figure 1. Year 2001 flat abalone fishery sample.

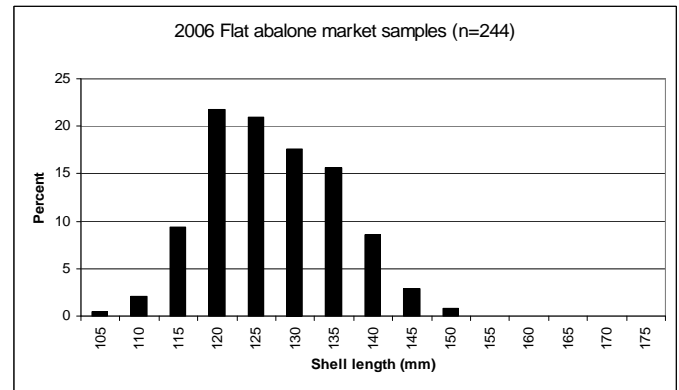


Figure 4. Year 2006 flat abalone fishery sample.

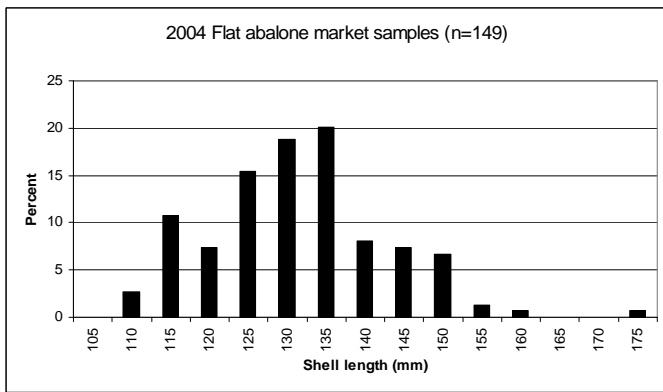


Figure 2. Year 2004 flat abalone fishery sample.

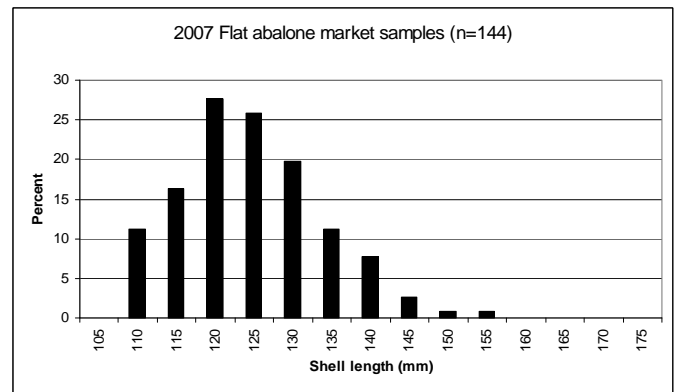


Figure 5. Year 2007 flat abalone fishery sample.

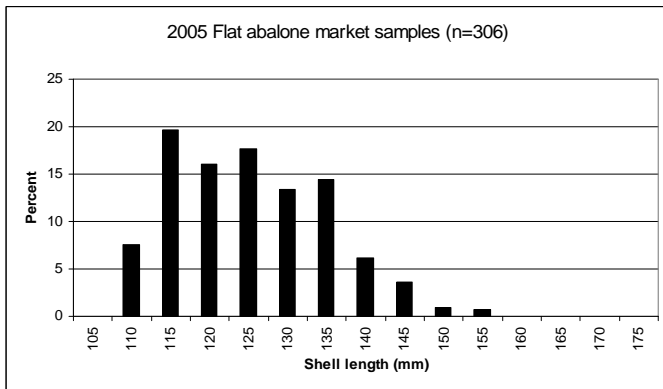


Figure 3. Year 2005 flat abalone fishery sample

Fishery dependent data

Logbook data:

As a condition of the DEVO permit, the flat abalone permit holder is required to submit logbooks providing the following data for each delivery: date, number of dives, dive down time, harvest location (nearest landmark), and estimated weight of harvest. This information is used to determine catch per unit of effort (CPUE).

Harvest area	Logbook values - Total pounds 2001-2006	% of total harvest	CPUE (abalone pounds harvested/ hour of down time)
Simpson Reef (Charleston)	1,569	8.7	34.8
Orford Reef (Port Orford)	2,475	13.7	25.4
Nellies Cove (Port Orford)	4,700	25.9	34.9
Redfish Rocks (Port Orford)	181	1.0	22.6
Rogue Reef (Gold Beach)	8,069	44.5	30.2
Brookings area (Brookings)	1,136	6.3	29.5

Year	Fish Ticket Pounds	CPUE (pounds/ hour of bottom time based on fisherman's logs)
2001	3000	44.7
2002	2999	33.5
2003	2981	31.0
2004	2709	32.0
2005	3000	26.8
2006	2965	23.6

Year	Hours	Pounds	CPUE
2002	2.5	26	10.40
2003	18.5	479	25.89
2004	13	339	26.08
2005	13	364	28.00
2006	50.5	1267	25.09

Year	Hours	Pounds	CPUE
2001	30	1486	49.53
2002	28.6	1017	35.56
2003	22.5	636	28.27
2004	36	1162	32.28
2005	83.5	2201	26.36
2006	57.5	1287	22.38

Year	Hours	Pounds	CPUE
2003	14	597	42.64
2004	17.5	600	34.29
2005	insufficient data	254	insufficient data
2006	6.5	118	18.15

Year	Hours	Pounds	CPUE
2001	31.5	1341	42.57
2002	30	1093	36.43
2003	24	778	32.42
2004	31	1018	32.84
2005	7	181	25.86
2006	11	289	26.27

Survey data

As a condition of the DEVO permit, the flat abalone permit holder is required to survey areas for density of abalone (number per square meter) prior to initial harvest. Seven harvest areas have been surveyed. These include Goat Island and Mack arch (Brookings), Orford reef (Port Orford), 2 areas on Rogue reef (Gold Beach), and Simpson's reef (Charleston). Only one area (Nellies cove) has a post harvest survey.

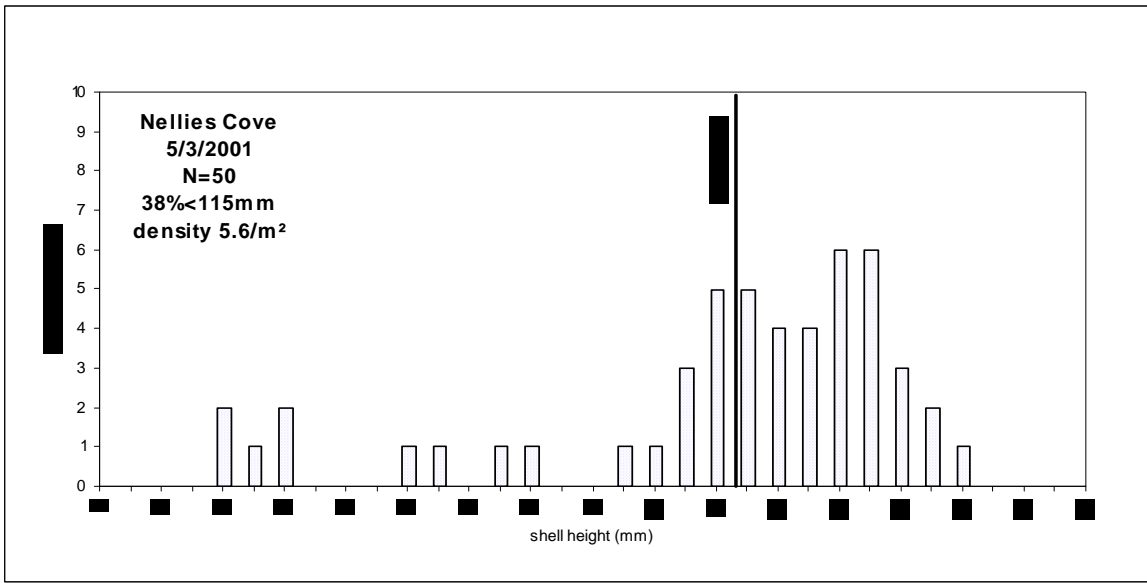


Figure 6. Nellies Cove density survey 2001

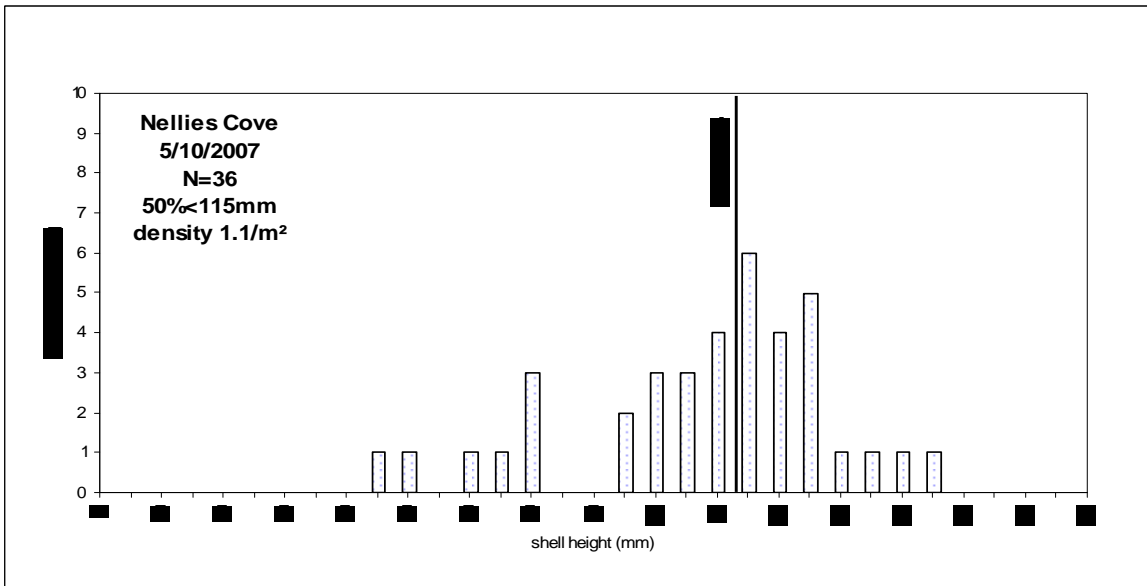


Figure 7. Nellies Cove density survey 2007.