



Oregon Fish and Wildlife Commission
November 17, 2000

EXHIBIT D

SUBJECT Developmental Fisheries Program

PRINCIPAL STAFF PERSON Jim Golden and Jean McCrae

COMMISSION ACTION REQUESTED The Commission will review the Developmental Fishery Program for 2000 and consider regulation changes in the harvest program for some fish species as recommended by the Developmental Fishery Board, and request appointment of a new board member.

- DOCUMENTS ATTACHED: 1. Agenda Item Summary, 2. Hearing Notice and Fiscal Impact Statement, 3. Executive Summary, 4. Staff Report, 5. Draft Administrative Rules, 6. Public Correspondence, 7. Letter and attachment re: Appointment of Board Member

RELATED STATUTES ORS 506.109, 506.119, 506.129, and 506.540 through 506.465

RELATED RULES OAR Chapter 635, Division 006

Read and Approved by:
Division Director [Redacted] Date 10-30-2000
Attorney General [Redacted] Date 11/2/00
Director [Redacted] Date 11/2/00

Agenda Item Summary

BACKGROUND

This item is a review of the Developmental Fishery Program for 2000 as well as proposed rule changes in the harvest program for some developmental fishery species.

PUBLIC INVOLVEMENT

The regular meeting of the Developmental Fishery Board was held June 15, 2000. The issues outlined in the staff report were discussed at this meeting. This meeting is a "public meeting" and subject to the Oregon Meetings Law.

ISSUE 1

Add daphnia to the species list in Category A.

ANALYSIS

The Developmental Fishery Board recommends that daphnia be listed in Category A and that a harvest program be added for that species.

OPTIONS AND STAFF RECOMMENDATION

See staff report attached.

ISSUE 2

Add flat abalone to the species list in Category A.

ANALYSIS

The Developmental Fishery Board recommends, but staff does not, that flat abalone be listed in Category A and that a harvest program be added for that species.

OPTIONS AND STAFF RECOMMENDATION

See staff report attached.

ISSUE 3

Appoint member to fill vacant position.

ANALYSIS

Mr. Frank Dulcich has resigned his position and recommends appointment of Ms. Heather Munro.

OPTIONS

1. Appoint Ms. Munro in accordance with OAR 635-001-0020.
2. Delay appointment.

STAFF RECOMMENDATION

Appoint Ms. Munro.

DRAFT MOTION

I move to amend OAR Division 006 to add daphnia to Category A of the species list with the harvest program as proposed by staff. I further move to appoint Ms. Heather Munro to the Developmental Fishery Board.

EFFECTIVE DATE

January 1, 2001

Secretary of State
NOTICE OF PROPOSED RULEMAKING HEARING*

A Statement of Need and Fiscal Impact accompanies this form.

Oregon Department of Fish and Wildlife (ODFW) - Fish Division

635

Agency and Division

Administrative Rules Chapter Number

Sharon Bird

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Rules Coordinator

Telephone

2501 SW First Avenue; P. O. Box 59; Portland, OR 97207

Address ODFW Commission Room Fish and Wildlife
11/17/00 8:00 a.m. 2501 SW First Avenue; Portland, OR 97201 Commission

Hearing Date Time Location Hearings Officer

Hearing Date Time Location Hearings Officer

Hearing Date Time Location Hearings Officer

Are auxiliary aids for persons with disabilities available upon advance request? Yes No

RULEMAKING ACTION

ADOPT:

Secure approval of rule numbers with the Administrative Rules Unit prior to filing.

AMEND: OAR 635-006-0850

REPEAL:

Renumber: Secure approval of rule numbers with the Administrative Rules Unit prior to filing.

Amend and Renumber: Secure approval of rule numbers with the Administrative Rules Unit prior to filing.

Stat. Auth.: ORS 506.119

Other Authority

Stats. Implemented: ORS 506.450, 506.455, 506.460, and 506.465

RULE SUMMARY

Amend rules to add species to the Developmental Fisheries Species List.

Redacted for Privacy

November 17, 2000

Day for Public Comment

Authorized Signer and Date

Sharon M. Bird

9/25/00

*The Oregon Bulletin is published on the 1st of each month and updates the rule text found in the Oregon Administrative Rules Compilation. Notice forms must be submitted to the Administrative Rules Unit, Oregon State Archives, 800 Summer Street NE, Salem, Oregon 97310 by 5:00 pm on the 15th day of the preceding month unless this deadline falls on a Saturday, Sunday or legal holiday when Notice forms are accepted until 5:00 pm on the preceding workday.

STATEMENT OF NEED AND FISCAL IMPACT

A Notice of Proposed Rulemaking Hearing or a Notice of Proposed Rulemaking accompanies this form.

Oregon Department of Fish and Wildlife - Fish Division

635

Agency and Division

Administrative Rules Chapter Number

In the Matter of amendment of)	Statutory Authority,
OAR Chapter 635, Division 006)	Statutes Implemented,
relating to Developmental Fisheries)	Statement of Need,
Species List)	Principal Documents Relied Upon,
)	Statement of Fiscal Impact

Statutory Authority: ORS 506.119

Other Authority:

Statutes Implemented: ORS 506.450, 506.455, 406.460, and 506.465

Need for the Rule(s):

The rules are needed to add species to the Developmental Fisheries Species List.

Documents Relied Upon:

Oregon Administrative Rules

The above documents are available for public inspection in the Department of Fish and Wildlife, Fish Division, Third Floor, 2501 SW First Avenue, Portland, Oregon, between 8:00 a.m. and 4:30 p.m., on normal working days, Monday through Friday.

Fiscal and Economic Impact:

Please see attached.

Administrative Rule Advisory Committee consulted?: The Developmental Fishery Board met and considered requests to add species to the Developmental Fisheries Species List.

If not, why?:

Redacted for Privacy

Authorized Signer and Date

Kay Brown

Economic Impact Statement for the November 17, 2000 Hearing in the Matter of the
Amendment of Rules Relating to the Developmental Fisheries Program

Fiscal and economic impact: The proposed rules will affect state agencies, units of local government and the public, respectively, as discussed below:

- a. The only state agency which should be affected by adoption of these rules is the Oregon Department of Fish and Wildlife. No significant changes from the current legislatively approved levels of the department's operations or expenditures are expected as a result of the amendment of the rules recommended by the staff.
- b. No units of local government are expected to be affected by these rules. No significant changes from the current levels of any local agencies' operations or expenditures are expected as a result of the adoption of these rules.
- c. The public could be affected by the adoption of these rules: The existing statute and rules require adoption of a list of developmental fisheries species, and the establishment or maintenance of limited entry harvest systems for the associated developmental fisheries. For this hearing, ODFW staff proposes two issues be considered by the State Fish and Wildlife Commission.
 - (1) To add daphnia to "Category A" of the developmental species list.
 - (2) To add flat abalone to "Category A" of the developmental species list.

Overall, the developmental fisheries rules are expected to produce positive economic effects for the public and small business both in the short run and in the long run. Rules relating to limited entry can be viewed as imposing additional costs (in the form of permit fees) on harvesters in the short run, and potentially excluding some harvesters who might not apply for limited entry permits soon enough. However, in the long run, implementation of the rules are expected to yield positive economic effects by controlling the development of fisheries, so the fisheries are sustainable in the long run. This is intended to help prevent the typical cycle in fisheries of boom (as a virgin fish stock is fished down to maximum sustainable yield levels) and bust (when the stock becomes incapable of sustaining yields at the initial exploitation level).

If the species being considered for addition are added to the developmental species list, we expect positive direct economic effects. We are unable to estimate the magnitude of those effects because we don't have enough information to predict harvest levels or associated revenues. Also, ODFW staff is concerned that flat abalone may be easily overexploited, so the staff recommendation is to not include flat abalone on the developmental species list.

The rules are believed to be fully compatible with legislative direction on the goals of fish and wildlife management in Oregon.

Most businesses affected by these rules are believed to be "small business."

**Developmental Fisheries Program
Staff Report**

**Prepared for Oregon Fish and Wildlife Commission
November 17, 2000 Portland, Oregon**

Summary of Staff Report

ODFW staff is providing a review of the Developmental Fishery Program for 2000 and submitting recommendations by the Developmental Fishery Board for the Commission to adopt regulation changes which would add two species to the Developmental species list.

Key elements and conclusions from the staff report are:

- One hundred and twenty permits for the harvest of developmental fishery species have been issued in 2000, through September. Most landings of developmental fishery species have been as bycatch in other fisheries, except for sardines.
- ODFW staff completed a review of the spot prawn fishery, participated in the planning process of a federal management plan for migratory species (which includes swordfish), participated in PFMC pelagic species management team meetings, participated in a symposium on sardines, and collected samples and observed bycatch in the sardine fishery.
- The Developmental Fishery Board considered requests to add daphnia to the species list, to add additional south coast bay clam permits, and to increase landing requirements for sardines. They also reconsidered the request to add flat abalone to the species list, discussed procedures to waive renewal requirements, and heard a review of the spot prawn fishery.
- The ODFW staff and Board recommend: adding daphnia to category A of the species list.
- The Developmental Fishery Board recommends, but ODFW staff opposes, adding flat abalone to category A of the species list

Outline of Staff Report

- I. Introduction Page 3
- II. Annual Report of Developmental Fisheries Activities Page 3
 - Summarizes permits and landing activities of developmental fishery species.
 - Summarizes research and management activities of developmental fishery program.
- III. Staff Analysis of Issues and Options - Recommendations Page 7

• *Issue 1.*
Add daphnia to the species list in category A.

- Option A *(preferred)* The Board and staff recommend the Commission adopt rules to add daphnia to the developmental species list in category A and add a harvest program.
- Option B No action: status quo, daphnia are not on the developmental species list.

• *Issue 2.*
Add flat abalone to the species list in category A.

- Option A The Board recommends the Commission adopt rules to add flat abalone to the developmental species list in category A and add a harvest program.
- Option B: *(preferred)* Staff recommends no action: status quo, flat abalone are not on the developmental species list.

- Oregon Administrative Rules Page 12
- Appendix A. Synopsis of information on daphnia Page A-1
- Appendix B. Synopsis of information on flat abalone Page B-1
- Appendix C. Staff review of spot prawn fishery Page C-1
- Appendix D. Staff letter to Developmental Fisheries Board Page D-1

I. Introduction

The public hearing on November 17 is the annual review of the ODFW Developmental Fisheries Program. At the hearing, staff will: 1) describe the activities of the Developmental Fisheries Program in 2000; and 2) forward recommendations from the Developmental Fishery Board to add two species to category A of the species list.

II. Annual Report of Developmental Fisheries Activities

Permits

ODFW staff has issued 120 permits for the harvest of developmental fisheries species through September, 2000 (Table 1). Of the 127 permits issued in 1999, 30 were renewed for 2000 (as compared to 37 the previous year). The permits for three fisheries (sardines, bay clams, and spot prawns) were issued through a lottery. All available permits were issued for four fisheries (spot prawns, bay clams, sardines, and sea cucumbers with trawl gear).

Landings

Landings of developmental fisheries species through September 2000 are summarized in Table 2. The majority of the landings of developmental species were taken as incidental catch in other fisheries, with the exception of sardines. Through September, 17 vessels have landed 20.3 million pounds of sardines into Astoria. The thirteen vessels using seine gear and targeting on sardines averaged almost 64,000 pounds per trip; the other four vessels made incidental landings with trawl gear. Log records through July show 89% of the landings were taken off Oregon and 11% off Washington. The three major processors occasionally put their vessels on daily limits due to their processing capabilities. The average price for sardines has been \$0.05 per pound. The landing fees for species in all categories have generated approximately \$22,369 into the developmental fisheries fund in 2000, through September.

Research

Sardines

Staff collected samples of sardines from the commercial harvest which will be analyzed for size, sex, maturity, and age. Samples worked up through August show a size range of 189-250 mm (average 216 mm, 8.5 in) and 107-230 gm (average 165 gm, 1/3 pound). Sardines sampled in 1999 and aged by California Dept. of Fish and Game were 33% age 2, with a range of 2-6 years. We hired a seasonal to ride-along on commercial vessels to observe by-catch. Through August, staff made 17 observer trips. The observed bycatch through July consisted of 35 salmon (averaging 2.6 per trip and 77% released alive), and one flounder. Logbook records for 78% of the landings through July show bycatch of 63 salmon (averaging less than 1 salmon/trip - 68% released alive) and incidental catch of 7500 pounds of mackerel.

Pacific Fishery Management Council Activity

The Pacific Fisheries Management Council (Council) is proceeding with the development of a management plan for highly migratory species (which will include swordfish). Staff participated in 10 team and Council meetings in the development process.

Staff also participated in two Coastal Pelagic Team meetings and a symposium on sardines. Staff developed a proposal to create a separate sub-allocation of the sardine harvest guideline for Oregon & Washington. The Council will consider this proposal this fall.

Developmental Fishery Board Activities

The Developmental Fishery Board held one meeting in 2000. The Board considered requests and made recommendations to add daphnia and flat abalone to the species list.

Proposals were submitted to increase the number of permits available for the south coast and to move bay clams out of Developmental Fisheries and under it's own limited entry system. The Board felt the number of permits available for the south coast was sufficient at this time. It would take legislative action to put a species under it's own limited entry system and the Board suggested the petitioners contact their local representatives to introduce legislation. There was also a discussion on the use of mechanical harvest method for bay clams. One person described a new method he felt would not be as destructive as methods used in the past. The Board expressed an interest in having staff evaluation this harvest method. Staff indicated they would also conduct a review of the fishery for consideration of limited entry.

Staff presented an informational review of the spot prawn fishery (Appendix C). Landings and catch per unit of effort for prawns off Oregon with trawl gear appear to be decreasing. There is interest in California and Washington of moving towards a pot only fishery. Recommendations were not discussed at this time.

The Board expressed interest in having staff work on several additional specific projects. Staff conducted a review of their existing workload and outlined in a letter to the Board what additional projects could be included in their workload for the remainder of this year (Appendix D).

A proposal was submitted asking to increase the renewal requirements for sardines. The Board felt there has not been enough activity in the sardine fishery to make any changes at this time. They would like to see a full year with more than one or two vessels participating to determine if an increase in the renewal requirements would be appropriate.

Last year, the Board recommended changing the composition of the permit review board. Prior to the Commission hearing, ODFW's legal counsel advised staff to not present the issue at that time because of recent changes in legislation on contested case hearings. The assistant attorney general for ODFW submitted a letter to the Board outlining his concerns. The Board expressed an interest in a meeting with legal counsel to discuss what options are available.

Table 1. 2000 Developmental Fishery Permits (as of 9/31/00).

	Permits Allowed	Permits Issued	Renewals from 1999
Pacific hagfish	25	7	2
blue shark	10	4	
swordfish	10 other 20 longline	8 7	2
northern anchovy & Pacific herring	15	1	
Pacific sardine & Pacific saury	15	15*	10
Pacific sandfish	10		
smelt	20		
Pacific pomfret	10		
slender sole	10		
box crab	25	4	
Oregon hair crab & scarlet king crab & grooved tanner crab	10	7	1
spot shrimp	6 (3N/3S) trawl 10 (5N/5S) other	6* 10*	2
coonstriped shrimp & sidestripe shrimp	10	7*	
cockle clams (ocean)	5		
bay clams	10 coastwide 5 south	10* 5*	9 3
giant octopus	10	2	
California market squid	30 (15N/15S) trawl	10	
other squid spp.	30 (15N/15S) other	8	
fragile urchin	6 trawl 6 other		
sea cucumber	6 (3N/3S) trawl 10 (5N/5S) diver 10 (5N/5S) other	6* 1	
marine snails	10	1	
brine shrimp	3	1	1
	total	120	30

* all available permits issued

N/S -- permits issued geographically by home port,
split at Heceta Head, 50% N, 50% S

Table 2. Landings of developmental fisheries species, by category, through September, 2000

Category A	Pounds	Category B	Pounds	Category C	Pounds
Pacific hagfish	318,677	salmon shark	-	spiny dogfish	62,106
blue shark	1,114	black hagfish	-	souppin shark	1,254
swordfish	357	Eelpouts	-	skate	1,456,575
northern anchovy	300	skilfish	-	American shad	152,608
Pacific herring	4,348	carp	-	Pacific cod	21,738
Pacific sardine	20,314,408	yellow perch	-	Pacific flatnose	-
Pacific saury	-	brown bullhead	-	Pacific grenadier	138,991
Pacific sandfish	-	northern squawfish	-	cabezon	54,085
smelt	19,103			sculpins	31
Pacific pomfret	24	euphausiids (krill)	-	kelp greouling	33,563
slender sole	-	Pacific sand crab	-	jack mackerel &	
		freshwater mussels	-	Pacific mackerel	606,883
box crab	306			greenstriped rockfish	
Oregon hair crab	-			redstripe rockfish	
scarlet king crab	73			shortbelly rockfish	
grooved tanner crab	38,680			sharpchin rockfish	
spot shrimp	65,437			splitnose rockfish	
coonstriped shrimp	-			Pacific sanddab	288,959
sidestripe shrimp	-			butter sole	1,168
butter clams	28,727			English sole	441,772
cockle clams	4,021			rex sole	433,960
gaper clams	2,714			rock sole	747
littleneck clams	730			sand sole	74,518
softshell clams	234			lemon sole	1,660
giant octopus	2,448			spotted ratfish	2
California market squid	12,539			wolf-eel	3,311
other squid spp.	-			walleye pollock	3,787
fragile urchin	-				
sea cucumber	-			red rock crab	1,180
marine snails	18			purple sea urchins	-
brine shrimp	31,500			crayfish	86,726
				grand total	24,711,382

III. Staff Analysis of Issues and Options - Recommendations

The following discusses staff recommendations. The full text of proposed rule changes is attached beginning on Page 12.

Issue 1.

Add daphnia to the species list in category A.

Background on daphnia

Appendix A contains the life history summary and the evaluation of the effects of harvesting for daphnia (Daphnidae family). Basic life history information for daphnia is fairly well known. Abundance, biomass, and sustainable yield information for Klamath Lake is unknown. However, the sustainable yield is expected to be high because of the species' high fecundity and short life span.

There has been no commercial harvest of daphnia in the past. However, daphnia has been a bycatch in the harvest of algae from Klamath Lake for several years. ODFW has no specific regulations on daphnia.

Issue 1

Petitioners have been harvesting algae from Klamath Fall for several years. Daphnia has been a by-product from the algae harvest. The petitioners feel there is a good market for daphnia in the aquaculture industry and a commercial harvest could create a new industry for the Klamath Falls area. However, petitioners, staff, and the Developmental Fisheries Board feel the lack of ecological information for Klamath Lake warrant adding daphnia to the developmental species list until such information can be gathered. Daphnia are small crustacea and would be harvested and utilized as aquaculture food in manners similar to brine shrimp and krill which are already on the developmental species list. The total amount of daphnia that could be harvested and not affect other species is unknown.

Klamath Lake provides habitat for numerous wildlife species, including game and endangered fish and threatened birds. Harvesting operations should be monitored for any effects to the endangered shortnose and Lost River suckers and game fish species. Gear modifications may be necessary to reduce any bycatch of fish. Time and/or area restrictions could also be established to provide protection for fish species.

The use of the harvest vessels on the lake raises concerns for disturbance of bird populations, especially nesting of the threatened bald eagle and the sensitive white pelican. Time and area restrictions could be established to reduce disturbance. Harvest should be restricted from the State of Oregon's Klamath Wildlife Area.

Harvest Program

The following outlines the harvest program recommended by the Developmental Fishery Board and staff.

A. Numbers of permits

The Developmental Fishery Board and staff recommend issuing 4 permits to harvest daphnia from Klamath Lake.

B. Renewal requirements

The Developmental Fishery Board and staff recommend an annual renewal requirement of a total of 35,000 pounds (wet weight).

C. Other requirements

Staff and industry collaborated to develop the following buffer zones and closed areas to protect threatened and sensitive bird populations and endangered fish species (Figure 1).

- Shoalwater Bay, that area managed by the State of Oregon, Klamath Wildlife Area, is closed to commercial fishing.
- From January 1 through June 30, no harvest, mooring of vessels, or operation of generators or pumps allowed within 1/2 mile around active bald eagle nests on the Eagle Ridge North and Squaw Point nest territories.
- From January 1 through July 31, no harvest allowed within 300' of the mean high water line, starting at the northern point of Eagle Ridge, traveling south along the ridge to Squaw Point.
- No harvest allowed within 500' of the mean high water line, starting at Squaw Point, traveling west along the northern shoreline of Howard Bay, south along Hwy 140, ending at the Geary Canal Bridge.
- No harvest allowed within 1000' of the mean high water line, extending north from Hagelstein Park, to the east bank of Agency Straits.
- No harvest allowed within 1 mile of the mouths of the Wood, and Williamson Rivers.
- No harvest allowed within 0.5 mile of the mouths of Fourmile and Recreation Creeks.

Option A: (*preferred*) The Board and staff recommend the Commission adopt rules to add daphnia to the developmental species list in category A and add a harvest program.

Option B: No action: status quo, daphnia are not on the developmental species list.

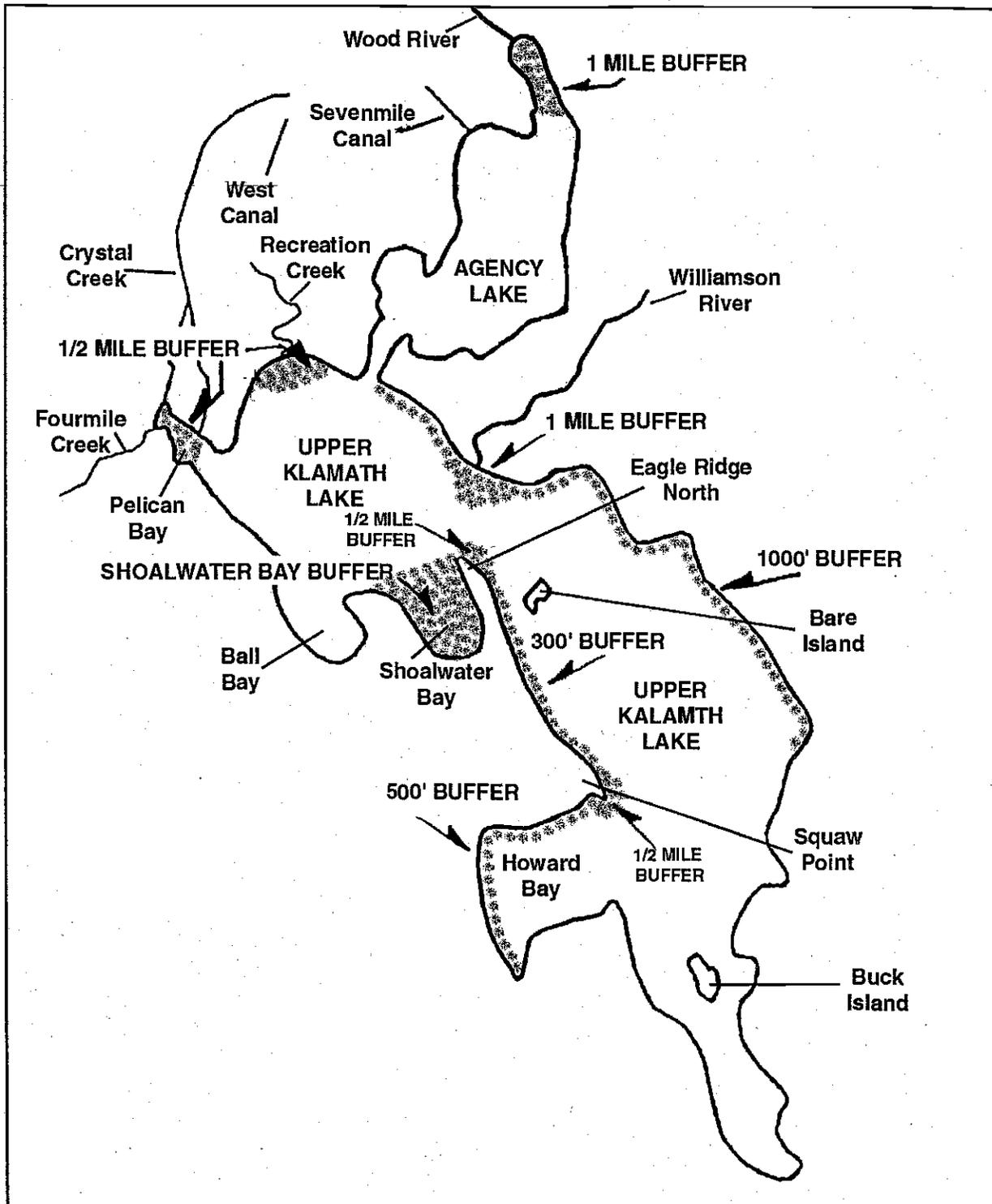


Figure 1. Proposed buffer zones closed to daphnia harvesting (width of buffers not to scale).

Background of Oregon abalone fisheries

Currently, commercial harvest of abalone is not allowed in Oregon. In 1996, the recreational bag limit was reduced from 3 to 1 abalone per day, with a yearly limit of 5. The minimum size limit for recreational harvest is 8 inches. This size limit precludes the harvest of the smaller flat abalone species.

Issue 5.

Last year, a proposal was presented and the Board recommended to the Commission to add flat abalone to the developmental species list. Staff opposed the proposal and the Commission chose to not accept the Board's recommendation. This spring, the petitioner asked the Board to reconsider the proposal as he felt the Board did not understand that staff would present an opposition view at the Commission hearing. The Board agreed and is recommending the Commission re-consider the proposal as submitted last year.

Staff continues to oppose the proposal, but encourages the aquaculture potentials for abalone. Appendix B contains the life history summary and effects of evaluation for flat abalone. Basic life history of abalone is fairly well known; however, here is very little information specifically on flat abalone. Flat abalone have a fairly wide distribution, but abundance is sparse. The difficulty in distinguishing flat abalone from small red abalone may result in some incidental harvest of small red abalone. Abalone are a very high value product. A high degree of interest has led to a great deal of illegal harvest activities in other abalone fisheries. Fisheries in other areas have shown that abalone populations can be easily over exploited. There may be concerns with having a commercial harvest but not allowing a sport harvest for this species. Staff has limited resources to conduct research on, or monitor, a new offshore dive fishery.

Staff will be contracting with the petitioner, this fall, to collect size and abundance data in selected areas on the south coast. Samples of flat abalone will also be collected and analyzed by researchers at Oregon State University for size at maturity.

The applicant feels flat abalone are abundant on the southern Oregon coast, are of high quality, and could be sold in the live markets for optimum value. Because the sea urchin fishery is no longer a year round fishery, dive fishers need to diversify to survive. He believes a fishery for flat abalone would create a new source of revenue needed by divers and fish buyers.

The Board feels the lack of information warrants issuing one permit in order to gather additional information. They adopted a recommendation to include flat abalone on the species with the following harvest program.

Harvest Program

A. Number of permits.

The Developmental Fisheries Board recommends issuing one permit to harvest flat abalone. The

permit would be issued to the vessel with no more than two divers allowed on the vessel.

B. Renewal requirements.

The Developmental Fisheries Board recommends an annual renewal requirements of 10 landings of at least 20 pounds each.

C. Other stipulations.

Other stipulations recommended by the Developmental Fisheries Board include: an annual harvest quota of 3,000 pounds; a 4.5 in minimum size limit; a harvest season of May through Oct.; no harvest from depths less than 10 ft from MLLW; no undersized abalone brought ashore or aboard any vessel; and harvest done only by hand or abalone iron.

Option A: The Board recommends the Commission adopt rules to add flat abalone to the developmental species list in category A and add a harvest program.

Option B: (*preferred*) Staff recommend no action: status quo, flat abalone is not on the developmental species list.



OREGON ADMINISTRATIVE RULES

OREGON DEPARTMENT OF FISH AND WILDLIFE

Developmental Fisheries Program

635-006-0850

Developmental Fisheries Species List

(1) The Developmental Fisheries Species List, Category "A," is as follows:

(a) FISH:

(A) Pacific hagfish (*Eptatretus stouti*) fishery has a qualifying and annual renewal requirement of five landings. There are 25 permits for harvest of which there are no trawl permits;

(B) Blue shark (*Prionace glauca*) fishery has a qualifying and annual renewal requirement of either five landings consisting of at least 500 pounds each landing or one landing consisting of at least 5000 pounds. There are 10 permits for harvest of which there are no high seas drift net permits and no large mesh gill net permits. No permit is needed for hand lines or hand harvest. Experimental gear permits may be required;

(C) Swordfish (*Xiphias gladius*) fishery has a qualifying and annual renewal requirement of either five landings consisting of at least 500 pounds each landing or one landing consisting of at least 5000 pounds. Permits are valid for and renewal requirements are calculated from February 1 through January 31 of the following year. There are 20 permits for harvest by floating longline and 10 permits for harvest by other gear. Specially adapted drift/gill net may be permitted. Experimental gear permits may be required. Five single-delivery permits will be issued to those who applied by annual filing date, but did not receive a Developmental Fishery Permit. Gill net gear must conform to California gear restrictions;

(D) Northern anchovy (*Engraulis mordax*) and Pacific herring (*Clupea pallasii*) fishery has a qualifying and annual renewal requirement of either five landings consisting of at least 500 pounds each landing or one landing consisting of at least 5000 pounds. There are 15 permits for ocean harvest. Specially adapted small mesh drift/gill net may be permitted. No permit is needed for hand lines or hand harvest. Experimental gear permits may be required;

(E) Pacific sardine (*Sardinops sagax*) and Pacific saury (*Cololabis saira*) fishery has a qualifying and annual renewal requirement of either five landings consisting of at least 500 pounds each landing or one landing consisting of at least 5000 pounds. There are 15 permits for ocean harvest. Specially adapted small mesh drift/gill net may be permitted. Experimental gear permits may be required;

(F) Pacific sandfish (*Trichodon trichodon*) fishery has a qualifying and annual renewal requirement of five landings. There are 10 permits for harvest of which there are no dredging permits and no trawl permits, however, limited numbers of experimental gear permits may be issued for trawl harvest. Permits are area specific. Experimental gear permits may be required. No permit is needed for hand lines or hand harvest;

(G) Eulachon (*Thaleichthys pacificus*), whitebait smelt (*Allosmerus elongatus*), night smelt (*Spirinchus starksi*), longfin smelt (*Spirinchus thaleichthys*) and surf smelt (*Hypomesus pretiosus*) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 100 pounds each landing. There are 20 permits for ocean harvest of which there are no trawl permits, however, limited numbers of experimental gear permits may be issued for trawl harvest. Specially adapted small mesh drift/gill net may be permitted. No permit is needed for hand lines or hand harvest. Experimental gear permits may be required;

(H) Pacific pomfret (*Brama japonica*) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 100 pounds each landing. There are 10 permits for harvest. Experimental gear permits may be required;

(I) Slender sole (*Eopsetta exilis*) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 100 pounds each landing. There are 10 permits for harvest. Experimental gear permits may be required.

(b) INVERTEBRATES:



OREGON ADMINISTRATIVE RULES

OREGON DEPARTMENT OF FISH AND WILDLIFE

(A) Box crab (*Lopholithodes foraminatus*) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 100 pounds each landing. There are 25 permits for harvest with pots only;

(B) Grooved tanner crab (*Chionoecetes tanneri*), Oregon hair crab (*Paralomis multispina*) and scarlet king crab (*Lithodes couesi*) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 100 pounds each landing. There are 10 permits for harvest with pots only;

(C) Spot prawn (*Pandalus platyceros*) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 100 pounds (round weight) each landing or one landing consisting of at least 1000 pounds. There are six permits for harvest by trawl gear and 10 permits for harvest by other gear. Permits are area specific. Experimental gear permits may be required. Permits are issued geographically, split at Heceta Head with 50 percent issued north and 50 percent issued south of Heceta Head, until after the date of the lottery;

(D) Coonstripe shrimp (*Pandalus danae*) and sidestripe shrimp (*Pandalopsis dispar*) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 100 pounds (round weight) each landing. There are 10 permits for harvest by pot gear;

(E) Ocean cockle clams (*Clinocardium nuttallii*) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 100 pounds each landing. There are five permits for ocean harvest only. No permit is needed for hand lines or hand harvest. Experimental gear permits may be required;

(F) Bay clams including cockle clams (*Clinocardium nuttallii*), butter clams (*Saxidomus giganteus*), gaper clams (*Tresus capax, nuttallii*), native littleneck clams (*Protothaca staminea*), and softshell clams (*Mya arenaria*) fishery has no qualifying and annual renewal requirements for intertidal hand harvest, an unlimited number of permits, and a \$25 permit fee. There are 11 permits (individual or vessel) for subtidal dive harvest, effective March 18, 1997-December 31, 1997, and 10 permits thereafter for statewide harvest and 5 permits for harvest south of Heceta Head. Qualifying requirements are either five landings consisting of at least 200 pounds each landing or an annual total of 2500 pounds for one calendar year during the qualifying period of January 1, 1990 through October 16, 1995. Annual renewal requirements are either five landings consisting of at least 100 pounds each landing or an annual total of 2500 pounds;

(G) Giant octopus (*Octopus dofleini*) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 100 pounds each landing. There are 10 permits for harvest using octopus pots only;

(H) California market squid (*Loligo opalescens*) and other squid (several species) fishery has a qualifying and annual renewal requirement of either five landings consisting of at least 500 pounds each landing or one landing consisting of at least 5000 pounds. There are 30 permits for harvest using trawl gear and 30 permits for harvest using other gear types. Experimental gear permits may be required. Permits are issued geographically, split at Heceta Head with 50 percent issued north and 50 percent issued south of Heceta Head, until after the date of the lottery;

(I) Fragile urchin (*Alloctrotus fragilis*) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 500 pounds each landing. There are six permits for harvest using trawl gear and six permits for harvest using other gear. Experimental gear permits may be required. Permits are issued geographically, split at Heceta Head with 50 percent issued north and 50 percent issued south of Heceta Head;

(J) Sea cucumber (*Parastichopus* spp.) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 100 pounds each landing. There are six permits for harvest using trawl gear, 10 permits for harvest by diver, and 10 permits for harvest by other gear. Experimental gear permits may be required. Permits are issued geographically, split at Heceta Head with 50 percent issued north and 50 percent issued south of Heceta Head, until after the date of the lottery;



OREGON ADMINISTRATIVE RULES

OREGON DEPARTMENT OF FISH AND WILDLIFE

(K) Marine snails (various species) fishery has a qualifying and annual renewal requirement of five landings consisting of at least 100 pounds each landing. There are 10 permits for subtidal harvest only;

(L) Brine shrimp (*Artemia* spp.) fishery has a qualifying and annual renewal requirement of at least 5000 pounds landed. There are three permits to harvest adults.

(M) *Daphnia* (*Daphniidae* family) fishery has an annual renewal requirement of a total of at least 35,000 pounds. There are four permits for commercial harvest in Klamath Lake.

(2) The Developmental Fisheries Species List, Category "B," is as follows:

(a) FISH

- (A) Salmon shark (*Lamna ditropis*);
- (B) Carp (*Cyprinus carpio*);
- (C) Black hagfish (*Eptatretus deani*);
- (D) Yellow perch (*Perca flavescens*);
- (E) Eelpouts (family Zoarcidae);
- (F) Brown bullhead (*Ameiurus nebulosus*);
- (G) Skilfish (*Erilepis zonifer*);
- (H) Northern squawfish (*Ptychocheilus oregonensis*).

(b) INVERTEBRATES

- (A) Euphausiids (krill) (family Euphausiidae);
- (B) Pacific sand crab (*Emerita analoga*);
- (C) Freshwater mussels (families Margaritifera, Anodonta, Gonidea, and Corbicula).

(3) The Developmental Fisheries Species List, Category "C," is as follows:

(a) FISH

- (A) Spiny dogfish (*Squalus acanthias*);
- (B) Soupfin shark (*Galeorhinus zyopterus*);
- (C) Skate (family Rajidae);
- (D) American shad (*Alosa sapidissima*);
- (E) Pacific cod (*Gadus macrocephalus*);
- (F) Pacific flatnose (*Antimora microlepis*);
- (G) Pacific grenadier (*Coryphaenoides acrolepis*);
- (H) Cabezon (*Scorpaenichthys marmoratus*);
- (I) Sculpins (family Cottidae);
- (J) Kelp greenling (*Hexagrammos decagrammus*);
- (K) Jack mackerel (*Trachurus symmetricus*);
- (L) Chub (Pacific) mackerel (*Scomber japonicus*);
- (M) Greenstriped rockfish (*Sebastes elongatus*);
- (N) Redstripe rockfish (*Sebastes proriger*);
- (O) Shortbelly rockfish (*Sebastes jordani*);
- (P) Sharpchin rockfish (*Sebastes zacentrus*);
- (Q) Splitnose rockfish (*Sebastes diploproa*);
- (R) Pacific sanddab (*Citharichthys sordidus*);
- (S) Butter sole (*Pleuronectes isolepis*);
- (T) English sole (*Pleuronectes vetulus*);
- (U) Rex sole (*Errex zechirus*);
- (V) Rock sole (*Pleuronectes bilineatus*);
- (W) Sand sole (*Psettichthys melanostictus*);
- (X) Curlfin (lemon) sole (*Pleuronichthys decurrens*);
- (Y) Spotted ratfish (*Hydrolagus colliei*);
- (Z) Wolf-eel (*Anarrhichthys ocellatus*);
- (AA) Walleye pollock (*Theragra chalcogramma*).

(b) INVERTEBRATES



OREGON ADMINISTRATIVE RULES

OREGON DEPARTMENT OF FISH AND WILDLIFE

- (A) Red rock crab (*Cancer productus*);
- (B) Purple sea urchins (*Strongylocentrotus purpuratus*);
- (C) Crayfish (*Pacifastacus leniusculus*).

APPENDIX A. Synopsis of information on Daphnia

Daphnia (Water Fleas)

Daphnidae fam.

Ecology

Daphnia are found in most quiet fresh water ponds and lakes (Lutz 1986; Fox 1994). Most species are planktonic (Lynch 1980) and, in Klamath Lake, data suggest they are stratified toward the surface (Hazel 1969)

Life History

Reproduction

Daphnia reproduce by two methods. For most of the year, reproduction is parthenogenetic and the population consists entirely of females which reproduce asexually (Fox 1994; Lynch 1980; Wetzel 1975). Parthenogenetic eggs have little yolk (Fox 1994) and are carried in the brood chamber until they hatch as miniature adults (Fox 1994; Lynch 1980). There are no free-swimming larval forms (Wetzel 1975). Maximum clutch size will vary with species and ranges from 8-105 (Lynch 1980). Following the release of these young, the adult molts and a new clutch of eggs is deposited in the brood chamber, and the pattern is repeated many times (Lynch 1980; Wetzel 1975).

In adults, the number of molts is more variable than in juveniles, ranging from a few to well over 20. Each instar ends with the release of young from the brood pouch, molting, rapid increase in size, and deposition of a new clutch of eggs into the pouch, all occurring in a matter of minutes. Therefore, an individual can produce several hundred progeny in a life span under favorable growing conditions of temperature and food supply (Wetzel 1975). The mean lifespan will vary with species and ranges from 28-70 days (Lynch 1980).

Parthenogenesis continues until unfavorable conditions arise. As the production of parthenogenetic eggs declines, some of the eggs develop into males and others into eggs that are very yolky and require fertilization (Fox 1994; Wetzel 1975). Following fertilization, the brood pouch thickens and encloses the eggs into an ephippium (Wetzel 1975). These eggs are not brooded, but rather are immediately released by the female (Fox 1994). The ephippia either sink or float, and can withstand severe conditions such as freezing or drying. It is not unusual to find large accumulations of ephippia along windward shorelines (Wetzel 1975). Ephippia are often

inadvertently picked up and dispersed to other bodies of water by aquatic birds (Lutz 1986). The eggs hatch the following spring, always into parthenogenetic females, i.e. females that reproduce without fertilization. Eventually, after one or several generations of parthenogenetic females and their summer eggs, males will be produced and fertilization will occur to produce a new generation of overwintering eggs (Fox 1994).

Males are smaller and only slightly modified in morphology from females. Male production is correlated with crowding and a rapid reduction of food supply, as opposed to a constant low food supply, which simply inhibits reproduction. Short-day photoperiods increased the production of ephippia (Wetzel 1975).

Growth

Daphnia range in size from 0.2 to 6 mm (Wetzel 1975; Fox 1994). Up to 8 pre-adult instars are common in Daphnia. Longevity, from the time of egg release into the brood pouch until death of the adult, varies widely with species and environmental conditions. Longevity and time between molts are approximately inversely related to temperature; longer time between molts with lower temperatures. For example *Daphnia magna* averaged 108, 88, 42, and 26 days at 8°, 10°, 18°, and 28° C, respectively (Wetzel 1975).

Longevity also is affected by food availability, and commonly increases with a decrease in food consumption, short of starvation. But food supply is a secondary importance in comparison to the effects of temperature (Wetzel 1975).

Food

Most daphnia are filter feeders that consume phytoplankton (Fox 1994). Some species have modified legs that are capable of picking up larger pieces of detrital material (Wetzel 1975).

At Klamath Lake, daphnia do not feed directly on the blue-green algae, *Aphanizomenon*. Detritus resulting from the death of *Aphanizomenon* rather than the intact cells may support the abundant populations of daphnia (Hazel 1969)

The grazing rates of daphnia vary greatly with body size, food, temperature, and season. A number of studies indicate that the rate of feeding stabilizes or decreases as the concentration of food particles increase. Feeding rate is constant above the incipient limiting concentration of food particles. Filtering rates have been found to increase with increasing body length and with

creasing temperatures. Temperatures above a given point result in a decreasing in the filtration rate. The temperature of maximum filtration rates apparently differs among species (Wetzel 1975).

Predators

Daphnia are a fundamental link in the food chains of many aquatic ecosystems (Lutz 1986). Planktonic daphnia are eaten by zooplanktivorous fishes and other invertebrates, such as salamanders (Wetzel 1975; Lynch 1980; Fox 1994).

At Klamath Lake, daphnia is a primary source of food for young-of-the-year of all species of fish and for chubs to adult size. Fish species present at Klamath Lake include game fish (two or three species of trout, brown bullhead, and yellow perch) and two endangered species (shortnose and Lost River suckers) (Hazel 1969; Smith 1999)

Population

Seasonal population patterns are quite variable among species and within species among different lake conditions. Some are perennial species that overwinter in low population densities as adults rather than as resting eggs. These species may exhibit 1, 2, or more population peaks during the year. The species that have a distinct resting egg stage commonly develop population peaks in the spring and summer at relatively high water temperatures. Although one peak is general, a second population peak often occurs in the autumn (Wetzel 1975).

With increasing food supply from photosynthesis (algae, detritus, bacteria) and rising temperatures in spring, populations increase from overwintering adults or resting eggs. Temperature increases the rate of molting and brood production, while rising food supply increases the egg number per brood. Mortality, especially of juveniles, normally is highest in summer (Wetzel 1975).

During a study of Klamath Lake in 1964-64, daphnia was found to be the most abundant single genus (Hazel 1969). In another study in 1987-93, the zooplankton community of Klamath Lake was dominated by daphnia, accounting for more than 90% of the zooplankton biomass (Beaver and Kann 1994). The overall relationship between the biomass of the blue-green algae, *Aphanizomenon*, and mean annual daphnia abundance was significant (Beaver and Kann 1994).

Harvest

In Klamath Lake, daphnia have been taken as bycatch in commercial algae harvesting but discarded; the quantity harvested is unknown.

Management

Present Regulations

Oregon has no specific regulations for daphnia. They are regulated under general "ocean food fish" regulations.

Shoal Water Bay is managed by the State of Oregon as part of Klamath Wildlife Area.

Suggestions for Future Management

Klamath Lake provides habitat for numerous wildlife species, including game and endangered fish and threatened birds. The use of boats on the lake raises concerns for disturbance of bird populations, especially nesting of the threatened bald eagle and the sensitive white pelican. Time and area restrictions could be established to reduce disturbance.

Time and/or area restrictions could also be established to provide protect to the endangered shortnose and Lost River suckers and game fish species. Gear modifications may be necessary to reduce bycatch of fish. The total amount of daphnia that could be harvested and not affect food supplies for other species is unknown.

Harvest should be restricted from the State of Oregon's Klamath Wildlife Area.

Evaluation of Effects

Additional information is needed to determine short-term and long-term effects of harvest on daphnia resources and on other resources. Daphnia should be managed under the developing fisheries program with conservative numbers of permits and restrictions.

- (1) Sustainability of developmental fisheries resources or incidental catch under proposed future harvest:
 - a. Daphnia are found world wide in fresh water environments at high abundance.
 - b. Daphnia are short lived, fast growing, and have relative high fecundity.
 - c. Resistant eggs are formed under stressful conditions.

- (2) Biological and ecological effects on critical habitats, other habitats and other species supported by those habitats:
 - a. Method of harvest would have very little impact on the habitat.

- b. Some bycatch of fish, including game and endangered species, could occur.
- c. Harvest activity could cause disturbances to bird populations, including threatened and sensitive species.
- d. The amount of daphnia harvest that would not affect food supply for other resources is unknown.

(3) Conformity and compatibility with existing uses such as commercial and recreational fishing, non-consumptive uses, public access, etc:

- a. Daphnia is currently discarded in commercial algae harvesting operations which has occurred on the lake since the late 1980's.
- b. There is no recreational harvest of daphnia.
- c. A recreational fishery for game fish exists on the lake.
 - a. There are some residential areas along the edge of Klamath Lake.
 - b. There are potential conflicts of space with commercial algae harvesters and recreational anglers.
 - c. The area around Shoal water bay is managed by the State of Oregon as the Klamath Wildlife Area.

(4) Ability of the Department and other agencies to monitor the fishery for needed data and compliance with rules and regulations:

- a. Analysis of existing data, sampling, and monitoring a new fishery would require additional staff resources.
- b. Monitoring of effects on birds and endangered fish would be labor intensive and would require additional staff resources.
- c. Harvesters may be willing to contribute resources for monitoring activities.

(5) Recommendations for future fishery development including gear types and effort levels:

- a. Information not sufficient to determine optimum effort levels.

Program Objectives

- (1) Develop scientific information on the stocks and life history of daphnia at Klamath Lake.
 - a. Need opportunities for on-board, dockside, and/or research sampling.
 - b. Need recording of effort, location, and time on logbooks.
- (2) Develop understanding of effects of harvest on local ecosystem.

- a. Conduct literature review and analyze habitat studies.
- b. Conduct food use studies.
- c. Need recording of bird disturbances and fish bycatch on logbook.

(3) Develop improved fishing practices and equipment to protect the local resources.

- a. Monitor fish bycatch and alter intake screens to reduce if necessary.
- b. Seasonal and or area restrictions may reduce impacts to other resources.

(4) Identify and protect critical habitat and other important biological habitats for daphnia or other affected resources.

- 1. Identify areas and seasons of critical bird and fish use.
- b. Seasonal and or area restrictions may reduce impacts to other resources.

(5) Report findings and research data during annual review.

Management Options

Staff and Board Recommendation

- a. Permits - 4
- b. Renewal requirements - 35,000 lb annually
- c. Buffer zones to protect fish and bird species

Other Options

- a. Status quo - species not on developmental list.

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APPENDIX B. Synopsis of information on flat abalone

Flat Abalone

Haliotis walallensis

(Note: there is little information in the literature specifically on the flat abalone species. Much of the following information is for abalone in general, unless flat abalone are specifically mentioned.)

Ecology

Flat abalone occur from British Columbia southward into Baja California; but are sparsely distributed throughout its range (Cox, 1962; Mottet, 1978; Ebert and Houk, 1989; Hahn, 1989). Flat abalone are found along open coasts from intertidal to 17 m in northern California, to 20 m in central California, and at depths greater than 27 m in southern California (Cox, 1962; Mottet, 1978; Hahn, 1989). Abalone prefer high energy, open coastal environments with good water circulation (Karpov and Tegner, 1992). Flat abalone live on and under rocks with other species of abalone (Cox, 1962).

Depth and geographical distribution of abalone are best described by seawater temperature (Karpov and Tegner, 1992; Lindberg, 1992).

Life History

Reproduction

The spawning season of flat abalone is April, May, June (Hahn, 1989).

Abalone are broadcast spawners and release their sex products directly into the seawater, where fertilization takes place (Mottet, 1978). The sexes are separate (Cox, 1962; Mottet, 1978) and the sex ratio is usually one to one (Mottet, 1978).

At the biological minimum size when the gonads first ripen, the abalone may produce only a thousand eggs, but millions of eggs are likely in later years. There is usually a simple near-linear relationship between the number of mature eggs in the ovary and body weight (Mottet, 1978). Sexual maturity is reached at a small size, and fecundity, which increases exponentially with size, is high (Karpov and Tegner, 1992).

The spawning season appears to be affected by environmental differences and there is considerable variation even in the same species from one year to the next, and from one location to another (Mottet, 1978). Although the spawning season for the different species of *Haliotis* may vary according to their location, liberation of sex products is believed to depend upon the water's temperature (Cox, 1962).

After a relatively brief period (2-11 days) in the water column, the free-swimming larva settles to the bottom and assumes the creeping life-style of a post-larva (Mottet, 1978).

Flat abalone hybridizes with pink abalone, *H. corrugata* (Cox, 1962) and are capable of hybridizing with red abalone (Mottet, 1978; Hahn, 1989).

Growth

Most flat abalone are 7.5 to 12.5 cm in length (three to five inches) but can reach 17.5 cm (seven inches) (Cox, 1962; Mottet, 1978; Hahn, 1989).

Growth of abalone is quite slow, and it takes a minimum of 4 years (and often several years longer) for the abalone to grow to a moderate length of 10 cm (4 inches). Both male and female grow at the same rate (Mottet, 1978).

In at least some abalone species, food intake and corresponding growth correlate most strongly with the water temperature, and is slowed or stopped at higher or lower temperatures (Mottet, 1978). Growth during the first two years is believed to be fairly uniform among all species depending on the amount and kind of food available. Growth rates of adults are highly irregular and size is not directly related to age. Growth is directly dependent upon the availability of food (Cox, 1962).

The amount of meat in abalone with the same shell dimensions will vary depending on seasonal and environmental conditions (Mottet, 1978).

Food

Flat abalone feed by grazing on small attached algae (Cox, 1962). Abalone are almost entirely vegetarians, in locations where there is abundant drift or vegetation. Each abalone species shows definite preferences for certain types of seaweeds. Abalone may eat up to 39% of their weight in seaweed per day, but with better food species, 10-20% is more typical (Mottet, 1978).

Abalone, particularly when they are young, will eat other things besides seaweeds. Very small abalone less than a year old usually subsist on a diet of sessile diatoms and sometimes coralline algae. In fact, young abalone often grow very well in areas which are not suitable for adults (Mottet, 1978). During free-swimming stages, diet consists of pelagic plankton. As juveniles, they feed upon diatoms attached to the substrate (Cox, 1962).

The color of the shell can vary depending on the food eaten. The diets of pinto, flat, and threaded abalone probably contain greater amounts of diatomaceous and coralline algae than do the diets of the other species. This is suspected because the shells of these three species exhibit the typical mottling produced by this diet (Cox, 1962).

Most abalone are quite inactive and do not forage unless they are unable to catch sufficient drift algae (Mottet, 1978). California abalone feed primarily on algal drift; foraging on attached algae is rare. Specialization on drift algae puts abalone in competition with sea urchins. Sea urchin grazing has been reported to limit kelp and abalone distributions in many regions of California (Karpov and Tegner, 1992).

Predators

Predators includes sea otters, fishes (cabazon and sheepshead), crab, spiny lobster, octopuses, seastars, and gastropods (Cox, 1962; Karpov and Tegner, 1992). In some locations, predation is the major factor restricting abalone to certain habitats, limiting the size of the population and affecting feeding behavior. Most abalone predators hunt by sight. To reduce the probability of attack, abalone rarely move about except under the cover of darkness (Mottet, 1978).

Adult abalone, unless they have become dislodged from the substrate, are not ordinarily vulnerable to fish predation (Cox, 1962; Karpov and Tegner, 1992). Many species of fish will attack abalone which have become detached from the substrate due to storms or human activities, and a few are adept at knocking the abalone off the substrate (Mottet, 1978). If displaced and unable to right themselves quickly, the abalone usually fall victim to the always-present fish. Fish immediately swarm around upturned abalone and tear pieces from the foot (Cox, 1962). In one study, a third of the fish stomachs contained the shells of young *H. corrugata* and *H. wallalensis*. (Mottet, 1978).

The young of all species are restricted by predators to the undersides of rocks or to crevices where they are unlikely to be seen (Mottet, 1978). Small abalone are preyed upon by starfish but large abalone successfully resist the starfish attacks even though the starfish are larger (Cox, 1962). Though starfish are known to prey on abalone, there are no studies to indicate that they are a significant problem (Mottet, 1978).

Where urchin populations are next to abalone, there is competition for food and living space. Once sea urchins have gained a foothold,

they seldom leave and they may be able to out-compete abalone for food (Cox, 1962; Mottet, 1978). Sea urchins are more intensive grazers than abalone and they crop the rocks almost completely bare (Cox, 1962).

In North America, sea otters are potentially the greatest source of danger to abalone population, and it is likely that sea otters and a commercial abalone fishery cannot coexist in the same area (Mottet, 1978).

Population

Flat abalone are generally not plentiful, but occasionally abundant in small areas (Cox, 1962). Abundance is highest where physical conditions allow good kelp growth and the substrate promotes trapping of drift kelp (Karpov and Tegner, 1992).

Estimates of the mortality rate of native abalone populations, made on different species in different locations by a variety of methods, vary considerably. Studies from southern and central California suggest that natural finite mortality rates are quite high. In central California, three methods resulted in finite mortality rate estimates of 0.3 to 1.0 for one population of red and flat abalone (Tegner and Butler, 1989).

A sport and commercial fishery for abalone usually results in many more mortalities than are revealed by fishing statistics. A serious problem is the wounds inflicted on under-sized abalone while they are being removed from the substrate. Bar cut abalone bleed profusely because abalone blood has no clotting mechanism. Sampling has shown that the percentage of legal-sized abalone which are cut varies greatly depending upon species, accessibility, weather conditions, and the experience of the collector. commercial divers cut 8-13% of their catch (Mottet, 1978).

Storms can be an important source of mortality and may limit abalone distribution in areas of greatest exposure (Karpov and Tegner, 1992).

In California, abalone stocks are in decline due to commercial harvest efficiency, increased market demand, sport fishery expansion, an expanding population of sea otters, pollution of mainland habitat, and loss of kelp populations. Management efforts to protect stocks through size limits and limits on the number of commercial abalone fishermen have been ineffective (Karpov and Tegner, 1992).

Harvest

After surveys for red abalone were conducted on the southern Oregon coast from 1958-1962, abundance of red abalone was deemed insufficient to support a commercial fishery and commercial harvest of all abalone was prohibited. Sport harvest is basically limited to the southern Oregon coast where a few red abalone can be found. Annual sport harvest is estimated to be less than 100 animals.

Management

Present Regulations

Commercial harvest of abalone is not allowed in Oregon. Sport harvest is limited to abalone greater than 8 inches in length. This size limit precludes the harvest of the smaller flat abalone species.

There is no commercial harvest of abalone in any west coast state or province at this time. California closed the last commercial harvest of abalone in 1997, mostly due to overfishing. Recreational harvest is also closed south of San Francisco because of overfishing and "withering syndrome" disease (Kashiwada, 1999). Washington has never allowed commercial harvest of abalone and they closed their recreational harvest in 1994 (Bradbury, 1999). Alaska has not opened their commercial fishery since 1995 due to low stock abundance (Larson, 1999).

In Canada, commercial harvest of abalone has not been allowed since 1990 because of poor stock conditions. Illegal harvests apparently continued after the closure of the legal fishery because of high abalone prices. Although stock reviews are ongoing, there is little chance it will be opened soon (Muse, 1998).

Suggestions for Future Management

There is very little information available on the flat abalone species. Any harvest should be restrictive until abundance, distribution, and other population parameters can be obtained.

Abalone are a very high value product. A high degree of interest has led to a great deal of illegal harvest activities in other fisheries.

A dive fishery should be restricted to conserve intertidal resources. Refugia to protect nursery areas may be beneficial.

A minimum size limit would insure a portion of the population has a chance to spawn before being harvested.

Most sessile (slow or non-moving) invertebrates need tight adult concentrations in order for successful egg fertilization to occur.

Effects Evaluation

Information is not sufficient to meet statewide planning Goal 19. Additional information is needed to determine short-term and long-term effects of harvest on flat abalone resources and on other resources. Flat abalone should be managed under the developing fisheries program with conservative numbers of permits and restrictions.

(1) Sustainability of developmental fisheries resources or incidental catch under proposed future harvest:

- a. Flat abalone have a fairly wide distribution, but abundance is sparse.
- b. Abundance, distribution, and life history data are limited.
- c. Abalone have a relatively high fecundity.
- d. There may be undocumented mortalities from injuries during harvest activities.
- e. Fisheries in other areas have shown that abalone populations can be easily over exploited.

(2) Biological and ecological effects on critical marine habitats, other habitats and other species supported by those habitats:

- a. Dive gear would have very little impact on the habitat or other species and little incidental catch.
- b. The activity of turning over rocks while searching for abalone may have some impact on habitat.
- c. Inability to distinguish flat abalone from small red abalone may result in some incidental harvest of red abalone.
- d. There is potential for diving activities to cause disturbance to marine mammals and birds utilizing offshore rocky areas.
- e. If sea urchins are able to move into areas from which abalone have been harvested, the urchins may out-compete the remaining abalone for food or keep the abalone population from reestablishing.

(3) Conformity and compatibility with existing uses such as commercial and recreational fishing, non-consumptive uses, public access, etc:

- a. There is currently no commercial harvest of any species of abalone.
- b. There is no recreational harvest of flat abalone due to size limits.
- c. There may be concerns with having a commercial harvest but not allowing a sport harvest for this species.

(4) Ability of the Department and other agencies to monitor the fishery for needed data and compliance with rules and regulations:

a. Analysis of existing data, sampling and monitoring a new fishery would require additional staff resources.

(5) Recommendations for future fishery development including gear types and effort levels:

a. Information not sufficient to determine optimum effort levels.

b. Alternatives to harvesting wild stocks such as culturing flat abalone may exist and could be explored.

Program Objectives

(1) Develop scientific information on the stocks and life history of flat abalone.

a. Need opportunities for on-board, dockside, and/or research sampling.

b. Need recording of effort, location, and time on logbooks.

(2) Develop understanding of effects of harvest on local ecosystem.

a. Conduct literature review and analyze habitat studies.

b. Need research cruises with underwater video gear or using SCUBA methods to evaluate effects on ecosystem.

(3) Develop improved fishing practices and equipment to protect the local resources.

a. Need research cruises with underwater video gear, using SCUBA methods, and/or ride-along trips on harvest vessels.

(4) Identify and protect critical habitat and other important biological habitats for flat abalone or other affected resources.

a. Need research sampling to identify juvenile, spawning, and rearing areas.

b. Fisheries should be restricted to depths greater than 10 feet from MLLW to conserve resources.

c. Refugia may be very helpful.

(5) Report findings and research data during annual review.

Management Options

Board Recommendations

1. Permits - 1 (issued to a vessel)

2. Renewal requirements - 10 landings of 20 lb.

3. Other permit stipulations

a. minimum size limit - 4.5 inches

b. season quota - 3,000 pounds

c. season - May through October

d. harvest area - below 10 ft from MLLW

e. gear - abalone irons only

f. no more than two divers on vessel

Staff Recommendation

1. Status quo - species not on developmental species list; no commercial harvest of abalone.

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APPENDIX C. Staff review of spot prawn fishery.

UPDATE ON THE SPOT PRAWN DEVELOPMENTAL FISHERY IN OREGON

Prepared for the Oregon Developmental Fisheries Board
Oregon Department of Fish & Wildlife, Marine Program
By Keith Matteson

June 2000

Spot prawns (*Pandalus platyceros*) have been managed in Oregon under the Developmental Fisheries Program since 1995. Spot prawns are harvested from a few well defined areas off Oregon. These locations are relatively small in size and are characterized by a high relief rocky bottom. For a summary of the life history and ecology of the species, refer to the ODFW Developmental Fisheries Staff Report, October 1994, pp. A37-39.

Fishing occurs in confined areas where abundance is high enough to make commercial harvest a reasonable venture. Off Oregon, sparse populations of spot prawns are distributed widely along the coast. The small areas consistently fished consist of prime spot prawn habitat, with dense concentrations. There are three sites off Oregon that are regularly utilized most years; the "prawn patch", off Nehalem Bay is about 35 square miles; and two other sites are off Cape Blanco (35 sq. miles) and the Rogue River (26 sq. miles). All are in 90-125 fathoms of water. Other sites may be fished in years of high effort, but these are generally exploratory tows of low *catch per unit effort* (CPUE), and are not concentrated in any single area.

Landings and Effort

The first significant landings in Oregon occurred in 1993. With the exception of 1994, most years have been dominated by trawl gear (Table 1, Figure 1). Analysis of the permit applications since 1996 shows a reversal in interest between the two gear types. In 1996 and 1997, there was no lottery for trawl permits, though all were granted by mid-March of both years. In 1999 and 2000, the opposite has occurred, with no lottery for pot permits, and the last permit not issued until June in 1999.

Table 1. Landings of spot prawns into Oregon.

Year	Permits issued	Pounds landed		
		pot gear	trawl gear	total
1992	(not needed)	0	0	0
1993	"	840	39,372	40,212
1994	"	20,398	44,621	65,019
1995	16*	3,982	8,874	12,856
1996	16	1,438	6,493	7,931
1997	16	4,845	81,665	86,510
1998	16	7,544	130,081	137,625
1999	16	752	21,459	22,211
2000#	16	0	14,158	14,158

* six permits are issued for trawl gear; 10 for pot gear
through 5/26/2000

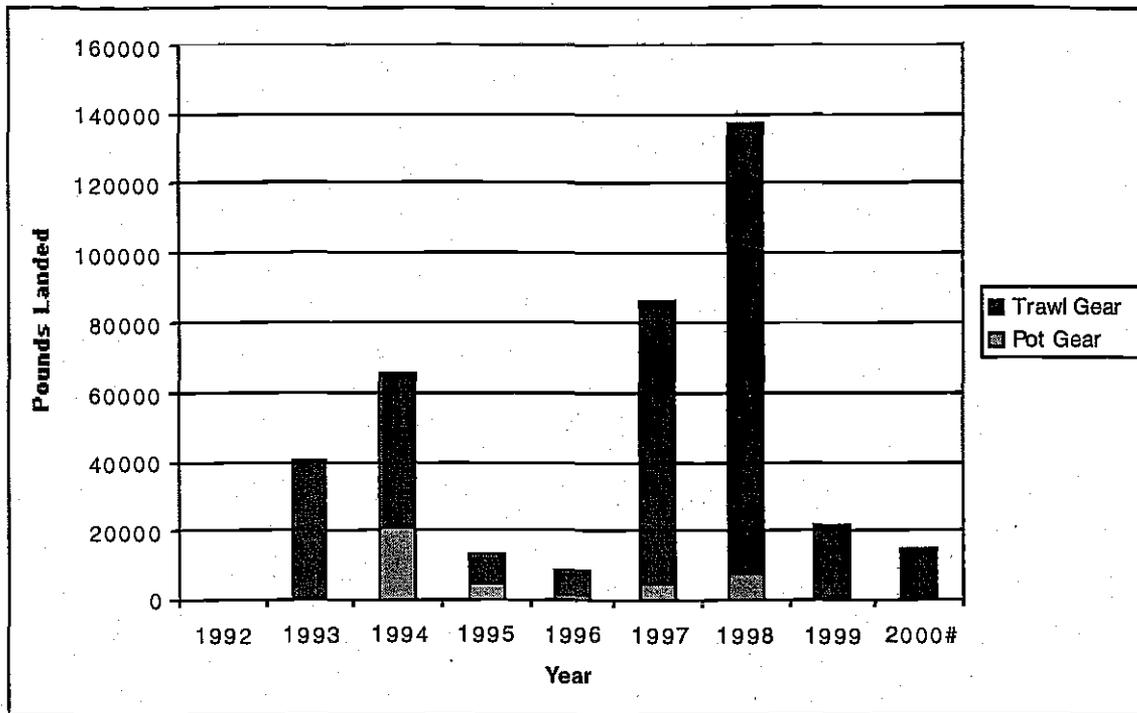


Figure 1. Landings of spot prawns by trawl gear and pot gear by year, through 5/26/2000.

Examination of logbook information shows that most of the spot prawns landed in Oregon have been taken from Washington waters over the past three years (Table 2). The rise and fall of total pounds landed from year to year seems to be driven by the amount of fishing occurring off Washington. Even during 1998, only small amounts of prawns were caught in Oregon waters.

Table 2. Distribution of spot prawn harvest for prawns landed in Oregon.

Year	Total pounds	Oregon pounds	Oregon harvest %	Washington pounds	Washington harvest %	% logbook coverage
1994	65,019	27,958	43%	37,061	57%	86%
1995	12,856	----	---	---	---	2%
1996	7,931	6,900	87%	1,031	13%	74%
1997	86,510	13,842	16%	72,668	84%	60%
1998	137,625	12,386	9%	125,239	91%	67%
1999	22,211	3,998	18%	18,213	82%	62%

Both logbooks and fish tickets suggest that CPUE is declining off Oregon over the past three years. Information entered in logbooks is often unclear whether round pounds or tails only are being recorded. Fish ticket data can only give a CPUE calculation for an entire trip, but most boats tended to fish a single location per trip, therefore fish ticket CPUE is likely the more reliable estimate.

CPUE was calculated for two locations that had been fished during the period from 1997 through 1999 (Table 3). Double-rigged vessels had their CPUE adjusted to *single-rig*

equivalents (SRE) which is done by dividing the CPUE of a double-rigged boat by 1.6. At Cape Blanco, the most heavily fished site, CPUE dropped slightly in 1998, and significantly in 1999 (fish ticket data, $p < 0.05$) (Figure 2). Logbook data suggested the same trend at this site.

Table 3. CPUE for two locations off Oregon. Calculated CPUE is shown for both data sources; logbooks and landings tickets.

Data source	Location	CPUE - lbs. per trawl hour, SRE		
		1997	1998	1999
Logbooks	Cape Blanco	21	15	8
	Rogue River	9	26	7
Tickets	Cape Blanco	35	32	9
	Rogue River	22	28	19

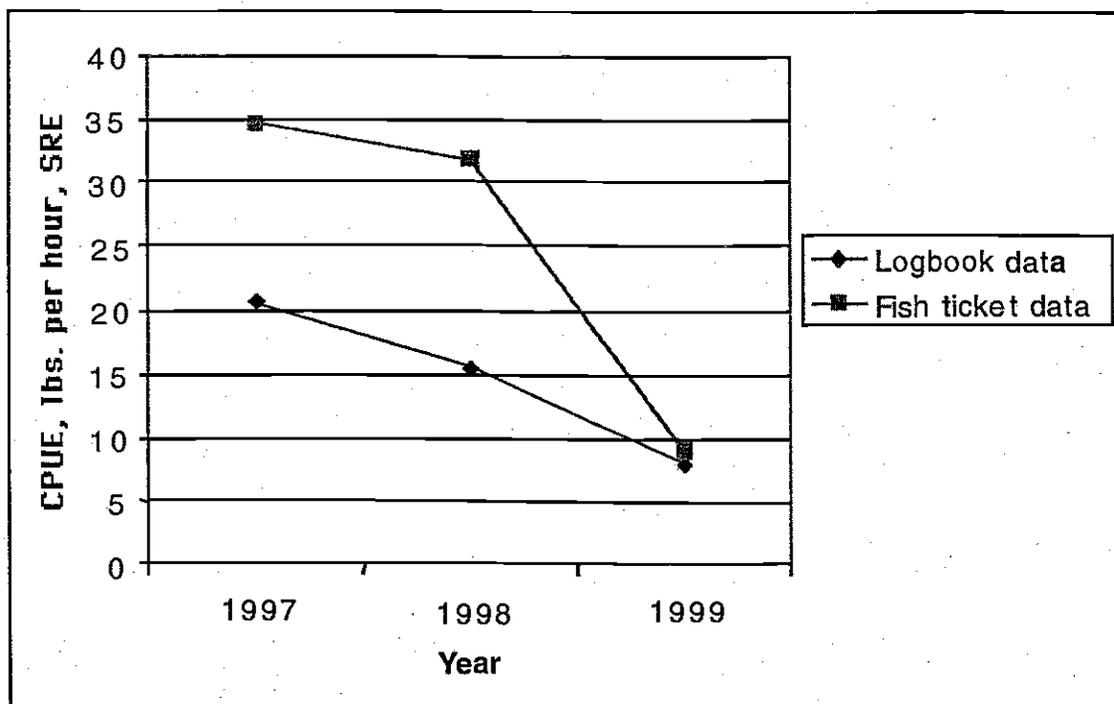


Figure 2. CPUE at spot prawn fishing location off Cape Blanco.

Examination of an area known as the "prawn patch" off Netarts Bay gives some suggestion of the time it may take for spot prawns to recover from heavy fishing pressure. CPUE in late 1993 was approximately 25 lbs./hour SRE. In 1997 a few tows in this area yielded 21 lbs./hour. In 1998 a few exploratory tows yielded no prawns, and in 1999 there were no tows at the prawn patch recorded in logbooks. Year 2000 logbooks show renewed activity at this site, and a CPUE of 21 lbs. hour SRE. This suggests that about three years may be necessary for spot prawn populations at a given site to recover to levels where fishing becomes worthwhile.

Gear and Habitat Conflicts

Since 1995, trawl gear has come to predominate the effort off Oregon. Spot prawn trawl gear is characterized by a short, low trawl body with a very strong footrope assembly consisting of chain and roller gear connected to the footrope by dropper chains. The gear is designed to be towed through very rough, rocky terrain. Logbooks show frequent gear hangups and gear damage.

Mapping of the logbook "prawn patch" data reveals that in 2000 fishing resumed in a small area exactly where fishing in 1997 and 1993 had occurred. Mapping of other sites, such as Cape Blanco and off the Rogue River, show fishing occurring in exactly the same place, within the same tight confines, in each year that fishing has occurred at that site. The small size of these areas cannot be overstressed. None of these sites are more than six miles in diameter. The logbook data for 2000 shows 2 boats making 80 tows being made within a triangular area only 8 miles across at it's widest point.

With trawling being focused in small, confined areas, habitat damage in these areas could be severe. This begs the question of how long spot prawn trawls can be used in an area of high relief before the habitat is altered to the point where it is no longer suitable for spot prawns.

The Habitat Steering Committee of the Pacific Fisheries Management Council has agreed that a better understanding of the sensitivity to fishing impacts on habitat types is needed (PFMC, 1999). An invitation to accompany an Oregon spot prawn trawl vessel has been extended to the ODFW staff, and will take place September 2000. Catch will be examined for length and sex, CPUE, and bycatch. Video gear will be placed in the trawl in an attempt to examine footrope activity on the bottom.

Regulations and Activity Coastwide

In Oregon, commercial fishing for spot prawns is allowed year-round. Use of groundfish trawl gear or shrimp trawl gear is permitted during the established seasons for those species. Spot prawns are legally retained as bycatch during commercial shrimp season.

In Washington, spot prawns are listed as an Emerging Fishery (Washington Administrative Code, Chapter 220-88B). Experimental fishery permits are issued to those who have landed 1,000 pounds of spot shrimp during the previous two years. Participation is limited to 11 pot and 5 trawl permits. The season runs from May 1 to November 30. Fish excluder devices are required. There is a harvest guideline allowing 250,000 pounds of spot prawns to be captured from Washington waters, which includes spot prawns caught off Washington and landed in Oregon.

Washington interprets the rising average catch per landing as indicative of a rising CPUE, and feels that the spot prawn stock is stable and capable of supporting the current harvest levels (pers. comm, Steve Berry, WDFW, June 2000). Landings in Washington have followed the same general trend as Oregon, with landings peaking in 1998 (Table 4; Figure 2).

Table 4. Landings of spot prawns by state.

Year	Oregon pounds	Washington pounds	California pounds
1992	0	2,480	224,400
1993	---	13,555	334,800
1994	27,958	28,870	394,500
1995	---	0	395,000
1996	6,900	22,839	527,600
1997	13,842	60,801	738,300
1998	12,386	126,727	772,895
1999	3,998	83,096	---

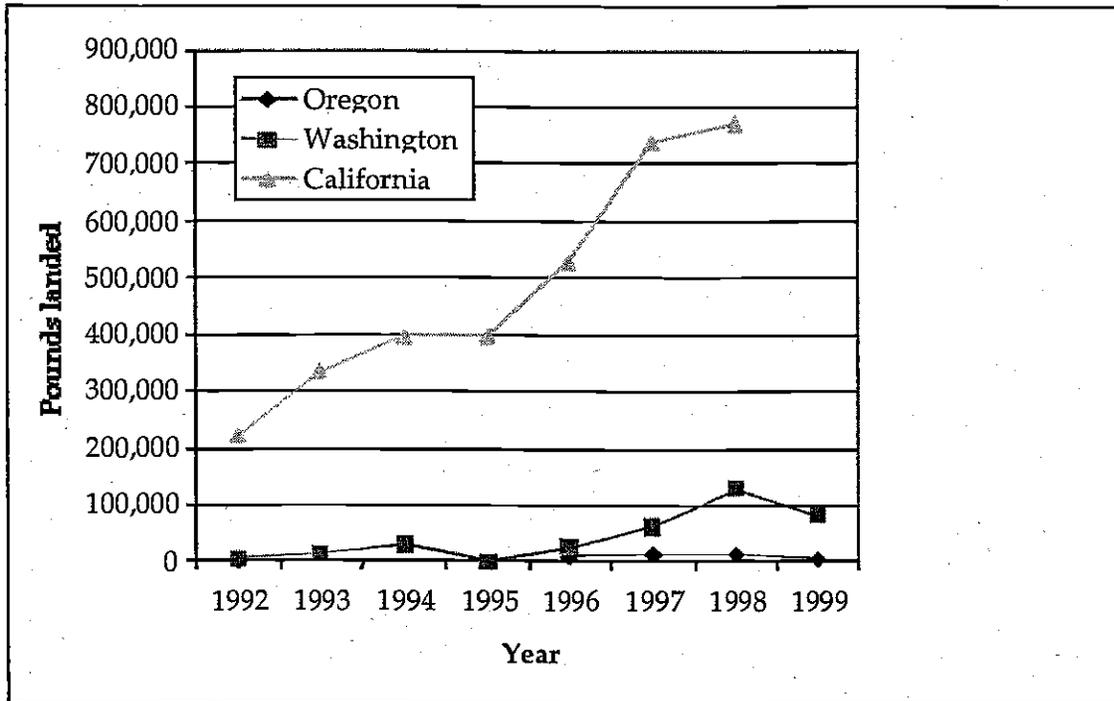


Figure 2. Comparison of landings of spot prawns by state

In California, which has a much longer history of commercial spot prawn activity, fishing for spot prawns is by permit only for both trawl and pot gear (California Code of Regulations, Sections 120.3 and 180.1, Title 14). All vessels fishing for spot prawns must pay an observer fee (\$250-\$1000) based on the amount landed in 1998. For trawlers, bycatch of spot prawns in groundfish landings is limited to 50 pounds or 15% of the total catch. Prawn traps may be fished north of Point Arguello from July 31 to April 30, and south of Point Arguello from Jan. 31 to Oct. 31. Trawling is not permitted inside of 3 miles, or in area 19A between Malibu Point and Rocky Point.

Landings in California peaked in 1981, when nearly 360,000 pounds were landed primarily by trawl gear, then again in 1998 when the combined trawl and pot catch was nearly 580,000 pounds (pers. comm., Paul Reilly, CDFG, June 2000). Landings by the two gear types have varied over the years, with trawl gear landing most of the catch in the early 1980s, at which time pot gear landings began increasing, reaching 200,000 pounds in 1993. The number of boats fishing California waters has been between 60 and 90 boats since 1990.

References

Oregon Department of Fish & Wildlife. 1994 Developmental Fisheries Staff Report. October, 1994. PpA37-39. Oregon Department of Fish & Wildlife, 2040 SE Marine Science Drive, Newport, OR 97365

Pacific Fishery Management Council. Habitat Steering Group Report On The Joint Meeting Of the Habitat Steering Group, Groundfish Advisory Subpanel, And Groundfish Management Team Regarding Fishing Gear Impacts On Essential Fish Habitat. Supplemental Report E.1.(1). September, 1999. Pacific Fishery Management Council, 2301 SW 1st Ave, Suite 224, Portland, OR, 97201

APPENDIX D. Staff letter to Developmental Fisheries Board

7-14-00

To Developmental Fisheries Board:

At the Developmental Fisheries Board meeting in June, we indicated we would send you some follow-up information on a couple of items; what is needed to move forward on a limited entry system for bay clams and a summary of our work load for the next few months.

I. Clam limited entry

Putting bay clams under their own limited entry system will require Legislative action. Interested individuals will need to talk to a Legislator to get a bill introduced into the 2001 session. In considering a limited entry system, Legislators will be interested in background information on the fishery. We will put together a summary of the fishery which will include data on landings, effort, CPUE, etc. It will also include any information we have collected on evaluating mechanical harvest methods.

II. Priority of workload items for July through December

The Board expressed interest in having staff work on several additional specific projects. We indicated we would review our existing workload and identify what additional projects could be included. Below is an outline of staff's workload for July through December (in priority order) with Board identified projects indicated in bold.

A. Council activities

- 3-4 Highly migratory plan development team meetings and writing assignments between meetings
- 1 Coastal Pelagic team meeting
- 1-2 Council meetings

B. Sardine work

- At-sea observations - as many as possible until end of fishery (mid September?)
- Process samples - complete by December

C. Commission meeting October 13, Newport

- Staff report completed by September 8.

D. **Letter to legal counsel regarding waivers for renewals** - by mid-September

E. **Spot prawns** - ride along on vessel, collect biological data - by end of September

- F. Permits/applications for 2001
 - 2001 applications available - by mid November
 - Review renewal applications - month of December
- G. **Clam dredge evaluation** - after end of sardine fishery
- H. **Abalone**
 - identify areas for survey work - by mid-August
 - send out request for bid - by mid-September
 - collect samples for maturity - by end of September
- I. **Clam fishery summary** - by end of February
- J. **Identify clam survey areas** - After January, 2001
- K. **Daphnia monitoring** - (Done by K. Falls staff)

As you can see, between Council activities, the sardine fishery, and getting ready for the Commission hearing, we are very busy for the next several months. We feel the ranking is appropriate given the large volume and high interest of the sardine fishery. Consequently, we will not be able to initiate many new field activities until after the sardine fishery has completed for the year (mid-September?). Depending on the volume of work generated by the sardine fishery (samples & data), and the commitments to the other top 5 items, it is possible, we may not be able to complete some of the lower priority items, but will make every attempt to do so. If you have any comments or feedback regarding the above items, please feel free to contact me or Jim Golden.

Sincerely,

Jean McCrae
Fish & Wildlife Biologist
541-867-4741
jean.mccrae@hmsc.orst.edu



Oregon

John A. Kitzhaber, M.D., Governor

Department of Fish and Wildlife

Marine Resources Program

2040 SE Marine Science Drive

Newport, OR 97365

(541) 867-4741

FAX (541) 867-0311

10-30-00



Oregon Fish and Wildlife Commission,

Attached is a letter from Mr. Frank Dulcich resigning from ODFW's Developmental Fishery Board. Mr. Dulcich recommends Ms Heather Munro as his replacement as an Ex-Officio member and we support this recommendation. As you can see by her attached resume, Ms Munro has been very active with the commercial fishing industry and would provide a diverse perspective to the Board. We encourage her appointment to the Developmental Fishery Board.

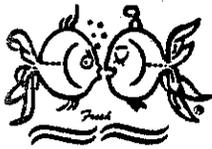
Sincerely,

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Neal Coenen
Acting Fish Division Director

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- S&S
- Nemesis

October 10, 2000

Mr. Jim Golden
 Marine Resources Program Supervisor
 Oregon Department of Fish & Wildlife
 2040 SE Marine Science Drive
 Newport, OR 97365

Dear Mr. Golden:

Due to unforeseen circumstances, I have been unable to commit the time necessary to participate as an advisor to this important Board. Please accept this letter as a formal request to appoint Heather Munro as my replacement on Oregon's Developmental Fisheries Board as an Ex Officio member.

Ms. Munro is the Deputy Director for the West Coast Seafood Processors Association (WCSPA) based in Portland. Ms. Munro, through WCSPA, represents the interests of the majority of seafood processors in the state of Oregon. She has considerable experience in fisheries management and policy, both at the state and federal levels.

By offering practical guidance and knowledgeable insights, I believe that Ms. Munro will be an invaluable advisor to Oregon's Developmental Fisheries Board.

Please use this letter as a formal request to begin the process of appointing Ms. Munro as my replacement. I can be reached at (503) 226-2200 to answer any questions.

Sincerely,

Redacted for Privacy

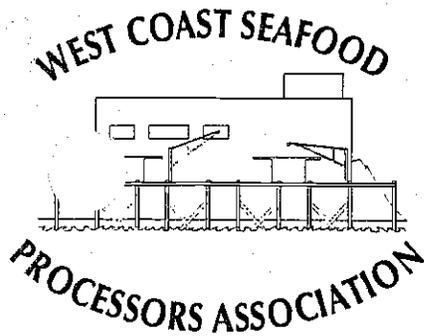
Frank D. Dulcich
 President and CEO

FDD/lt

cc: Heather Munro, WCSPA

cc: Developmental Fisheries Board

F/FRANK/LETTERS/MUNRO1



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October 27th, 2000

Mr. Jim Golden
Marine Resources Program Supervisor
Oregon Department of Fish & Wildlife
2040 SE Marine Science Drive
Newport, OR 97365


Dear Mr. Golden:

As per our discussion on October 25th, I have attached a brief synopsis of my current employment and corresponding affiliations for the Commission's review in order to consider my appointment to the Oregon Developmental Fisheries Board as an ex-officio member replacing Mr. Frank Dulcich.

Please don't hesitate to call me with any questions or for further information.

Sincerely,
Redacted for Privacy

Heather M. Munro
Deputy Director

cc Jean McCrae

Heather M. Munro, Deputy Director
West Coast Seafood Processors Association
PO Box 1477 Portland, Oregon 97207-1477
(503) 227-5076
hmunro@attglobal.net

I am currently the Deputy Director for the West Coast Seafood Processors Association based in Portland, Oregon. WCSPA represents the majority of shore-based seafood processors in the state of Oregon. I have worked for WCSPA for four years. Prior to my employment with WCSPA, I was on the Pacific Fishery Management Council (Council) staff for just under two years.

I have a comprehensive knowledge of the Magnuson-Stevens Fishery Conservation and Management Act (and Sustainable Fisheries Act amendments), Pacific Fishery Management Council operations and process, state fishery management processes, west coast fishing regulations and management schemes, and domestic fishery policy issues. In addition, I have considerable experience acting as a liaison between the west coast fishing industry and State and Federal government management agencies. I also participate annually on the west coast Slope Survey and am especially familiar with biological sampling processes and protocol.

Committee, Board, and Panel Memberships

- ▶ Coastal Pelagic Species Advisory Panel (Vice-Chair), Appointee. Pacific Fishery Management Council.
- ▶ Groundfish Total Catch Determination Committee, Appointee. Pacific Fishery Management Council.
- ▶ Marine Reserves Committee, Appointee. Pacific Fishery Management Council.
- ▶ Women's Coalition for Pacific Fisheries, Board of Directors.
- ▶ Seafood Education Committee (Chair). Women's Coalition For Pacific Fisheries.
- ▶ California Seafood Council, Board of Directors.
- ▶ Economic and Social Aspects of Rockfish Fishing, selected Panelist. Pacific Marine Conservation Council Rockfish Forum, Monterey, California. 1999.
- ▶ Species Advisory Panel, selected Panelist. Working Together For West Coast Groundfish Workshop, Portland, Oregon. 1998.